

Committee For The Environment Inquiry into Climate Change Volume Two

TOGETHER WITH THE MINUTES OF PROCEEDINGS, MINUTES OF EVIDENCE AND WRITTEN SUBMISSIONS RELATING TO THE REPORT

Ordered by the Committee for the Environment to be printed 23 November 2009

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This document is available in a range of alternative formats.

For more information please contact the
Northern Ireland Assembly, Printed Paper Office,
Parliament Buildings, Stormont, Belfast, BT4 3XX
Tel: 028 9052 1078

Membership and Powers

The Committee for the Environment is a Statutory Departmental Committee established in accordance with paragraphs 8 and 9 of the Belfast Agreement, section 29 of the Northern Ireland Act 1998 and under Standing Order 46.

The Committee has power to:

- Consider and advise on Departmental budgets and annual plans in the context of the overall budget allocation;
- Consider relevant secondary legislation and take the Committee stage of primary legislation;
- Call for persons and papers;
- Initiate inquiries and make reports; and
- Consider and advise on any matters brought to the Committee by the Minister of the Environment

The Committee has 11 members including a Chairperson and Deputy Chairperson and a quorum of 5.

The membership of the Committee since 9 May 2007 has been as follows:

Mrs Dolores Kelly (Chairperson) 6
Mr Cathal Boylan (Deputy Chairperson)

Mr David Ford Mr Adrian McQuillan 7
Mr Ian McCrea Mr Alastair Ross 1
Mr Peter Weir Mr Daithi McKay
Mr John Dallat 5 Mr Danny Kinahan 3,4
Mr Roy Beggs 2

1 From January 21 2008, Mr Alastair Ross replaced Mr Alex Maskey on the Committee for the Environment.

2 With effect from 15 September 2008 Mr Roy Beggs replaced Mr Sam Gardiner.

3 With effect from 29 September 2008 Mr David McClarty replaced Mr Billy Armstrong

4 With effect from 22 June 2009 Mr Danny Kinahan replaced Mr David McClarty

5 With effect from 29 June 2009 Mr John Dallat replaced Mr Tommy Gallagher

6 With effect from 3 July 2009 Mrs Dolores Kelly replaced Mr Patsy McGlone

7 With effect from 17 September 2009 Mr Adrian McQuillan replaced Mr Trevor Clarke

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Airtricity



20th February 2009

The Committee Clerk
Environment Committee Office
Room 245
Parliament Buildings
Stormont
BT4 3XX

Dear Mr McGarel

Thank you for the opportunity to contribute to the Northern Ireland Assembly Environment Committee Enquiry into Climate Change. We have attached 2 documents. The first sets out Airtricity's views on the threats and the opportunities arising from the challenge of climate change. The second attachment sets out what we believe to be the targets Northern Ireland should meet in terms of renewable energy and the barriers that need to be overcome to achieve them.

In either instance, I would be more than happy to give evidence to the committee in person and explain further the content of our presentations.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'me' followed by a stylized 'E'.

Mark Ennis

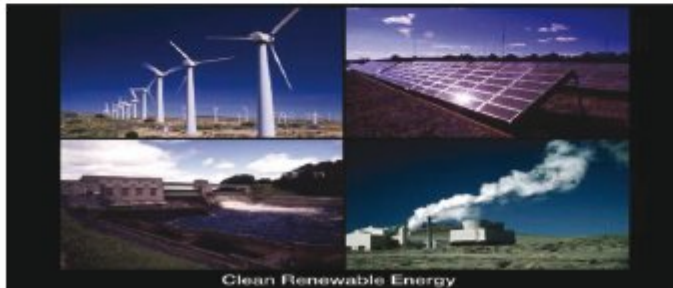
Director of Communications & Strategy

Twenty Steps – Northern Ireland

Meeting NI Energy Challenge

SSE – Who we are

- Electricity Distribution & Transmission – £2.7bn RAV
– 2nd largest in UK
- Energy Supply – 8.75 million customers
– 2nd largest in UK
- Generation – Over 10,000MW
– 2nd largest in UK
- Renewable Generation (wind, marine, hydro, biomass)
– Over 2,000MW
– Largest in UK
– Largest in Ireland



• **SSE** – Airtricity is the renewable energy development division of Scottish and Southern Energy (SSE)

• **Responsibilities** – Development of onshore and offshore wind farms in the UK, Ireland, Europe and Asia as well as developing hydro and marine projects

• **Leading wind farm developer** – The combined Airtricity and SSE team has developed over 40 farms (> 1500MW) across Europe and North America and China

• **Goal** – Help protect the future of the planet and meet future energy needs by delivering renewable energy with passion, innovation and integrity

Current Renewable Portfolio

•	2,089MW	Total renewable generating portfolio
	653MW	Wind farms in operation
	1,356MW	Hydro in operation
	80MW	Biomass in operation
	1,678MW	Wind farms with consent/in construction
	100MW	Hydro in construction
	7,800MW	Development pipeline (approx)

The Importance of Sustainability

Business as usual

- Plateau Oil 2010 – 2015
- Plateau Gas 2020 – 2025

World Energy needs increase 50% by 2030 (IEA)

Europe will be importing: 94%-Oil; 84%-Gas; 59%-Coal

In terms of climate change if we implement all current initiatives, there will be a 20% increase in emissions by 2030 = 3° C temperature by 2100

Consequences of a 3° C rise

- Water – 4 billion suffer shortages
- Food – 500 million hungry
- Health – up to 3 million starve; spread of malaria
- Land – 170 million impacted by coastal flooding
- Environment – 20-50% species facing extinction
- Evidence suggests Greenland ice shelf has already started to melt which will result in flooding major coastal cities including London, Shanghai, New York, Tokyo, Dublin and Belfast.



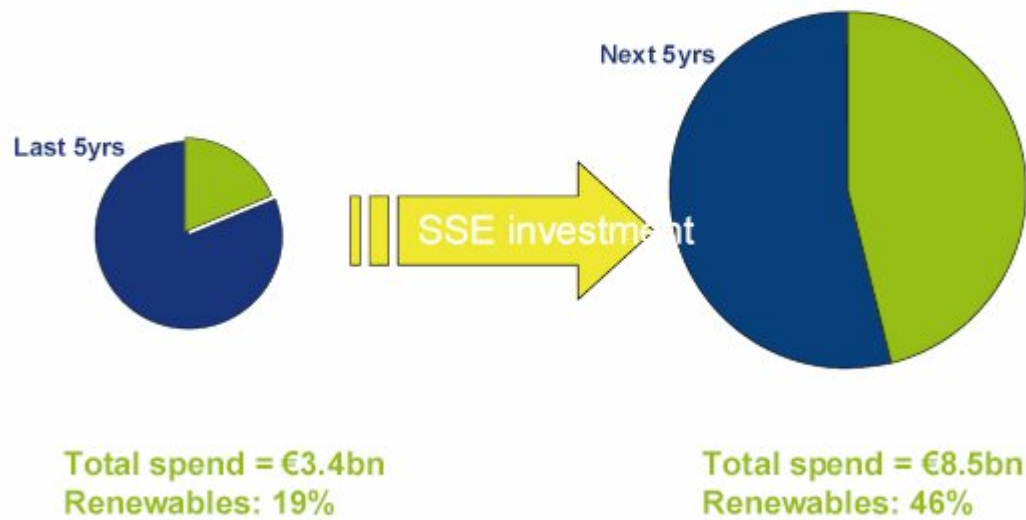
Key Questions for NI and SSE

- How do we respond to climate change?
- How do we address the dilemma of rising global demand for energy with depleting oil and gas supplies?
- How do we secure energy supplies and make them more reliable?

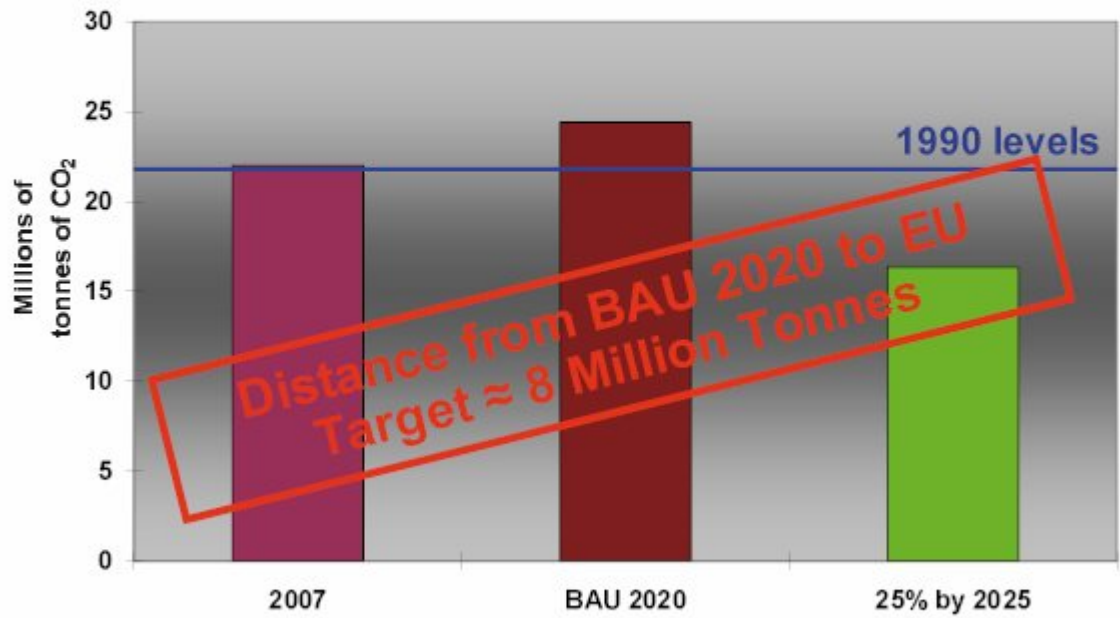
SSE Response

- Reduce the carbon intensity of our electricity generation by 50% by 2020
- Build one of Europe's largest renewable portfolios
 - Wind, Hydro, Marine, Solar and Biomass
- Focus on a European platform that maximises local sustainable energy sources

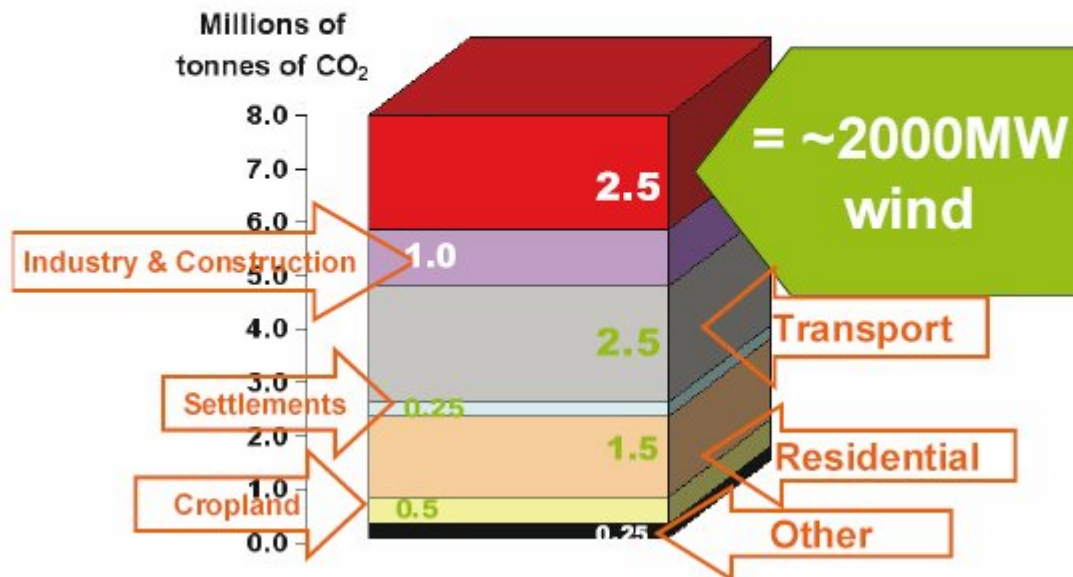
SSE investment



Northern Ireland Emissions Scenarios



The 8 Million Tonne Challenge



Seven Success Factors for a Renewable Market

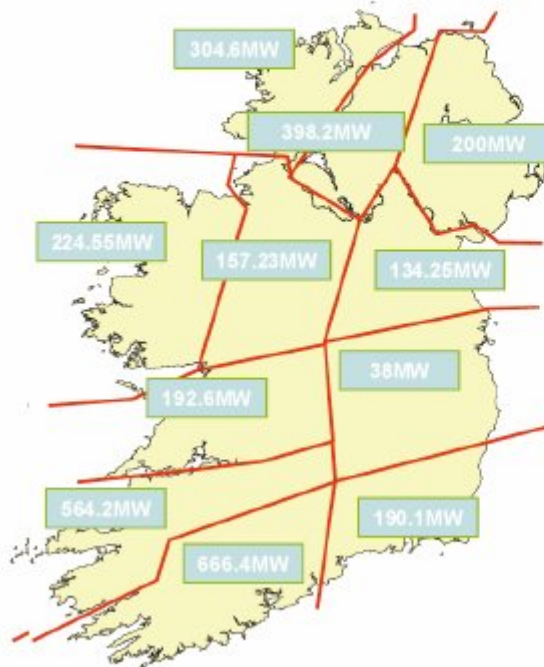
- Good Wind Resource
- Supportive Government and Regulator
 - Support Mechanism
 - Grid Code
 - Planning Process with defined time lines
- Strong or proactive Grid System
- Clear and simple rules to achieve necessary approvals
- Clear ownership of assets
- Power Purchase Agreement or Transparent Trading Regulations
- Turbine Availability

The Onshore Challenge – All-Island

Onshore: 6000MW

	NI	Rol
Wind	1500	4500
Total	6000MWs	

Current Position Likely to be built before 2012



	RoI	NI
Wind	2,500	500
Total	3,000MWs	

Extremely difficult to go beyond 500MW without serious upgrades to grid –

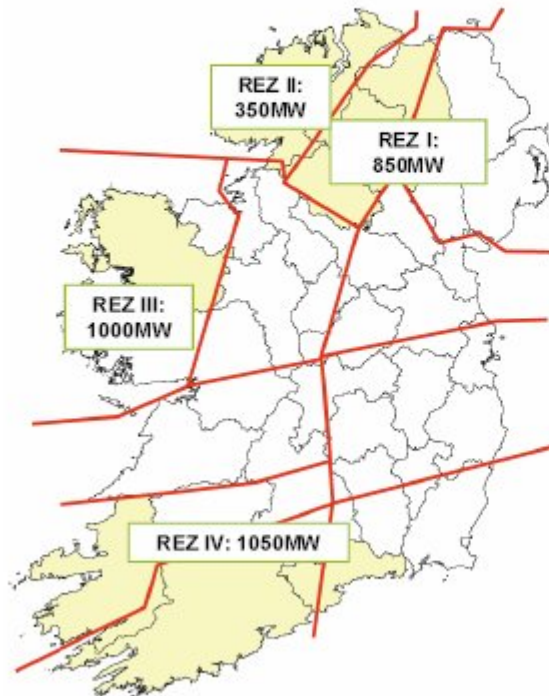
Overhead lines & planning

Grid – Limitations

- Current approach - “Patch Up” strategy
- Current grid connections heavily biased to fossil fuels
- Paradigm shift needed in grid development objectives

Aligning grid development & REZs can create a **Green Grid that delivers renewables targets at lowest cost**

Creation of Renewable Energy Zones (REZ)



Develop four strategic areas:

- | | |
|------------|---------------|
| 1. West NI | 2. Donegal |
| 3. Mayo | 4. South West |

Introduce facilitated planning process in REZs

Create a consistent planning process within the REZ that is consistent & aligned with national goals

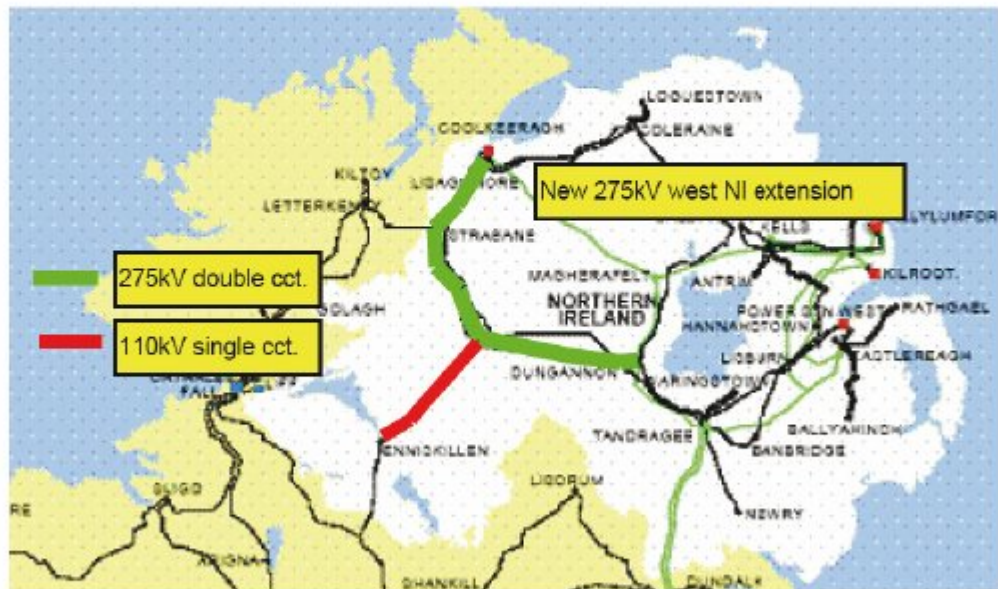
Economic Rationale for Northern Ireland

1000MW wind guarantees £350m income for the county

Secures rural communities

Item	Amount (£m)
Use of local labour in construction	65
Rent on space for turbines	65
Community Funds	11
Rates	209
Total	350

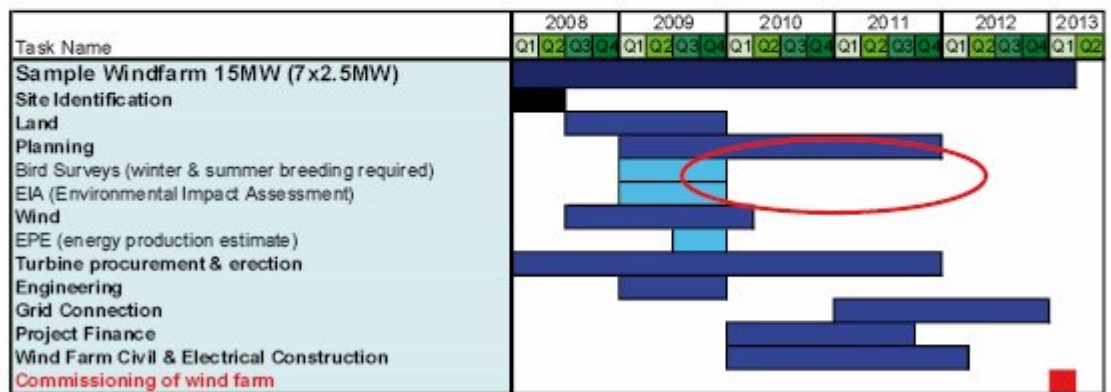
Northern Ireland Grid Upgrades – infrastructure highways?



Onshore Timeline to Delivery

Sample timeline for NI wind farm

- Key issue Statutory Consultees
- PPS 18 SPG



Wind farms can add to the Environment

“In the future the land under wind farms maybe become another new habitat protected from people-pressure and there is no doubt that climate change will create new habitats just as surely as it will destroy some old ones. The varied landscape and geology of Ireland ensure that it will always have a plant life of great diversity – even if not as we would recognise it”

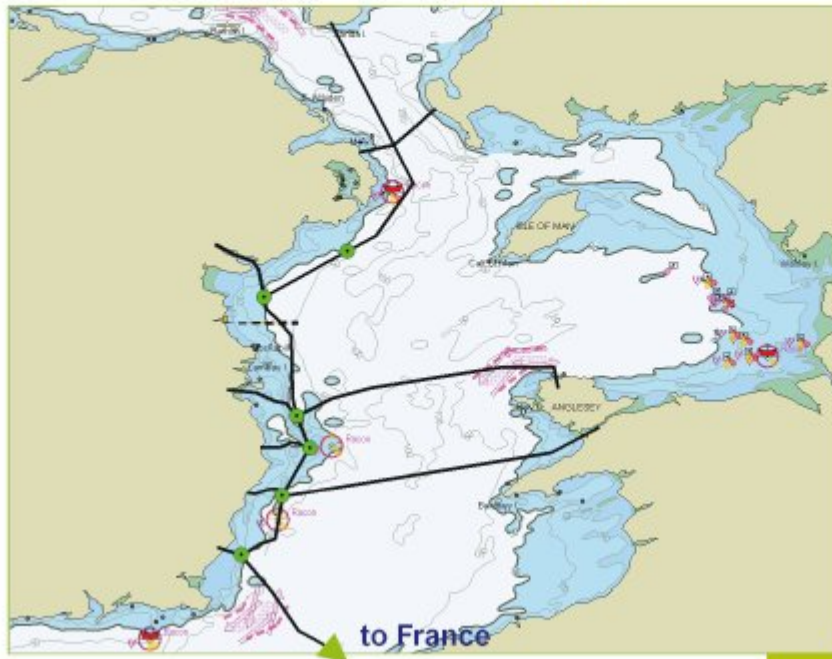
- extract taken from Flora Hibernica, by Jonathan Pilcher and Valerie Hall.

Summary of NI & ROI Position 2020

Onshore: 6000MW			Offshore: 4000MW		
	NI	RoI		NI	RoI
Wind	1500	4500	Wind	500	3500
Total	6000MWs		Total	4000MWs	

Delivering 4000MW Offshore – Profound Interconnection with Great Britain & France

Celtic Grid



Celtic Grid
provides three
interrelated
simultaneous
benefits

- security of supply
- competitive electricity prices
- carbon abatement

Integration of Celtic Grid into Supergrid



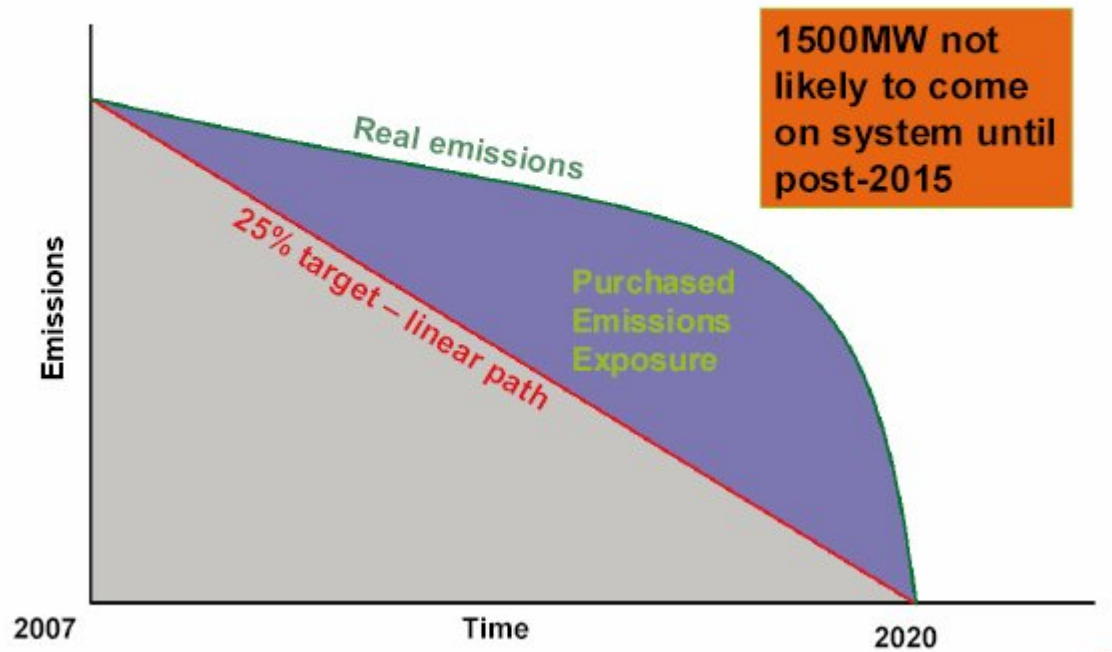
- Celtic Grid integral part of Supergrid
- Will provide energy security
- Provides nuclear solution via France

1000MW interconnection to France ~€1bn

1600MW Okiluto-3 EPR ~€4bn



Targets back-loaded



Twenty Steps

Clear Policy Objectives

1. Develop and implement an NI energy policy to meet the 25% emissions reduction by 2025 or the revised EU emission targets.
2. Integrate this NI policy into an All-Island and UK Energy Policy.
3. Divide the carbon targets into industry specific targets and benchmark progress on an annual basis across Depts.

Planning

4. Create Renewable Energy Zones (REZ) to facilitate increased renewables at the lowest cost.
5. Put a time limit on statutory consultees
6. Highlight the financial benefits to counties within REZ to encourage buy in.

Twenty Steps

Grid Development

7. On the back of the All-Island 2020 Grid Study establish a “Green Grid” that enables the nation to deliver its renewable energy in the most cost effective manner.
8. Ensure the necessary level of grid investment.
9. Prioritise grid connections for renewables in line with EU policy/Directives.
10. Align future grid development with REZ, to ensure lowest cost solution.
11. Ensure that the Grid Code demands maximum flexibility in CCGT plant in order that it is able to perform as mid merit plant.

Twenty Steps

Generation Portfolio

12. Carryout an economic and environmental study to determine optimum generation mix.

Interconnection

13. Support the construction of 3000MW of interconnection between Northern Ireland, RoI, GB & France highlighting the interconnector with France as a cost effective alternative to nuclear.
14. Ensure East-West interconnector and the second North-South interconnector are both operational by 2010.

Offshore

15. Create the Celtic Grid to interconnect Northern Ireland with Scotland, Wales & France, providing Northern Ireland with an offshore grid system that delivers security of supply, competitive energy prices and resolves the nuclear debate.
16. Set a target of 500MW offshore by 2020.

Twenty Steps

Agreement with Crown Estate

17. Agree offshore sites in NI coastal waters with Crown Estate

SEM

18. Create an ancillary services market that benefits flexible plant on the system such as OCGT and very flexible CCGT.
19. Ensure the electricity sector is structured in a manner that maximises the island's potential to deliver power from renewable sources and deliver maximum benefits to Northern Ireland and RoI: 6000MW onshore (minimum); and 4000MW offshore.

Vision of a Sustainable Energy System

20. Provide a vision of a Sustainable Energy Power Generation System which integrates a green grid with a flexible generation portfolio in the context of profound integration with GB and the continent.



Benefits for Northern Ireland

- Fills the emissions gap by 2020 and supports Northern Ireland's role in fighting climate change
- Enhanced security of supply
- Delivers competitive advantage to Northern Ireland's businesses through lower less volatile electricity prices
- Provides access to export markets for Northern Ireland's renewable electricity
- Secure rural communities

Targets back loaded

All measures need to be implemented now

Airtricity is the renewable energy development division of Scottish and Southern Energy (SSE). We are the UK and Ireland's second largest utility with over 9 million customers and 10,000 MWs of generation capacity. Importantly we are the UK and Ireland's leading renewable generator with over 2,000 MWs of renewable generation (both wind and hydro) in operation and a further 1,500 MWs in the course of construction. We take climate change and the need to develop a sustainable future seriously. As proof of this we have made a public commitment to reduce the carbon emissions from our electricity generation fleet by 50% by 2020.

Renewable portfolio in Operation



Projects in operation	
Wind	603tMW
Hydro	1,356tMW
Biomass	90tMW
Total	2,049tMW

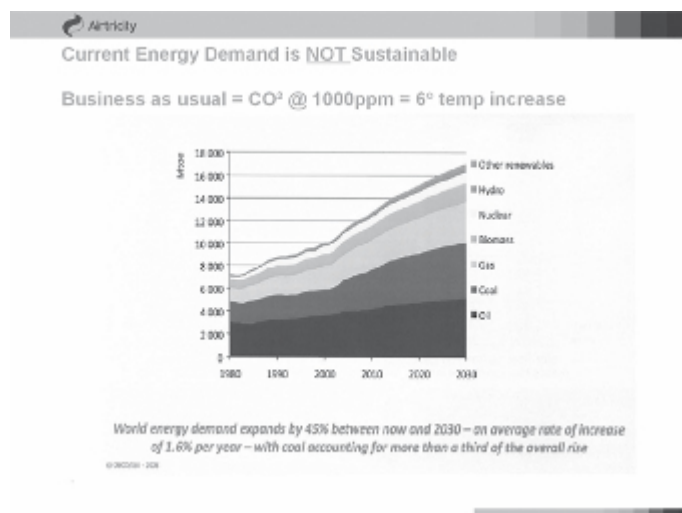
SSE Commitment

To reduce carbon emissions from its generated electricity by 50% by 2020.

Addressing climate change while at the same time securing our energy supplies represents a huge challenge, and also a huge opportunity for businesses and countries that recognise the issue and are prepared to be part of the solution. Security of energy supply issues are something that all businesses will have to address. Even allowing for the current recession the world energy needs will increase by 45% by 2030 (IEA) While world demand grows Europe's exposure to fossil fuel shortages will increase. Within 20 years Europe will be importing 94% of its oil, 84% of its gas and 59% of its coal. The International Energy Agency has just carried out the most comprehensive study of 700 of the world's oil fields (the vast majority) and found that they are depleting at a rate of 8% per annum. This means we will have to find the equivalent of 4 Saudi Arabia's if we are to meet world demand by the middle of the century. The increasing exposure to diminishing fossil fuel supplies will lead to increasingly volatile global prices.

Northern Ireland being on the peripheral of Europe with no natural fossil fuel resources and at the end of a 4000 mile pipeline from Russia the nearest source of gas or oil is particularly exposed. We have only to witness the recent events between Russia and the Ukraine to understand how serious that exposure is. If Russia turned the gas tap off completely it is likely that Northern Ireland would suffer rolling blackouts within 72 hours. No politicians should allow their country to be that exposed.

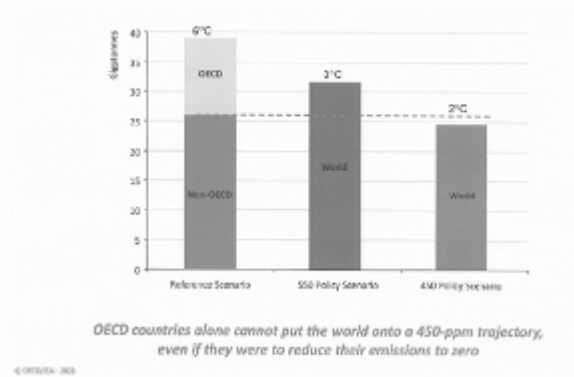
Climate change represents the biggest threat to humanity today. If the world carries on with business as usual with energy demand fed by fossil fuels it will result in atmospheric CO₂ of 1000 ppm which will lead to a 6°C temperature increase by the end of the century.



This would have catastrophic implications for our grandchildren as they would be confronted with a world in which there would be mass migration in search of food. There would be upheaval and anarchy as those faced with starvation, drought, and disease fight with those who still had resources. This is not Africa we are talking about; this will be the western world, as we know it particularly central USA and the Mediterranean regions.

The results of the UN's Intergovernmental Panel on Climate Change (IPCC) suggest a 450 ppm scenario is necessary to prevent any major tipping points being reached. This would have a corresponding 2 °C temperature increase but would require political leadership, a global approach and rapid deployment of low-carbon technologies. 2 °C could not be achieved by OECD countries alone; it needs to include developing countries especially China and India. The IPCC have produced 2 scenarios, the optimum 2 °C or 450 ppm scenario or the most likely 3 °C or 550 ppm.

World energy-related CO₂ emissions in 2030 by scenario



To put these climate change scenarios into perspective, the 550 ppm scenario will result in a 3 oC temperature increase which will lead to 4 billion people suffering water shortages, 500 million going hungry and 170 million impacted upon by coastal flooding, including many in Belfast and Dublin. All leaders across the globe be they in business, politics, science, whatever their field must unite to stop this. Northern Ireland must play its part.

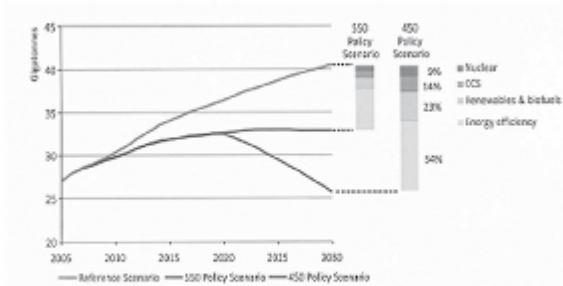
Key results of the post-2012 climate-policy analysis

550 Policy Scenario	450 Policy Scenario
<ul style="list-style-type: none"> Corresponds to a c.3°C global temperature rise Energy demand continues to expand, but fuel mix is markedly different CO₂ price in OECD countries reaches \$90/tonne in 2030 Additional investment equal to 0.25% of GDP 	<ul style="list-style-type: none"> Corresponds to a c.2°C global temperature rise - EU on track Energy demand grows, but half as fast as in Reference Scenario Rapid deployment of low-carbon technologies – particularly CCS Big fall in non-OECD emissions CO₂ price in 2030 reaches \$180/tonne Additional investment equal to 0.6% of GDP

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Both scenarios require significant investment in renewable energy and energy efficiency technologies

Reductions in energy-related CO₂ emissions in the climate-policy scenarios



While technological progress is needed to achieve some emissions reductions, efficiency gains and deployment of existing low-carbon energy accounts for most of the savings

Those countries that respond to these challenges quickly will not only contribute to resolving the world's climate change and security of energy supply problems but they will create positions of technological leadership that will create new businesses and wealth which will create employment and improved living standards.

At Airtricity, we see climate change as a business opportunity not a business hindrance! Opportunities will be created in many sectors including energy procurement, waste management, efficient building and insulation technologies, and innovations in transport and engine efficiencies.

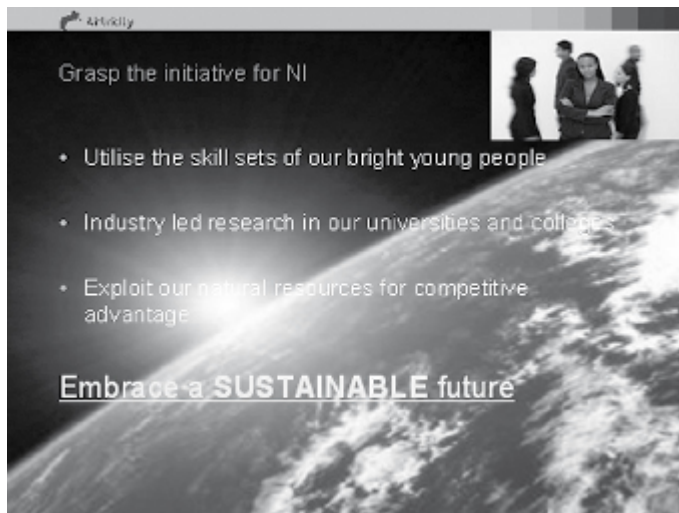
Changing Behaviour = Business Opportunity for Northern Ireland

Waste

- Alternatives to Landfill and incineration
- Waste to energy
- Recycling Household waste
- Bio Fuels



Northern Ireland needs to embrace a sustainable future by utilising the skill sets of our bright young people, having industry led research in our universities and exploiting our natural resources for a competitive advantage, i.e.: wind and tidal power. By taking a leadership role we can also benefit from the financial support available from Europe for such activities.



Baglady Productions

28 February 2009
66 Grange Road
Ballymena BT 42 2DU
www.bagladyproductions.org
[028] 25 639609

I, Shirley Lewis, am director of Baglady Productions, a not-for-profit company working to inspire individuals and community to take responsibility for our place on this planet. We have no formal membership, but our message gets out; our website indicates wide support across Northern Ireland, the UK and globally.

I am a member of the Climate Change Coalition [CCC] and have played my part in the discussions about our collective response. My own experience as an environmental campaigner makes enables me fully to endorse the Climate Change Coalition response.

My role is:

(i) to communicate the urgency of action

(ii) to point to the good developments that will accompany this action

(iii) to inspire people in Northern Ireland and around the world to look after this, our beautiful place..

My focus here is, as always, on doing rather than talking. I am always calling for action. We have no time to lose. Not currently employed by government at any level, I am free to say exactly what I think and feel. I continually strive to do so with respect for everyone and everything,

Since my return home to Northern Ireland from Australia in 2002, I've been funded 6 times by government*.

In total I've managed over £100,000 in cash and a lot more in kind, keeping waste of all kinds to a minimum. I have taken great pleasure in doing much more than was expected at most stages of the 5 years of funding. I knew there was no time to lose.

I've visited over 150 schools in Northern Ireland and met hundreds of teachers and thousands of schoolchildren who are bursting with enthusiasm to do something urgent about climate change and other environment issues . They often know, and are prepared to do, much more than their parents.

Their Positive Pester Power [PPP]** skills can get us adults off our proverbials ; through internet and other media they can reach out to other children, and their parents, right around the world. And they can help us make it fun.

I have 7 years experience in living ASAP [As Sustainably as Possible] which means no car, no garage, no oiltank, and much attention to domestic energy saving of all kinds, and means I can make a very strong contribution on all aspects of the spectrum from waste to sustainability. I am writing a play about this.

Response to the terms of reference

(a) To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

Baglady comment:

At approx 1.7million people, we in Northern Ireland make up 1/4000th of the world's population.

Sadly, we use much, much more than our fair share of resources, guzzling up 1000th of what's available. North and South of the border, our global footprint is about 4 times what it should be [wwf]

[Climate Change Coalition: 'Northern Ireland's per capita emissions of 12.83 tonnes compares badly with the UK average of 10.48 tonnes, the global average of 4 tonnes and the global fair share of 1.65 tonnes']

People somewhere else in the world don't have enough because of what we're using and wasting..

This is the true story of climate change - Earth responding negatively to our greed, excess and laziness. Human beings have developed problems of attitude and behaviour which threaten our very existence.

We know we are doing this. Yet we continue to do so, giving all sorts of reasons to justify our failure to change even the most basic of wasteful habits - eg plastic bags, water, energy in all forms, food, paper.... the list is massive and it needs decisive action from the Environment Committee and the NI Assembly.

We can change; we are already changing. It just needs to happen on a broader scale, faster, more efficiently and ideally with a great deal of our fabled Irish creativity and humour. The very smallness of our community, its friendliness and sense of humour all suggest to me that we can quite easily take the lead here. Our children need our support.

I agree with the Climate Change Coalition that:

'The Assembly should ensure that its voice is heard at the national and international level. It should categorically state its support for an international climate change agreement to limit global warming to no more than 2° Celsius above pre-industrial temperatures (most scientists accept that 'dangerous climate change' is much more likely above this temperature increase).

'The Assembly has accepted that the provisions of the UK Climate Act will be extended to Northern Ireland. [Next, we need] 'a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.'

'The Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum. '

(b) To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

Baglady comment:

Action is my forte. It is, oddly enough, the most difficult thing for humans to do - especially in the climate change context.

We now broadly agree: to do nothing is NOT an option. But what to do? and how? how long can we put it off?

We need immediate leadership from our politicians and people at all levels, top to bottom, in government departments.

In my experience, people in political positions and in related government departments often take up their post knowing very little about environment, climate change etc. The knowledge is new, rapidly changing, and highly confronting, eg if you get driven to work in a fuel-inefficient car, like Arlene Foster.

Often by the time these people are fully equipped for the task in hand, they're moved to a different department. It would be most helpful to ask these people for their insight into how to deal with this information gap.

The people I've met with the best skills and least conflict of interest are the scientific community [eg QUB and UU], charities and environment NGOs. They should be trusted more and consulted in greater depth - as you're doing now.

I personally have access to a wealth of comment on energy, transport etc - and direct experience of living it - it would take weeks or months to tabulate them. Instead, I am finding ways to express what I've learned - eg in installing PV cells and thus generating my own electricity to sell back to the grid [!!] - in a way that sucks people in....

(c) To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

Baglady comment: A 12 yr-old boy sees the solar panels on my roof. For weeks, he and his friends plague me with questions about why I have it, what it costs, how it works etc... I tell them all I can; and I add that installing solar panels could be a good, worthwhile and interesting job... this keeps them going for even longer.

Action Renewables: 'almost 6,000 short term and 400 long term jobs could be sustained in Northern Ireland, exclusively by developing renewable energy within the region.'

Baglady: Our children are almost not needed in a world where machines do most things better, quicker and cheaper than they ever could. Our kids have nothing to do, nothing to look forward to. They become angry, or despairing.

This is costing us huge sums of money in violence, vandalism, medical bills for depression, obesity, prison sentences, the list goes on.

The Climate Change Coalition quotes Northern Ireland's Chief Medical Officer Michael McBride:

"Current predictions on climate change suggest greater long-term impacts on health than any current public health priority. To preserve health in a changing climate, we need to modify and strengthen the systems we have to adapt to the likely future impacts of global warming. We must tackle this issue on all fronts, reducing our contribution to the problem and responding to the effects of climate change is a shared international responsibility." '

Baglady: Meanwhile, my travels around NI show me that it's in a shocking state of rubbish and waste. We will never have the money to clean it up. But we do have the people. Taking responsibility for our daily life in terms of the basics: shelter, food, water, warmth.... will make a huge difference; and we can measure it.

Further relevant - and encouraging - extracts from the Climate Change Coalition response:

'The central message [of the Stern Review] is that reducing emissions today will make us better off in the future: one model predicts benefits of up to \$2.5 trillion each year if the world shifts to a low carbon path.

'The renewable sector in Germany supports 170,000 people and existing German government support measures promoting renewable energy could create 130,000 new jobs by 2020 [German environment ministry]

'Greater than 70,000 jobs could be created in the UK by investing in and developing offshore wind technology. [Carbon Trust]

'The overall added value of the low carbon energy sector by 2050 could be as high as \$3 trillion per year worldwide and... could employ more than 25 million people.' [Gordon Brown]

'The Coalition believes that there are strong moral imperatives for Northern Ireland to contribute its fair share of global emissions cuts in order to combat global climate change. Hundreds of millions of people across the globe could lose their lives and livelihoods, up to a third of land-based species may become extinct, immense political instability will occur as people migrate to avoid droughts and floods and compete for scarce resources, and great economic damage will be caused by increasingly extreme weather.

The SNIFFER report on the impacts of climate change on Northern Ireland identified a number of direct effects, mostly negative, on human health, the economy, natural habitats and water

resources, for example, the extent of flood risk to existing settlements remains unquantified compared with the situation in Great Britain.

(f) To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

'The legal responsibility to deliver the targets set in a Northern Ireland Climate Change Act and through the carbon budgets should fall collectively on the Executive.

Specific responsibilities to deliver the targets set in the Climate Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department.

A public service agreement should be drafted for the Department of the Environment which would include a commitment to provide information and support to the other departments to help deliver the targets set in a Northern Ireland Climate Change Act and in the carbon budgets.

Baglady comment: The public need to see all government staff, particularly those in the Department of Environment, showing full awareness of their own role and responsibility, in forestalling climate change. Getting rid of the take-away packaged lunches, the heat and light wastage in offices - all these things can be used to build awareness and staff morale.

Individual and group actions in any of these areas needs to be praised and publicised both interdepartmentally and community-wide, so people can learn by example.

Preaching and stats don't work, how-tos, targets, responses, tables etc do. And always remember: make it fun.

There is huge frustration in the Education Department over Education for Sustainable Development [ESD] Progress there is slowed by steady withdrawal of funding from various bodies specialising in school visits eg Sustainable NI, Action Renewables. Curriculum material appears brilliantly envisaged and practical - but the subject is not examinable. The Sustainable champion in Education has too many other commitments to find sufficient time and energy for this huge job.

I have found that environment in general, and dealing with Climate Change in particular, are very popular subjects with schoolchildren of all ages. Much of the alienation experienced by the less academically promising children vanishes, in the rush to show and share skills acquired in this new and challenging field. Again, it's fun.

The Climate Change Coalition:

'The people of Northern Ireland are asking for leadership from the Assembly.

There is a lot of expertise on climate change available in Northern Ireland and many groups are looking to play their part in facilitating moves towards a low carbon economy. The Committee should engage widely and openly.'

Conclusion

September 2009 is a long way away if you consider that we need to reduce our carbon output by 3% per annum. And it's cumulative; the longer we postpone, the harder it will be to make it up.

Baglady Productions congratulates the Environment Committee on its initiative in launching this enquiry, and would welcome the opportunity to make a presentation to the Committee if invited.

footnotes:

* first a costs-only Millennium Award, then 2X Ballymena Borough Council [Environment Weeks 2003,2004] , which led to 2X DoE funding for NEEDabag? campaign with 10 councils [2005] and with 23 councils, 100+ schools and thousands of supermarkets and convenience stores and solid press, radio and TV support. The last funded project, in partnership with jollytv, had us travelling ASAP[[bus and train where possible] all over N Ireland to film baglady in 16 places. see www.bagladyproductions.org

** Baglady apparently discovered Positive Pester Power in 2006. It was immediately adopted by Down District Council's Janet McIlvenna and featured on BBC Politics Show. Subsequently praised by Eamon Holmes on BBC Summer Special show 2007

CCC (NI) members:

- ARENA Network
- Baglady Productions
- British Council (Northern Ireland)
- Centre for Global Education
- Chartered Institute of Environmental Health
- Christian Aid
- Concern
- Conservation Volunteers Northern Ireland
- Friends of the Earth
- Green Action
- NICVA
- Northern Ireland Environment Link
- Oxfam Ireland
- RSPB
- Sustainable NI
- Sustrans
- Tearfund
- The National Trust
- TIDY NI
- Tools for Solidarity
- Trocaire
- Ulster Wildlife Trust

- WWF Northern Ireland

Barbre de Brun MEP

EUROPEAN PARLIAMENT

2004



2009

Session document

A6-0495/2008

10.12.2008

REPORT

on "2050: The future begins today – Recommendations for the EU's future integrated policy on climate change"
(2008/2105(INI))

Temporary Committee on Climate Change

Rapporteur: Karl-Heinz Florenz

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DRAFT EUROPEAN PARLIAMENT RESOLUTION

on “2050: The future begins today – Recommendations for the EU’s future integrated policy on climate change”
(2008/2105(INI))

The European Parliament,

- having regard to its decision of 25 April 2007, adopted pursuant to Rule 175 of its Rules of Procedure, on setting up a temporary committee on climate change¹,
- having regard to existing EU environmental legislation making a positive contribution to combating climate change in various policy areas (Annex A) and to its resolutions on climate change, particularly those adopted during the current sixth parliamentary term (Annex B),
- having regard to its resolution of 15 November 2007 on limiting global climate change to 2 degrees Celsius – the way ahead for the Bali Conference on Climate Change and beyond (COP 13 and COP/MOP 3)²,
- having regard to its resolution of 31 January 2008 on the outcome of the Bali Conference on Climate Change (COP 13 and COP/MOP 3)³,
- having regard to its resolution of 10 April 2008 on the Commission Green Paper on “Adapting to climate change in Europe – options for EU action” (COM(2007)0354)⁴,
- having regard to its resolution of 21 May 2008 on the scientific facts of climate change: findings and recommendations for decision-making⁵,
- having regard to its resolution of 21 October 2008 on building a Global Climate Change Alliance between the European Union and poor developing countries most vulnerable to climate change⁶,
- having regard to the declaration of 8 July 2008 made at the G8 Summit in Hokkaido Toyako (Japan) on ‘Environment and Climate Change’, stating the long-term intention to halve greenhouse gas emissions by 2050,
- having regard to the 14th Conference of Parties to the UN Framework Convention on Climate Change (UNFCCC) (COP 14) and the Fourth Conference of Parties serving as a meeting of the parties to the Kyoto Protocol (COP/MOP 4), from 1 to 12 December 2008 in Poznań (Poland),
- having regard to the Citizens’ Agora on Climate Change, held on 12 and 13 June 2008,

¹ CJ C 74 E, 20.3.2008, p. 652; see also the minutes of the plenary sitting of 18.2.2008, point 7.

² CJ C 282 E, 6.12.2008, p. 437.

³ Texts adopted, P6_TA(2008)0032.

⁴ Texts adopted, P6_TA(2008)0125.

⁵ Texts adopted, P6_TA(2008)0223.

⁶ Texts adopted, P6_TA(2008)0491.

- having regard to the Joint Parliamentary Meeting of the European Parliament and the national parliaments, held on 20 and 21 November 2008 to debate energy and sustainable development,
- having regard to the results of the Eurobarometer Special opinion poll No 300 on Europeans' attitudes to climate change,
- having regard to the public hearings and exchanges of views with senior figures held by the Temporary Committee on Climate Change and the outcome of delegation visits,
- having regard to Rule 45 of its Rules of Procedure,
- having regard to the report of the Temporary Committee on Climate Change (A6-0495/2008),

Guiding political ideas

- A. whereas the task of preserving nature and humanity is passed on from one generation to the next,
- B. whereas global warming is now recognised as a very serious, urgent and man-made threat and is already having, like climate change, a momentous impact,
- C. whereas, particularly in the current parliamentary term, the European Parliament's work on climate change has been a source of inspiration and a mandate for action to shape an integrated European policy to combat climate change and to reconcile climate change with sustainable economic growth,
- D. whereas Parliament is examining, together with the Council, proposals for legislation aimed at delivering the EU climate commitments,
- E. whereas the Lisbon Treaty explicitly lays down the objectives and competences of the European Union in the field of climate change and, if ratified, will strengthen the Union's role in promoting sustainable development and fighting climate change,
- F. whereas the leading role of the European Union in the international fight against global warming and its particular responsibility as a union of developed countries contribute to its sense of identity and imply an obligation to the citizens of Europe not only to formulate medium- and long-term climate objectives but to achieve those objectives through forward-looking political measures, as well as through political dialogue with developing countries,
- G. whereas a key objective of the European Union as regards both its internal policy and its external relations is promoting respect for human rights, and whereas, in particular, the European Union recognises the rights to life, security, health, education and environmental protection as fundamental, as well as the protection of persons particularly vulnerable to the effects of climate change, including women, children, the elderly and persons with disabilities,
- H. whereas parliamentary representatives of the citizens of Europe, not only now but in the

The international dimension: post-2012, external climate policy and international trade

- R. whereas the negotiations towards a post-2012 agreement are being carried on under UN leadership in accordance with the Bali roadmap in the following core areas: emissions reductions and new binding reduction targets, adaptation measures, forest clearance, destruction and degradation, development of technology for mitigation and adaptation measures, the necessary financial resources, and finally the review of the flexible mechanisms under the Marrakesh agreements on the Kyoto Protocol,
- S. whereas the World Trade Organization (WTO), the World Bank and the International Monetary Fund should also be deeply involved in the mitigation effort,
- T. whereas the negotiations on a post-2012 agreement need to be concluded at the Copenhagen climate conference (COP 15) at the end of 2009 in order to avoid a gap between the first and second commitment periods,
- U. whereas the Council's 2008 Spring Summit stressed the need to speed up the negotiations on the Bali roadmap with a view to adopting a new climate change agreement by 2009, in accordance with the EU's 2°C objective,
- V. whereas the leading industrial nations expressed their support at the recent G8 summit in Hokkaido Toyako (Japan) for halving CO₂ emissions by 2050, and wish to pursue this objective in negotiations on a post-2012 agreement,
- W. whereas climate change may exacerbate the potential for conflict in international relations, for example through climate-induced migration, loss of land and border disputes arising from floods and receding coastlines, as well as conflicts over resources owing to shrinking arable land, growing water scarcity or deforestation,
- X. whereas the Council's 2008 Spring Summit ordered a European strategy to be drawn up for the financing of measures to combat climate change, aimed at the reduction of emissions and adaptation linked to research into, and development of, low-carbon technologies and the transfer of such technologies,
- Y. whereas mitigation and adaptation efforts are both of paramount importance; whereas industrialised countries have an historical responsibility for climate change; whereas developing countries have contributed little to climate change and yet are the most affected by it; whereas the available funding to combat climate change in developing countries is inadequate and should be substantially increased,
- Z. whereas the development and transfer of modern environmental technology is an essential precondition for the successful implementation of global emissions reduction and adaptation strategies,
- AA. whereas technology transfer is being hindered by concerns about the protection of intellectual property, by weak political institutions and the absence of the rule of law, and by a general lack of capital,
- AB. whereas the WTO does not represent an alternative negotiating forum for international

action on the climate, and whereas without a successful conclusion to the post-2012 negotiations world trade cannot be expected to help in combating climate change,

AC. whereas the EU's carbon footprint includes the greenhouse gases emitted in the production of goods consumed in Europe but produced elsewhere,

Energy

AD. whereas oil is the most important source of energy worldwide, accounting for some 35% of primary energy consumption, followed by coal at 25% and natural gas at 21%; whereas, however, the age of cheap and abundant fossil energy is coming to an end,

AE. whereas developments on the energy markets help the pursuit of climate objectives, since market-driven increases in energy prices form important incentives to sustainable use of resources and thus to low-CO₂-footprint consumption,

AF. whereas the International Energy Agency predicts an increase of at least 60% in world energy requirements by 2030, some of which will be engendered by the emerging countries,

AG. whereas in the medium to long term there can be no question of covering the increasing need for energy solely with fossil fuels, and whereas investment decisions over the next few years will determine the structure of the energy system and the composition of the energy mix for the coming decades,

AH. whereas the growing need for energy requires a number of complementary measures, such as the urgently needed modernisation of the existing fossil-fuel-fired power stations and transmission networks with a view to a massive improvement in overall energy efficiency, the construction of new power plants and the constant expansion of renewable energy sources,

AI. whereas energy savings are in the long term the most cost-effective and cleanest way of saving resources and thus combating climate change, and whereas committed and sustained efforts to enhance the EU's energy efficiency will bring about widespread structural solutions across the economy, thereby paving the way towards a green low-carbon economy,

AJ. whereas the use of nuclear energy – irrespective of the availability of uranium – still raises the issue of the safe final storage of nuclear waste and the spread of the technology to undemocratic states,

AK. whereas the International Thermonuclear Experimental Reactor project has become a capital-intensive development centre for nuclear fusion as a possible new energy source for the future, and whereas any contribution to the energy market can only be expected in the ultra-long term,

Biofuels

AL. whereas current policy on biofuels must be seen in a global perspective, where on the one

hand there is growing competition for productive land and on the other there is an increasing need for renewable energy, in particular in the transport sector,

AM. whereas the production of biomass offers many developing countries new economic opportunities for energy production and as a fuel, and will make them less dependent on energy imports, provided that such production is sustainable and does not lead, for example, to monocultures or to competition as regards food production,

AN. whereas the emissions reduction potential of many first-generation biofuels in comparison to conventional fuels has been revised downwards, in some cases substantially, following a comprehensive life-cycle analysis, and whereas issues of sustainability, environmental impact and the availability of arable land in competition with food production have still not been satisfactorily resolved,

AO. whereas a sustainable biofuels policy should be geared not only to setting sustainability criteria for the manufacture of biofuels but also to promoting the most rapid development possible of second-generation biofuels,

AP. whereas the petroleum industry will only put in place the necessary comprehensive infrastructure for new fuels when there is a sufficient demand for biofuels, but whereas the motor industry has made technological advances permitting any mixture of petrol and biofuels to be detected by a sensor in the vehicle, a device which will also enable older vehicles to run on biofuels, thus achieving CO₂ emissions reductions over the whole range of existing vehicles,

AQ. whereas the potential of biofuels can only be realised if they are seen as a component in the development of sustainable transport systems, including the development and use of highly fuel-efficient vehicles,

Energy efficiency

AR. whereas several Member States do not have a clear strategy for energy efficiency,

AS. whereas the Member States should improve and expand the use of energy-efficiency certificates, and link the recommendations to financial incentives,

AT. whereas decreasing energy consumption together with energy efficiency at an individual and community level creates new commerce and jobs and combats energy poverty,

AU. whereas the construction sector accounts for 40% of final energy consumption, and 33% of all greenhouse gas emissions are thus generated by the built environment,

AV. whereas the building sector (residential buildings, commercial and public buildings) has an enormous cost-efficient potential for reducing CO₂ by modernising thermal insulation and heating/cooling systems, electrical appliances and ventilation systems and by installing sun protection,

AW. whereas low-energy houses are attractive, fashionable and cost-effective,

AX. whereas decoupling growth in energy consumption from economic growth by investing

in energy efficiency in all sectors of society is a key objective of the EU.

- AY. whereas there is a need to develop financial instruments, to allocate the necessary budgetary resources for the improvement of energy efficiency and to constantly review and adjust efficiency standards for electrical and electronic appliances in line with market developments, as well as to extend standards to cover large industrial appliances and to consider introducing a ban on "stand-by" mode for new equipment,

Mobility and logistics

- AZ. whereas the separation of transport growth from economic growth as a whole is a key objective of EU transport policy, but whereas demand for transport services has nevertheless outstripped GDP growth and the already high share of transport in EU greenhouse gas emissions is thus continuing to rise,
- BA. whereas transport currently accounts for approximately one third of final energy consumption in the EU and the transport sector is almost completely (97%) dependent on petroleum-based fuels (petrol and diesel),
- BB. whereas the EU's greenhouse gas emissions from 1990 to 2005 would have fallen by 14% instead of 7.9% if the transport sector had achieved the same reductions as other sectors,
- BC. whereas 80% of Europe's population live in urban areas, where 40% of all transport emissions are produced, with congestion – which is also concentrated in urban areas – costing the EU some 1% of its GDP,
- BD. whereas on the one hand urban mobility is directly linked to individual quality of life, while on the other hand it is individual transport in cities that contributes substantially to greenhouse gas emissions and other environmental problems such as air pollution and noise, so that instead of enhancing quality of life for many citizens it can considerably detract from it through negative effects on health,
- BE. whereas half of all journeys made by EU citizens are shorter than 5 km,
- BF. whereas 60% of all car journeys and 90% of all rail journeys in daily regional and commuter traffic are no longer than 30km,
- BG. whereas the transport of freight by rail and waterways decreased between 2001 and 2006 (from 18.6% to 17.7% and from 6.5% to 5.6% respectively) while freight transport by road increased (from 74.9% to 76.7%),
- BH. whereas the transport of passengers and goods by water is one of the most energy-efficient transport modes and the proportion of goods transported by water in the EU is around 40%,
- BI. whereas it is estimated that the energy consumed per tonne of goods and km of travel by inland waterways transport amounts to one sixth of the energy consumption of road transport and half that of rail transport,

- BJ. whereas trade on overseas routes is on the increase and the trend is towards larger container and passenger ships which consume more heavy-grade oil and thus pollute the environment more severely than in the past, and yet international shipping forms no part of international efforts to combat climate change,
- BK. whereas on the one hand the gradual liberalisation and deregulation of the aviation sector over the past decade was an essential precondition for the dynamic growth of air transport, with a 49% increase in passenger flights within the EU from 1999 to 2004, while on the other hand CO₂ emissions from the sector as a whole rose by 79% from 1990 to 2005,
- BL. whereas the growth of the air transport sector continues to increase its environmental impact in spite of technical and operational improvements, but whereas there has as yet been no debate on binding emission standards for aero engines, there have been only restricted improvements in engines and there are no studies on implementing possibilities,
- BM. whereas the Commission and the Member States have launched the "Clean Sky" Joint Technology Initiative and the SESAR, Galileo and GMES programmes, as well as research projects for intelligent transport systems, with a view to improving energy efficiency in the transport field,
- BN. whereas air transport emits into the atmosphere not only CO₂ but also nitrogen oxides, water vapour, sulphates and particulates which, according to estimates by the International Panel on Climate Change (IPCC), intensify the overall effect of aviation emissions by a factor of 2 to 4, estimates which do not take account of the additional effect of cirrus cloud formation,
- BO. whereas it should be stressed that, in the long term, the most efficient way of reducing transport-based emissions is to decrease transport growth as a whole by making public transport a more attractive alternative to passenger cars, increasing the volume of rail transport and ensuring that urban and infrastructure planning takes into account the absolute need to reduce the use of passenger cars,
- BP. whereas programmes such as Marco Polo and NALADES have been insufficiently used by Member States to shift the transport of merchandise to inland waterways and to seas,
- BQ. whereas the inhabitants and economies of the outermost regions are extremely dependent on air transport for their mobility and development,

Tourism and cultural heritage

- BR. whereas a study by the UNESCO World Cultural Heritage Centre states that one-tenth of all world cultural heritage sites and traditional landscapes are threatened by the effects of climate change,
- BS. whereas, according to the United Nations World Tourism Organization, Europe is the most important tourist region in the world, accounting for 55% of all international tourist arrivals in 2006,

BT. whereas climate change may alter tourist flows, which would involve major economic disadvantages for the holiday regions affected,

Emission Trading Scheme and industrial emissions

BU. whereas the European Emission Trading Scheme is a unique instrument for achieving emissions reductions with maximum efficiency and may act as a model for similar schemes, though the compatibility of such schemes would have to be guaranteed,

BV. whereas the industrial sectors are key to meeting the greenhouse gas emission reduction targets set by the European Council and whereas they should be encouraged to reduce their industrial greenhouse gas emissions further, whilst remaining competitive,

BW. whereas the idea underlying the Clean Development Mechanism (CDM) and Joint Implementation (JI), namely the dissemination of modern and efficient technologies, should work in reality; whereas CDM/JI should be limited to high-quality projects which provide documented additional reductions in greenhouse gas emissions,

Agriculture and livestock breeding

BX. whereas changes to agricultural practices, European environmental legislation and the most recent structural reforms in the common agricultural policy aim at sustainability and thus indirectly – via improved use of available resources – bring about a reduction in emissions,

BY. whereas agriculture is an emitter of greenhouse gases but also contributes positively to the reduction of greenhouse gas emissions, and also suffers directly from the negative effect of climate change leading to different economic and social consequences across regions of Europe,

BZ. whereas the increased consumption of meat and fish have had an impact on climate change as well as other environmental consequences, and may lead to conflicts about how best to use land and resources in order to reduce hunger in the world,

CA. whereas specific climate objectives – such as binding requirements for the reduction of methane and nitrous oxide emissions – are lacking in agriculture, as are incentive schemes to exploit existing emissions reduction potential,

CB. whereas the widespread cultivation of feedstuffs for livestock production contributes substantially to the total greenhouse gas emissions from agriculture,

CC. whereas the rearing of livestock in a more nearly natural way has significant benefits for the environment in terms of care for the landscape and the conservation of grazing areas, while also reducing energy input and emissions,

CD. whereas livestock numbers should be adapted to suit the land areas available and whereas soil-sustainable grazing practices could help to prevent soil erosion in pasturage areas,

Forests

- CE. whereas forests are very valuable for the biosphere and have many functions in the global eco-system,
- CF. whereas forests have three-dimensional roles in climate change mitigation: as carbon stocks through sustainable use and protection of forests, as carbon sinks through forestation and as a substitute for fossil fuels and fossil products as a renewable raw material,
- CG. whereas over 30% of the world's landmass is covered in forest, which is home to more than two thirds of all species living on earth, and whereas some 30% of annual greenhouse gas emissions are absorbed by forests,
- CH. whereas on the one hand forests play a vital role in holding back climate change while on the other hand at least a third of the world's forests are affected by the consequences of climate change,
- CI. whereas the most serious problem underlying forest destruction lies in related socio-economic factors such as poverty and under-development, weak political institutions and absence of the rule of law, as well as unjust property ownership conditions and corruption which can, amongst other consequences, lead to the illegal logging and clearing of forests,
- CJ. whereas forest areas are destroyed because of fires caused by heat waves, flooding or deforestation,
- CK. whereas there are not enough strategies and programmes for the reforestation of forests that have been cleared,
- CL. whereas the great extent of the forest area destroyed each year makes a decisive contribution to CO₂ emissions,
- CM. whereas the make-up of forest plantations in the EU does not reflect the natural mixed woodland characteristic of Europe,

Soil protection

- CN. whereas the soils of Europe are undergoing irreversible damage at a faster rate than ever before, and the extent of this damage is being intensified by climate change,
- CO. whereas the thawing of permafrost soils is altering the nature of soils in the northern hemisphere and releasing significant additional quantities of methane into the atmosphere,

Water management

- CP. whereas the availability of water resources, drinking water and other water supplies, water consumption and the treatment of waste water are closely linked to economic and social conditions,

CQ. whereas the regional disparities in Europe with regard to available water resources, and the occurrence of floods and droughts, are being intensified still further by climate change,

Fisheries

CR. whereas fish and shellfish are an important source of food, and whereas the ocean is the largest carbon sink in the world and serves as a source of biomass and raw materials,

CS. whereas the nutritional resources of the sea are already being overexploited,

Waste treatment and resource management

CT. whereas the quantity of waste is regrettably continuing to rise, in spite of all efforts to reduce it,

CU. whereas European legislation on waste already contributes to reducing greenhouse gas emissions from the waste sector, even though not every potential is yet being exploited,

CV. whereas waste hierarchy is a key principle guiding climate change mitigation in the waste sector,

CW. whereas it should be acknowledged that waste disposal innovations and the increased use of recycled products have a positive impact on the environment,

Adaptation measures

CX. whereas adaptation measures of all kinds represent an insurance for the future with a view to alleviating damage from past greenhouse gas emissions and the consequent rise in temperature,

CY. whereas using a pure cost-benefit analysis in the development of adaptation measures is not sufficient to guarantee the necessary minimum protection to all population groups; whereas, with a view to such measures, the local effects of climate change need to be analysed as a matter of urgency,

CZ. whereas according to the Millennium Ecosystem Assessment the consumption of natural resources currently threatens two thirds of all ecosystems, increases vulnerability to climate change and thus further intensifies the pressure to develop adaptation measures as soon as possible,

DA. whereas the joint EEA (European Environment Agency), JRC (Joint Research Centre) and WHO (World Health Organization) report entitled "Impacts of Europe's changing climate" draws attention to the fact that vulnerability to climate change varies widely across regions and sectors in Europe, hitting mountainous regions, coastal zones, the Mediterranean and the Arctic harder, and whereas that report underlines that, in addition to enhanced global greenhouse gas emission reductions, proactive adaptation measures are needed at European and national level in order to moderate effects,

Health

DB. whereas many of the effects of climate change on health as reported, for instance, by the WHO may be kept at bay by preparing and strengthening health systems by appropriate preventive measures, with particular attention being paid to the spread of tropical diseases, and by public information campaigns addressing especially vulnerable groups such as pregnant women, newborn babies, children and elderly people,

DC. whereas the European Environment and Health Action Plan 2004-2010 is definitely inadequate to address the environmental causes which affect health, especially those stemming from climate change,

Growth and employment

DD. whereas the climate policy goals agreed at the 2007 Spring Summit are technically and economically feasible and offer unique business opportunities for thousands of European firms,

DE. whereas many businesses have not yet sufficiently recognised the scope of the opportunities and risks linked to climate change,

DF. whereas committed action to combat climate change is compatible with continued economic growth and prosperity; whereas it could represent an effective investment with an important anti-recession function and must be seen as a challenge for wide-ranging structural changes having as their ultimate objective the development of a truly green economy,

DG. whereas there is more likely to be a restructuring of jobs within particular industries than between one industry and another,

Promoting technologies of the future

DH. whereas emissions trading is the essential building block of the European climate change programme, with a view to achieving lower greenhouse gas emissions through improved efficiency,

DI. whereas achieving climate change mitigation targets requires appropriate financial steering mechanisms to endorse the development and application of energy-efficient and clean technologies,

DJ. whereas sustainable housing offers enormous potential for job creation,

DK. whereas improved efficiency alone will not spark off a technological revolution, but will necessitate an integrated strategy at European, national and local level to boost R&D in novel and advanced technologies and processes, and to strengthen their take-up,

DL. whereas emissions trading alone is not sufficient to find a way out of the CO₂ impasse and to spark a widespread revolution in the field of low-CO₂ technologies,

DM. whereas carbon capture and storage (CCS) is already being applied on a small scale in

various areas – e.g. in oil and gas extraction – but is still in the early stages as a major technology to combat climate change.

DN. whereas the costs and risks still outweigh the economic advantages, and the effectiveness of power stations using CCS is diminishing despite the use of the latest technology,

DO. whereas the technology for CCS, as a bridging technology on the way to the decarbonisation of the energy system, may contribute to resolving the issue of reducing CO₂ emissions from power stations and could serve to complement renewable technologies, but whereas CCS is an end-of-pipe technology,

Intelligent computer systems and ICT

DP. whereas the ICT sector currently produces 2% of global CO₂ emissions, but the industry is potentially capable not only of reducing its own CO₂ emissions but also, in particular, of developing innovative and more energy-efficient applications for the economy as a whole,

Financing and budgetary matters

DQ. whereas the current EU budget is insufficient to achieve the climate objectives, since the political priority of combating climate change has not yet been furnished with the necessary budgetary appropriations,

DR. whereas in the forthcoming financial framework, budgetary appropriations must be allocated to combat climate change and create a European adaptation policy, in order to ensure that the EU has a sufficient “climate change budget” for the next budgetary period after 2013,

DS. whereas combating climate change must be taken into account in all EU policies; whereas, consequently, the EU can no longer merely redistribute existing resources but should promote the creation of new resources to finance the cross-sectoral nature of the fight against climate change,

Education, training, reporting, labelling and awareness-raising

DT. whereas economic and social policy measures to combat climate change herald a cultural transformation which will alter established habits and lifestyles, but whereas it will not be possible to achieve genuinely sustainable consumption and use of raw materials in all areas of society without a change of thinking and behaviour, for which new models of consumption and lifestyles must be developed,

DU. whereas climate change will give a boost to technological modernisation, representing an economic opportunity which can only be exploited if there are enough qualified specialist workers on the labour market,

DV. whereas the Eurobarometer Special Poll (Special Eurobarometer No 300) clearly shows that climate change is regarded as a very serious problem by a large majority of respondents in Europe, but whereas many complain of a lack of information and whereas

personal initiatives to counteract global warming tend to be confined to fairly simple measures such as waste sorting or lower energy and water consumption which do not call for any drastic changes in daily life,

DW. whereas the information needed to examine one's own mobility habits regarding, for example, the use of private cars and alternative means of transport (walking, cycling or public transport) is available,

DX. whereas European climate objectives and rules help local and municipal decision-makers to improve the quality of life in many towns in the European Union, and whereas local initiatives in metropolitan regions make a crucial contribution to reducing the EU's CO₂ emissions,

DY. whereas it is not the responsibility of retailers alone to bring about alternative purchasing behaviour among their customers; whereas, however, businesses as a whole could set examples of sustainability and resource efficiency through their business models and production processes and could make their staff into a significant multiplier for climate-aware action,

DZ. whereas consumer information concerning the climatic effects of agricultural products is largely lacking, but whereas targeted information campaigns can influence the purchasing behaviour of consumers and thus also achieve health policy objectives,

EA. whereas the problem of climate change cannot be tackled without the large-scale involvement of local people in all parts of the world, and whereas, therefore, one of the essential tasks will be to provide them, by every possible means, with the information they require in order to help solve problems and also to protect themselves when adaptation difficulties arise, as they inevitably will,

2050 – The future begins today

EB. whereas the world population's need for resources already exceeds by one quarter the earth's natural regeneration capacity, thus depriving future generations of the essentials of life,

EC. whereas the foundations of future production methods and consumer behaviour will be laid by the political decisions of the present, which call for foresight and political leadership, but whereas a more sustainable lifestyle will not be possible without the contribution of the economy, science, the media, organised civil society and the citizens,

ED. whereas climate change is a global environmental problem the causes of which are structural in nature,

Guiding political ideas

1. Recalls its abovementioned resolution of 21 May 2008, and in particular the fact that all efforts to curb emissions should aim at staying well below the objective of limiting global temperature increases to below 2°C, inasmuch as a level of warming of that magnitude would already impact heavily on our society and individual lifestyles and would also

entail significant changes in ecosystems and water resources; is deeply concerned about the fact that, as indicated by many recent scientific reports, climate change is both more rapid and more serious in terms of its adverse effects than was previously thought; consequently, calls on the Commission to closely monitor and analyse the latest scientific findings with a view to assessing, in particular, whether the EU 2°C target would still achieve the aim of avoiding dangerous climate change;

2. Stresses that there is an urgent need –pursuing a horizontal approach – to incorporate global warming and ensuing climate change as new parameters into all spheres and policies, and to take the causes and consequences of global warming into account in every relevant area of European legislation;
3. Recalls in particular the essential objectives in combating climate change and stresses the importance, in accordance with the recommendations contained in the IPCC's Fourth Assessment Report (AR4) and as included in the Bali roadmap, of setting, for the EU and the other industrialised countries as a group, a medium-term target of a 25-40% reduction in greenhouse gas emissions by 2020, as well as a long-term reduction target of at least 80% by 2050, compared to 1990, maintaining the focus on restricting the increase in average global temperature to 2°C over pre-industrial levels and thus achieving a 50% probability of meeting this objective;
4. Stresses that a nation's impact on the climate is not limited to its physical emissions; urges the EU to take urgent steps at home and in the context of international negotiations to develop accounting principles that also include the full effects of consumption, including the effects of international aviation;
5. Calls on the Commission to consider the carbon footprints of future European policy initiatives so as to ensure that climate change targets set at European level are met, whilst still ensuring a high level of protection for the environment and public health;
6. Stresses the political measures, and cooperation at international level (including regional multilateral agreements) and at EU and Member State level, repeatedly proposed by Parliament with a view to combating climate change;
7. Recalls its position of [date of adoption in plenary] within the framework of the legislative procedures on the "climate and energy package";
8. Is committed to a leading role for the European Union in international negotiations under the UNFCCC at COP and MOP level, as well as in other international fora, such as the WTO, the World Bank and the International Monetary Fund; also highlights the urgent need for the EU and its Member States to meet the targets of the Kyoto Protocol in order to play this leading role in a credible way;
9. Agrees that the development, application and export of modern environmental technologies contributes simultaneously to fulfilling the Lisbon Strategy and meeting the EU's Kyoto targets and other climate objectives, and points out that, in order to achieve the ambitious environmental targets and economic growth to be realised, the Lisbon strategy and the climate and energy package should be fully integrated;

10. Emphasises, in this context, that tackling climate change will lead to societal changes that will help to create new jobs and industries, combat energy poverty and dependency on imports of fossil fuels and provide social benefits for citizens; stresses that cooperation at international, regional and local level will be critical if we are to be successful in achieving this goal;
11. Is convinced, moreover, that climate change can only be successfully combated if citizens are fully engaged in the process and are protected during the period of transition to a carbon-neutral economy; highlights, therefore, the fact that mitigation and adaptation policies will push the European Union towards a new model of sustainable development which should promote its social character in order to secure the social consensus;
12. Stresses the need, first of all, to achieve dramatic improvements in efficiency in all areas of everyday life and, in parallel, to launch a sustainable production and consumption model with a conscious saving of resources on the basis of renewable energy;
13. Stresses in this context the need to examine the EU's budget, and existing and future financing instruments, as to their compatibility with European climate policy, and where necessary to adapt them;
14. Stresses that a successful R&D policy will only be made possible by the practical application of new technologies via secured market access points;
15. Calls for research to be carried out into potential trends of climate-induced migration and the ensuing pressures on local services, in order to inform long-term planning and risk-management processes;
16. Stresses that nearly half of the world's population is under the age of 25 and that today's decisions on climate policy will have far-reaching consequences for the largest generation of young people in human history;

The international dimension: post-2012, external climate policy and international trade

17. Urges the Commission and the coming Council Presidencies to assume a leadership role in international negotiations towards a post-2012 agreement and to reach a conclusion by the end of 2009, so that sufficient time remains to ratify the forthcoming climate change agreement and avoid a gap between obligation periods;
18. Stresses that the new climate change agreement should come into being under the auspices of the UN and on the principle of a "common but differentiated responsibility", with the countries of the industrialised world taking the lead in reducing their domestic emissions while the developing countries also commit themselves, in accordance with the Bali Action Plan, to taking nationally appropriate mitigation actions in the context of sustainable development, supported and enabled, in a measurable, reportable and verifiable manner, by technology, financing and capacity-building from industrialised countries;
19. Stresses that the post-2012 agreement needs to be reconciled with other objectives on the UN's and EU's political agendas, such as conservation of biodiversity, the Millennium

Development Goals and security issues, so that political synergies can be exploited;

20. Calls on the Commission and the Member States to construct a foreign policy on climate change and to repeatedly draw attention to the EU climate targets in the EU's and the Member States' diplomatic missions; for its own part, undertakes to repeatedly raise the issue of the EU climate targets, and to defend those targets, in its contacts with parliamentarians from other countries;
21. Calls on the Commission and the Member States to incorporate the requirements of emission reductions, and measures to adapt to the consequences of climate change, into development aid programmes, and/or to refer to these requirements in the decision-making processes of international development aid agencies, thus involving the private sector, public authorities and non-governmental organisations in the countries or regions concerned by way of partnerships; stresses that additional resources need to be mobilised to help developing countries to tackle the climate change challenge, and that emerging initiatives in this context must be formally linked to the UNFCCC process and to achieving the Millennium Development Goals; welcomes the EU's launching of a Global Climate Change Alliance (GCCA) to support adaptation to climate change in poor developing countries that are most vulnerable to climate change, and recalls in this regard its above-mentioned resolution of 21 October 2008;
22. Endorses the recommendations set out in the report by the High Representative for the Common Foreign and Security Policy and by the Commission on "Climate Change and International Security", and stresses the need to construct an appropriate multilateral preventive EU climate diplomacy to that end, so that climate issues can be incorporated to a greater extent in the formation of international relations together with other international relations factors such as population growth and climate-induced migration, urbanisation, energy needs, rising energy prices and shortages of food and water;
23. Calls on the EU and its Member States, in the context of the European Security Strategy (ESS) and the European Security and Defence Policy, to prevent, monitor, and take action to tackle the effects of climate change and resultant natural disasters on civil protection and human safety as well as possible conflicts caused by changes in water and land supply resulting from climate change;
24. Calls on the EU and its Member States to strengthen their existing climate partnerships with target developing countries, and to enter into new partnerships where these do not currently exist, providing significantly increased financial support for technology development and transfer, protection of intellectual property and institutional capacity-building;
25. Calls on the Commission and Member States to attach the highest priority to energy efficiency and renewable resources in the context of development cooperation;
26. Calls on the Commission, in the context of the WTO negotiation rounds and the post-2012 process, to pursue coordinated negotiation strategies in the field of trade and environment policy in order to send its negotiating partners a credible message about Europe's climate targets and the instruments developed to achieve them, to dispel concerns about trade barriers or other disadvantages to trade relations with third countries

that have no binding climate objectives, and to implement the reciprocity principle in the interests of combating climate change at a global level;

27. Calls on the Commission, the Presidents-in-Office and the Member States to adopt a mediating role at bilateral level in the negotiations towards a post-2012 agreement, in order to ensure the success of the climate negotiations aimed at achieving the 2°C goal;

Energy

28. Stresses that Europe needs a forward-looking common energy policy, both within the EU and in external relations, so as to ensure a high level of security of energy supply meeting the conditions of sustainability, resource efficiency and climate neutrality;
29. Calls on the EU to create a European renewable energy community to promote further research and pilot projects in this field as well as the development of the grid so as to allow for the optimal integration of renewable energy resources;
30. Calls on the EU and its Member States to ensure:
- the development of, and investment in, a European energy transport infrastructure (including the so-called supergrid) needed to ensure diversity for the EU in terms of energy sources;
 - ongoing research and development of pilot projects related to ICT-linked technology, decentralised production and other new technological developments;
31. Calls on the EU and its Member States to secure a transitional phase in the energy mix, influenced by politicians and led by entrepreneurs, during which the use of renewable energy sources gradually supplements and subsequently reduces and replaces the use of fossil fuels, by means of active support from the public authorities in the Member States and at EU level, together with the greatest possible degree of cooperation with other countries and international organisations;
32. Calls on the Member States to support a sense of ownership among regions and citizens and to promote the increased use of locally available renewable energy sources by means of legal and fiscal incentives;
33. Calls on the Member States to motivate electricity suppliers, by means of depreciation systems and tax incentive schemes, to carry out the necessary modernisation of fossil-fuel-fired power stations in order to achieve substantial efficiency improvements in conventional power production;
34. Calls on the Member States to secure network access for energy, gas and electricity from decentralised sources, to dismantle barriers to market access for innovative power suppliers in the renewable energy sector and to press for the expansion of local cogeneration and trigeneration, gearing it to medium-term targets;
35. Proposes the creation, as building blocks of a European external energy policy, of solar energy partnerships with third countries in the Mediterranean region which aim in the initial phase to generate solar power and transfer it to the European Union via high-voltage cables, and which may in a second phase form the basis for electricity and

hydrogen production and thus for the switch to a renewables-based economy;

36. Calls on the EU, the Member States and the business community:
 - to invest in infrastructure, networks and grids for the production, transport and storage of solar energy and hydrogen;
 - to offer third countries, by way of energy partnerships, programmes for the creation of the necessary institutions, infrastructures and training programmes for locally based experts and network access for their own needs;
37. Calls on the Member States to step up still further, in line with local or regional capabilities, the share in the energy mix of wind energy – which thanks to intensive promotion has already become an established means of energy generation – and of hydro and geothermal power, and to make further use of existing development potential, *inter alia* through European research initiatives and coordination via networks of excellence;
38. Stresses the considerable potential of the use of sustainable biomass for energy production with a view to reducing greenhouse gas emissions, and calls for a European strategy for the exploitation of sustainable biomass for production of electricity and gas, heating and cooling;
39. Calls on the Commission to submit a comprehensive analysis of all emissions throughout the entire life-cycle of individual sources of bioenergy in order to determine what role biomass from residues and dedicated cultures can play as an energy source in future; considers that the advantages and disadvantages of the opportunities offered by breeding innovations and the use of biotechnology for improving the calorific value of biomass should be investigated, without prejudging the outcome;
40. Regards combined heat and power as an effective, economical and environmentally sensible option;
41. Acknowledges the different approaches of the Member States with regard to nuclear energy and therefore urges the Commission to pay special attention to radioactive waste and its full cycle, with a view to improving safety;
42. Considers that research into the technological feasibility of nuclear fusion in the International Thermonuclear Experimental Reactor is the first step towards the objective of commercial utilisation of this form of energy, and stresses that the achievement of that goal is highly dependent on long-term guarantees of funding for such research;

Biofuels

43. Notes that certain production-types of biofuels can have an impact on food prices, loss of biodiversity and deforestation, and notes at the same time that biofuels must be produced responsibly and through a verifiably sustainable process;
44. Suggests that the Commission rethink the notion of a quota for biofuels and develop flexible policies which take account of the complex nature of biofuels production, including life-cycle greenhouse gas emissions and assessment of all relevant indirect effects;

45. Considers it essential to involve the developing countries in a long-term strategy for the development and production of biofuels, in order to examine the possibility of their economic planning and profitability, to secure the availability and production of food, to answer the question of their environmental sustainability, and not least to permit social development and a lasting increase in earnings, as well as to ensure that developing countries receive the training needed in order to be in a position to meet the EU sustainability criteria;
46. Calls on the Commission and the Member States to step up research and development of advanced biofuels, to ensure that they are allocated the necessary funding and to link them to fixed development goals;
47. Calls on the Commission and the Member States to use the experience gained from the development of sustainability criteria within the EU to actively promote the development of a global biofuels standard;

Energy efficiency

48. Calls on the Commission to propose a binding goal of 20% in energy efficiency by 2020 and to accompany that proposal with concrete interim reduction targets;
49. Calls for a broad, locally-based public information campaign to improve decentralised energy efficiency, with house and flat owners being provided with thermal images and energy performance information for their properties, as well as with recommendations for financing possible modernisation work, along the lines of micro-credits;
50. Calls on the Commission and the Member States to take active steps to increase awareness of the importance of information and communications technologies for improving energy efficiency, sustainable development and the quality of life of EU citizens;
51. Calls for synergy between property owners, financial service providers, tradesmen and other operators in the property sector to be generated through trade fairs, open days and seminars;
52. Calls for clear European coordination with a view to the expansion of electricity cogeneration and trigeneration and their integration into industrial plants, so as to guarantee local or regional starting-points for climate protection measures, whilst at the same time increasing energy consumption efficiency;
53. Calls on the Economic and Financial Affairs Council (ECOFIN) to introduce reduced rates of VAT for renewable energy and for energy-saving goods and services; proposes, in particular, that the Member States create incentives to modernisation by means of VAT reductions on modernisation work and the equipment used to carry this out, by gearing land or property taxation to the energy efficiency of buildings and by fully implementing and promoting energy performance certifications;
54. Proposes, as an incentive for the modernisation of rented property, the reduction of tax rates on rental income in line with investment in renewable heating and electricity systems as well as efficiency gains;

55. Notes, given the long life of buildings, the paramount importance of ensuring that new buildings are constructed to the highest energy-efficiency standards possible, that existing buildings are upgraded to contemporary standards, and that minimum levels of energy from renewable sources are used in all new or refurbished buildings requiring heating and cooling;
56. Proposes that Member States improve and expand the use of energy-efficiency certificates and link the recommendations to financial incentives;
57. Calls for minimum EU energy-efficiency standards for new and refurbished buildings; calls on the relevant local authorities and professional associations in the Member States to establish energy-efficiency criteria, guidelines and national legislation or administrative decisions for new buildings as a leitmotiv for architects and building engineers, with building regulations for the energy efficiency of new buildings and major renovation works, and to ensure in this context clean and healthy indoor air;
58. Stresses the need for minimum energy-efficiency criteria to be included in a comprehensive public procurement policy for public buildings and services at national, regional and local levels, as a means of promoting innovation in new technologies and ensuring their market access;
59. Calls on the Commission and the Member States to provide active support for research and technological development relating to lighting technologies and intelligent lighting applications, so that the introduction of more energy-efficient lighting in both indoor and outdoor public spaces – with an emphasis on highly efficient light-emitting diodes – can be more vigorously promoted;
60. Notes that renovation and improvement of the energy efficiency of tower-block buildings, especially in those countries where such buildings make up the biggest part of the housing market, is the easiest way to save energy and reduce CO₂ emissions; calls on the Commission to revise and increase the currently existing 2% structural funds limit applicable to grants for the renovation of tower blocks;
61. Notes that the long-term target in the building sector in Europe should be net zero-energy performance in new residential buildings by 2015 and in new commercial and public buildings by 2020, and considers that the target should be extended in the long term to cover renovated buildings;
62. Calls on the Commission to adjust the energy-efficiency requirements for electrical and electronic equipment of all kinds to market developments at least every five years following the “top runner” principle, to update existing labelling programmes or efficiency classifications and thus to prevent the consumer from being given inaccurate information;
63. Calls on the Commission to set stringent EU targets and establish integrated industrial policies designed to ensure market access and the uptake of energy-efficient technologies, including the development of common technological objectives (such as passive houses), greater use of integrated policy strategies such as lead markets and green public procurement, and supporting regulation in respect of product design and minimum

standards;

64. Calls on the Commission to implement consistently the ban on devices with high stand-by losses and, as a next step in the implementation of the Eco-design Directive³, to consider making it compulsory for devices to have a switch-off function, and to make automatic switch-off and energy-saving modes mandatory even for installations with large motors and for industrial equipment and machinery;
65. Urges early and rigorous implementation of the 2006 requirements relating to the installation of smart meters in order to raise consumer awareness of energy use and help energy suppliers manage demand more effectively;

Mobility and logistics

66. Notes that the European economic and social model is based on securing the mobility and availability of persons and goods, giving priority to efficiency of time rather than efficiency of resources, and that a combined approach using both factors will thus be necessary in future;
67. Calls on the European Investment Bank and its risk-capital subsidiary, the European Investment Fund, to broaden significantly their support for energy efficiency and renewable energy development;
68. Reminds the relevant operators that the transport sector must also comply with the EU climate goals of reducing CO₂ emissions by 2020 by at least 20%, and if there is an international agreement by at least 30%, below 1990 levels and increasing energy efficiency by 20% during the same period;
69. Calls for a comprehensive policy mix of mutually supportive measures aimed at a sustainable transport policy comprising the development of vehicle technology (eco-efficient innovation), increased use of alternative energy sources for transport, the creation of distribution networks for clean fuels, increased use of alternative forms of propulsion, intelligent traffic management, changes in driving styles and car use, improved logistics, "green corridors" and ICT for transport, a CO₂ tax and the modernisation of public transport in order to achieve the goal of zero emissions without ignoring the increased need for mobility; points out that all of these could be promoted by clear preferences in public procurement;
70. Considers that special priority must be given to the application of the "polluter pays" principle, and calls for all modes of transport to be fully involved in the internalisation of their external costs; points out that the achievement of this goal will require an adequate economic environment, and therefore calls on the Member States to review the taxes and duties concerned;
71. Welcomes the Commission's Greening Transport Inventory, which lists both existing and necessary future legislation for sustainable growth in the transport sector;

³ Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products (OJ L 191, 22.7.2005, p. 29).

72. Stresses the importance of infrastructure projects for the transport sector; however, calls for potential climate impact to be taken into account in future in planning, design and construction;
73. Calls on the Commission and the Member States to exploit the potential of satellite navigation systems with a view to increasing energy efficiency in the transport field by improving the management and organisation of traffic flows, providing real-time information concerning the movement of goods and persons, and optimising the selection of routes and modes of transport;
74. Regrets that the challenges involved in the delivery of transport-efficient and environmentally friendly town planning with pedestrian areas, cycle paths and flexible links to local public transport have in many places been addressed inadequately or too late, or have been only partially tackled;
75. Calls on European cities and local authorities to offer flexible and coordinated alternatives to car use and to extend mobility schemes, for example by linking existing central and peripheral local transport networks more closely and using traffic regulations to accord priority to public transport in city centre traffic;
76. Stresses the potential of rail transport as a low-carbon, energy-efficient mode of transport, both for long-distance freight haulage and for short- and medium-distance regional and commuter traffic, and asks that such priorities be reflected in the criteria for the support of regional and cohesion funds;
77. Welcomes the creation and the extension within the EU, as well as to the neighbourhood countries, of the Trans-European Transport Networks (TEN-T) and calls on the Member States to complete the priority projects, in particular those which are most climate-friendly, as soon as possible, since these are vitally important for freight transport logistics and a sustainable European transport policy;
78. Stresses the important role of inland waterways in goods transport, emphasises the environmentally friendly nature of this sector and the fact that it has plenty of spare carrying capacity;
79. Regrets that, in spite of the scope, in the interests of the transport sector as a whole, for effecting a modal shift to rail and inland waterways for a large proportion of freight, investment in the expansion of the railways has fallen during the past decade;
80. Calls on the Member States and local authorities, by means of pricing measures and other incentives, to promote a modal shift from cars to local public transport and from road to more environmentally friendly means of transport, and by substantial investment in the necessary infrastructure to massively expand and improve the overall service, making public transport more attractive; in the intermediate period, calls for improvements in the integration of private/individual transportation with passenger/freight-integrated logistics and public/collective transport systems; is convinced that investment in rail infrastructure must go hand in hand with a better railway service;
81. Stresses the importance of intelligent traffic management systems in the interests of co-

modality and their incorporation into Community, national, regional and local transport policy, since they lead to safer and more environmentally friendly transport; calls for the development and use of intelligent transport systems in order to manage traffic and to reduce traffic congestion;

82. Calls on the Member States to promote co-modality by introducing transferable number plates in line with existing practice, making it more attractive for citizens to use rail for long journeys and energy-saving local-use cars at their starting point and destination;
83. Calls on the EU and its Member States to work closely together with industry to create the necessary market policy conditions with a view to incorporating intelligent transport systems – particularly as regards logistics and safety management (ERTMS, RIS, eCall) – into transport management;
84. Supports the Commission in its plan to designate, together with the Member States, special “motorways of the sea”, and has great hopes regarding the ability of the forthcoming “European Maritime Transport Space without Barriers” to promote sea transport in Europe and to boost its efficiency;
85. Supports the Commission's proposals to increase port dues and berthing fees on the basis of vessels' exhaust levels and to ensure that power for ships in port is supplied from land rather than by the ships' own generators;
86. Considers that shipyards and shipbuilders should look closely at new efficiency-boosting technologies such as the use of kite sails, the Air Cavity System, the exploitation of waste heat for electricity production, more efficient motors, better hull and rudder profiles, more accurate weather forecasts permitting course adjustments, and possible fuel savings thanks to hull paint;
87. Calls on the International Maritime Organization to agree on a reduction target within the shipping industry and to set minimum standards for the use of these modern technologies in the construction of new vessels; calls on the Commission to set an emission reduction target for maritime transport, should this prove to be necessary;
88. Considers that there is a need for an integrated approach in the aviation sector which will commit the aircraft industry worldwide, airlines and airport operators jointly to an emission reduction target by 2020, without calling in question the benefits of emissions trading as an instrument for increasing efficiency;
89. Urges the EU and its Member States to implement and expand both the Single European Sky and the SESAR (Single European Sky Air Traffic Management Research) projects as efficiently as possible before the entry into operation of the Emissions Trading Scheme for the aviation sector, so as to make the creation of functional and flexible airspace regions and the flexible use of airspace as a whole a priority, with a view to exploiting available reduction potentials immediately and reducing aircraft fuel consumption by up to 12%;
90. Calls on the producers of propulsion systems and motors for the transport sector to work together in accordance with Euro-6 standards, but also beyond those standards, on

continually improving the energy efficiency of their machines, to set targets within the industry for massive efficiency increases and to continue research into alternative fuels, so as to contribute to the more sustainable growth of the industry;

91. Calls on car manufacturers to shift their fleets towards smaller, lighter, more efficient models in order to allow for individual mobility under the constraints of climate change and limited oil resources;
92. Calls on the armaments industry also to look at efficiency improvements in their motors and propulsion systems and to carry out research into the possible use of alternative fuels;
93. Calls on all Member States and the EU institutions to give all necessary support to R&D in respect of break-through environmentally friendly transport technologies, such as hydrogen, electric, fuel cells, hybrids or advanced biofuels;
94. Calls on the European Union and its Member States to adopt a hydrogen-specific support framework based on renewable energy sources, so as to ensure that the production of hydrogen vehicles is rapidly speeded up; considers that the framework should address the issues of increasing EU budget support for hydrogen end-use applications, the provision by Member States of support to hydrogen-specific deployment through financial measures such as tax incentives, and creating early markets through zero-emission vehicle procurement within governmental services;
95. Calls on the Commission to draw up by 2010 a report on the restrictions which still exist on cabotage and other factors in the European Union which lead to unladen journeys and losses of efficiency in the internal market; believes that efficient and effective freight logistics, used as an integral part of the EU transport system, are the key to sustainable mobility in Europe, to economic efficiency and competitiveness, to optimal use of energy resources, to job creation, to the protection of the environment and to fighting against climate change;

Tourism and cultural heritage

96. Expresses its concern that cultural heritage and traditional landscapes in Europe are threatened by extreme weather phenomena and long-term climate change, and calls on the Member States to draw up a uniform list, coordinated at European level, of European cultural heritage sites threatened by climate change;
97. Calls on the Commission, Member States and regions, in climate-sensitive seasonal tourist areas where there are no real alternatives on offer, to take comprehensive adaptation and preventive measures – such as securing water supplies, protecting against forest fires, taking precautions against the melting of glaciers and improving coastal defences – to reflect the economic importance of tourism and of the necessary infrastructure for jobs and incomes, and to counteract significant economic damage along the whole length of the value chain;
98. Considers that in some regions the further growth of tourism is economically sensible and environmentally justifiable only when likely effects of climate change – such as more serious water shortages, lack of snow or the disappearance of glaciers – are taken into

account at local level when considering future development;

99. Calls on the tourist industry, together with local authorities and economic associations, to work on integrated strategies with a view to reducing emissions and improving the energy efficiency of the sector – particularly as regards transport and accommodation – and to plan measures to promote ecotourism and to protect tourist sites from extreme weather conditions;
100. Recommends the development of more ecological types of tourism, such as social tourism, sport tourism or cultural tourism, and stresses that the tourist destinations of excellence should be those which respect and protect the environment;

Emissions trading scheme and industrial emissions

101. Calls for the inclusion of workplace climate-change audits in company reporting standards to enhance transparency in the monitoring of greening policies and emissions reductions;
102. Requires all commercial and non-commercial entities to report publicly, on an annual basis, on the amount of greenhouse gas emitted, measures taken to reduce greenhouse gas emissions, activities undertaken to re-skill employees (in the event of closure due to proven carbon leakage) and revenues gained through emission trading scheme operations; asks the Commission to monitor these activities and to report to Parliament on progress made by industrial sectors to curb emissions;

Agriculture and livestock breeding

103. Calls on the Commission to consider, without prejudging the outcome, the explicit inclusion of agriculture in a future integrated European climate policy and the elaboration of binding reduction targets for the emission of greenhouse gases, including methane and nitrous oxide, from the agriculture sector, exploiting all existing potential;
104. Points out that optimised land management increases the humus content of soil and that if cultivation management is improved and unplanted fallow land is avoided, areas under cultivation can play a much larger part in carbon storage than hitherto;
105. Takes the view that optimised storage and application of mineral fertiliser can make a significant contribution to reducing nitrous oxide emissions; calls in this connection for fertilisation with organic mixtures in place of mineral fertiliser to be further stepped up;
106. Calls for economic analyses to be carried out of the profitability of certain regional cultivation practices under different climatic conditions, in order to identify possibilities of adaptation and to facilitate switching to other cultivars;
107. Calls for research to be carried out into new technologies and for the development of those technologies, including biotechnology for seed and plant breeding and green gene technology, and for plant protection to be stepped up, in order to implement a climate protection policy for agriculture; also calls for funding for research in to, and the development of, new and more environmentally friendly methods of cultivation and farm

management and for their implementation by way of pilot schemes, which should include seminars and educational programmes for both new and the existing farmers, in order to help agriculture to adapt to climate change;

108. Takes the view that, if agricultural practice is to take account of climate change, new land and water management know-how needs to be imparted, and that vocational training for young farmers should cover the effects of climate change or the climatic relevance of agricultural production;
109. Recognises that the cultivation of cereals and soya as feed for livestock is responsible for substantial greenhouse gas emissions; recalls the report entitled "Livestock's Long Shadow" issued by the UN Food and Agriculture Organization in November 2006, which states that the livestock industry is responsible for 18% of the world's total greenhouse gas emissions; considers that a switch from intensive livestock production to extensive sustainable systems should be encouraged while total meat consumption also needs to be reduced, in particular in industrialised countries;
110. Calls for feed rations in dairy and meat production to be reviewed, and where necessary improved, with the aim of achieving a reduction in methane formation in the rumen of ruminants; calls for any feeding and breeding measures in the livestock sector to be subject to an animal health and welfare impact assessment and for such measures not to be introduced if there are any adverse effects on the animals concerned;
111. Recognises that expansion of biogas systems to obtain energy by processing manure can make an economically feasible and environmentally meaningful contribution to reducing methane emissions from livestock farming;

Forests

112. Takes the view that the objective of future European climate policy should be not only the conservation of tropical rainforests and of the surviving boreal forests but also the care and reforestation of the European forests; points out that protective woodland belts around large urban areas and industrial centres can play an important role;
113. Takes the view that if avoiding the destruction of forests is to be effective in cutting emissions, an ongoing system of compensation must be devised for forestry through the UNFCCC, and calls for a clear economic incentive to be created for permanently preserving virgin forests or large forest areas by using them in a sustainable manner, with the value of a forest area being far more closely assessed according to the "eco-services" and overall social functions it performs;
114. Calls, in the context of a global CO₂ market, for those countries that still have large areas of natural forest to be given particular economic incentives to preserve them by recognising the carbon accumulated each year in a rigorously preserved forest; suggests that consideration be given to the question whether it makes sense in this connection to focus solely on tropical rainforests;
115. Calls on the EU, in cooperation with the international community, to set up aerial and satellite-based monitoring systems and the necessary infrastructure to secure the long-

term survival of tropical forests in particular; calls for the establishment of a global fund under the auspices of the World Bank for the creation of monitoring systems;

116. Considers that the global monitoring systems for forest protection can only be held to be a success if the necessary institutional support and administrative bodies with qualified staff are put in place and maintained in the long term;
117. Highlights in this connection the need for monitoring programmes in European forests to permit the early detection of pest damage and for scientific risk modelling in relation to wooded areas prone to heat waves, wildfires and drought, so as to make it possible to take appropriate counter-measures to protect the forests;
118. Considers that the Member States' national forest inventories are an important source of information with a view to analysing the overall condition of the European forests and their importance as a CO₂ sink; calls on the Commission not only to press for the drafting and evaluation by the Member States of the data collected but also to take advantage of existing best practice in the Member States;
119. Notes that, based on its life-cycle attributes, wood is a "greener" choice in construction than steel and concrete, since it locks up carbon dioxide and requires much less energy to produce than alternatives, and its by-products can be used to produce renewable energy; notes further that using wood as a construction material would help to take carbon emissions out of the carbon cycle permanently and would replace energy-intensive materials such as concrete;
120. Stresses that sustainable forest management, which uses very broad social, economic and environmental goals, should be implemented in the EU; notes that sustainable forest management aims in the long term to increase the forest carbon stock; notes further that young, growing and well managed forests are good carbon sinks and hence considers that, where forests are being cut down, new planting should be undertaken to replace those trees which are cut down; considers that, simultaneously, more old forests should be protected, as they play a vital role in maintaining biodiversity;

Soil protection

121. Recommends that scientific studies of and monitoring of the condition of soils be extended with a view to taking measures in good time to counteract erosion, the loss of agricultural land and biodiversity;
122. Calls on the Council to approve its common position on the Framework Directive on soil protection in order to introduce a genuine Community instrument to combat the effects of deforestation, erosion and desertification;
123. Calls on the Member States to establish a policy of soil protection by appropriate soil treatment methods, taking account of the importance of organic materials in the soil for its fertility, water retention capacity and ability to function as a carbon sink, and to consider the possibilities of using biochar;
124. Highlights in this connection the importance of the ecosystem approach in avoiding and

lessening the effects of soil erosion, destruction of permafrost, desertification, invasive alien species and forest fires;

Water management

125. Takes the view that strategic planning and integrated water resources based on supply measures and the hierarchy of water uses are crucial to coping successfully with the effects of climate change on the availability and variability of water resources;
126. Considers that integrated water resources management should comprise strategies for the improvement of water use efficiency, water saving, rationalisation and limitation of water consumption, and improved consumer awareness concerning sustainable water consumption, and that it should respond to issues concerning the collection and storage of rainwater in natural and artificial reservoirs, as well as to those relating to the risk and impact of floods and droughts; considers that action should be encouraged to establish an effective hierarchy of water uses and recalls that a demand-side approach should be preferred when managing water resources;
127. Calls on the Commission to assume an important cross-border coordinating role in water management, particularly by network creation and funding of research into innovative technologies for the desalination of sea water, new irrigation systems and agricultural and urban water consumption, and for pilot projects to reduce damage from drought or flooding; calls for the rapid establishment of the European Observatory on droughts, desertification, floods and other effects of climate change in order to gather information and ensure a more effective response by means of an early-warning system;
128. Considers that, in order to provide adequate incentives to use water resources efficiently, Member States should, in their water policy, take account of the principle of recovery of the costs of water services and of the "polluter pays" principle;

Fisheries

129. Stresses that some current fishing practices further decrease the resilience of fish stocks and marine life to the impact of climate change;
130. Is convinced that a comprehensive framework plan for the sea, as set out in the Marine Strategy Framework Directive¹, is needed in order to guarantee better and more sustainable management of the marine environment and resources; warns that European marine protection areas will otherwise become the last oases of biodiversity in a lifeless and empty ocean;
131. Welcomes the Commission's decision to increase the resilience of fish stocks and of the marine ecosystem as a whole by establishing catch quotas for industrial fishing on the basis of sustainability criteria;
132. Takes the view that environmental changes resulting from climate change could mean

¹ Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (OJ L 164, 25.6.2008, p. 19).

that aquaculture has to be relocated, resulting in economic harm to its current locations; warns, however, that the relocation of aquaculture may have negative effects on the ecosystems in question and calls in this connection for compulsory impact assessments;

Waste treatment and resource management

133. Recognises that the hierarchy of waste forms a leitmotiv in European waste policy; invites the Commission to propose percentage reduction targets on reducing, reusing and recycling waste; demands that the targets be reviewed and tightened when necessary;
134. Notes that waste prevention, for example by optimising packaging, is the best way of reducing the sector's direct emissions; stresses, however, that waste prevention in the long term demands changes in production methods and consumption habits;
135. Stresses that separate collection of biowaste and material recycling make a significant contribution to preventing direct emissions from landfill sites;
136. Considers that, in order to restrict direct emissions from the waste sector, it makes sense to avoid transporting unsorted waste over long distances; takes the view that cross-border transport of mixed domestic waste in the EU should therefore be reduced to a minimum; considers that illegal exports of material suitable for recycling must be combated in order to avoid "exporting emissions" and retain valuable raw materials in the EU;
137. Considers that, after a phasing-out period, Member States should entirely cease in the medium term to landfill unsorted domestic refuse, since better use of existing recycling systems or the development of completely new systems would improve waste treatment as a whole and exploit existing potential for reducing greenhouse gases using existing technologies; calls in this connection for compulsory methane capture for heat production on existing landfill sites;
138. Regards energy recovery from residual waste in dedicated waste-to-energy plants and energy recovery from pre-sorted waste, particularly in conjunction with cogeneration systems with strict emissions controls, as a potentially highly effective way of recovering energy which can reliably be used to reduce indirect greenhouse gas emissions and replace fossil fuels;
139. Considers that enhancing research and development in respect of waste treatment and resource management solutions is vital, and stresses the need for the immediate application of new innovative technologies in this field;
140. Acknowledges, in the context of the negotiations on a post-2012 agreement and the involvement of third countries, that more consistent application of European standards of waste treatment is a possible way of linking development objectives – such as better protection of human health and the environment – with new economic opportunities while making a positive contribution to combating global climate change;
141. Calls on the Commission to carry out a study on including the waste sector in emissions trading and the compatibility of such inclusion with CDM projects;

Adaptation measures

142. Recalls the demands made in its above-mentioned resolution of 10 April 2008, and calls on the Commission to publish without further delay its promised White Paper setting out a coordinated EU-wide framework for the planning of adaptation measures;
143. Stresses that, while the subsidiarity principle must be properly respected and while it is important to recognise the key role played by regional and local authorities, particularly in more vulnerable areas such as upland and coastal regions, action at EU level is essential in order to build resilience for biodiversity by reinforcing the Natura 2000 network and integrating effective adaptation measures into EU cohesion, agriculture, water and marine policies;
144. Stresses once again the need for coherence and the integrated coordination of adaptation measures at EU level and for the search for possible synergies, including under international agreements covering specific regions or territories to which the European Community is a party, reiterates its call for an EU-wide framework for the planning of adaptation measures;
145. Underlines the importance of the publication by the Commission of its Green Paper on territorial cohesion, which stresses the need for an integrated approach to sectoral policies in order to improve the combined territorial impact of EU and national and regional policies; therefore calls for the improvement of structural funds procedures to enable them to make an even larger contribution to climate measures;

Health

146. Stresses the importance of green zones in urban areas for the health of the general public, air quality and carbon capture, and to help to tackle climate change; calls on the Commission, the Member States and local authorities to preserve and enlarge the existing – and to develop new – green zones in urban areas;
147. Stresses the coordinating role of the EU, in particular in creating automatic or continuous pollutant monitoring and early warning systems for heat waves, prolonged frost and flooding, and in improving the systematic collation of health, meteorological, environmental and statistical data;
148. Stresses that climate change will play a critical role in the increased prevalence of certain diseases, as a result of the inevitable changes in the nature of ecosystems, which will affect *inter alia* animals, plants, insects, protozoans, bacteria and viruses;
149. Emphasises that it is of paramount importance to acquire specific expertise on the effects of climate change on human health, especially in relation to certain infectious and parasitic diseases;
150. Stresses that, although the main objective of the 2008-2013 public health programme is to act on the factors which traditionally determine health (diet, smoking, alcohol consumption and the use of drugs), it should also focus on certain new challenges to health and address the determining environmental factors resulting from climate change;

151. Stresses the coordinating role of the EU and the European Centre for Disease Prevention and Control in providing advice to the general public on avoiding insect-borne disease through the use of, in particular, protective clothing, bed nets and insect repellent and control products;
152. Notes that possible measures may include the collection and evaluation of relevant data on the effects of climate change on human health, improving preparedness for natural disasters, public health services and emergency planning, support for measures to promote health in all sectors, and measures to increase awareness, particularly the provision to the public of information about new types of dangers to health, warnings and specific tips on avoiding exposure, with special reference to insect-borne diseases and heat waves;
153. Highlights that tropical illness spread by parasites or mosquitoes and other pathogenic agents, usually encountered in tropical areas, could appear at higher latitudes and altitudes, representing a new threat to human beings;
154. Considers that there is a need for research in medical science and in the pharmaceutical sector in order to develop drugs and vaccines for new diseases, which should be made available to all affected populations at an affordable price;

Growth and employment

155. Considers that Europe enjoys an excellent starting position in the global race for a low-emission economy, and should make the most of this position to trigger greater innovation which will create new and competitive businesses and new jobs in the fields of clean technology, renewable energies and green enterprises and green skills in order to counterbalance any possible loss of jobs in high CO₂-emitting sectors, in full accordance with the Lisbon Strategy; calls on the Commission and the Member States to identify structural changes resulting from the implementation of climate change policies and calls on the Commission to propose, periodically, measures to support the populations most affected;
156. Warns against pessimism, which may lead to our missing the economic opportunity offered by climate change and the political measures needed to combat it, by stressing the need for optimism on the part of the social partners who will be directly involved in stimulating the economy and the possibilities of re-education and absorption of workers affected as a result of climate change adaptation and mitigation; considers that public and social consensus will be critical to winning the global race for efficiency, innovation, raw materials and future technologies, and markets;
157. Takes the view that growth and employment potential can only be fully realised if at the same time market access points are secured and bureaucratic barriers to the utilisation of available technology are dismantled;
158. Invites the Member States to examine the compatibility of existing rules with climate policy objectives and to develop incentives to facilitate the shift to a low-carbon economy;

159. Invites the social partners and the two sides of industry in the Member States and at EU level to develop common economic strategies for each sector, so as to identify and strategically exploit potential where it exists;

Promoting the technology of the future

160. Takes the view that a combined approach should be launched and developed comprising emission reductions and a separate process of technological renewal within the framework of an integrated European climate policy designed to secure resources for future generations;
161. Considers, particularly with regard to the technological neutrality of the EU approach, that the environmentally safe use of CCS should be discussed extensively and with the involvement of private and public stakeholders, without prejudging the outcome; advocates the promotion of international cooperation in order to encourage technology transfer, particularly with those emerging countries which still rely on local coal as a fuel;
162. Takes the view that creating next-generation technologies and making possible the necessary increase in scale requires considerable financial support for long-term research and development;
163. Urges the members of the UNFCCC to recognise CCS as a technology transfer under the CDM provided for by the Marrakesh Agreement on the Kyoto Protocol;
164. Calls on the EU and its Member States to respond by means of research and public awareness measures to possible public scepticism or concerns about the application of CCS;
165. Proposes that the integrated European climate policy should concern itself with proposals for fundamental incentive mechanisms and support measures, so that the necessary technological renewal can be launched, the running costs for new but costly technologies reduced, and more stringent reduction targets set and achieved in future;
166. Recommends that Member States consider ways of accelerating the implementation of clean and energy-efficient technologies, such as direct subsidies to consumers investing in technologies, for instance solar panels, ground heat pumps, air heat pumps, water heat pumps and cleaner burning hearth appliance stoves;
167. Proposes to that end parallel measures such as the participation of economists, engineers and private businesses in an institutionalised and parallel "Kyoto Plus Process", along the lines of the successful method of the Montreal Protocol for protecting the ozone layer;
168. Calls for the establishment of a European Climate Fund and/or corresponding funds in the Member States, and regards this as a way of creating a capital stock to fund a future climate policy, given that there are limits on how far one can plan now for the individual measures which that policy will necessitate and the investment and solidarity they will require;
169. Proposes that this capital stock be used on the capital market to permit a backflow to the

economic operators and (re-)investment in future technologies, thus leaving it to the market to decide which technologies should be used in future to achieve medium- and long-term climate objectives, instead of determining this by legislation;

170. Stresses emphatically that, in the long term, effective solutions to the problem of climate change will also come from scientific innovations both in the field of the production, distribution and use of energy, and in other, related fields, which will effectively restrict the production of greenhouse gases without creating accompanying environmental problems;
171. Stresses the importance of the Seventh Research Framework Programme for the development of green energy sources and calls on the Council and the Commission to support this priority in forthcoming research framework programmes too;

Intelligent computer systems and ICT

172. Suggests to the forthcoming Council Presidencies that they make the future topic of ICT and its importance in combating and adapting to climate change one of the priorities of their periods of office;
173. Calls on the EU and its Member States to promote the testing, validation, introduction and further dissemination of computer- and ICT-based methods for dematerialisation and vastly enhanced energy efficiency – particularly through improved logistics in freight transport, replacing physical travel with tele- and videoconferencing, improved electricity networks, energy-efficient buildings and smart lightning – in cooperation with industry, consumers, authorities, universities and research institutions;

Financing and budgetary matters

174. Considers that the EU should make a financial commitment not only in the core areas of promoting and developing technologies to combat climate change and of climate-related development aid, but also in supporting cross-border adaptation measures, increased efficiency and aid for disasters, in accordance with the Union's solidarity principle;
175. Calls on the Commission to draw up an inventory of all existing funding instruments and their significance for European climate objectives and, on the basis of this "climate audit", to devise proposals for the future financial framework so that EU budget lines can be adapted in line with the requirements of climate policy, while not excluding the possibility of creating new funds and thus allocating new resources to them;
176. Calls on the Council to tackle the question of unused, earmarked funds from the EU budget, allocating these where necessary for climate policy purposes;
177. Stresses, in its capacity as an arm of the budgetary authority together with the Council, that the highest priority must be given to climate change and measures to combat it in the next financial perspective;

Education, training, reporting, labelling and awareness-raising

178. Calls on the competent bodies in the Member States to create new careers and to adapt not only practical work training but also occupational training colleges and courses at technical colleges and universities to the specific employment-related challenges of the structural economic change which is being hastened by climate change and its effects;
179. Recognises the important role played by workers and their representatives in greening their companies and workplaces, at the national and transnational levels, and calls for Community support for the development, exchange and dissemination of best practice;
180. Calls on the Commission to develop communication strategies to spread information to the general public on the science of climate change (based on the latest IPCC findings), energy saving strategies, energy efficiency measures and the use of renewable energy sources; in addition, suggests that EU youth exchange programmes focus on common climate change awareness projects and therefore calls on the Commission to commission annually, via Eurobarometer, an EU citizen survey measuring citizens' attitudes and perceptions towards climate change, and furthermore calls for general and simple efficiency standards for all areas of everyday life, and for the creation of incentives (e.g. of a fiscal nature) for responsible energy consumption;
181. Calls on the Member States, together with electricity suppliers, to enter into a dialogue with citizens in order to convince the public of the need, for reasons of energy and climate policy, to make modern fossil-fuel-fired power stations more energy-efficient, including a discussion of CCS;
182. Calls on the Commission to share information with citizens and Member States on successful projects such as the "car-free day" in the context of European Mobility Week, and highlights the need to make citizens think about their urban mobility and hence question their behaviour as road users in their cities, and not to confine the term "individual mobility" to the use of one's own car but extend it to all forms of individual travel in cities and conurbations, such as walking, cycling, car-sharing, car-pooling, taxis and local public transport;
183. Welcomes the meeting of the world's largest cities under the auspices of C40, particularly as a forum for exchanging proven greenhouse gas reduction measures at global level, and for learning from each other;
184. Stresses in particular the need to inform and consult citizens on the ground and to involve them in decision-making processes, and encourages urban centres, regions and greater urban areas to aim for specific reduction targets and implement them by means of local or regional innovative financing programmes with support from the public authorities;
185. Calls on the Member States, with a view to raising public awareness, to incorporate into the relevant building regulations a provision to the effect that citizens applying for planning permission will receive comprehensive information on what opportunities exist locally for the use of renewable energy sources;
186. Suggests that local and regional authorities, districts, quarters and municipalities, and in

particular public institutions, schools and child and youth care establishments, carry out "energy saving competitions", as well as local campaigns properly resourced at national and EU level, with a view to raising public awareness of savings potential, achieving citizen participation and generating learning effects;

187. Suggests that the Commission declare a European Year of Energy and Resource Efficiency in order to raise citizens' awareness at all policy levels of more efficient use of resources and to take climate change as an opportunity to hold an intensive debate on the availability and handling of resources; calls on the Commission and the Member States to fight energy poverty as well as to guarantee the development of a water saving culture and to raise public awareness of water saving through educational programmes; calls on the Commission to look into the possibility of promoting a network of cities to encourage sustainable water use with the aim of exchanging good practice and jointly carrying out pilot demonstration projects;
188. Regards advertising and product information as an important instrument for raising consumer awareness of the environmental costs of consumer goods and changing consumer behaviour; warns, however, of the risk of "greenwashing" and calls on the Commission and the Member States, in consultation with European industrial associations, to draw up an advertising and labelling code for their industries with a view to condemning misleading advertising and incorrect statements about the environmental effects of products, and to comply with existing European advertising and labelling rules;
189. Considers it important, in the dialogue with citizens and retailers, to focus advertising on regional and seasonal products, and to use consumer information, in particular mandatory labelling regarding the production method of meat products, as an aid to consumer decisions, so as to highlight the climate impact of intensive livestock production;
190. Considers that citizens should be made more aware of the fact that a reduction in the production and consumption of meat and dairy products would decrease greenhouse gas emissions as well as reduce the risks of certain cancers, heart disease and obesity;
191. Considers the lack of information among the public on measures to combat climate change to be a serious problem; therefore calls on the EU, its Member States and regional and local authorities and institutions, together with the press, broadcasters and online media, to devise and implement a Europe-wide information campaign on the causes and effects of climate change and growing scarcity of resources, focussing on individual ways of changing one's behaviour in everyday life and giving a better and more readily understandable picture of the work of European and national authorities on measures to combat climate change;
192. Welcomes initiatives by major undertakings to pursue internal reduction targets with the involvement of their staff and their small and medium-sized suppliers, and to use public communication strategies to promote sustainable production and consumption models; encourages economic organisations in the Member States and at European level to emphasise sustainable business practices as a unique asset in competition;

193. Calls for an agenda for action to combat climate change for the period 2009-2014, to be implemented as follows:

(a) at EU level, the Commission and the Member States should:

- lead discussions at a local and global level on actions to be taken to combat climate change,
- develop, fund and introduce an EU-wide supergrid accessible to all forms of electricity providers,
- promote and fund efficient, sustainable transport infrastructure to reduce carbon emissions, including hydrogen technology and high-speed railways,
- develop new communication strategies to educate citizens and provide them with incentives to reduce emissions in an affordable way, e.g. by developing information on the carbon content of products and services,
- develop appropriate legislative instruments to encourage all industrial sectors to become leaders in the fight against climate change, starting with a demand for transparency on carbon emissions,
- establish stronger links between the Lisbon policy agenda, the social agenda and climate change policies;

(b) at local and regional level, best practices should be promoted and exchanged, in particular concerning:

- energy efficiency measures to combat energy poverty, with the objective of net-zero-energy performance targets in private, commercial and public buildings,
- the recycling and re-utilisation of waste, for instance by developing infrastructures for collection points,
- the development of infrastructures for low-emission passenger cars using renewable energies, as well as the introduction of incentives for the development of zero-emission vehicles for public transport,
- the promotion of more sustainable mobility in cities and in rural areas,
- the adoption and implementation of measures for adaptation to climate change;

194. Stresses the need to face up to climate change and its effects by means of political and educational measures based on a long-term perspective and by implementing decisions in a coherent way, not subordinating them to short-term political goals; encourages the promotion of lifestyles and consumption patterns geared to sustainable development;

195. Stresses the need not to capitulate in the face of the complexity of the problem of climate

change but to show a visionary desire to make a difference, and to demonstrate leadership in the political, economic and social spheres, in our response to the economic, environmental and social challenges with which we are confronted at this turning-point in energy and climate policy, reflected in a growing scarcity of raw materials;

196. Stresses the need, on the basis of the founding ideals of the European Union, to take decisions out of a conviction that they are necessary and correct, and to take the unique opportunity of shaping the future of our society by means of strategic action;
197. Calls on Parliament's relevant bodies to draw up and publish a version of this report for the general reader within three months of its adoption;

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198. Instructs its President to forward this resolution to the Council, the Commission, the governments and parliaments of the Member States and the Secretariat of the UNFCCC with a request to the latter that it be forwarded to all contracting parties which are not EU Member States and to the observers referred to in the UNFCCC.

**ANNEX A:
SELECTED EU LEGISLATION MAKING A POSITIVE CONTRIBUTION TO
COMBATING CLIMATE CHANGE**

Legislation in force:

- Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources¹
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora², and related legislation
- Council Directive 93/12/EEC of 23 March 1993 relating to the sulphur content of certain liquid fuels³, and related legislation
- Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control⁴, and related legislation
- Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC⁵, and related legislation
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy⁶
- Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants⁷, and related legislation
- Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings⁸
- Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC⁹, and related legislation
- Directive 2003/105/EC of the European Parliament and of the Council of 16 December 2003 amending Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances¹⁰
- Directive 2004/12/EC of the European Parliament and of the Council of 11 February

¹ OJ L 375, 31.12.1991, p. 1.

² OJ L 206, 22.7.1992, p. 7.

³ OJ L 74, 27.3.1993, p. 81.

⁴ OJ L 257, 10.10.1996, p. 26.

⁵ OJ L 350, 28.12.1998, p. 58.

⁶ OJ L 327, 22.12.2000, p. 1.

⁷ OJ L 309, 27.11.2001, p. 1.

⁸ OJ L 1, 4.1.2003, p. 65.

⁹ OJ L 275, 25.10.2003, p. 32.

¹⁰ OJ L 345, 31.12.2003, p. 97.

2004 amending Directive 94/62/EC on packaging and packaging waste¹

- Regulation (EC) No 549/2004 of the European Parliament and of the Council of 10 March 2004 laying down the framework for the creation of the single European sky²
- Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council³
- Directive 2006/40/EC of the European Parliament and of the Council of 17 May 2006 relating to emissions from air-conditioning systems in motor vehicles and amending Council Directive 70/156/EEC⁴, and related legislation
- Decision no 1982/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013)⁵
- Regulation (EC) No 715/2007 of the European Parliament and of the Council of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information⁶, and related legislation

¹ OJ L 47, 18.2.2004, p. 26.

² OJ L 96, 31.3.2004, p. 1.

³ OJ L 191, 22.7.2005, p. 29.

⁴ OJ L 161, 14.6.2006, p. 12.

⁵ OJ L 412, 30.12.2006, p. 1.

⁶ OJ L 171, 29.6.2007, p. 1.

Proposed legislation:

- Proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community (2008/0013 (COD) – COM(2008)0016)
- Proposal for a decision of the European Parliament and of the Council on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020 (2008/0014 (COD) – COM(2008)0017)
- Proposal for a directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006 (2008/0015 (COD) – COM(2008)0018)
- Proposal for a directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources (2008/0016 (COD) – COM(2008)0019)
- Proposal for a regulation of the European Parliament and of the Council setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO₂ emissions from light-duty vehicles (2007/0297 (COD) – COM(2007)0856)

**ANNEX B:
EUROPEAN PARLIAMENT RESOLUTIONS ON CLIMATE CHANGE AND
ENERGY**

- Resolution of 17 November 2004 on the EU strategy for the Buenos Aires Conference on Climate Change (COP-10)¹
- Resolution of 13 January 2005 on the outcome of the Buenos Aires Conference on climate change²
- Resolution of 12 May 2005 on the Seminar of Governmental Experts on Climate Change³
- Resolution of 16 November 2005 on "Winning the Battle Against Global Climate Change"⁴
- Resolution of 18 January 2006 on climate change⁵
- Resolution of 1 June 2006 on Energy efficiency or doing more with less – Green Paper⁶
- Resolution of 4 July 2006 on reducing the climate change impact of civil aviation,⁷
- Resolution of 26 October 2006 on the European Union strategy for the Nairobi Conference on Climate Change (COP 12 und COP/MOP 2),⁸
- Resolution of 14 December 2006 on a European Strategy for Sustainable, Competitive and Secure Energy – Green Paper⁹
- Resolution of 14 February 2007 on climate change¹⁰
- Resolution of 21 October 2008 on building a Global Climate Change Alliance between the European Union and poor developing countries most vulnerable to climate change¹¹

¹ OJ C 210 E, 18.8.2005, p. 81.

² OJ C 247 E, 6.10.2005, p. 144.

³ OJ C 92 E, 20.4.2006, p. 384.

⁴ OJ C 280 E, 18.11.2006, p. 120.

⁵ OJ C 287 E, 24.11.2006, p. 182.

⁶ OJ C 298 E, 8.12.2006, p. 273.

⁷ OJ C 303 E, 13.12.2006, p. 119.

⁸ OJ C 313 E, 20.12.2006, p. 439.

⁹ OJ C 317 E, 23.12.2006, p. 876.

¹⁰ OJ C 287 E, 29.11.2007, p. 344.

¹¹ Texts adopted, P6_TA(2008)0491.

EXPLANATORY STATEMENT

Be the change you want to see in the world
Mahatma Gandhi

The creation of a Temporary Committee on Climate Change is the European Parliament's response and contribution to placing the challenge of climate change as a priority on the European and international agenda. Following the decision of the Conference of Presidents on 19 April 2007 to propose to Parliament the creation of a temporary committee on climate change, and following the decision of Parliament on 25 April to set up such a temporary committee, the newly created Temporary Committee on Climate Change held its constituent meeting on 22 May 2007. On 18 February 2008 Parliament decided to extend the mandate of the Temporary Committee until 9 February 2009. On 21 May 2008 Parliament adopted in plenary the interim report of the Temporary Committee on Climate Change on the scientific facts of climate change: findings and recommendations for decision-making.

This final report contains recommendations on the EU's future integrated climate policy to pave the way for a low-carbon economy, and seeks to coordinate Parliament's common position on the negotiations on a future international agreement on climate change.

It was drawn up on the basis of all the information gathered in the course of the Climate Change Committee's activities and is based on the premise that a well-founded scientific consensus now exists on the role played by anthropogenic greenhouse gas emissions in the world's climate, and that in view of the existing risk assessment there is an urgent need for action.

Your rapporteur is convinced that there is no single correct approach to combating climate change, but that we must firstly face up to the climate policy challenge by a dramatic increase in efficiency and better management of resources, and secondly that we must also be prepared to go down new paths. We are looking not at natural climate variations or oscillations but at a rise in global average temperature caused by humans as a result of a lifestyle which wastes resources instead of conserving them, and is thus not geared to sustainable development meeting the needs of today's generation without endangering the opportunities of future generations.

This final report is divided into 22 topics:

1. Guiding political ideas

The climate policy principles and guidelines of the final report of the Temporary Committee on Climate Change are based on the position of the European Parliament as already set out in the 13 resolutions on climate change in the current 6th legislative period. The report stresses in particular that climate change is to be understood as a horizontal policy to be taken into account in all legislative proposals.

These principles include first and foremost the key targets agreed upon and frequently reiterated since, such as the restriction of global climate change to 2°C, the reduction target of 20% below 1990 levels by 2020 (or 30% if other industrialised countries commit themselves to similar reductions) or 60%-80% by 2050.

The EU's leadership role in the international fight against global warming, which contributes to its sense of identity, entails an obligation to the citizens of Europe not only to formulate medium- and long-term climate objectives, but to achieve these objectives by forward-looking political measures, and requires not just present but future parliamentary representations and representatives of the citizens of Europe to be guided by these climate policy principles, and not to cease from putting the necessary global climate objectives into practice.

2. The international dimension: Post-2012, external climate policy and international trade

The negotiations on a post-2012 agreement at the Copenhagen Climate Conference (COP 15) at the end of 2009 must be successfully concluded, in order to prevent a gap between the first and second commitment periods. International commitment is also important because climate change may further heighten existing conflict potential in international relations, e.g. as a result of environment-induced migration, loss of land and border disputes owing to flooding and receding coastlines, conflicts over resources arising from the shrinkage of agricultural land, or increasing scarcity of water.

3. Energy

According to the World Energy Outlook of 2006, petroleum is the most important energy source in the world, accounting for 35% of primary energy consumption, followed by coal at 25% and natural gas at 21%. Reliable sources and predictions point to a substantial increase in energy needs in the world by 2020 and beyond. For example, the International Energy Agency expects an increase in world energy needs of at least 60% by 2030. This is linked to an increasing extent with a distribution problem, since the rising need for energy in emerging countries will further exacerbate the competition for secured access to fossil fuel sources in the next few years, particularly because the age of cheap and abundant fossil energy is coming to an end.

To meet this growing need, the world community is faced with enormous challenges. It seems unlikely that the increasing energy needs of a growing world population can be met solely by efficiency improvements. Accordingly, investment decisions taken in the next few years will determine the structure of the energy system and the energy mix over the coming decades.

4. Biofuels

Present-day biofuels policy has resulted in a conflict of objectives marked on the one hand by scarcity of foodstuffs and rising food prices and on the other by increasing energy needs and the search for alternative fuels. Meanwhile the issue of a sustainable biofuels policy is

becoming ever more acute and should be geared both to setting sustainability criteria for first-generation biofuels and to the ideology-free development of the second generation.

5. *Energy efficiency*

The existing scientific data speak for themselves: 40% of final energy consumption is accounted for by the buildings sector, which means that 33% of all greenhouse gas emissions derive from the built environment. Accordingly the buildings sector (residential accommodation as well as commercial and public buildings) has an immense and cost-effective potential for CO₂ reduction by modernising heat insulation and heating and cooling systems, electric appliances and ventilation systems. One crucial issue in this connection is what incentives can be created to trigger these necessary massive modernisation measures.

6. *Mobility und logistics*

While the separation of transport growth from general economic growth is a key objective of EU transport policy, demand for transport services has nevertheless outstripped GDP growth and the already high share of transport emissions as a percentage of overall greenhouse gas emissions in the EU is continuing to rise. At present transport accounts for around one third of final energy consumption in the EU, with the transport sector almost completely (97%) dependent on petroleum-based fuels (petrol and diesel).

On the one hand urban mobility is directly linked to individual quality of life, yet on the other hand it is individual traffic in cities which makes a substantial contribution to greenhouse gas emissions and to other environmental problems such as air pollution and noise. Instead of enhancing citizens' quality of life, it may significantly detract from it through negative effects on health.

Here, too, we must not evade the challenges. Ultimately the transport sector must also meet the EU's climate goals of reducing CO₂ emissions by at least 20% below 1990 levels by 2020 and increasing energy efficiency by 20% over the same period. We therefore need to give a common answer to the question how we are to reconcile the European economic and social model – which is based on the availability of people, goods and services, giving priority to efficiency of time – with the efficiency of resources needed for sustainable development.

7. *Tourism and cultural heritage*

According to UNESCO, one tenth of all world heritage sites and traditional landscapes are endangered by the effects of climate changes. In Europe this means that the tourist industry is hard hit, because according to the UN World Tourism Organisation (UNWTO) Europe is the most important tourist region in the world, with 55% of all international tourist arrivals in 2006. It is well known that climate change can alter tourist flows, which would result in significant economic disadvantages for the holiday regions in question.

8. Emissions Trading Scheme and industrial emissions

With its Emissions Trading Scheme the European Union has created a unique instrument for achieving emissions reductions with maximum efficiency. The first multi-national emissions allowance trading entered into force on 1 January 2005. As the first scheme of its kind in the world, it has the potential in particular to serve as a model for our international partners.

On 23 January 2008 the Commission submitted a proposal for a directive amending the Emissions Trading Scheme, under which investment cycles (availability of new types of production process, capital requirement, time factor) should be taken into account in the formulation of further reduction targets for emissions trading.

9. Agriculture and livestock breeding

Climate change confronts agriculture in Europe and the world with several challenges of equal magnitude. Agriculture needs first of all to reduce its own emissions and develop adaptation strategies to changing climatic conditions. As a producer of biomass and materials for biofuels it supplies the essential raw materials for emerging sources of energy. At the same time sufficient food must be produced to feed the world's still growing population. In this context, livestock production in particular plays a crucial role: the Food and Agriculture Organisation (FAO) predicts an increase in meat production from 229 million tonnes at present to 465 million tonnes in 2050, and for milk production from 580 to 1043 million tonnes. This means that the livestock rearing sector will be growing faster than any other sector of the agriculture industry. At the same time, all along the value chain, livestock production is responsible for 18% of global greenhouse gas emissions and thus produces more greenhouse gases than the transport sector!

Changes to agricultural practice, European legislation and the most recent structural reforms to the Common Agricultural Policy, which increasingly aim at sustainability, will undoubtedly lead indirectly, via improved use of available resources, to emissions reductions. However, one should not ignore the fact that there are no specific climate objectives for agriculture, nor are there any incentives to exploit existing mitigation potential. As in other sectors, a modern career with a clear climate profile is becoming more and more important. Climate-friendly agricultural practice therefore calls for the transmission of new knowledge in soil management, and the professional training of young farmers must increasingly take account of the impact of climate change and the climate impact of agricultural production in order to confront the challenge which climate change represents for agriculture and livestock rearing.

10. Forests

There can be no doubt that forests are of immense value for our biosphere. 30% of the world's

land surface is covered in forests, which are home to more than two thirds of all the species on earth. Furthermore some 30% of annual greenhouse gas emissions are absorbed by forests. Forests thus play a major role in combating climate change. And yet, in spite of their many functions in the global ecosystem, they have no overall market price. Moreover, at least a third of the world's forests are already affected by the consequences of climate change. We should recognise these eco-services and social functions performed by forests – or, to put it rather flippantly, we should acknowledge that the forest is more than the sum of its trees.

11. Soil protection

The soil is the most important spatial basis for economic activity. On the one hand it is the basis for the production of 90% of all human food, animal feed, textiles and fuels. As a result of the increasing and often contradictory demands placed on it by nearly all sectors of the economy, including agriculture, private homes, industry and trade, transport and tourism, the soil is exposed more rapidly than ever before to irreversible damage by sealing and erosion, organic matter decline, pollution, salination, compaction, loss of biodiversity, flooding and landslides.

There is a clear link between climate change, sustainable development, environmental quality and soil degradation. The soil is affected by climate changes which may in turn lead to further degradation of the soil. At the same time the soil plays an important role via the dynamics of humus in binding atmospheric carbon. Soil degradation leads to the loss of organic soil material (and thus of organically bound carbon), which in turn entails a loss of the soil's capacity to operate as a carbon sink.

We must therefore do all we can to establish a policy of soil protection by appropriate soil treatment measures taking account of the importance of organic substances in the soil for its fertility, its water storage capacity and its ability to function as a carbon sink.

12. Water management

Owing to the negative effects of climate change and sometimes inept water management, the quality of the EU's water is far from satisfactory. Water quality is subject to particular dangers from a number of sources including releases, emissions and losses of hazardous substances. Human activities impact so deeply on the structure of global hydrology that it is barely possible for water to regenerate. Most of all, however, water also has a central role to play in climate change in that it not only triggers climate-changing processes (e.g. in the form of meltwater) but is also itself subject to change. The effects of climate change on the hydrological cycle may in turn unleash a domino effect on a number of economic sectors such as agriculture (increased need for watering), energy (less hydroelectric potential and reduced availability of water for cooling), human health (poorer water quality), leisure and recreation (restrictions on tourism), fisheries and shipping, as well as negative effects on already threatened biodiversity.

The central challenge we need to face is the issue of integrated water management based on present and future water requirements, which is the key to coping successfully with the

impact of climate change on available water resources.

13. Fisheries

Over the past hundred years, the average global temperature has risen by some 0.6°C, and sea levels by 0.17m. During that period both seawater and freshwater systems have warmed by 0.04°C, while surface temperatures have risen by 0.6°C.

It is predictable that climate change will bring major changes to sea fishing and marine aquaculture in the European Union. For example, a rise in temperature and thus in sea levels is expected, as is a change in the Atlantic thermohaline circulation, a change in salinity and the geographical distribution of organisms, shifts in fish populations and a quantitative reduction in phytoplankton. Consequently the changing climate will have a direct influence on survival rates, spread, fertility and behaviour of individual animals and thus on the size and distribution of industrial fish stocks.

We therefore need a comprehensive framework plan for the sea, as provided for in the Marine Strategy Directive, to ensure a better and more sustainable management of marine areas and resources.

14. Waste treatment and resource management

Our waste and resource management is faced with crucial challenges: on the one hand it is clear that European waste legislation already contributes to reducing net greenhouse gas emissions from the waste sector. That is certainly a success. However, it is regrettably also clear that waste quantities continue to increase in spite of our best efforts. Forecasts promise that this trend will continue: the European Environmental Agency expects a 25% rise in the quantity of household waste between 2005 and 2020. Nevertheless, the Agency predicts a clear (more than 80%) drop in emissions from the waste sector as compared with the late 1980s.

We must therefore rely more on biological presorting and material recycling in order to avoid direct emissions from landfill sites. Moreover, energy recovery from waste in conjunction with cogeneration systems makes an important contribution to avoiding indirect emissions, as it replaces fossil fuels to generate electricity and heat. The strict application of the nearness principle would also certainly be useful: waste transport over long distances should be avoided in order to restrict direct emissions from the waste sector.

15. Adaptation measures

In its resolution of 10 April 2008 on the Commission's Green Paper on 'Adapting to climate change in Europe – options for EU action' (COM(2007) 354) the European Parliament gave a detailed opinion on this topic. This final report of the Temporary Committee on Climate Change stresses once again the need for coherence and integrated coordination of adaptation measures at EU level, and reiterates its call for an EU-wide framework for the planning of

adaptation measures, taking due account of the subsidiarity principle, since regional and local authorities in Europe are better placed to make political responses based on their own experience.

16. Health

Climate change affects human health both by altering weather phenomena (e.g. more intense and more frequent extreme weather events) and indirectly by changes affecting water quality and quantity, air and food, as well as ecosystems, agriculture, livelihoods and infrastructures. The WHO states that climatic conditions influence diseases which are transmitted either by water or by certain vectors such as mosquitoes. These include dysentery, malaria and metabolic diseases resulting from malnutrition. Africa is particularly hard hit by these diseases. In addition, climate changes have an influence on the release of allergens and on increased ultraviolet radiation.

According to the WHO, 150 000 people a year die as a result of climate change, and a further five million become ill. The indirect results through floods, soil desiccation, crop failure, changes in animal or plant life or destruction by weather are particularly serious.

The specific challenge we are faced with in this area is twofold. On the one hand we must massively reinforce our health systems, because in doing so we can keep many health impacts of climate change at bay. On the other hand the widely differing health risks associated with climate change call for corresponding preventive measures.

17. Growth and employment

Europe enjoys an excellent starting position in the global race for a low-emission economy. We should therefore make the most of this position to trigger greater innovation which will create new and competitive businesses and new jobs in the field of clean technology in full accordance with the Lisbon Strategy. This is a real economic opportunity offered by climate change and by political measures to combat it, and pessimism should not cause us to pass it up.

We should therefore make a point of enabling market access for efficient, innovative technologies, dismantling bureaucratic hurdles and at the same time developing incentives to facilitate the shift to a low-carbon economy, in order to exploit all our opportunities in the global competition for efficiency, innovations, raw materials and future technologies, and markets.

18. Promotion of technologies of the future

Increased efficiency is a necessary but not a sufficient condition for combating climate change. Efficiency improvements alone cannot spark off the necessary technological revolution needed to find the way out of the carbon impasse.

Although emissions trading is the essential building block in the European climate programme with a view to achieving lower greenhouse gas emissions through efficiency increases, this will probably only favour those technologies and processes which have already been developed and are market-ready. It is not a way to cut the cost of developing new and consequently costly technologies, nor to help the market penetration of existing technologies, though these are urgently needed to meet long-term climate targets.

We should therefore do all we can to create fundamental incentive mechanisms and support measures so as to launch the necessary technological renewal, reduce the running costs for expensive but new technologies, and set and in future achieve more stringent reduction targets.

The International Energy Agency is expecting an increase of at least 60% in the world's energy needs by 2030. Even now, 24% of the EU's CO₂ emissions derive from coal-fired power stations. It is less a matter of how to plan for the abandonment of coal than of how to manage the shift to clean coal.

The UN's International Panel on Climate Change (IPCC) considers, in its 'IPCC Special Report on Carbon Dioxide Capture and Storage' (2005), that by the end of the century CCS technology could contribute between 15% and 55% of necessary greenhouse gas reductions and serve to supplement the expansion of renewables. However, the costs and risks still outweigh the economic advantages. For example, CCS consumes energy itself, and a power station with CCS consumes between 10% and 40% more primary energy to produce the same amount of electricity.

There are also many unanswered questions about storage sites. The CO₂ can be stored at a depth of at least 800m (where the gas changes to a quasi-liquid state), in worked-out or almost empty oil or gas fields, in salt rock strata or in deep salt water veins. Research is also being carried out into the possibility of storing the CO₂ in mineral form. However, there is still the underlying risk that storage sites will develop leaks and will gradually release small, or even suddenly larger quantities of CO₂ into the atmosphere. Moreover, not every soil is suited as a potential storage site. Finally, possible scepticism or concern among the general public about the use of CCS must also be taken seriously. Overall it is important, in view of the technological neutrality of the EU approach, to debate the issue of CCS openly without prejudging the outcome.

19. Intelligent computer systems and ICT

The ICT sector currently produces 2% of worldwide CO₂ emissions. However, the industry could not only reduce its own CO₂ emissions but could in particular develop innovative and more energy-efficient applications for the economy as a whole. Accordingly there is an urgent need to focus more closely on the testing, validation, introduction and further dissemination of computer- and ICT-based methods to improve energy efficiency.

20. Financing and budgetary matters

The current EU budget for achieving climate targets is insufficient. However, the EU should

commit itself financially in the core areas of support and development of technologies for combating climate change and climate development aid, and in supporting cross-border adaptation measures, efficiency increases and aid for natural disasters, in accordance with the EU's solidarity principle. A first step in the right direction would be to draw up an inventory of all existing financing instruments and their significance for European climate goals and, on the basis of this 'climate audit', to devise proposals for the future financial perspective to ensure that the EU budget lines can be adapted in accordance with the requirements of climate policy. In addition, unused, earmarked funds from the EU budget could be allocated where necessary for climate policy purposes.

21. Education, training and awareness-raising

The topic of 'energy efficiency' should impinge much more strongly on our daily lives. Simple and flexible efficiency standards for all spheres of everyday life could be the first step in the right direction. We should also, as a matter of urgency, adapt not only practical work training but also occupational training colleges and courses at technical colleges and universities to the specific employment-related challenges of the structural economic change hastened by climate change and its effects. This includes the creation of 'climate-related careers'. This final report considers that one possible awareness-raising measure might be a European Resource Efficiency Year, to raise awareness of more efficient use of resources and to take climate change as the starting point for a debate on the availability and use of resources.

22. 2050 – The future begins today

Climate change is a global environmental problem, whose causes are structural in nature. One reason for it certainly lies in a thoughtless use of our resources. The world's need for resources already exceeds its natural regeneration capacity by a quarter. Our lifestyle is depriving coming generations of their means of subsistence. It therefore seems absolutely crucial to counteract climate change and its effects by political measures on the basis of a long-term perspective and to implement the long-term decisions underlying it coherently and not to subordinate it to short-term political goals.

But a more sustainable lifestyle will not be possible without the contribution of the economy, science, the media, organised civil society and the citizens. It is therefore important not to capitulate in the face of the complexity of the problem. We must show a visionary desire to make a difference, together with leadership qualities in the political, economic and social spheres, in our response to the economic, environmental and social challenges with which we are confronted at this turning point in energy and climate policy, reflected in a growing scarcity of raw materials. And we are called upon to act today, because our action today will determine our future.

ANNEX 1: WORK PROGRAMME OF THE TEMPORARY COMMITTEE ON CLIMATE CHANGE

- **Tuesday, 17.07.2007, 15:00-18:30**
 - ❖ Exchange of views with Commissioner Dimas
- **Thursday, 06.09.2007, 10:00-12:00**
 - ❖ Discussion on COP 13 draft resolution
- **Monday, 10.09.2007, 15:00-18:30**
1st thematic session: Climate impact of different levels of warming
- **Monday, 01.10.2007, 15.00 - 18.30 - Tuesday, 02.10.2007, 9.00 - 12.30**
Joint Parliamentary Meeting on Climate organised by the President of the European Parliament and the President of the Portuguese Parliament
- **Thursday, 04.10.2007, 09:00-12:30**
 - ❖ Consideration of amendments to COP 13 draft resolution
 - ❖ Exchange of views with Mr Hans-Gert Poettering, President of the European Parliament
- **Thursday, 04.10.2007, 15:00-18:30**
2nd thematic session: The Climate Protection Challenge post-2012
- **Monday, 22.10.2007, 19:00-20:30**
 - ❖ Vote on COP 13 draft resolution
- **Monday, 05.11.2007 - Wednesday, 07.11.2007**
Delegation visit to China
- **Monday, 19.11.2007, 15:00-18:30**
3rd thematic session: Social and economic dimension, R&D, new technologies, transfer of technologies, innovation and incentives
- **Wednesday, 12.12.2007 - Saturday, 15.12.2007**
EP delegation to the Thirteenth Conference of the Parties to the UN-Convention on Climate Change (COP 13) - Bali, Indonesia
- **Monday, 17.12.2007, 15:00-18:30**
 - ❖ Outcome of COP 13 Bali - Exchange of views
- **Wednesday, 23.01.2008, 15h00-18h30**
 - ❖ Exchange of views with Minister Podobnik, Slovenian Minister for Environment
 - ❖ Consideration of draft resolution on adaptation
 - ❖ Adoption of draft resolution on outcome of COP 13

- **Monday, 28.01.2008, 15h00-18h30**
❖ Consideration of Florenz draft interim report
- **Tuesday, 29.01.2008, 15h00-18h30**
4th thematic session: Climate change and the world's water with special focus on sustainable development, land use, land use change and forests
- **Monday, 04.02.2008 - Friday, 08.02.2008**
Delegation visit to India and Bangladesh
- **Monday, 18.02.2008, 19h00-20h00**
❖ Consideration of amendments to draft resolution on adaptation
- **Monday, 3.03.2008, 15h00-18h30**
5th thematic session: Sources of emission from the industry and energy sector and transport emissions at global level
- **Monday, 10.03.2008, 21h00-22h30**
❖ Consideration of amendments to Florenz draft interim report
- **Wednesday, 26.03.2008, 15h30-19h00**
6th thematic session: How to engage other main actors - climate change, adaptation in third countries and global security
- **Thursday, 27.03.2008, 9h00-12h30**
❖ Vote on draft resolution on adaptation
- **Tuesday, 1.04.2008, 9h00-12h30**
❖ Vote on Florenz draft interim report
- **Monday, 28.04.2008 - Wednesday, 30.04.2008**
Delegation visit to United States
- **Thursday, 29.05.2008,**
7th thematic session: Meeting the climate commitments: addressing competitiveness, trade, financing and sustainable employment in a European and global context
- **Thursday, 12.06.2008 - Friday, 13.06.2008**
Citizens' Agora on Climate Change
- **Monday, 23.06.2008, 15h00-18h30**
- *8th thematic session: Achieving significant CO₂ emission reductions in short time: learning from Best Practices regarding successful policies and technologies*

- **Tuesday, 24.06.2008, 9h00-12h30**
 - ❖ Report back by Commission on UNFCCC AHW negotiation sessions
 - ❖ First exchange of views without document on Florenz draft report
- **Monday, 14.07.2008, 15h00-17h30**
 - ❖ Second exchange of views without document on Florenz draft report
- **Thursday, 17.07.2008, 11h00-12h30**
 - ❖ Exchange of views with Minister Borloo, Minister of Environment, Energy and Sustainable Development of France
- **Monday, 15.09.2008, 15h00-18h30**
 - ❖ First consideration of Florenz draft report
 - ❖ Presentation of results of Eurobarometer's survey on European attitudes towards climate change
- **Thursday, 18.09.2008, 9h00-12h30**
 - ❖ Second consideration of Florenz draft report
- **Wednesday, 8.10.2008, 16h00-18h30**
 - ❖ Exchange of views with Ms Hedegeard, Minister for Climate Change and Energy (Denmark)
- **Monday, 20.10.2008, 21h00-22h30**
 - ❖ Consideration of amendments to Florenz draft report
- **Monday, 27.10.2008 - Wednesday, 29.10.2008**
 - ❖ Delegation visit to Russia
- **Tuesday, 04.11.2008, 9h30-12h30**
 - ❖ Consideration of amendments to Florenz draft report
 - ❖ Exchange of views with a delegation of Members of the Joint Committee on Climate Change and Energy Security of the Oireachtas
- **Thursday, 20.11.2008 - Friday, 21.11.2008 (Strasbourg)**
 - Joint Parliamentary Meeting on Energy and Sustainable Development
- **Tuesday, 2.12.2008, 15h00-18h30**
 - ❖ Adoption of Florenz draft report
 - ❖ Briefing by Commissioner Dimas in preparation to COP 14
- **9-13.12.2008**
 - EP delegation to the Fourteenth Conference of the Parties to the UN-Convention on Climate Change (COP 14) - Poznan, Poland

- **Thursday, 18.12.08, 10h00 - 12h00**
 - ❖ Exchange of views on outcome of COP 14

February 2009 part-session: Plenary vote on Florenz final report

ANNEX 2: THEMATIC SESSIONS HELD BY
THE TEMPORARY COMMITTEE ON CLIMATE CHANGE

*1st THEMATIC SESSION, "Climate Impact of different levels of warming", Monday,
10.09.2007, 15:00-18:30*

Theme leader: Vittorio Prodi

Key-note speaker:

Prof. Hans Joachim SCHELLNHUBER
Director of the Potsdam Institute for Climate Impact Research, Germany

Experts:

Prof. Dr. Richard LINDZEN
Professor of Meteorology at the Massachusetts Institute of Technology

Michel JARRAUD
Secretary General of the World Meteorological Organisation, Switzerland

Prof. Javier MARTIN VIDE
University of Barcelona

Dr. Malte MEINSHAUSEN
Institute for Climate Impact Research, Germany

Dott.ssa Cristina SABBIONI
Istituto Scienze dell'Atmosfera e del Clima, Italy

Prof. Sir Brian HOSKINS
Dept. of Meteorology at the University of Reading, United Kingdom

Prof. Jean-Pascal VAN YPERSELE
Vice-Chair of IPCC Working Group II,
Catholic University of Louvain, Belgium

Prof. Dr. Robert WATSON
School of Environmental Sciences,
University of East Anglia, United Kingdom

*2nd THEMATIC SESSION, "The Climate Protection Challenge post-2012", Tuesday, 4.10
2007, 15:00-18:30*

Theme leader: Satu Hassi

Key-note speakers:

John ASHTON
Special Representative on Climate Change of the UK Foreign and Commonwealth Office

Yvo DE BOER,
Executive Secretary of the UN Framework Convention on Climate Change

Experts:

H.E. Takekazu KAWAMURA
Ambassador, Mission of Japan to the EU, Brussels, Belgium

H.E. C. Boyden GRAY
Ambassador, Mission of the United States of America to the EU, Brussels, Belgium

Ronglai ZHONG
Minister Counsellor of the Mission of the People's Republic of China to the EU, Brussels,
Belgium

Karsten NEUHOFF
Faculty of Economics
University of Cambridge

Nick CAMPBELL
Chair, International Chamber of Commerce Climate Change Task Force, Paris, France

Katherine WATTS
Policy Officer, Climate Action Network (CAN), Brussels, Belgium

Chris MOTTERSHEAD
Distinguished Advisor, Energy and the Environment, BP, United Kingdom

Andrei MARCU
Chief Executive, International Emissions Trading Association (IETA), Brussels, Belgium

3rd THEMATIC SESSION, "The social and economic dimension, R & D, new technologies, transfer of technologies, innovation and incentives", Monday 19.11.2007, 15:00-18:30

Theme leader: Philippe Busquin

Key-note speakers:

Prof. Carlo RUBBIA
Nobel Prize for Physics

Günter VERHEUGEN
Vice-President of the European Commission

Experts:

Kevin ANDERSON,
Professor, Tyndall Centre, University of Manchester

Stefan MARCINOWSKI,
Member of Board of Executive Directors, BASF AG

Graeme SWEENEY,
Executive Vice-President of Future Fuels and CO₂, Shell

Bernard FROIS,
CEA Grenoble

Milan NITZSCHKE,
CEO, German Renewable Energy Federation (BEE)
Solarworld AG, Authorized Representative

4TH THEMATIC SESSION, "Climate change and the world's water, with a specific focus on sustainable development, land use change and forests", Tuesday, 29.01.2008, 15:00-18:30

Theme leader: Cristina Gutierrez-Cortinez

Key-note speaker:

Kaveh ZAHEDI
UNEP Deputy-Director and Climate Change Coordinator

Experts:

Dr. Franz FISCHLER
President of Ecosocial Forum Europe

Dr. Henning STEINFELD
Head of the livestock sector analysis and policy branch at the UN Food and Agriculture Organization (FAO)

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John LANCHBERY
Principal Climate Change Advisor at the Royal Society for the Protection of Birds

Prof. Riccardo PETRELLA
International Committee for the World Contract on Water

Prof. John A. DRACUP
Professor at the University of California, Berkeley

Prof. Seppo KELLOMAKI
Dean of Faculty of Forest Sciences, University of Joensuu

5TH THEMATIC SESSION, "Source of emission from the industry and energy sector and transport emissions at a global level", Monday, 3.3.2008, 15.00 – 18:30

Theme leader: Etelka Barsi-Pataky

Experts:
Gordon MCINNES
Deputy Director, European Environment Agency

Philippe EYDALENE
Senior Vice President European Affairs, Air France - KLM

Matthias WISSMANN
President of VDA

Jos DINGS
Director of T&E, The European Federation for Transport and Environment
Christian AZAR
Professor of Energy and Environment, Professor of Sustainable Industrial Metabolism,
Chalmers University of Technology

Lars Göran JOSEFSSON
CEO, Vattenfall

Felix MATTHES
Dr. rer.pol. Dipl.-Ing., Öko-Institut (Institute for Applied Ecology)

6TH THEMATIC SESSION, "How to engage other main actors - climate change, adaptation in third countries and global security", Wednesday, 26.3.2008, 15:30-19:00

Theme leader: Justas Vincas Paleckis

Key-note speaker:

Dr. Rajendra K. PACHAURI

Chairman of the Intergovernmental Panel on Climate Change, 2007 Nobel Peace Prize laureate

Experts:

Prodipto GHOSH

Member of the India's National Council on Climate Change, chaired by the Prime Minister, former Secretary in the Ministry of Environment and Forest, India

Rubens BORN

Vitae Civilis, Brazil

Amjad ABDULLA

Environment Ministry, Maldives

Frank ACKERMAN

Stockholm Environment Institute and Global Development and Environment Institute, Tufts University

Tapani VAAHTORANTA

Finnish Institute for International Affairs, Helsinki

7TH THEMATIC SESSION, "Meeting the Climate Commitments: Addressing Competitiveness, Trade, Financing and Sustainable Employment in a European and Global Context", Thursday, 29 May 2008, 15.00 – 18.30

Theme leaders: Lambert van Nistelrooij and Robert Goebbels

Key-note speaker:

Pascal LAMY

Director-General of the World Trade Organisation

Experts:

Matthew STILWELL

European Director of the Institute for Governance and Sustainable Development

René VAN SLOTEN

Executive Director Industrial Policy, CEFIC (European Chemical Industry Council)

Adam JACKSON
Climate Change Director, Tesco

John MONKS
Secretary General, ETUC

Michele DE NEVERS
Senior Manager, Environment Department, World Bank

Mike MATHIAS
Chair, CONCORD Policy Forum

8TH THEMATIC SESSION, "Achieving significant CO₂ emission reductions in short time: learning from best practices regarding successful policies and technologies", Monday 23 June 2008, 15:00 – 18:30

Theme leader: Bairbre de Brún

Key-note speaker:
Ken LIVINGSTONE
Former Mayor of London

Experts:
Frederic XIMENO I ROCA
Director General for Environmental Policies and Sustainability, Generalitat of Catalunya

Mark HARBERS
Rotterdam Climate Initiative, City Councillor (Wethouder)

Gösta GUSTAVSSON
Vice Mayor of Linköping, Sweden

Carin Ten Hage
Director Programme "Planet Me"
TNT

Neil HARRIS
Head of Green IT and Sustainability, CISCO Europe

Franco MIGLIETTA
Associate Professor, Department of Nuclear and Theoretical Physics, Research Director at the Institute of Biometeorology of CNR, Firenze

All documents related to the Thematic Sessions can be found on :
<http://www.europarl.europa.eu/activities/committees/hearings/Com.do?language=EN&body=CLIM>

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**ANNEX 3 : DELEGATION VISITS OF THE TEMPORARY COMMITTEE ON
CLIMATE CHANGE**

Place	Date	Chair of the Delegation
Beijing, China	05.11. - 07.11.2007	Guido Sacconi
EP-delegation to COP 13, Bali	11.12. - 15.12.2007	Alejo Vidal-Quadras
Delhi, India / Dhaka, Bangladesh	04.02. - 07.02.2008	Guido Sacconi Romana Jordan Cizelj (for the Bangladesh part)
Washington, US	28.04. - 30.04.2008	Guido Sacconi
OECD, Paris	02.10.2008	Matthias Groote
Moscow, Russia	27.10 - 29.10.2008	Vittorio Prodi
EP-delegation to COP 14, Poznan	9.12. - 13.12.2008	Guido Sacconi Romana Jordan Cizelj

All documents related to the Delegation visits, including the summary reports, can be found
on:
<http://www.europarl.europa.eu/activities/committees/publicationsCom.do?language=EN&body=CLIM>

**ANNEX 4 : PARTICIPATION OF THE TEMPORARY COMMITTEE
ON CLIMATE CHANGE IN THE WORK OF PARLIAMENTARY DELEGATIONS**

Meeting	Date	CLIM representatives
EP-China Interparliamentary Meeting	Beijing and Tibet, 23-29 June 2007	Fiona HALL reported back to CLIM
EP-South Africa interparliamentary meeting	Strasbourg, 5-6 September 2007	Guido SACCONI, Chairman
COP 8 to the UN Convention to combat desertification	Madrid, 11-14 September 2007	Roberto MUSACCHIO, vice-chairman, reported back to CLIM
EP-China Interparliamentary Meeting	Strasbourg, 26-27 September 2007	Fiona HALL reported back to CLIM
EP delegation for relations with India	Brussels, 21 November 2007	Guido SACCONI, Chairman Karl-Heinz FLORENZ, rapporteur
EP-Canada interparliamentary meeting	Brussels, 22 November 2007	Guido SACCONI, Chairman
Baltic Sea Parliamentary Conference (BSPC), working group on energy and climate change	Tallinn, 5 February 2008	Paul RÜBIG, EP representative in the working group
EP-Mexico interparliamentary meeting	Strasbourg, 22 May 2008	Karl-Heinz FLORENZ, rapporteur Elisa FERREIRA
EP-US interparliamentary meeting	Ljubljana, 24-26 May 2008	Romana JORDAN CIZELJ
EP-Japan interparliamentary meeting	Brussels, 3 June 2008	Guido SACCONI, Chairman Romana JORDAN CIZELJ

**ANNEX 5 : PRESS ACTIVITIES BY
THE TEMPORARY COMMITTEE ON CLIMATE CHANGE**

PRESS CONFERENCES HELD IN THE CONTEXT OF CLIM ACTIVITIES		
Subject	Date	Participants
CLIM 1st thematic session	Brussels, 10 September 2007	Guido SACCONI, Chairman Karl-Heinz FLORENZ, rapporteur Vittorio PRODI, theme-leader Prof. Hans-Joachim SCHELLNHUBER, key-note speaker
Delegation visit to Beijing	Beijing, 7 November 2007	Guido SACCONI, Chairman Vincenzo LAVARRA, Baurbre de BRUN, Anne LAPERROUZE, members of the delegation
Adoption of resolution in view of COP 13	Strasbourg, 14 November 2007	Alejo VIDAL-QUADRAS, Chairman EP delegation to COP 13 Guido SACCONI, CLIM Chairman Karl-Heinz FLORENZ, rapporteur Satu HASSI, rapporteur on COP 13
CLIM 3rd thematic session	Brussels, 19 November 2007	Guido SACCONI, Chairman Karl-Heinz FLORENZ, rapporteur Philippe BUSQUIN, theme-leader Prof. Carlo RUBBIA, key-note speaker

In the context of the COP 13 Climate negotiations:		
Joint Press Conference with Commission	Bali, 11 December 2008	Commissioner Dimas Alejo VIDAL-QUADRAS, Chairman EP delegation to COP 13 Miroslav OUZKÝ, Co-Chairman EP delegation to COP 13
EP Press Conference on round-table of parliamentarians	Bali, 12 December 2008	Alejo VIDAL-QUADRAS, Chairman EP delegation to COP 13 Guido SACCONI, Co-Chairman EP delegation to COP 13 Karl-Heinz FLORENZ, EP speaker at round-table
Joint Press Conference with Council and Commission	Bali, 15 December 2008	statement read on behalf of Guido SACCONI, Co-Chairman EP delegation to COP 13
Delegation visit to Delhi	Delhi, 5 February 2008	Guido SACCONI, Chairman Romana JORDAN CIZELJ, Co-Chairman of the delegation Neena GILL, Chairman of the delegation for relations with India
CLIM 6th thematic session	Brussels, 26 March 2008	Guido SACCONI, Chairman Karl-Heinz FLORENZ, rapporteur Justas Vincas PALECKIS, theme-leader Dr. Rajendra K. PACHAURI, key-note speaker
Delegation visit to Washington	Washington, 30 April 2008	Guido SACCONI, Chairman Karl-Heinz FLORENZ, rapporteur
Adoption of CLIM interim report	Strasbourg, 21 May 2008	Guido SACCONI, Chairman Karl-Heinz FLORENZ, rapporteur

CLIM 8th thematic session	Brussels, 23 June 2008	Guido SACCONI, Chairman Karl-Heinz FLORENZ, rapporteur Bairbre DE BRÚN, theme- leader Ken LIVINGSTONE, key-note speaker
Presentation of results of Eurobarometer survey	Brussels, 11 September 2008	Commissioner WALLSTRÖM Commissioner DIMAS Guido SACCONI, Chairman
Delegation visit to Moscow	Moscow, 29 October 2008	Vittorio PRODI, Chairman of the delegation to Moscow Romana JORDAN CIZELJ Giulietto CHIESA Avril DOYLE Agnes SCHIERHUBER, members of the delegation

**ANNEX 6 : OTHER ACTIVITIES BY
THE TEMPORARY COMMITTEE ON CLIMATE CHANGE**

RELATIONS WITH NATIONAL PARLIAMENTS		
Meeting	Date	CLIM representatives
Joint Parliamentary Meeting on climate change	Brussels, 1-2 October 2007	EP activity - several CLIM members
Hearing and exchange of views with EU delegation of French National Assembly	Paris, 17 October 2007	Guido SACCONI, Chairman Karl-Heinz FLORENZ, rapporteur
Meeting of the Chairpersons of the committees responsible for energy and the environment from the national parliaments and the European Parliament organised by the Slovenian National Assembly	Ljubljana, 20-21 January 2008	Guido SACCONI, Chairman
Exchange of views with a delegation of Members of the Joint Committee on Climate Change and Energy Security of the Oireachtas	Brussels, 4 November 2008	CLIM meeting
Joint Parliamentary Meeting on energy and sustainable development	Strasbourg, 20-21 November 2008	EP activity - several CLIM members

PARTICIPATION TO INFORMAL COUNCILS		
Informal Environment Council	Ljubljana/Brdo 10-12 April 2008	Hans BLOKLAND represented both ENVI and CLIM
Informal Environment /Energy Council	Paris, 3-5 July 2008	Guido SACCONI, Chairman

RELATIONS WITH LOCAL AUTHORITIES		
Final session of the Catalan Convention on Climate Change organised by the government of Catalunya	Barcelona, 14 February 2008	Guido SACCONI, Chairman

RELATIONS WITH CIVIL SOCIETY		
Agora on climate change	Brussels, 12-13 June 2008	EP activity - several CLIM members
International Expo 2008, European Day	Zaragoza, 5 September 2008	Roberto Musacchio, Vice-Chairman

OTHER ACTIVITIES		
Request for an Eurobarometer survey on Europeans' attitudes towards climate change		Presentation of results at CLIM meeting of 15 September 2008
Request to the EP Bureau to ask the Secretary-General to look into the possibility of setting-up within the EP a scheme for emissions offsetting	letter by CLIM Chairman of 31.3.2008	Bureau Decision of 22 September 2008 to examine the issue in the context of the reduction of the EP carbon footprint

**ANNEX 7 : STUDIES AND BRIEFING PAPERS REQUESTED BY
THE TEMPORARY COMMITTEE ON CLIMATE CHANGE**

***Joint Parliamentary meeting on Climate change and climate change related
legislation***

**National Legislation and national initiatives and programmes (since 2005) on topics
related to climate change**

By IEEP, 03/09/07

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=17631>

This study presents national legislation, initiatives and programmes recently launched by EU Member States and EEA countries to tackle climate change. Lessons learnt from 'good' EU practices and efforts aimed at halting the loss of biodiversity and the fight to climate change indicate that these initiatives were not successful, mainly due to weak implementation (e.g. the lack of financial resources) and lack of political will. The various legislation, initiatives and programmes have been collected via a questionnaire sent out by the European Parliament through the ECPRD network to the different National Parliaments. This network is especially designed to facilitate the exchange of information between national parliaments and the European Parliament. The overall material has been processed, the main results are presented in comparative tables and the information within these tables and 'interesting practices' are briefly discussed.

Climate change legislation and initiatives at EU level

By Copenhagen Economics, 01/10/07

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=18835>

The study was to review current and prospective EU climate policy related legislation and initiatives and provide recommendations for future policies. It evaluates current performance and puts forward options for reform in the post-2012 regime. For policy actions already affecting the commitment period up to 2012, three priorities are underlined all with the aim of improving the cost-effectiveness of climate policies: create a better functioning internal market for energy, take a more selective approach to regulatory energy standards, and use more market based mechanisms to reduce road transport emissions. For the period post 2012, two issues are stressed: the needed reform of the ETS, and the challenges involved in distributing the target reductions among member states.

**Climate Change Legislation and Initiatives at International Level and Design options for
Future International Climate Policy**

By Ecofys, 05/12/07

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=18491>

This study provides background information for the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) and the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (COP/MOP) in December 2007 in Bali, Indonesia. It discusses the major issues under discussion at the start of the official negotiation of an international post 2012 framework agreement, initiated at the COP/MOP meeting in Bali and to be reached by 2009. The study provides an overview an assessment of the approaches that can be taken in a future international agreement on climate

change. The study includes a review of climate change policies of major countries (European Union, USA, Japan, Russia, China, India, Brazil) and private and non-governmental initiatives as well as the extent to which they are implementing their existing commitments under the Kyoto Protocol. Future international climate policy is discussed in various international processes in addition to the UNFCCC, including the G8 plus 5 process, the Asia-Pacific Partnership (AP6), the United Nations High-Level Climate Change Talks, the US major emitters initiative and the Greenland/South Africa/Sweden Ministerial dialogue on climate change.

Social and economic dimension, R&D, new technologies, transfer of technologies, innovation and incentives

Burden Sharing - impact of climate change mitigation policies on growth and jobs

By IEEP, 15/03/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=19998>

This report provides a synthesis and review of existing studies addressing the impact of climate change mitigation policies on growth and jobs in different economic sectors (energy, iron and steel, cement, transport, construction). It looks at the implications of different mitigation scenarios for 2020 and beyond. The study reveals that, according to many literature sources, mitigation policy will lead to job creation in some sectors (e.g. related to RES, energy efficiency, CCS, etc), while some jobs will be lost in others (e.g. related to fossil fuels and production of inefficient products). In general, the studies highlight that the overall net effect is likely to be positive, as jobs in less labour intensive industries could be replaced by jobs in more labour intensive ones, or in sectors with longer value chains. Furthermore, it appears that the average cost of mitigation is usually considered relatively small, in the order of no more than 1% of GDP – with changes to assumptions resulting in slightly higher and lower estimates. Aggregated EU GDP could even slightly increase thanks to positive restructuring of the economy, such as the opening of profitable new markets (e.g. RES, CCS technologies and fuel efficient vehicles).

Climate change and the world's water with special focus on sustainable development, land use, land use change and forests

Climate change-induced water stress and its impact on natural and managed ecosystems

By IEEP, 07/01/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=19073>

This study has shown that much of the impact anticipated from climate change can be attributed to changes in water regimes. The simple summary is to say that this means in some places there will be too much water, in other places not enough; but the story is more complex – shifts in the timing of runoff due to early snow melt; increased annual average precipitation but falling in winter instead of during the growing season; interactions with rising CO₂ levels and temperatures that can benefit certain plant species, but only up to a point. Preparing for and responding to climate impacts will require reviewing approaches to natural and managed ecosystems, for example through the lens of ecosystem services, by which greater emphasis is placed on the preservation of healthy ecosystems; and through sustainable agricultural and forestry practices that can lead to rather than working against climate resilience and species health.

Forestry and climate change: potential for carbon sequestration

By Goossens, Policy Dept. A

(only internal; available upon request)

The note aims to give some exact figures and data on - amongst others - global forest resources, deforestation and carbon stock in vegetation, supplementing the study requested and commissioned by the European Parliament to IEEP on "*Climate change - Induced water stress and its impact on natural and managed ecosystems*". The briefing note highlights the potential of forestry to contribute to climate change mitigation through carbon sequestration.

Sources of emission from the industry and energy sector and transport emissions at global level

An overview of global greenhouse gas emissions and emissions reduction scenarios for the future

By IEEP, 15/02/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=19411>

This study focuses on carbon dioxide (CO₂) emissions from fossil fuels. Key drivers of these emissions are activity, economics, energy intensity and carbon intensity. As reducing GDP or population is not a likely aim of climate policy, the primary means of affecting emissions is to change the last two of the four factors: reducing the amount of energy needed per GDP, and decarbonising the fuel mix. The study tries to quantify current greenhouse emissions and anticipate their future evolution which are important analytical inputs for policymaking.

How to engage other main actors - climate change, adaptation in third countries and global security

State of play of post-Bali negotiations

By Ecofys, 15/03/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=19955>

The note summarises the status of negotiations after the Bali meeting (COP 13/CMP 3) of December 2007, and presents the issues at stake for building the elements of a future climate agreement: on *mitigation* the specification of "measurable, reportable and verifiable nationally appropriate mitigation commitments or actions" for developed countries (most likely continuing the emission reduction targets under the Kyoto Protocol); on *adaptation*, the difficult issue is to define exactly which adaptation activities should be supported by the international system and how developing countries would be able to apply for support; on *technology*, a comprehensive framework for technology transfer has been decided and ways to assess the effectiveness of technology transfer are being developed; on *finance*, the challenge is to create a constant flow of financial resources, substantially larger than the currently available funds, and independent of government budgets.

Engaging developing countries in climate change negotiations

By IEEP, 26/03/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=20148>

Engaging the developing world has become increasingly more important and urgent. This paper explores the possible ways to attract developing countries on board in addressing climate change and reducing their own emissions. The paper addressed the following issues: the division of the world into Annex I/B and non Annex I/B countries; the lack of

commitment globally to defining a long-term objective on when climate change becomes dangerous for the earth and defining a pathway towards achieving such a long-term goal; the limited resources available in the multiple funds especially for adaptation; the Clean Development Mechanism (CDM); the slow rate at which technology transfer and capacity building; land-use and deforestation; and adaptation. The paper concludes with a menu card of policy options and a set of recommendations on a long-term objective, on policies and measures.

Engaging emerging economies - Removing barriers for technology cooperation
By Wuppertal Institute, 26/03/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=19911>

For emerging economies technology transfer is crucial in order to ensure a steady energy supply for their rapid economic development. Energy demand in these countries is growing fast, particularly in India and China. To ensure that the economic growth is not coupled with the high GHG emission growth, technology transfer of low-carbon technologies and technology avoiding negative impact on adaptation is essential. The briefing gives an overview of key partnerships and points the barriers that technology transfer is facing and examples for appropriate tools that can help to overcome the remaining obstacles and promote technology transfer and climate change-related projects.

Linking the EU ETS with other Emissions Trading Schemes

By Wuppertal Institute, 26/03/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=19802>

In this note, different options of linking the EU ETS with other emissions trading schemes are quantitatively and qualitatively assessed, as well as the economic and environmental impacts and the design implications of these options. Economic analysis shows the important role of cap-setting and global emissions constraints for the economic impacts of linking the EU ETS internationally. The institutional analysis shows that several design issues of emerging schemes have important implications for the equity, the economic and the environmental effectiveness in a combined scheme. The report concludes that these problematic issues fundamentally flow from countries' level of ambition as regards climate protection and that linking should therefore only be sought between countries which have a comparably ambitious climate policy outlook.

Engaging the US & other industrialized countries: US climate change policy

By World Resources Institute, 26/03/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=19959>

The United States' cumulative GHG emissions have continued to be among the world's largest – topped only by the rise in Chinese emissions on an annual basis. Due to lack of leadership at the federal level, the U.S. still does not have a comprehensive plan to reduce emissions. In the absence of a national direction, many regions, states, and municipalities have begun to implement policies to reduce emissions on their own and in concert with other regions, states, and municipalities. The policies addressing a variety of sectors – in particular the electricity and transportation sectors and many aim to increase energy efficiency and renewable energy use are presented in this note. These efforts are complemented by action in the private and nongovernmental sectors and, in part driven by local and business initiatives, new proposals for legislation in the U.S. Congress. The paper also presents the U.S. Presidency candidates policy perspectives in the field of climate change.

Meeting the Climate commitments: Addressing competitiveness, trade, financing and sustainable employment in a European global context

Competitive distortions and leakage in a world of different carbon prices
Compilation of briefing notes by several authors, 04/07/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=21551>

Effective climate policy in Europe requires early commitment to ambitious emission reduction targets, with tight emission caps and rapid shifts towards auctioning of emissions. This guides a transition to a low carbon economy, provides growth opportunities for innovative sectors and technologies, and demonstrates leadership to drive international climate policy. Whether or not an agreement is reached at the Copenhagen in 2009, it is very unlikely that a single global price for carbon will prevail. A frequently voiced concern is that states with stringent climate policies will place domestic industries at a disadvantage relative to competitors in states with less ambitious climate efforts. This study compilation is an attempt to present the policy options available in this possible future situation of different levels of ambitions in climate policies. This is done in 5 chapters by different authors, from different points of views and academic disciplines. The study compilation asks the question whether competitive distortions and leakage, either in CO₂ or employment, present a realistic danger in a world of different carbon prices.

Climate change financing in developing countries

Compilation of briefing notes by several authors

<http://www.europarl.europa.eu/activities/committees/studies/Com/download.do?file=21631#search=%20Climate%20change%20financing%20in%20developing%20countries%20>

Part 1 the report assesses the interaction between climate change financing and development aid: what are the impacts of those policies today, and what are potential incoherencies in the different intervention areas of development assistance with regards to climate change adaptation and mitigation objectives and development objectives. Part 2 provides an overview of EC programmes and international EC funded financing initiatives aimed at developing countries in the field of climate change mitigation and adaptation (objective, allocated budgets and financing mechanisms) and recommendations to improve coherence and effectiveness of the different EC mechanisms. Part 3 assesses the mechanisms for mainstreaming of adaptation and mitigation of climate change in development policies and programmes at EU and international level and for climate risk assessment and recommendations for improvement (EU/donor perspective). Part 4 assesses the mechanisms for mainstreaming of adaptation and mitigation into development projects on a national and local level and recommendations for improvement (recipient countries perspective)

Achieving significant CO₂ emission reductions in short time: learning from Best Practices regarding successful policies and technologies

Sustainable cities: Best practices on CO₂ savings in urban areas - Building efficiency, household emissions and energy use

By Wuppertal Institute, 23/06/08

<http://www.europarl.europa.eu/activities/committees/studies.do?language=EN>

In Europe, numerous good practice examples related to emission reductions in cities can be found. A high number of cities and towns have implemented local energy action plans, local

emission reduction targets or even plan to become carbon neutral. These targets usually include a whole package of different measures and instruments. The aim of the following compilation is to identify medium-scale examples that are innovative, show short-term emission reductions and are replicable to other urban areas throughout Europe. The focus lies on energy efficiency in buildings, household emissions and energy use.

Delegations

China and climate change: Impacts and policy responses

By Prof Ash, London University, 01/10/07

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=18039>

This briefing paper seeks to demonstrate that the challenges for China posed by climate change are real. The consequences of global warming are already apparent. The scientific evidence of investigations by Chinese and international bodies overwhelmingly indicates that the threat to the sustainability of China's future social and economic development, as well as to fragile ecosystems, will intensify. That the Chinese government recognises the scale of the problems that China faces as a result of climate change is beyond doubt, as is its commitment to address those problems, subject to its insistence that industrialised countries bear the major responsibility in meeting the challenges of global warming. More questionable, however, is whether the policies Beijing has so far put in place will be capable of halting, let alone reversing, the recent inexorable and accelerating increase in China's GHG emissions.

China's energy policy in the light of climate change, and options for cooperation with the EU

By Prof. Holslag, 01/10/07

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=18035>

This paper briefly introduces China's new *comprehensive energy security* policy. Subsequently, it sheds a light on how the European Union tries to take advantage of this move, by stepping up its efforts to promote green energy and simultaneously tapping China's vast market. Afterwards, an assessment is made of the success of this European approach for wind and solar energy, clean coal technologies, natural gas, hydropower and bio-fuel and recommendations for EU policy in this area are provided.

Climate Change and India: Impacts, Policy Responses and a Framework for EU-India Cooperation

By Dr Kumar, TERI-Europe, 24/01/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=19208>

The briefing note provides a brief overview of the impacts that climate change is having on the Indian economy, government policies that are in place that assist in adaptation to climate change in sectors, India's contribution to global greenhouse gases and mitigation efforts currently underway and indicative areas for collaboration between the EU and India on adaptation to climate change as well as on mitigation efforts.

Climate Change Impacts and Responses in Bangladesh

By Dr. Huq, International Institute for Environment and Development, 24/01/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=19195>

Bangladesh is one of the most vulnerable countries to climate change because of its disadvantageous geographic location; flat and low-lying topography; high population density; high levels of poverty; reliance of many livelihoods on climate sensitive sectors, particularly agriculture and fisheries; and inefficient institutional aspects. Many of the anticipated adverse effects of climate change, will aggravate the existing stresses that already impede development in Bangladesh, particularly by reducing water and food security and damaging essential infrastructure. This briefing note describes the country characteristics that make it particularly vulnerable to climate change, before outlining the main climate change impacts that are of concern. These impacts are discussed in relation to their adverse effects on different sectors. Finally, the national and international policy responses to manage these effects are outlined.

Engaging the US & other industrialized countries: US climate change policy

By World Resources Institute, 26/03/08

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=19959>

The United States' cumulative GHG emissions have continued to be among the world's largest – topped only by the rise in Chinese emissions on an annual basis. Due to lack of leadership at the federal level, the U.S. still does not have a comprehensive plan to reduce emissions. In the absence of a national direction, many regions, states, and municipalities have begun to implement policies to reduce emissions on their own and in concert with other regions, states, and municipalities. The policies addressing a variety of sectors – in particular the electricity and transportation sectors and many aim to increase energy efficiency and renewable energy use are presented in this note. These efforts are complemented by action in the private and nongovernmental sectors and, in part driven by local and business initiatives, new proposals for legislation in the U.S. Congress. The paper also presents the U.S. Presidency candidates policy perspectives in the field of climate change.

UNFCCC - COP-14 in Poznan (December 2008)

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=23435>

The briefing was prepared as a background material for the EP delegation to the 14th UNFCCC COP meeting on Climate Change in December 2008 in Poznan, Poland. At last year's meeting in Bali, Indonesia, a time-lined negotiation on a post-2012 framework was agreed, aiming at reaching an agreement in Copenhagen in December 2009. As a steppingstone on the path from Bali to Copenhagen, the Poznan conference will mark the turning point from analysis and discussion to negotiation stage.

Ahead of the Poznan Conference there are four key issues or 'hot topics': i) sectoral approaches; ii) Clean Development Mechanism (CDM) and Land Use, Land Use Change and Forestry (LULUCF); iii) Reducing Emissions from Deforestation in Developing Countries (REDD); and iv) financing and development.

Other key issues are the participation of the US in an international climate change agreement; whether or not emerging economies should take up binding emission reduction commitments; and how to accommodate diversity among developing countries not only in terms of economic capability, natural resource endowments, and vulnerability to impacts of climate

change but also in terms of topics of their priority. The Copenhagen agreement should form a 'shared vision' with a level of ambition and send a strong signal from joint leadership of all major economies to the market, business, scientists, and citizens.

International Forest Policy: Integrated climate and forestry policy options. The implications of carbon financing for pro-poor community forestry: How do we design forest policy tools to jointly address climate change, environmental and development goals?
<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=23272>

The study addresses the integrated climate and forestry policy options in developing countries, focussing on the implications of carbon financing for pro-poor community forestry. Specifically, it responds to the following question: "How do we design forest policy tools to jointly address climate change, environmental and development goals?"

The report provides an overview of carbon finance initiatives and proposals; analyses carbon finance initiatives/proposals targeting forest issues from the perspectives of climate change mitigation, biodiversity and other environmental issues, and development; and offers recommendations on steps forward to promote a pro-poor forest agenda for UNFCCC negotiations, the spending of revenues from EU-based green house gas emission mitigation efforts, and other pertinent processes. The focus is on tropical forests as these make the largest contribution to greenhouse gases (GHGs) and have most links with the 'pro-poor community forestry' agenda.

The study examines CDM afforestation/reforestation projects, Reduced Emissions from Deforestation and forest Degradation (REDD), and voluntary projects.

Energy and Climate Change in Russia

<http://www.europarl.europa.eu/activities/committees/studies/download.do?file=21815>

The briefing was prepared as a background material for the EP CLIM delegation to Russia in October 2008. The report addresses the impacts of climate change in Russia, including the expected impacts on ecosystems, and analyses how Russia's oil and gas contributes to climate change worldwide.

The briefing identifies the main opportunities in Russia to mitigate climate change through hosting Joint Implementation (JI) projects, LULUCF (Land Use, Land Use Change and Forestry) activities, participating in International Emissions Trading (IET), or applying some Green Investment Schemes (GIS), focusing on the country's potential in supplying the global carbon market with emission reductions.

The report presents the framework of cooperation between the EU and Russia, such as the Partnership and Cooperation Agreement (PCA), the EU-Russia “energy dialogue”, and the debate concerning the ratification by Russia of the Energy Charter Treaty (ECT). Finally, opportunities for enhancing EU-Russia cooperation on climate change are being suggested.

Background information and external expertise
managed by EP Policy Department A

ANNEX 8 : WORKING DOCUMENTS DRAWN UP IN THE CONTEXT OF THE
ACTIVITIES OF THE TEMPORARY COMMITTEE ON CLIMATE CHANGE

Working Documents on Thematic Sessions

- No 1 on Climate Impact of different levels of warming by *Vittorio Prodi*, theme-leader
- No 2 on The Climate Protection Challenge Post-2012 by *Satu Hassi*, theme-leader
- No 3 on The social and economic dimension R. & D. New Technologies, transfer of technologies, innovation and incentives by *Philippe Busquin*, theme-leader
- No 4 on Climate change and the world's water, with a specific focus on sustainable development, land-use change and forests by *Cristina Gutiérrez-Cortines*, theme-leader
- No 5 on Sources of Emission from the Industry and Energy Sector and Transport Emission at Global Level by *Etelka Borsi-Pataky*, theme-leader
- No 6 on How to engage other main actors - climate change, adaptation in third countries and global security by *Justas Vincas Paleckis*, theme-leader
- No 7 on Meeting the climate commitments: addressing Competitiveness, Trade, Financing and Sustainable Employment in a European and Global Context by *Lambert van Nistelrooij* and *Robert Goebbels*, theme-leaders
- No 8 on Achieving significant CO₂ emission reductions in short time: learning from best practices regarding successful policies and technologies by *Bairbre de Bruin*, theme-leader

Working Documents by Karl-Heinz Florenz, Rapporteur

- No 9 on waste treatment and resource management as part of a climate protection strategy
- No 10 on water
- No 11 on fisheries
- No 12 on health
- No 13 on adaptation to the consequences of climate change
- No 14 on agriculture
- No 15 on livestock breeding
- No 16 on transport
- No 17 on forests
- No 18 on growth and employment
- No 19 on Carbon Dioxide Capture and Storage (CCS)
- No 20 on soil protection
- No 21 on energy efficiency in the building sector
- No 22 on energy
- No 23 on financing and budgetary affairs

All working documents can be found on:

<http://www.europarl.europa.eu/activities/committees/homeCom.do?language=EN&body=CLDM>

RESULT OF FINAL VOTE IN COMMITTEE

Date adopted	2.12.2008
Result of final vote	+: 47 -: 4 0: 2
Members present for the final vote	Liam Aylward, Etelika Bani-Pataky, Ivo Belet, Johannes Blokland, John Bowis, Jerzy Buzek, Pilar del Castillo Vera, Dorette Corbey, Chris Davies, Avril Doyle, Lena Ek, Edite Estrela, Karl-Heinz Florenz, Matthias Groot, Françoise Grossetête, Rebecca Harms, Satu Hassi, Roger Helmer, Jens Holm, Dan Jørgensen, Romana Jordan Cizelj, Dieter-Lebrecht Koch, Eija-Riitta Korhola, Linda McAvan, Marian-Jean Marinescu, Roberto Musacchio, Riitta Myller, Dimitrios Papadimitriou, Markus Pieper, Vittorio Prodi, Herbert Reul, Luca Romagnolo, Guido Sacconi, Andres Tarand, Silvia-Adriana Ţicău, Antonios Trakatellis, Alejo Vidal-Quadras, Åsa Westlund, Anders Wijkman
Substitute(s) present for the final vote	Pilar Ayuso, Michel Ebever, Anne Ferreira, Catherine Guy-Quint, Fiona Hall, Peter Liese, Bill Newton Dunn, Zita Plešinská
Substitute(s) under Rule 178(2) present for the final vote	Glenn Bedingfield, Francesco Ferrari, Juan Fraile Cantón, Louis Grech, Genis Willmott, Stefano Zappalà

European Parliament

2004



2009

Temporary Committee on Climate Change

14.7.2008

Working Document No. 8

on the 8th Thematic Session "Achieving significant CO₂ emission reductions in short time: learning from best practices regarding successful policies and technologies"

Contribution by Bairbre de Brún, Theme leader to the Rapporteur

Temporary Committee on Climate Change

Rapporteur: Karl-Heinz Florenz

Introduction

The Temporary Committee on Climate Change (CLIM) held its eighth thematic session on the subject "Achieving significant CO₂ emission reductions in short time: learning from best practices regarding successful policies and technologies" on Monday, 23 June 2008, from 15:00-18:30, in the premises of the European Parliament in Brussels, Room PHS 1A 002.^[1]

The objective of the eighth session was to gather information on the possibilities to start quickly a coherent policy in order to combat climate change. These policies should not be dependent on R+D nor on possibilities that are not yet available in the market, but focus on existing technology. Together, they should be able to reduce significantly the amount of CO₂ emissions.

Opening session and first expert panel

Guido Sacconi, Chairman of the Temporary Committee on Climate Change, opened the event introducing the speakers and the topics to be discussed. Inaugurating the eighth thematic session, the Chairman encouraged the experts to explain the various possibilities concerning the reduction of CO₂ emissions.

Karl-Heinz Florenz, Rapporteur for the Temporary Committee on Climate Change asked the experts to deliver solutions that would be immediately applicable and that would produce significant positive results.

Bairbre de Brún, theme leader for the 8th thematic session stated that although climate change is a global challenge, solutions can be found at local level. The successful companies of the future will be green companies. The successful cities will have an urban infrastructure that helps to limit CO₂ production.

Key-note speaker and First Expert Panel

Calling climate change "the single biggest problem humanity has faced" the key-note speaker Ken Livingstone said that the tools necessary to halve emissions are already in place. He said that political will and sustainable energy consumption are key requisites and that a successful EU climate change policy will have to involve the pooling of best practices across Europe. In London, said Livingstone, it would be possible to reduce carbon emissions "by 60 percent by 2025 and 80-90 percent by 2050" by using existing technologies.

Ken Livingstone had to convince the British government to change the regulatory framework to locally generated power, because the present mass power generation far from the users creates

a waste of energy of 65 % in cooling and transport. When local power stations were used, the heat could also be applied usefully so that only 15 % is lost, which makes 50 % difference or 30 percent of the total.

The other 30 % of gains can come from lifestyle changes: never waste anything: re-use waste, never waste light, use efficient fridges, washing machines and other white goods, and properly insulate homes. If each city advances on every front - accumulating best practices from cities worldwide - the 60% reduction in London could be reproduced all over Europe.

Ken Livingstone when Mayor of London was instrumental in establishing the C40 group of the world's largest cities, working in partnership with the Clinton Foundation to reduce greenhouse gas emissions among cities. The Clinton Foundation used its bargaining power to negotiate with big companies on the subject of retrofitting buildings. As the number of bigger projects increased, so did demand and thus the whole market, and prices could be brought down. Further there was a negotiation on special financing arrangements. The companies would do the work upfront without charging and would be paid back from 80 % of the energy savings, leaving 20 % for the "clients". The congestion charge was also important as will be the introduction of a low emission zone in London with tariffs on certain lorries not complying with standards.

European legislation is helping local government work more in a more environment-friendly way. Without regulation in the EU, the slowest would even be slower.

Frederic Ximeno i Rocca, Director General for Environmental Policies and Sustainability, Generalitat of Catalunya, spoke on the experiences of Catalonia, and in particular on the hugely participatory process that led to the development of their 2008-2012 Catalan Plan to Mitigate Climate Change. The aim of the government of Catalonia is to prevent the emission of 5.33m tonnes of CO2 equivalent on a yearly average during the Kyoto protocol period.

A Catalan office for combating climate change was created and citizens were invited to take part in the Catalan Convention on Climate Change. More than 800 people and around 500 different organisations were involved. More than 1000 proposals were examined, many of them highly developed. They adopted a structured approach involving not only meetings but also internet and media programmes, integrating all sectors of the government as well as civil society and resulting in clear objectives. The focal point of the plan's efforts is on mitigating emissions from sectors not included in the EU's Emissions Trading Directive, and which contribute 65% of emissions including mobility, waste, agriculture, the residential sector, retail, construction, industry and energy. The plan also includes a programme for the sectors covered in the directive, as well as a programme of actions aimed at driving research, awareness-raising and participation. The government of Catalonia considers that the participatory process has helped particularly to increase awareness, motivation and support by the population for the climate programme.

Mark Harbers, City Councillor (Wethouder) of Rotterdam, presented the Rotterdam Climate Initiative, which intends to achieve a 50% reduction in CO2 emissions by 2025, compared with the level in 1990. This initiative was partly inspired by Rotterdam's participation in the international climate program of former US president Bill Clinton. Within this programme, Rotterdam leads the way in the subprogramme focused especially on world ports. Both the government and the corporate sector are represented in the Rotterdam Climate Initiative. This concerted approach allows rapid progress and it has created enormous action power.

Innovative entrepreneurs come up with clever ideas for alternative sources of energy. Sizeable transport companies, such as TNT, the Rotterdam taxi centre, and the municipal transport company all contribute their own programmes to enhance the sustainability of their fleet. Companies that emit a lot of CO2 capture this CO2 and transport it to the greenhouse district

nearby, the Westland, where market gardeners use it to grow tomatoes. Housing associations are working hard to enhance the sustainability of their housing stock, and more and more property developers decide to build only sustainable buildings from now on.

The municipality, therefore, mainly needs to serve as a catalyst, a booster, a trailblazer. They remove barriers, for instance by helping to provide new forms of financing to improve the possibilities for sustainability investments. They detect initiatives and movements, identify frontrunners, place good examples on display for everyone to see, and bring parties together. They have reached agreements with developers, building contractors, architects and investors on sustainable construction in Rotterdam. Together with forty other large port cities they will conclude agreements on cleaner forms of shipping. They are conducting experiments concerning the possibilities of introducing LED lighting in the city centre of Rotterdam. And they invest in innovation, for instance in the further development of Formula Zero (cars running on hydrogen), as well as new types of wind energy. Last winter, they arranged for the delivery to over 300,000 homes, of two low-energy light bulbs. All of these low-energy light bulbs together result in a total saving of 50,000 tons of CO₂.

Gösta Gustavsson, Vice Mayor of Linköping in Sweden talked about the initiatives and best practices in his city, including best practice transport initiatives, promoting public transport and halving the transport of goods through pooling. Linköping applies climate and environmental requirements to all purchases and communicates climate issues to employees, elected representatives, residents and businesses in the municipality. Bicycle traffic amounts to 30% of all traffic and there is more than 40km of pedestrian and bicycle paths.

Linköping is today one of Europe's leading biogas cities and has fifteen years of experience of the processing, production and development of bio-methane, from organic matter such as waste from slaughterhouses and household food waste, which is used in city buses, refuse collection vehicles, almost all taxis, and the municipal car pool. There are three production plants, thirteen public fuelling stations, and one bus depot. Bio-methane sales represent 6% of the total vehicle fuel volume in Linköping. Bio-fertilizer is sold to farmers and replaces fossil fertilizers. Linköping will also try to run a train on biogas. Organic waste is turned to biogas with the advantage of a reduction of weight and volume of the "waste mountain".

Other initiatives mentioned include the district heating and cooling grid, a sorting plant/recycle station, landfill elimination and initiatives that seek to involve all citizens and the private sector. Linköping's economic track record shows that the municipality and society has benefited. There must be long term targets and rules because companies and citizens must trust the city. That is the secret and the EU has, until now, been very helpful in creating this stable set of conditions.

In the discussion after the first expert presentations the following Members took part: Riitta Myller, Roberto Musacchio, Karl-Heinz Florenz, Catherine Guy-Quint, Vittorio Prodi, and Guido Sacconi. The discussion focussed on an eventual binding target for increased energy efficiency, the input of the non-used electrical power into the public grid, the stimulating power of European rules, the use of waste and the effects of measures on transport and mobility.

Key note speaker Ken Livingstone answered that there are still problems of congestion but that there is a shift away from cars usage to public transport and cycling. There are 50 % more bus passengers and many more buses. Incineration must be skipped in order to use more efficient ways of getting rid of waste. EU regulations always worked best and Ken Livingstone asks the Members to be tougher.

Frederic Ximeno I Roca mentions that Spain has not yet achieved its goals on CO₂ reduction. EU regulation helps to put environmental objectives into mainstream SMEs take many initiatives in Barcelona because there is now more awareness. There are seventy-three measures to reduce

pollution. Although drivers did not react well to 80 kilometres per hour speed limit, there are fewer accidents, less petrol use and less CO₂-emissions.

Mark Harbers states that there is a very good information-exchange including the communication of experiences. Bigger companies know that it is in their economic interest to invest in CO₂ reductions but SMEs are somewhat lagging behind. In the field of heat-power and residual heat there are extensions of district-heating. EU regulation is very important to make progress and Mark Harbers advocated regulation on the waste of heat, particularly because heat is not an unuseful waste.

Gösta Gustavsson. said that in Linköping there is no incineration of what can be re-used or recycled. A municipal company is responsible for district-heating. If you start with biogas you need to have it, you need to have the infrastructure and the users, and all that at the same time.

Second Expert Panel

Guido Sacconi welcomed the second expert panel consisted of Carin ten Hage, director of "Planet me" (the environment programme) within TNT, Neil Harris, Head of Green IT and Sustainability, CISCO Europe and Franco Miglietta, Associate Professor, Department of Nuclear and Theoretical Physics, Research Director at the Institute of Biometeorology of CNR, Firenze.

Carin Ten Hage stated that the overall ambition of TNT is a continuous reduction of the carbon intensity of operations through a three stage procedure. The first Count Carbon is to count carbon and integrate carbon management in business processes, measuring the impact of initiatives, setting targets, improving internal carbon reporting, developing a framework for effective carbon management and providing accurate CO₂ information to customer level. The second part Code Orange touches on every aspect of business, including aviation, buildings, business travel, company cars, green investment, operational vehicles, procurement and partnering with customers. The company builds and implements a global fuel and energy efficiency programme, develops a subcontractor strategy, and purchases green electricity for TNT's European operations. TNT will include CO₂ among the principal criteria in their budget and investment process. They will also implement a green company car fleet and introduce an additional cash incentive for employees who choose cars that produce less than 120g/Co₂ per kilometre. The company's trucks and vans generate some 23% of total emissions and they are running a number of projects for the use of alternative fuels such as the use of electric lorries, pure bio diesel lorries, hybrid trucks, and even in bio diesel-blend trucks in India. The third part Choose Orange is a voluntary programme that aims to engage all employees and their extended family by educating, engaging and motivating employees on fuel efficient driving through the "Drive me" challenge, for example and through educating the next generation through the Planet Me Game.

Neil Harris, Head of Green Technology and Innovation for CISCO Europe says it is the responsibility of every industry to be greener. The Cisco green programme will by 2012 result in a 25 % reduction of greenhouse gas emissions. Cisco is a partner in the Clinton Global Initiative. ICT technologies account for a very small part of the world's technologies, but they can provide solutions to help other technologies work more effectively. Cisco works to curb its own company's greenhouse gas emissions through an eco drive that includes the measurement of energy flows, allowing machines to shut down when not in use and recycling material consumed in offices. The process to find the necessary reductions is to monitor, manage and reduce, as for electricity use in offices, appliances in homes, or traffic flows in cities. Other solutions for customers can include ICT and Ethernet to the factory floor for heavy industries such as steel work and cement factories and Smart grids for power generation and transmission. ICT solutions use energy but can also avoid the use of energy through the use of collaboration technology such as TelePresence software to allow for telecommuting thus reducing the need for business

travel by employees, partners and customers. Connected Urban development is a Cisco initiative working with cities on urban design for better sustainability. It began in three cities San Francisco, Seoul and Amsterdam with a total Cisco investment of \$15m and expanded to Birmingham, Hamburg, Lisbon and Madrid. The Amsterdam project alone is to save 76 thousand tonnes of CO₂ over five years.

Franco Miglietta, Associate Professor, Department of Nuclear and Theoretical Physics, Research Director at the Institute of Biometeorology of CNR, Firenze, indicated the obvious problem: we have too much CO₂ so the question is of how to make this carbon useful. His speech on "Biochar in agriculture for residue management, energy production and Carbon sequestration: a win to win strategy" intended to find solutions to that problem. Investigators found a dark type of soil in Brazil and this dark soil dates back to pre-colonial times. Charcoal was used as fertilizer, it made the plot very fertile and the result is a remaining black-coloured soil. Biochar is green charcoal. Vegetable charcoal remains in the soils for thousands of years, improves the water dynamics of the soil, remains active as fertilizer and the production by pyrolyses/distillation also produces energy. You can make it out of plant waste. There are thus three win situations: substitution of a portion of fertilizers, sustainable land-use and reduction of off-site pollution.

In the discussion after the second round of expert presentations the following Members took part: Riitta Myller, Vittorio Prodi, Karl-Heinz Florenz and Guido Sacconi. The discussion focussed on the package which parliament should give its opinion on, the availability of plant-matter necessary for the production of biochar and other aspects of the production of biochar.

Carin Ten Hage stated that business needs a real value put on carbon emissions because then they will invest in new technologies. ETS must be transparent, must have the same standards for the whole economy. Businesses need consistent and pragmatic policies. Neil Harris answered that in the ICT industry we work a great deal on energy efficiency by ICT and that will contribute to solving the CO₂ problem. Franco Miglietta gave an example of a farmer. On 1ha of land the outcome of 1 year could be an emission of 30 tons of CO₂. Ten tons would lead to food to be consumed, 20 tons could be included in the waste. This waste should either be burned or it can be used to produce organic charcoal, with all the advantages. It is important that it is used and that there is a legislative framework. One can calculate how much CO₂ is taken from the atmosphere. His opinion is that planting trees will create mitigation, but not much. In farming and biochar the result would be easier to calculate and more significant.

Bairbre de Brún, theme leader, stressed that speakers from both the public sector and business are for EU regulation. No sign of fear for employment has been shown, on the contrary the indications were that through the measures to combat climate change a lot of work and thus employment can be created. But the most important conclusion is bringing people with you. Every participant in the thematic session stressed that motivation is a very important factor.

Even though climate change is an urgent issue not many of our cities and governments are sharing the information that is out there.

Karl-Heinz Florenz, rapporteur, pointed out that the ideas of the C40, executed in London and other cities where an innovative financing plan was introduced where the works were done by and financed by industry from future gains were very interesting. They could certainly be more widely applied and might increase demand and thus lead to lower prices of innovative products. Internalization of external cost will lead to fair situation. As far as traffic is concerned, we are close to traffic collapse and ideas must be developed to improve the situation. If you collect and implement best practice from each area of the world you can advance significantly.

Conclusions by the Theme Leader:

On the basis of the presentations and the discussions held at the eighth thematic session the Theme Leader draws the following key conclusions:

1. A sufficient mix of technologies exists to make rapid CO₂ reductions possible. EU policies act as a spur to the adoption and use of these technologies and can help on a national, local and regional level to achieve rapid reductions of CO₂ emissions.
2. Information on climate issues and climate solutions is all important. Businesses, cities and governments will be inspired to action if they know that what they regard as 'new' technologies and policies are already standard practice in other places, and are producing results.
3. An action plan with clear objectives and targets will aid progress, drawing on widespread input from a range of participants and learning from best practices elsewhere. The challenge is global but individual and local actions produce solutions. No place is too small to make a contribution.
4. Motivating citizens, employees, business and other stakeholders is important in getting action and changing habits, attitudes, practices and lifestyles. Networking and information exchange will help local and regional governments in developing the necessary approaches.
5. Initiatives such as the distribution of two energy efficient lightbulbs to every household address mentioned in the presentations can be as important in raising awareness as the use of documents or media advertising campaigns.
6. Amongst the best practices mentioned in the thematic session were efficiency measures such as retrofitting of houses and offices, more sustainable buildings, better traffic planning, more efficient lighting, re-using and re-cycling, more efficient use of water, increased public transport, walking and cycling, use of ICT to reduce travel and to improve the effectiveness of processes in industry, monitoring the carbon footprint of the business or municipality, and a move to renewables. There are administrative and motivational barriers to be overcome, but the overall effect of these measures is a positive financial gain, less CO₂ emissions and a significant rise in employment.
7. Sustainability and economic development are not opposing factors; they are opportunities for mutual reinforcement. Quality of life and employment will not suffer from actions to combat climate change.
8. There is a greater willingness to contribute to tackling climate change than is generally thought, including among business. Clear legislation and ambitious long-term emission requirements from the EU aid stability in planning as well as intermediate targets and clear legislation at member state level.
9. Local and regional level governments could set stricter, binding targets than the 20/30 % reduction envisaged by the climate package of the European Commission. However, as cities and regions differ greatly, those targets should be tailored to the regional or urban level.
10. Innovative financing programmes must play a role in order to overcome barriers
11. Waste management and the use of waste are crucial for urban areas. The use of waste in an environmentally sustainable manner can create a supply of biogas, energy, and heat, relatively close to users in the urban area. As examples have shown, waste management can provide financial gains, less CO₂ and a positive effect on employment.

12. Large companies can make changes not only to their own practices but, through engagement with subcontractors and suppliers, can influence the behaviour of SMEs also. They can also engage with their employees about lifestyle changes outside the workplace.

[1] Please note that some presentations delivered at the thematic session are available at the CLIM-Webpage at http://www.europarl.europa.eu/comparl/tempcom/clim/sessions/default_en.htm

Bairbre de Brún MEP

February 2009

Overview

Sinn Féin recognises the potentially disastrous impact of climate change on our environment and society. We believe that effectively tackling climate change brings opportunities as well as challenges.

In the Sinn Féin submission to the Programme for Government (PfG) we identified recommendations relating to a number of Departments on how to tackle Climate Change.

The Executive should commit to reducing our emissions by at least 30% from their 1990 level by 2020. The rate of reduction should be at least 3% per annum. There also needs to be periodic targets set by the Executive for the period leading up to 2020, and proposals made to compensate where emissions reductions targets have not been met.

The European Union has introduced a mandatory target of 20% renewable energy-use by 2020, and we should play our part in meeting that target. We believe that Ireland is well-placed to be at the centre of a new, green economy, if the political will exists, because of our potential abundance of wind and wave energy as well as our historic lack of heavy industrialisation compared to other developed countries. Sinn Féin also supports the use of biomass and solar energies as a part of our renewable energy production.

Sinn Féin supports waste to energy solutions where these involve production of electricity from Mechanical-Biological Treatment and Anaerobic Digestion processes in Combined Heat and Power plants, and do not involve incineration or other thermal waste treatment.

Within an all-Ireland framework, Sinn Féin also supports moves towards energy independence and decentralisation in energy production. We believe the Assembly Executive and the Irish Government should put renewable energy production at the heart of all-Ireland economic planning in order to allow a prosperous all-island economy to become a world leader in renewable energy production.

Underpinning this approach should be an integrated strategy across government departments and in conjunction with local councils, accompanied by targets, goals and monitoring mechanisms.

Initial commitments

Climate change is not just the major political challenge of our time; the worst impacts of climate change constitute a great social, environmental and economic threat. We cannot afford to fail in addressing the very real danger of climate change.

While much political attention is rightly focused on bringing down the emissions that cause climate change, we also need to work on adapting to climate change. Even if we agree strict new emission reduction standards, we will still need to deal with changing climate conditions for decades to come. We need to be prepared.

The Assembly has given its consent for the provisions of the Climate Change Act 2008 to apply to the North of Ireland. There is an opportunity through new local legislation and a new integrated Executive policy to take forward a strategic response to setting and meeting specific targets for the North of Ireland on reducing CO2 emissions and responding to the economic challenges facing us.

A detailed integrated Executive strategy to setting out how we are going to meet our carbon emissions targets and adapt to Climate Change should spell out how each sector of the economy and society can contribute to reducing these emissions. The Scottish Climate Bill shows the direction that we can and should go, and we should take account of suggestions being made in Scotland for further strengthening of the Scottish legislation.

Sinn Féin believe the Executive could give a greater focus on a number of key areas, including:

- A reduction in energy consumption;
- The development of renewables; and
- Decentralisation of the energy infrastructure.

The Executive needs to reassess its options for tackling rising energy demand, meeting energy efficiency and renewable energy targets and reducing CO2 emissions. A tremendous opportunity exists to put the production and use of renewable energy at the heart of the Executive economic development strategy.

Investing in new technologies and moving much more decisively to renewable energies as well as energy efficiency can create more jobs and lower energy bills. Renewable energy in particular could be developed in an all-Ireland energy market.

The Executive needs to be pro-active in its support for low carbon innovation. Actions can and should be taken across departments, including in the fields of enterprise and job creation, energy, transport, agriculture and land use, waste management, planning, tourism, fisheries and forestry, education and training and finance and investment. Closer co-operation and co-ordination between Departments is needed and between the relevant Assembly Committees.

I also strongly support the call for building regulations here to be revised to promote the use of renewable energy technologies.

International and European context

2009 is a key year in setting out the global response to Climate Change with the UN Conference in Copenhagen at the end of the year due to agree new targets and actions to tackle Climate Change.

The European Parliament Climate and Energy Package has also given effect to the targets set by the EU last year to have 20% renewable energy, 20% energy efficiency and a 20%-30% reduction in emissions relative to the 1990 level by 2020. This represents an unprecedented attempt to tackle the causes and consequences of climate change. Sinn Féin supports all

measures at local, national, EU and indeed at global level through the UN climate talks which can set the necessary binding targets for CO2 reductions.

There are some very disappointing elements in the EU package such as the possibility for member states to export the majority of their emissions reductions actions to countries outside the EU and the complete failure to stand up to the automobile industry and impose strict reductions in CO2 emissions from passenger cars. On the other hand the measures on renewable energy and on fuel quality and the improvements to the Emissions Trading Scheme represent movement in the right direction.

Efforts to decarbonise the economy will offer significant business opportunities in the time ahead and we should introduce fiscal incentives to develop research into clean technologies.

The European Commission has announced, as part of its European Economic Recovery Plan that it will allow EU funds be used for energy-efficiency projects in low-income housing. This is something Sinn Féin argued strongly for. The Executive should make this part of their strategy to deal with fuel poverty and to tackle climate change.

Sinn Féin also believe that all investments and policies in Europe should be 'disaster and climate proof'. We have recently seen a stark example of a lack of local disaster-proofing in Stoneyford where a housing estate, built on a flood plain, has experienced repeated serious flooding, making the houses uninhabitable. We have to ensure that preventative measures are in place and that protection structures are well maintained. We also need to have strong policy controls on where building takes place.

In 2007 the European Parliament set up a Temporary Committee on Climate Change, vested with a number of powers including to formulate proposals on the EU's future integrated policy on climate change. It held a number of thematic sessions, and I was theme leader for the 8th Thematic Session "Achieving significant CO2 emission reductions in short time: learning from best practices regarding successful policies and technologies"

Amongst the best practices mentioned in the thematic session were efficiency measures such as retrofitting of houses and offices, more sustainable buildings, better traffic planning, more efficient lighting, re-using and re-cycling, more efficient use of water, increased public transport, walking and cycling, use of ICT to reduce travel and to improve the effectiveness of processes in industry, monitoring the carbon footprint of the business or municipality, and a move to renewables. There are administrative and motivational barriers to be overcome, but the overall effect of these measures is a positive financial gain, less CO2 emissions and a significant rise in employment.

I attach the report of that session, Working Document No 8 of the Temporary Committee on Climate Change, as an annex to this submission.

The concluding report of the European Parliament Temporary Committee on Climate Change emphasised that tackling climate change will help to create new jobs in new technologies, combat energy poverty and dependency on imported fossil fuel and provide social benefits for citizens. It also calls for a 'climate audit' so that EU budget lines can be adapted in line with the requirements of climate policy, as well as tackling the question of allocating unused existing EU funds for climate policies. The report, which has since been adopted by the whole parliament in a somewhat amended form, contains useful suggestions in a range of areas, which could provide a good starting point for discussion and policy-making. I therefore attach a copy of that report also, (Appendix I) the European Parliament resolution of 4 February 2009 on "2050: The future begins today – Recommendations for the EU's future integrated policy on climate change" (2008/2105(INI))

Executive Action Plan on Climate Change

Binding domestic legislation which incorporates emission reduction targets can go some way to address the affects of climate change at home and throughout the world. A local Climate Change Bill with annual appraisals that places the emphasis on action at local and all-Ireland level would help deliver long term sustainable environmental development that positions climate change as a priority policy concern. Such a bill could also encourage initiatives involving unions and the workforce in negotiated green workplace agreements to cut carbon footprints.

Engaging with business as well as the public sector makes a lot of sense. Large companies can make changes not only to their own practices but, through engagement with subcontractors and suppliers, can influence the behaviour of SMEs also. They can also engage with their employees about lifestyle changes outside the workplace.

All public sector procurement, especially the Investment Strategy (ISNI) should have robust components built in to underpin targets for reducing CO2 emissions and respond to the impact of Climate Change.

As stated above, actions can and should be taken across departments, including in the fields of enterprise and job creation, energy, transport, agriculture and land use, waste management, planning, tourism, fisheries and forestry, education and training and finance and investment. Closer co-operation and co-ordination between Departments is needed and between the relevant Assembly Committees also.

In terms of adaptation to the climate change we already know will take place, we need to take account of the 2007 report of the Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) 'Preparing for a Changing Climate in Northern Ireland'

Action needs to happen now and should not be left until the deadline for some of the longer-term targets looms. Actions should be incorporated into the priorities of the Departments and there should be annual assessments made of progress towards reaching those targets.

Targets

Sinn Féin proposes that both governments in Ireland set legally binding targets of reducing CO2 emissions by at least 80% on 1990 levels by 2050. The key to achieving this locally will be an agreed approach across all Stormont departments on how to build a low carbon economy. This will include promoting energy efficiency, better waste management, investing in renewable energy sources such as wind, tidal and solar, and expanding public transport.

Sinn Féin believes that the Executive should commit to reducing emissions by at least 30% from their 1990 level by 2020. The rate of reduction should be at least 3% per annum.

There need to be periodic targets set by the Executive for the period leading up to 2020. There needs to be detail about how we are going to meet carbon emission targets and how this will affect policy in different departments.

The Committee established under the Climate Change Act 2008 should also be asked for advice with regard to targets.

The Carbon Trust has set out a number of areas for action and Sinn Féin would broadly support these; including:

- Investing in industrial energy efficiency
- Transforming building design and construction
- Planning for sustainable housing development
- Decarbonising the electricity supply industry
- Developing the skills base
- Changing attitudes
- Exchanging best practice, solutions and ideas
- Stimulating innovation and product development; and
- Exploring new technology options

There should be a specific target for low carbon, good quality, well-insulated, energy efficient, affordable housing.

We should also use the expertise of other EU member states, through the cross-border, territorial or interregional programmes, through the EU Task Force and through the 2009 regional development OPEN DAYS in Brussels. We should also use the expertise gained to date in this field at local government level through the Interreg programme.

Green Cities

Cities are an obvious place where energy efficiency needs to be secured, and housing is a major area where this efficiency can be maximised. There should be a specific target for low carbon affordable housing, and this should apply to existing as well as new housing. High building standards should be set in regard to building new homes, with energy efficiency at the core. The same high standards should apply to new public buildings and other structures.

Reaching the targets set by the EU, known as the 20/20/20 targets, will require the development of more 'Green Cities'. 80% of the EU's population live in cities or urban areas. Sustainable development models need to be applied to all urban planning.

Transport

In transport there are a number of necessary shifts in policy which we need to get to grips with. Decades of underinvestment in our transport services mean a culture of car dependency has evolved. This dependency must be broken by providing efficient and sustainable public transport networks in cities, towns and rural areas.

We need to provide accessible, efficient and integrated public transport provision through increased investment in bus and rail network services in urban and rural communities across the north.

Cities and urban areas in the EU produce 40% of the greenhouse gas emissions in transport. Most city dwellers travel only relatively small distances each day yet many travel in private transport based on petroleum fuels. In an effort to reduce transport's burden on our environment, the EU as part of the climate package, passed a directive which will limit the CO₂ emissions from cars.

The EU is also encouraging the use of green procurement with regard to local government vehicles. We must look at ways of facilitating the roll-out of such green procurement here.

A small company in a remote rural area of County Mayo in Ireland developed "Adaptive Intelligent Street Lighting" that allows for remote monitoring of electrical power consumption, individual control and monitoring of each street light and remote dimming capabilities depending on the amount of traffic. These have been installed worldwide, including Oslo, Paris and parts of Asia. Oslo has 10,000 intelligent street lights.

Energy Supply

In terms of energy, the question of security of energy supply is important to any economy and society. Self-sufficiency should be aimed for as much as practicably possible, and we should aim for decentralisation of the energy structure.

In Ireland's case this means the greatest possible use of our own resources such as solar, wind and tidal power and the development of energy saving, resource-efficient, renewable and low emission technologies.

By helping to meet our share of the European Union target of achieving 20 % of energy from renewable sources such as wind and tidal power as well as solar power, we can boost the local economy, and create jobs while meeting the challenge of climate change. We have wind, wave and tidal resources here and we have some great individual projects. We also have the possibility to work on cross-border projects. The Executive must provide the push and the incentives for the development of renewables on both a small-scale and large scale, and to move beyond individual projects to put the development of renewable energy firmly centre stage in our economic development plans.

We should reject the notion that nuclear energy has any part to play in meeting our energy needs.

In particular the opening up of an all-Ireland energy market could help bring down prices, particularly for electricity. We would also be in a better position to benefit from a new green deal to help re-launch the global economy.

We should also look at some of the work done by DARD and the Agriculture and Rural Development Committee in terms of renewable energy.

Reducing our Carbon footprint

While we are working towards such self sufficiency, we can and should take simple actions in our own lives to reduce our own "carbon footprints" and lead by example - use energy efficient electrical appliances, low energy light bulbs, resist leaving electrical items on standby, shop locally, avoid over packaged goods, have properly insulated homes, move to renewable energy and car share to work where walking, cycling or public transport is not a viable option.

Energy saving through simple steps such as insulating older homes and commercial properties must also be addressed. The ban on incandescent light bulbs should be supported with those on low incomes being supported during the phasing out process. Awareness raising programmes and incentive initiatives for business are to be encouraged and built upon.

Protecting our Environment

Protecting our natural environment will also pay dividends in the fight to reduce our emissions. Planting trees protecting vital carbon sinks are just two examples. Agriculture also has a part to

play and there is a need to find a way to create sustainable livestock production. Biomass and short rotation coppice willow has also made a contribution in some areas.

Both mitigation and adaptation measures need to look very specifically at the question of biodiversity and habitats.

We also need to look at the role of waste management and the contribution that waste prevention, minimisation and recycling can play in reducing emissions.

Working with local government

Local authorities also need to grab hold of this issue as Dublin City Council has done on Sinn Féin's initiative. Dublin has adopted a Climate Change Strategy with a focus on reduction, reuse and recycling. This type of local action needs to be replicated across Ireland. One of the best aspects of this Strategy is its coherence. Waste management, transport, planning, energy generation and biodiversity are linked within the strategy and not treated as individual phenomena.

This type of joined-up thinking also shows where Assembly strategy and legislation could usefully encourage coordination of policy areas.

Attitudinal change is the most important element required in tackling climate change. This change can come from the bottom-up as was done by Dublin City Council and the many excellent environmental activists and organisations we have but making this change at the very top at government level can only be ensured through legislation that places the emphasis on action at national and local level.

The world economy is moving to meet this challenge and the Executive needs to ensure that we don't get left behind.

Housing and Planning

There should be a specific target for low carbon, good quality, well-insulated, energy efficient, affordable housing. In this regard we should take account of the 2008 House of Commons Communities and Local Government Committee report on Existing Housing and Climate Change.

High building standards should be set in regard to building new homes, with energy efficiency at the core. The same high standards should apply to new public buildings and other structures. This is important for meeting our emissions targets as well as for tackling fuel poverty.

There should also be minimum standards for homes and a major programme of insulation and energy efficiency as a first step. There is a need for a cross-departmental action to ensure greater fuel efficiency in existing homes, including improvements to insulation schemes. Such a strategy could tackle three major issues in tandem - energy efficiency in relation to climate change, fuel poverty and the downturn in the building industry.

Costs

There is undoubtedly a cost to the measures that need to be taken. However the successful economies of the future will be green economies and there will be significant extra cost to our economy if we are left behind. Moreover, the Stern Report indicates that extreme weather could

reduce global gross domestic product (GDP) by up to 1% and that a two to three degrees Celsius rise in temperatures could reduce global economic output by 3%

We also need to offset against the cost of measures we take the considerable potential benefits to the local economy in embracing green jobs and technologies. Across Europe this is identified as a key focus for action on climate change and

as part of a wider response to the current financial challenges.

In presenting the proposed Climate and Energy Package to the European Parliament in January 2008, Commission President Barroso described it as "an opportunity that should create thousands of new businesses and millions of jobs in Europe,"

Action Renewables estimated that almost 6,000 short term and 400 long term jobs could be sustained in the North of Ireland, exclusively by developing renewable energy here.

Assembly legislation

The Executive should introduce its own legislation in the form of a Climate Change Act for the North of Ireland that includes a legally binding regional target to reduce our carbon dioxide emissions by at least 30% from their 1990 level by 2020 and by at least 80% from 1990 levels by 2050. We should also introduce legislation to include a tax on plastic bags, and also to tackle the problem of packaging waste.

British Wind Energy Association and Irish Wind Energy Association

20 February 2009

Summary Points

The British Wind Energy Association (BWEA) and the Irish Wind Energy Association (IWEA) welcome the Environment Committee's Inquiry into Climate Change. The Committee is right to focus its Inquiry at identifying how Northern Ireland can play its part in tackling climate change. The scientific and economic rationales for addressing human impact on climate change is well established and widely accepted. The time for action is now.

IWEA and BWEA represent the interests of the renewable energy industry in Northern Ireland, Ireland and Great Britain. Through this submission, we will demonstrate the necessary role that wind, wave and tidal technologies will be required to play in order to meet existing climate change objectives, and provide guidance as to how the Assembly can facilitate the deliver of renewable energy and climate change targets. We very much welcome the opportunity to submit evidence at this stage and look forward to engaging with you further.

Northern Ireland can positively contribute to both the European and UK Carbon targets in two main ways. Firstly, taking advantage of the natural resources available to Northern Ireland will make an appreciable contribution to these targets. The UK has a rich variety of renewable energy resource, including 40% Europe's wind resource. Northern Ireland has a significant share of this resource, with one of the greatest wind resources in Europe. As such, Northern Ireland has a real opportunity to make a meaningful contribution to reducing carbon-dioxide emissions

through renewable energy, while meeting Northern Ireland's energy demands and delivering a cleaner local environment.

As the world moves towards a low-carbon economy the price of carbon will increase. Northern Ireland should not be left behind but should embrace this approach; indeed Northern Ireland has the potential to be a world leader in the ever growing green economy. The region has unique access to markets and natural energy resources including wind, marine and geological storage. US president elect Obama has outlined a strategy for developing 5 million new green collar jobs in the US. Based on the relative sizes of the US and NI economies this would be equivalent to over 14 000 new jobs in NI if the region can deliver a similar strategy. IWEA and BWEA believe that Northern Ireland can use its strategic advantages to surpass this level.

We believe that there are four key areas in which the Northern Ireland Assembly can enable the renewable energy sector to realise climate change objectives:

1. Northern Ireland should adopt a target of 42% electricity from renewable sources by 2020.
2. A strategy for investment and development in the Grid infrastructure should be developed.
3. Consistent policy and strategy should be adopted across government. In particular energy and planning policy should be aligned.
4. A roadmap for policy development should be introduced to provide greater investment confidence in all aspects of the renewable energy sector

The need for action

The Committee is right to focus its Inquiry at identifying how Northern Ireland can play its part in tackling climate change. The scientific and economic rationales for addressing human impact on climate change is well established and widely accepted.

The Intergovernmental Panel on Climate Change (IPCC), a group containing over 2500 scientists, reported in 2007 that 'warming of the climate is unequivocal' and that 'most of the observed increase in temperature is very likely (90%) due to human activity'. The findings of the IPCC are also supported by the Academies of Science of the 11 largest countries in the world, including the Royal Society of London.

The Stern Review calculated that the dangers of unabated climate change would be equivalent to at least 5% of GDP each year. However, when more recent scientific evidence is included in the models, the Review estimates that the dangers could be equivalent to 20% of GDP or more. In contrast, the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year. The central message is that reducing emissions today will make us better off in the future: one model predicts benefits of up to \$2.5 trillion each year if the world shifts to a low carbon path.

The people of Northern Ireland are asking for leadership from the Assembly. A survey conducted in 2008 by Sustainable Northern Ireland for the Northern Ireland Climate Change Impacts Programme revealed that, "92% of respondents were willing to make changes to their lifestyles, especially if encouraged to do so by strong government leadership." The Committee should provide this leadership.

The industry would welcome the opportunity to make an oral presentation to the Committee Inquiry.

BWEA and IWEA broadly support the views set out by Northern Ireland Environment Link. We have re-iterated some of these points in this response, for the purpose of emphasis. If you would like to discuss these comments we would be delighted to do so.

Submission of Evidence

The comments below relate to the Terms of Reference provided by the Committee, in its call for evidence.

(a) To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

The Committee on Climate Change recommended, and the UK Government has accepted that a reduction of 80% by 2050 - based on 1990 emissions levels - would be an "appropriate" UK contribution to global aims to cut emissions by 50%. The Assembly has accepted that the provisions of the UK Climate Act will be extended to Northern Ireland. However, the UK Act does not set specific emission reduction targets for the devolved administrations.

Northern Ireland's per capita emissions of 12.83 tonnes per annum compares badly with the UK average of 10.48 tonnes, the global average of 4 tonnes and the global fair share of 1.65 tonnes.

The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum. Combining indicative annual milestones with the legal framework of the budget periods should offer flexibility without compromising longer term targets.

The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting and monitoring of Northern Ireland specific budgets and action plans. The Committee on Climate Change's reports on progress and action plans should be delivered to the Assembly and responded to by the Executive.

The Committee on Climate Change should help ensure co-ordination of emissions reduction efforts across the UK. Carbon emissions in Northern Ireland and the Republic of Ireland are closely interlinked. Therefore, provisions to enable joint achievement of emissions reduction goals should be made.

All plans, programmes and policies should be assessed (Climate Impact Assessments) to determine their contribution to or impact on achieving carbon budgets.

(b) To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

The Committee on Climate Change's statutory duty to Northern Ireland includes:

To provide advice on the sectors of the economy in which there are particular opportunities for contributions to be made towards meeting the budgets through reductions in emissions.

The Committee on Climate Change's first report was released in December 2008. It includes an analysis of what opportunities exist for making emission reductions in Northern Ireland. It states Northern Ireland could contribute emissions reductions of over 2MtCO₂e (Million tonnes of carbon dioxide equivalent) per year in 2020:

- Emissions from buildings and industry could be reduced by up to 1 MTCO₂ in 2020 by using energy more efficiently;
- More efficient vehicles and new transport fuels could deliver reductions of up to 1 MTCO₂ in 2020;
- Emissions from agriculture, land use and forestry and waste management sectors could be reduced by up to 0.5 MtCO₂e in 2020.

BWEA and IWEA do not consider that the actions outlined above go far enough to keep Northern Ireland on track to achieve an 80% emissions reduction target by 2050. We believe that it should be a requirement of each government department to investigate the opportunities for and obstacles to carbon reductions within their areas of responsibility, and that the Public Sector procurement budget be used as a tool to deliver significant emissions reductions.

But first and foremost, it is imperative that all government departments work together in establishing a holistic approach to carbon reduction. All government departments have a key role to play in delivering a low-carbon economy and in ensuring economic, social and environmental resilience, through a commitment to sustainable development. The need for joined-up policy approaches to economic policy, energy policy and spatial planning, for example, will be essential if Northern Ireland is to deliver on existing climate change targets, and develop more sustainable communities.

We therefore recommend that the Committee on Climate Change's role in Northern Ireland be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans, and the monitoring of these budgets and plans.

The rapid deployment of renewable energy and improved energy efficiency are essential in meeting carbon reduction targets. This view is shared by many governmental, scientific and environmental stakeholders, including the IPPC, the Carbon Trust, Stern, WWF, and RSPB, etc. as key areas to target early in the de-carbonisation plans.

A Strategic Energy Framework target of sourcing 15% of all our energy (electricity, transport and heat) from renewable sources by 2020 (this is the target set for the UK in the EU Climate and Energy Package) will act as the driving forces towards a low carbon society.

To achieve the energy target it is estimated over 40% of electricity would have to be produced from renewable sources and renewable sources would also have to provide a significant source (5-10%) of energy for heating purposes. The Department of Enterprise Trade and Investment, in co-operation with its counterpart in Ireland, published the internationally acclaimed All Island Grid Study in January 2008. This study demonstrated that 42% of the island's energy needs could be met by renewable sources. The IWEA and BWEA believe that Northern Ireland should adopt 42% as a formal target.

It is vital that a formal target is adopted as this will create the framework for other policy decisions. Without a target in place for renewable energy, development of the industry will

continue to be frustrated by a multitude of detailed policy concerns and minimal progress will be made.

Achieving a 42% share of electricity from renewable sources would ensure lower wholesale energy prices, lower carbon emission, enhanced energy security and robust system stability as well as foster the growth of a multi-million pound Northern Ireland renewable industry.

(c) To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

The Stern Review calculated that the dangers of unabated climate change would be equivalent to at least 5% of GDP each year. However, when more recent scientific evidence is included in the models, the Review estimates that the dangers could be equivalent to 20% of GDP or more. In contrast, the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year. The central message is that reducing emissions today will make us better off in the future: one model predicts benefits of up to \$2.5 trillion each year if the world shifts to a low carbon path.

As the world moves towards a low-carbon economy the price of carbon will increase. Northern Ireland should not be left behind but should embrace this approach; indeed Northern Ireland has the potential to be a world leader in the ever growing green economy. The region has unique access to markets and natural energy resources including wind, marine and geological storage.

The significant emissions reductions proposed for the UK in the Committee on Climate Change's first report can be achieved without harming the economy and at a cost less than 1% of GDP in 2020. In other words, an economy that might grow by 30% in the period to 2020 would instead grow by 29%. The Committee on Climate Change advises that this is a price worth paying, given the long-term costs of inaction on climate change.

Based on current market conditions, meeting a 42% renewable electricity target will generate private investment of over £1.2bn in wind generation in Northern Ireland. Of this, around £300m will be retained by local NI businesses. This will provide a significant boost to local industry and will create several thousand jobs in high value industries.

The Prime Minister stated that the overall added value of the low carbon energy sector by 2050 could be as high as \$3 trillion per year worldwide and that it could employ more than 25 million people. The Carbon Trust estimates that more than 70,000 jobs could be created in the UK by investing in and developing offshore wind technology.

Investing in innovation and development of skills will allow Northern Ireland to benefit significantly from the growing international market for renewable energy and support services. NI is also uniquely placed to access the UK and Irish markets for energy and renewable certificates. Increased interconnection and harmonisation of policy will also facilitate access to these markets.

Government should see investment in a low carbon future as a way to stimulate the local economy (as President Obama has in the USA). The move to renewable fuels may help develop industries that will provide economic opportunities and jobs. Given the huge potential that exists around our shores for wind power there are sound economic and environmental reasons for ensuring that a significant proportion of these jobs are developed in Northern Ireland.

Action Renewables estimate that almost 6,000 short term and 400 long term jobs could be sustained in Northern Ireland, exclusively by developing renewable energy within the region. We believe that there is potential for even greater growth in the number of green collar jobs in Northern Ireland, based on the proposals of US President Obama. If the Executive were to adopt a similar strategy to the US, there would be the potential to generate 14 000 new jobs in Northern Ireland. BWEA and IWEA believe that Northern Ireland can use its strategic advantages to surpass this level.

In addition, a robust and reliable grid infrastructure will be necessary to enable the continued development of the Northern Ireland economy. A high performance grid infrastructure which takes advantage of the latest technological advancements to support both renewable and conventional generation is needed for a high performance generation portfolio. An infrastructure which can accommodate increased levels of renewable generation gives greater energy security, greater price stability and depresses the average market price, ultimately resulting in lower energy costs for consumers.

A robust grid system provides greater security of supply to Northern Ireland customers and enables investment in energy intensive industries. It will also allow for more efficient dispatch of generating resources and the reduction of transmission losses.

Further interconnection with the ROI and the UK would add to system flexibility while the enhanced integration of the SEM North and South should lead to greater price stability.

(d) To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO2 emissions. (Akin to Regulatory Impact Assessments/Rural Proofing)

The industry believes that long term plans, supported by a strong legislative framework, are the best way to promote efficiency and innovation in policy and technology design and thus the best mechanism to minimise costs.

A consistent policy framework facilitates the efficient delivery of objectives. This will reduce the ultimate cost of implementing any strategy to the benefit of the customer and the economy. Due to the complexity of the energy industry this is a challenging task that most jurisdictions have not effectively addressed. This strategic energy review provides Northern Ireland with an opportunity to investigate means of delivering a consistent platform for policy.

In particular there is a need to align policy between the planning and energy sectors. The development of new energy generation facilities (renewable or conventional) will have a significant interaction with the planning process. It is essential that the developments respect the character of Northern Ireland's landscape and fit within its overall planning strategy. Once this has been achieved the costs of new developments can be reduced by aligning the planning process with energy considerations.

The current process for determining supplementary planning guidance for wind development in Northern Ireland should fit within the overall Northern Ireland policy framework. It is feared that in the event that this process imposes restrictions on the height of turbines that may be developed, Northern Ireland will be forced to develop more expensive generating facilities in the future. Reducing the height of a wind turbine leads to a disproportionate loss in energy yield. This will add significant costs to the consumer and will result in a greater number of turbines being required to deliver the same quantity of energy. We believe that Northern Ireland should use world class technology to fully reap the benefits of its natural resources.

It will also lead to less efficient and more dispersed grid development. We believe that the draft SPG should be amended to reduce its prescriptive nature. This will allow individual developments to be considered on their merits. It will allow for more efficient development in specific cases where this meets overall policy objectives.

There should also be more flexibility in the generator licensing process. In particular if it were possible to assign licenses it would simplify the transfer of ownership process and facilitate the entry of new investors to the Northern Ireland energy sector.

All plans, programmes and policies should be assessed using Climate Impact Assessments to determine their contribution to or impact on achieving carbon budgets. The process should be akin to equality screening and should be initiated at the start of policy design to maximise outcomes and minimise costs.

(e) To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

The key climate targets that the SD Strategy should deliver are those identified in a Northern Ireland Climate Act, carbon budgets and annual targets.

We believe that the SD Strategy should include a renewable energy strategy within it, which should be fed down to the local level and developed for each of the 11 new proposed super councils.

The SD Strategy should also help deliver the recommendations on how to achieve emissions reductions put forward by the Committee on Climate Change.

The SD Strategy could play an important role in helping to inform and empower individuals to take action to tackle climate change.

The Strategic Energy Review also has a key role to play here. While the strategic Energy Framework will set the broad direction of energy policy for Northern Ireland there will be many detailed policy issues to be developed as the industry evolves. The manner in which this policy develops is of central interest to investors and energy market players. A clear and transparent process greatly reduces the perceived risk associated with Northern Ireland as an investment location. Policy makers in Northern Ireland have an excellent track record in this regard. We strongly commend their efforts to involve industry in discussions and analysis of key issues. However, the sheer number of important issues that require analysis makes it difficult for industry to engage as constructively as it might wish. The proposed roadmap is a device to facilitate industry in its engagement.

We recommend the introduction of a formal process for policy development that provides clarity on its scope and likely timing. It is recognised that policy makers may need to make decisions on issues outside the normal timelines and process. If there is a facility available to fast track decisions and consultations where necessary we believe that it will allow the development of a more structured and scheduled approach to be adopted for the majority of policy considerations

(f) To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

The legal responsibility to deliver the targets set in a Northern Ireland Climate Change Act, and through the carbon budgets, should fall collectively on the Executive.

Specific responsibilities to deliver the targets set in the Climate Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department. Departments should prepare action plans on how they intend to deliver their reduction targets.

Sharing responsibility to meet targets across the Executive and departments is the only way to ensure that all parts of government play their part in delivering the targets.

A public service agreement should be drafted for the Department of the Environment which would include a commitment to provide information and support to the other departments to help deliver the targets set in a Northern Ireland Climate Change Act and in the carbon budgets.

(g) To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Bill.

The industry believes that the secondary legislation in the UK Bill should not be the basis of Northern Ireland's climate change regulation. Instead, Northern Ireland should introduce its own primary legislation.

The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050.

The introduction of primary legislation in Northern Ireland will enable secondary legislation to be introduced to set 5-year carbon budgets and annual carbon targets (3% annual emissions reductions is a minimum) for the region.

Secondary legislation under a Northern Ireland Act should be used to impose public sector duties to deliver targets and to set sectoral targets for emissions reductions.

The role of the Committee on Climate Change should also be set and amended via secondary legislation.

The UK Act enables targets to be reviewed and amended but the 2020 and 2050 targets should only be amended based on the best available scientific advice.

(h) To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

The Environment Committee should scrutinise progress towards achieving the targets in the Act and within budgets. The Minister should be asked to explain progress and outline plans to achieve the targets to the Committee

The ability of the Committees and the Assembly as a whole to scrutinise progress will be greatly enhanced by ensuring the Committee on Climate Change report to the Executive and the Assembly and that the Executive respond to their reports in the Assembly.

(i) To produce a report on the findings and recommendations of the inquiry by September 2009.

The longer Northern Ireland delays significant and decisive action on climate change, the larger the task will become. Stern has concluded that early action makes economic sense. The greatest opportunities for job creation and market share in emerging technologies will also be delivered by responding early to the challenges we know we face. Therefore, the Committee should use its influence to encourage action now. Waiting until September to recommend that Northern Ireland should act on climate change, is only delaying the inevitable.

Chartered Institute of Environmental Health

February 2009

The Chartered Institute of Environmental Health

Our mission is to maintain, enhance and promote improvements in environmental and public health through knowledge, understanding and campaigning.

As a professional and awarding body, we set standards for the education and professional development of our members and the public, awarding qualifications and accrediting universities and training courses.

As a knowledge centre, we provide information, evidence and policy advice to government departments, students, members of the public and industry. We publish magazines and journals, commission research and develop policy positions.

As a training organisation, we educate employers, practitioners and individuals about environmental health issues. We organise events and courses with recognised qualifications enabling people to make a real difference to health and wellbeing.

As a campaigning body, we are committed to pushing environmental health further up the public policy agenda and are called upon by government and local authorities to share our knowledge, research and evidence.

We are a registered charity with nearly 11,000 members across England, Wales and Northern Ireland.

Any enquiries about this response should be directed in the first instance to:

Gary McFarlane
Director NI
Chartered Institute of Environmental Health
Philip House

123 York Street
Belfast BT15 1AB

Telephone 028 9024 3884
Email g.mcfarlane@cieh.org

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Summary

1.1 The CIEH commends the Environment Committee on its decision to make climate change the subject of its next inquiry. In our view this is the most urgent and challenging issue faced by not only by the Northern Ireland Assembly, but indeed by governments across the world.

1.2 This written submission seeks to set out some broad proposals. We believe it should be viewed as the start of a process of dialogue on this subject between the organisation and the committee. We would ask for the opportunity to discuss the contents of this paper in more detail with the committee and other stakeholders through whatever process the committee deem most appropriate.

1.3 We will also be happy to provide further supporting documentation and evidence on any of the issues raised in this initial paper if required or requested.

1.4 As a member of both Northern Ireland Environment Link (NIEL) and the Climate Change Coalition Northern Ireland (CCCNi), the CIEH is aware of and would wholly endorse and support the proposals made in those submissions.

1.5 Given the previous point this paper does not seek to reiterate those proposals, but rather to provide further evidence, particularly regarding the health impacts which relates to our field of professional expertise.

1.6 Health impacts clearly carry with them not only a financial cost (primarily through additional burdens on an already overstretched NHS) but also a significant, even profound, social cost which is more difficult to quantify in terms of a financial indicator.

1.7 The future of the economy is entirely dependant on adopting a truly integrated sustainable development approach across all government policy areas. If we fail to urgently incorporate and address environmental factors into all areas of the public, private and community & voluntary sector then our economy, along with the natural systems on which we ultimately depend for life, will collapse. Government in NI must urgently readdress its regrettably poor track record in this. Tackling climate change is the pro-growth strategy for the longer term, and it can be done in a way that does not cap the aspirations for growth of rich or poor countries.^[1]

Background

2.1 At the core of climate change is the increase in average global temperatures. Eleven of the past 12 years (1995-2006) rank among the twelve warmest in the instrumental record of global surface temperature since 1850. (IPCC 4th Assessment report 2007).^[2]

2.2 The IPCC report contains conclusions that have profound implications for the future and highlight the absolute critical need for action now. These are summarised below:

21st Century Climate changes are

- Most of the global warming of the past half-century is due to increases in greenhouse gases.
- That the CO₂ concentration in the atmosphere is unprecedented in the last 650,000 years
- The changes are cumulative (caused by past activities)
- The effects are irreversible
- There are large time lags – today's actions are tomorrow's problems and the world is already committed to more warming over the next few decades (even if we stopped all emissions now)
- They are global – they affect everyone

2.3 The CIEH accepts the evidence and analysis carried out by the IPCC which concludes that the main cause of this unprecedented rate of warming is the release of greenhouse gases through human activities. It is important to note that the vast majority of international governments and policy makers also accept these conclusions. Consequently, governments around the world are now actively seeking to develop both mitigation and adaptation policies and programmes to meet this urgent challenge.

2.4 This does not in any way in our view contradict or conflict with the evidence that suggests extreme climatic changes are a natural phenomena in the history of the planet. The same evidence also suggests that previous changes to global temperatures took place over substantially longer time periods than what we are now experiencing.

Health implications

There is a growing body of information and evidence on the health impacts of climate change. The World Health Organization estimates that the warming and precipitation trends due to anthropogenic climate change of the past 30 years already claim over 150,000 lives annually. Many prevalent human diseases are linked to climate fluctuations, from cardiovascular mortality and respiratory illnesses due to heatwaves, to altered transmission of infectious diseases and malnutrition from crop failures.^[3]

As well as having direct effects on health such as those relating to rising temperatures, increased flooding and more infectious disease, climate change also contributes towards widening the gap in health inequalities. Brief outlines of some of the potential health impacts/costs are summarised below. These have been abbreviated from a more substantive document published in November 2008. The data and evidence is drawn from a wide variety of sources and is fully referenced within the document which is available at http://www.cieh.org/library/Policy/Publications_and_information_services/Policy_publications/Climate_Change_Public_Health_Health_Inequalities.pdf

The reason why we believe that the health implications are so important in the Committees deliberations is largely to do with its expressed desire to consider the costs of failing to meet proportionate climate change obligations and commitments for NI (we note and are greatly concerned that as yet no such commitments have been made – we fully support and endorse the proposals set out in the CCCNI submission attached at appendix 1).

It is impossible and perhaps even unethical to attempt to place a financial figure on these - particularly in the case of predicted or modelled mortality increases as a result of extreme weather events such as: heatwaves and/or floods; increases in infectious diseases; possible civil unrest; or simply hunger. But it is very clear that Northern Ireland will face global impacts.

In November 2008 CIEH organised and facilitated a conference which incorporated many of the issues summarised below. The panel of speakers included leading international thinkers and academics as well as input from major UK advocates, policy makers, and business leaders. Webcasts of those presentations are available for viewing at http://www.cieh.org/event/climatechange_webcasts.html and may be useful for the committee to consider as part of their deliberations.

3.1 Food poverty, food security and demographics

3.1.1 The potential impact of climate change on world agriculture is enormous for us in the UK. The UK is self sufficient in food. We import around 40 percent of our food needs.

Some argue that we are heading towards a significant crisis in world food supplies as world crops are already being hit by extreme weather. For example, recent drought in Australia caused wheat prices to rise resulting in increased bread, cereal and animal feed prices across the world. Additionally countries are increasingly converting agricultural land to the production of bio-fuels – putting further pressure on basic food items like rice, wheat and corn.

3.1.2 Food animals, particularly, cattle produce significant amounts of methane. Methane, like carbon dioxide, is also a greenhouse gas – and in actual fact a much more potent one. Methane has been estimated to have around five times the warming potential of CO₂. Meat consumption in the developing world, particularly China and India, is increasing significantly as overall affluence increases and those populations aspire to lifestyles that the privileged world has enjoyed for decades. A world of global carnivores with meat consumption levels akin to that of the US and UK is not sustainable. Interestingly, this is but one example of where there is a strong complementarity between what might arguably be a sound environmental policy direction for the future, i.e. reducing consumption of red meat and increasing intake of fresh fruit and vegetables, and clear public health benefits in that this would entirely compliment current health policy.

3.1.3 Another very significant factor is population growth and demographics. The global population is currently increasing by around 7 million per month, and people are living longer lives. This has implications for consumption of both natural and man made resources and subsequently greenhouse gas emissions. Virtually everything we consume carries a carbon cost since energy, water and ultimately fossil fuels are inextricably linked to the production of all goods and services including food.

3.1.4 Equally significant may well be substantial increases in migration. Even in the best case scenario several scientific models already predict severe climate impacts in low lying deltas such as North East Africa, Bangladesh and Southern Asia. This has profound implications for global migration patterns and could significantly increase migration to these islands. Predictions indicate that by 2050 up to 1 million people could be displaced from each of these regions as a result of rising sea levels alone – the loss of these areas are also extremely significant in terms of world food production.

3.1.5 As a result of the above coupled with the inextricable link between food production and two key natural resources – oil and water – food prices are accelerating exponentially. Food prices have risen 45 percent since the end of 2006. There is, and is likely to be in the future, less land available in the world to grow crops, less oil and water for its production (while increased rainfall maybe a phenomenon of climate change we see in these latitudes, drought will be equally significant in other major food production areas of the world) and more people to feed. Food security is a very real and poignant threat. The 2006 interdependence report, published by the New Economics Foundation, indicated that the UK was, at that stage, reliant on the rest of the world by 16 April each year. That reliance includes food.

3.1.6 Even without global food shortages it is virtually certain that increasing food prices, coupled with other increasing vital daily living costs such as energy and water, will see increasing numbers of vulnerable people facing life threatening poverty, whether that be food, fuel or both. This will add to the burden of food poverty already existent in NI as outlined in a report published by the Public Health Alliance for the island of Ireland (PHAII) in November 2007.[\[4\]](#)

3.2 Heatwaves

3.2.1 Heatwaves are potentially lethal for vulnerable people, particularly those living in cities. Associated air pollution can further add to the dangers. For northern European countries, the heatwave threat is perhaps one of the most dramatic manifestations of climate change. For Europe, one of the most significant examples of the danger of climate change was the 2003 heatwave in France. In an advanced nation with excellent healthcare 35,000 people died. In the UK that summer it is estimated that there were 2,000 to 3,000 excess deaths [i.e. more than usual] in England.

3.2.2 There is a one in 40 chance that by 2012, southern England will have a severe heatwave which could again cause up to 10,000 heat related deaths. A wide variety of people are at risk, but particularly the most vulnerable in society including the elderly and those already ill. The risk of this type of occurrence within NI is, as yet, unquantified. However what is clear is that national UK targets for reductions in greenhouse gas emissions and international targets such as Kyoto have been calculated in an attempt to contain global temperature rise to no more than 2c above pre industrial levels by 2050. In other words by 2050 it is likely that summer temperature peaks will be significantly higher in the UK, and potentially including NI.

3.2.3 As with all health impacts, efforts to mitigate the effects of climate change must be considerably stepped up. However it is equally vital that appropriate and commensurate adaptive efforts are made in NI. At present NI, unlike England and Wales, does not have any plans in place to deal with a heatwave emergency. This needs to be addressed as a matter of urgency.

3.3 Cold-related illness

3.3.1 Despite predicted temperature rises cold related illness needs to remain a public health priority. In the last five years, more than 130,000 people over 65 have died from cold related illness during the winter months in Britain. There has been considerable political debate, campaigning, and ultimately intervention by the NI Assembly within the last six months concerning the issue of fuel poverty.

3.3.2 To what extent cold related deaths will be affected through climatic changes in the future is unclear. Some predictions suggest that they may well decrease due to milder winters, whilst other modelling has suggested the contrary, particularly with more extreme rises in global temperatures because of the way in which weather systems are affected (the changes are not necessarily either linear or corresponding – i.e. increased global temperatures can actually cause colder weather). What is more certain is that there is a high likelihood of increasing fuel poverty in the future due to increasing fuel and energy costs as well as increasing food costs. It is clear that efforts to reduce the number of people living in fuel poverty need to be substantially increased.

3.3.3 Strategies or interventions developed to tackle fuel poverty must include facilitating a greater move towards more sustainable heating alternatives. For example, the previous grants scheme administered by DETI, which encouraged and facilitated the installation of renewable technologies for households and encouraged a move away from fossil fuel dependence not only helped households in cutting fuel bills but also reduced carbon emissions.

3.4 Increased rainfall and rising sea levels

3.4.1 Floods are the most common natural disaster in Europe. They can cause death and serious injury as well as psychological distress through the devastating effects that such events can lead to, such as the loss of one's home or material possessions. Apart from the obvious direct health impacts of flooding there are also additional potential risks created as a result of secondary consequences that may arise, for example pollution incidents (chemical or biological and including the contamination of drinking water supplies); an increase in breeding grounds for disease carrying organisms due to high volumes of standing water; soil disturbances as a result of flood water which may increase exposure of agents such as anthrax and toxic contaminants such as heavy metals and disease and hazards associated with evacuation.

3.4.2 The potential for the frequency of flooding incidents is increasing not only because of increasing rainfall in the UK, but also due to rising sea levels. Sea level rise also affects the drainage capabilities of substantial river basins and estuaries. NI has not escaped from serious

flooding incidents in recent times. In December 2005 properties around the Ormeau road in Belfast were flooded for the 3rd time in 5 years^[5] . Serious flooding incidents occurred in June 2007 and August 2008 affecting large parts of NI.

3.4.3 Quite apart from the obvious social costs associated with these incidents in terms of the damage to and displacement of people from their homes, and the payouts in insurance claims which has been estimated to run into several million, the combined cost to the public purse from these incidents can conservatively be estimated at 6.2 million.^[6]

3.5 Waterborne disease and water pollution

3.5.1 Waterborne disease outbreaks, like cholera, are currently regarded as low risk in developed countries. However after Hurricane Katrina in the USA in August 2005 a cluster of *Vibrio* organisms were attributed to flood water and other environmental exposure. Severe flooding has the potential to significantly affect drinking water supplies through contamination of the mains supply. Most at risk are people with poorly treated private water supplies, unfiltered surface water and groundwater. More surface water turbidity caused by heavy rain escalates indicator bacteria and pathogens - a challenge for water treatment works, particularly those abstracting direct from rivers. *Cryptosporidium parvum*, *Giardia lamblia* and microsporidia are found in higher numbers after heavy rainfall. They can cause diarrhoea, stomach cramps and vomiting. Acute gastroenteritis proved to be another consequence of Hurricane Katrina. A Norovirus outbreak was reported in Texas among evacuees in overcrowded temporary shelters.

3.5.2 Floods can also increase the risk of rodent-borne disease. Flood related outbreaks of leptospirosis have been reported in several developing countries. Given that there are significant concerns over the increasing prevalence of pests in the UK, this is a risk which needs to be considered more seriously. Breeding of other potential insect vectors following floods could become a matter of concern in the UK, particularly when coupled with warmer weather. Standing water as a result of flooding creates an ideal breeding ground for mosquitoes.

3.6 Waterborne diseases due to increases in temperatures

3.6.1 Pipes and reservoirs are more vulnerable to micro-organisms during frequent droughts, particularly in coastal areas and at the end of water distribution systems. Algal blooms are likely to increase and associated health problems, from skin irritation to severe systemic disease.

3.6.2 Drinking water quality is more vulnerable in warmer climates. The risks from increased consumption of bottled water in warm weather are contamination, multiplication during storage and re-use of containers. Importing and transporting bottled water also increases our carbon footprint.

3.6.3 Water shortages and standpipes during drought periods could indirectly increase infections because of difficulties maintaining hygiene. Upland sources in peat-covered catchments would contain higher levels of dissolved organic carbon, risking trihalomide formation or disinfection with chlorine. This would be more likely after dry periods.

3.6.4 Water associated diseases like legionellosis could increase with the increased use of air conditioning and humidifiers that may be needed as part of adaptation interventions necessary to prepare for heatwaves etc.

3.6.5 As pathogens survive longer in warmer water, there are implications for wider leisure use of untreated fresh and marine waters contaminated by sewerage and animals.

3.7 Food poisoning

3.7.1 There is a strong correlation between notified food poisoning, Salmonella infections and temperature in the UK. Climate change could cause about 10,000 extra cases of food poisoning a year in the UK.^[7]

3.7.2 Higher temperatures also increase the risk of infection in animals, multiply bacteria in animal feed and add risk to the food chain.

3.8 Sunburn and skin cancer

3.8.1 Rates of melanoma, the most dangerous form of skin cancer, have risen by over 40 percent in the past decade, making it the fastest rising cancer in the UK. Melanoma skin cancer rates could treble over the next 30 years. There are more than 76,000 new cases of skin cancer in the UK each year.

3.9 Other health effects

3.9.1 As mentioned above, pests could become even more important disease vectors in the UK as a result of climate change. The spread of West Nile fever in the US and Lyme disease in Europe are warning signals of the impact of pests on public health. The World Health Organization report Public Health Significance of urban Pests has recently highlighted this issue. Paradoxically, the control of significant pests in the UK has been declining over the past decade. Given the evidence that indicates future temperature increases and the clear consequences of this in terms of the increased risk from pests this decline needs to be reconsidered.

3.9.2 As temperatures and rainfall increase, mosquitoes carrying the malaria parasite will extend their range. The Australian Centre for Epidemiology and Public Health estimates that up to 80 million people will be living in malarial regions by 2080. Indigenous malaria may be re-established in the UK by 2050.

3.9.3 The risk of disease from tick bites, such as tick borne encephalitis (TBE) and Lyme disease is harder to estimate, but the trend is upwards.

3.9.4 Other insect vectors that could be re-introduced in a warmer climate include fleas responsible for plague, associated with an increase in rodent populations or movement of rats during flooding.

3.9.5 Stinging and biting insects (bees, wasps, horseflies, hornets) could increase along with the danger of severe allergic reactions.

Discussion

4.1 This paper has sought to compliment and indeed support the recommendations made in the CCCNI submission as well as develop in more detail some of the critical public health implications of climate change. There is currently very little research that attempts to quantify the actual costs associated with some of these projections and predictions. In part that is because it is very difficult to do so, coupled with the fact that there are some extremely sensitive issues around doing so – how for example does one “cost” the loss of a human life through a heatwave for example?

4.2 It is however clear that there will be significant financial costs associated with dealing with highly probable consequences of unmitigated or unadapted climate change in terms of emergency responses; associated health care and treatment costs; and escalating insurance costs. It is also clear that "doing nothing" will have severe and seriously detrimental consequences for the NI economy.

4.3 Whilst the lack of research for NI is on the one hand a difficulty, it is difficult to see how this gap can be bridged either easily or, more importantly, in time. There is clear scientific evidence to suggest that emissions can only continue to rise for at best another eight years – six years would be, arguably, a wiser target – before they need to begin decreasing. That conclusion is based in turn upon the widespread consensus that it is imperative to contain global temperature rises to no more than 2 degrees above pre industrial levels. The key reason why this target is held as so critical is because even the most conservative modelling suggests that further temperature rises will trigger natural "positive feedback" mechanisms within our environment which will in turn then cause even greater release of greenhouse gases and therefore in turn even greater and more catastrophic climate change.^[8]

4.4 Whilst we accept the lack of current NI specific evidence in terms of cost analysis, we would urge the assembly to take both a pragmatic and risk averse approach to this, particularly because of what is already known in terms of the science. "Business as usual" is not in our view an option.

4.5 As already outlined, CIEH wholly supports and endorses the proposals made by both CCCNI and NIEL to this inquiry (appendix 1). It is imperative in our view that a robust legal framework is put in place and that the Assembly commits to the appropriate and commensurate targets, including the proposed interim target of a 40% reduction by 2020. It is also vitally important that the correct framework is developed to support both the achievement and the robust monitoring of these targets.

4.6 In addition to government other sectors, including the business, local authority and community and voluntary sectors have vital roles to play in the collective efforts to tackle climate change. Notwithstanding the previous point it is vital that this is not overlooked.

4.6 Action by local authorities will be critical to the achievement of the Assembly's climate change objectives. Local authorities are uniquely placed to provide vision and leadership to local communities by raising awareness and to influence behaviour change. In addition, through their core business and services, LAs can have significant influence over emissions in their local areas both directly and indirectly. The forthcoming community planning responsibilities could and should add even greater capacity and support for this potential.

4.7 Serious consideration should be given to linking all parts of the public sector into the achievement of binding targets for NI through appropriate statutory means. This could be achieved for local authorities through a strengthening of the mandatory sustainable development powers and duties.

4.8 At present NI lacks any coherent and consistent framework for potentially monitoring current and future carbon emissions at local level. DEFRA have developed a national indicator, NI186, to allow reporting of per capita emissions by local authority area^[9]. However, to the best of our knowledge at the time of this submission, this framework and data collection does not extend to cover NI. We would strongly advocate that this should be the case and that this needs to be addressed as a matter of urgency.

4.9 At present there the UK heatwave plan does not extend to cover NI, nor is there any equivalent. This issue needs to be addressed in an appropriate way.

4.10 Likewise there is a need to look comprehensively at the wider health aspects and risks associated with flooding incidents and ensure that appropriate and commensurate precautions are in place to prevent against potential public health threats.

4.11 Notwithstanding the previous points regarding the need for a clear government commitment to binding targets and an appropriate framework to develop prioritised future actions, it is clear that there is much that could be and needs to be done in the shorter term. Government must lead this agenda by example. Yet there are still large parts of the public sector which operate (i.e. in terms of the way they do their business) in a largely unsustainable way. Through better use of technology, much greater facilitation of remote and home working, much better staff engagement and ownership of the issue through appropriate capacity building and awareness raising programmes, the public sector could not only achieve significant carbon savings but also significant financial ones. All government departments should seek to put in place an effective environmental management system forthwith and should utilise the considerable expertise and assistance that already exists in NI in doing so.

Appendix 1

Climate Change Coalition Northern Ireland

20 February 2009

1. Summary of Points

1.1 The Climate Change Coalition (NI) comprises a wide range of environment and development groups who all wish to see Northern Ireland play its full role in combating global climate change.

1.2 The Coalition believes that written submissions should be considered as initial thoughts which can be added to and developed throughout the inquiry.

1.3 The Northern Ireland Assembly should ensure that its voice is heard at the national and international level. It should categorically state its support for an international climate change agreement to limit global warming to no more than 2° Celsius above pre-industrial temperatures (most scientists accept that 'dangerous climate change' is much more likely above this temperature increase).

1.5 The Assembly has accepted that the provisions of the UK Climate Act will be extended to Northern Ireland. However, the UK Act does not set specific emission reduction targets for the devolved administrations.

1.6 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act setting a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

1.8 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

1.9 The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting and monitoring of Northern Ireland specific budgets and action plans.

1.10 All plans, programmes and policies should be assessed to determine their contribution to or impact on achieving carbon budgets.

1.11 Each government department should investigate the opportunities and obstacles to carbon reductions within their competency areas.

1.12 The Public Sector procurement budget should be used as a tool to deliver significant emissions reductions.

1.13 The Executive and Assembly should invest in emissions reduction and low carbon infrastructure now; the Stern Review concludes this is the economically prudent path to follow.

1.14 The legal responsibility to deliver the targets set in a Northern Ireland Climate Change Act and through the carbon budgets should fall collectively on the Executive.

1.15 Specific responsibilities to deliver the targets set in the Climate Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department.

1.16 A public service agreement should be drafted for the Department of the Environment which would include a commitment to provide information and support to the other departments to help deliver the targets set in a Northern Ireland Climate Change Act and in the carbon budgets.

1.18 The Environment Committee should share responsibility for scrutinising progress towards achieving the targets in the Act and within budgets with all other departments.

1.20 The ability of the Committees and the Assembly as a whole to scrutinise progress will be greatly enhanced by ensuring the Committee on Climate Change reports to the Executive and the Assembly and that the Executive responds to their reports in the Assembly.

1.21 The Environment Committee should recommend that the Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050.

2. Climate Change Coalition Northern Ireland Overview

The Climate Change Coalition (NI) comprises a wide range of environment and development groups who all wish to see Northern Ireland play its full role in combating global climate change.

The goals of the Coalition are to raise awareness of climate change and to change behaviour and public policies to deliver local and global benefits. The coalition recognises that the behaviour of people in Northern Ireland is, through climate change, having disproportionate negative impacts on those living in many parts of the developing world. By working together we hope that we can help people here recognise that individual and political action in Northern Ireland can make a difference both here and internationally.

Vision

A world in which human-induced climate change is contained at a level that will allow all of humanity to prosper, by means that enables social, environmental and economic justice for all.

Mission Statement

The Coalition will publicise the need for individual action to combat climate change and will promote policy changes that will encourage and facilitate individual, governmental and corporate action to stop human-induced climate change having terrifying consequences.

Manifesto

Without urgent action, climate change is very likely to devastate life on earth as we know it. Hundreds of millions of people, particularly the world's poorest and most vulnerable, will be put at severe risk of drought, floods, starvation and disease. Species and habitats are also at risk with scientists warning that by the middle of the century significant numbers of species could face extinction.

High emitting countries, with their responsibility for historic emissions, must reduce their greenhouse gas output as well as helping poorer countries adapt to existing climate change. But because all countries share the obligation to ensure that damaging global warming is permanently avoided, each must commit to policies to guarantee that global greenhouse gas emissions decline beyond 2015.

The Coalition believes that there are strong moral, economic, social and environmental imperatives for Northern Ireland to contribute its fair share of global emissions cuts in order to combat global climate change.

The Northern Ireland Assembly's priority should be to:

1. Introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change. An annual Northern Ireland Carbon Budget should be set to ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions by an average of at least 3% per annum.²

The Assembly should also:

2. Support the International Negotiation Process for global warming to peak at no more than 2° Celsius above pre-industrial levels – there is international consensus that this is the threshold beyond which we risk catastrophic climatic change. This will mean global greenhouse gas emissions must peak by 2015 and then decline thereafter.⁴

3. Assist the Poorest Countries and Biodiversity (in Northern Ireland and around the world) to Adapt to the Unavoidable Effects of Climate Change by urging the UK, Ireland and the EU to support and strengthen the UN's international adaptation fund helping developing countries to protect themselves against climate change happening now. They should also transfer low/zero carbon technology to developing economies to allow for sustainable growth and support programmes helping biodiversity locally and across the world adapt to climate change.⁶

The Climate Change Coalition (NI) will strive to generate public support for personal and political action pursuant to the above objectives. Within this shared framework members will promote their own approaches to aspects of the challenge ahead.

CCC (NI) Members:

- ARENA Network
- Baglady Productions
- British Council (Northern Ireland)
- Centre for Global Education
- Chartered Institute of Environmental Health
- Christian Aid
- Concern
- Conservation Volunteers Northern Ireland
- Friends of the Earth
- Green Action
- NICVA
- Northern Ireland Environment Link
- Oxfam Ireland
- RSPB
- Sustainable NI
- Sustrans
- Tearfund
- The National Trust
- TIDY NI
- Tools for Solidarity
- Trocaire
- Ulster Wildlife Trust
- WWF Northern Ireland

3. Introduction

3.1 The Climate Change Coalition Northern Ireland welcomes the Environment Committee's decision to conduct an Inquiry into Climate Change. Climate change is an issue that must be addressed urgently at the local, regional, national and international levels.

3.3 The Committee is right to focus its Inquiry at identifying how Northern Ireland can play its part in tackling climate change. The scientific and economic rationales for addressing human impact on climate change is well established and widely accepted.

3.5 The people of Northern Ireland are asking for leadership from the Assembly. A survey conducted in 2008 by Sustainable Northern Ireland revealed that, "92% of respondents were

willing to make changes to their lifestyles, especially if encouraged to do so by strong government leadership." The Committee should provide this leadership.

3.6 There is a great deal of expertise on climate change available in Northern Ireland and many groups are willing to play their part in facilitating moves towards a low carbon economy. The Committee should engage widely and openly.

3.7 The call for submissions allowed interested parties only a short response time. The Coalition understands the urgency for action and commend the Committee in its efforts to publish its findings quickly. Therefore, the Coalition believes that written submissions should be considered as initial thoughts which can be added to and developed throughout the inquiry.

3.8 The Coalition would welcome the opportunity to make an oral presentation to the Committee Inquiry.

4. Response to the Terms of Reference

a. To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

4.1 Climate change must be addressed urgently at the local, regional, national and international levels.

4.2 The Assembly should ensure that its voice is heard at the national and international level. It should categorically state its support for an international climate change agreement to limit global warming to no more than 2° Celsius above pre-industrial temperatures (most scientists accept that 'dangerous climate change' is much more likely above this temperature increase).

4.3 To limit global temperature rise to no more than 2°C the IPCC suggests that atmospheric carbon dioxide levels should be limited to a maximum of 450 parts per million.

4.4 As carbon dioxide persists in the atmosphere for many years, the real determinant of the severity of climate change is not emissions in 2050, but total cumulative emissions by 2050. The Tyndall Centre has estimated that global carbon emissions need to peak by 2015 and then decrease by up to 6.5% each year if atmospheric CO₂ levels are to stabilise at 450ppm.

4.5 Industrialised countries have an historical responsibility for causing climate change and as a matter of fairness and justice should bear the leading responsibility for tackling the problem, both by reducing their emissions and by assisting developing countries to adapt to the changes that are already occurring.

4.6 New multinational climate agreements being developed by the United Nations (the post Kyoto climate agreement should be finalised in Copenhagen in December 2009) and the European Union (the Energy and Climate Package was endorsed by the European Parliament in December 2008) will require the United Kingdom and ultimately Northern Ireland to significantly reduce emissions. Attempts to delay action on climate change will only make achieving the new responsibilities more difficult and costly.

4.7 The Committee on Climate Change recommended, and the UK Government has accepted that a reduction of 80% by 2050 - based on 1990 emissions levels - would be an "appropriate" UK contribution to global aims to cut emissions by 50%.

4.8 The Assembly has accepted that the provisions of the UK Climate Act will be extended to Northern Ireland. However, the UK Act does not set specific emission reduction targets for the devolved administrations.

4.9 Northern Ireland's per capita emissions of 12.83 tonnes per annum compares badly with the UK average of 10.48 tonnes, the global average of 4 tonnes and the global fair share of 1.65 tonnes.

4.10 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

4.11 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum. Combining indicative annual milestones with the legal framework of the budget periods should offer flexibility but without compromising longer-term targets..

4.12 The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting and monitoring of Northern Ireland specific budgets and action plans. The Committee on Climate Change's reports on progress and action plans should be delivered to the Assembly and responded to by the Executive.

4.13 The Committee on Climate Change should help ensure co-ordination of emissions reduction efforts across the UK. Carbon emissions in Northern Ireland and the Republic of Ireland are closely interlinked. Therefore, provisions to enable joint achievement of emissions reduction goals should be made.

4.14 All plans, programmes and policies should be assessed (Climate Impact Assessments) to determine their contribution to or impact on achieving carbon budgets.

4.15 Adaptation is intrinsically linked to mitigation, and it is essential that both be addressed as a matter of urgency. The Northern Ireland Assembly should introduce cross-departmental policies and measures which will allow people, infrastructure, biodiversity and natural systems to adapt to changing climatic conditions.

b. To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

4.16 The Committee on Climate Change's statutory duty to Northern Ireland includes:

To provide advice on the sectors of the economy in which there are particular opportunities for contributions to be made towards meeting the budgets through reductions in emissions.

4.17 The Committee on Climate Change's first report was released in December 2008. It includes an analysis of what opportunities exist for making emission reductions in Northern Ireland. It states Northern Ireland could contribute emissions reductions of over 2MtCO₂e (Million tonnes of carbon dioxide equivalent) in 2020:

- Emissions from buildings and industry could be reduced by up to 1 MTCO₂ in 2020 by using energy more efficiently;

- More efficient vehicles and new transport fuels could deliver reductions of up to 1 MTCO₂ in 2020;
- Emissions from agriculture, land use and forestry and waste management sectors could be reduced by up to 0.5 MtCO₂e in 2020.

4.18 The actions outlined above do not go far enough to keep Northern Ireland on target to achieve an 80% emissions reduction target. The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans.

4.19 Each government department should investigate the opportunities for and obstacles to carbon reductions within their areas of responsibility.

4.20 The Public Sector procurement budget should be used as a tool to deliver significant emissions reductions.

4.21 Improved energy efficiency and rapid deployment of renewable energy are mentioned by the Carbon Trust, Stern, WWF, RSPB, etc as key areas to target early in the decarbonisation plans.

4.22 Appendix 1 contains a list of suggested actions the Climate Change Coalition Northern Ireland presented to Stormont Committees during 2008. The Coalition understands the requirement for cross-cutting actions and for each department and sector in Northern Ireland to be involved in emissions reductions.

c. To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

4.23 The Stern Review calculated that the dangers of unabated climate change would be equivalent to at least 5% of GDP each year. However, when more recent scientific evidence is included in the models, the Review estimates that the dangers could be equivalent to 20% of GDP or more. In contrast, the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year. The central message is that reducing emissions today will make us better off in the future: one model predicts benefits of up to \$2.5 trillion each year if the world shifts to a low carbon path.

4.24 The significant emissions reductions proposed for the UK in the Committee on Climate Change's first report can be achieved without harming the economy and at a cost less than 1% of GDP in 2020. In other words, an economy that might grow by 30% in the period to 2020, would instead grow by 29%. The Committee on Climate Change advises that this is a price worth paying, given the long-term costs of inaction on climate change.

4.25 The renewable sector in Germany supports 170,000 people and existing German government support measures promoting renewable energy could create 130,000 new jobs by 2020 according to the German environment ministry.

4.26 The Prime Minister stated that the overall added value of the low carbon energy sector by 2050 could be as high as \$3 trillion per year worldwide and that it could employ more than 25 million people.

4.27 The Carbon Trust estimates that more than 70,000 jobs could be created in the UK by investing in and developing offshore wind technology.

4.28 Government should see investment in a low carbon future as a way to stimulate the local economy (as President Obama has in the USA). The move to renewable fuels may help develop industries that will provide economic opportunities and jobs. Given the huge potential that exists around our shores for wind power there are sound economic and environmental reasons for ensuring that a significant proportion of these jobs are developed in Northern Ireland.

4.29 Action Renewables estimate that almost 6,000 short term and 400 long term jobs could be sustained in Northern Ireland, exclusively by developing renewable energy within the region.

4.30 The Coalition believes that there are strong moral imperatives for Northern Ireland to contribute its fair share of global emissions cuts in order to combat global climate change. Hundreds of millions of people across the globe could lose their lives and livelihoods, up to a third of land-based species may become extinct, immense political instability will occur as people migrate to avoid droughts and floods and compete for scarce resources, and great economic damage will be caused by increasingly extreme weather.

4.31 Climate change is one of the biggest threats to development: it could undo decades of progress in fighting poverty and compromise the achievement of the Millennium Development Goals (MDGs) which aim to reduce poverty and promote sustainable development by 2015.

4.32 The SNIFFER report on the impacts of climate change on Northern Ireland identified a number of direct effects, mostly negative, on human health, the economy, natural habitats and water resources, for example, the extent of flood risk to existing settlements remains unquantified compared with the situation in Great Britain.

4.33 Northern Ireland's Chief Medical Officer Michael McBride has said,

"Current predictions on climate change suggest greater long-term impacts on health than any current public health priority. To preserve health in a changing climate, we need to modify and strengthen the systems we have to adapt to the likely future impacts of global warming. We must tackle this issue on all fronts, reducing our contribution to the problem and responding to the effects of climate change is a shared international responsibility."

d. To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO₂ emissions. (Akin to Regulatory Impact Assessments/Rural Proofing)

4.34 The Coalition believes that long term plans, supported by a strong legislative framework, are the best way to promote efficiency and innovation in policy and technology design and thus the best mechanism to minimise costs.

4.35 The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans: sharing this resource with the rest of the UK should help minimise costs.

4.36 All plans, programmes and policies should be assessed using Climate Impact Assessments to determine their contribution to or impact on achieving carbon budgets. The process should be akin to equality screening and should be initiated at the start of policy design to maximise outcomes and minimise costs.

e. To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

4.37 The key climate targets that the SD Strategy should deliver are those identified in a Northern Ireland Climate Act. As stated earlier:

The Act must set a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change. To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

4.38 The SD Strategy should also help deliver the recommendations on how to achieve emissions reductions put forward by the Committee on Climate Change.

4.39 The SD Strategy could play an important role in helping to inform and empower individuals to take action to tackle climate change.

f. To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

4.40 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

4.41 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

4.42 The legal responsibility to deliver the targets set in a Northern Ireland Climate Change Act and through the carbon budgets should fall collectively on the Executive.

4.43 Specific responsibilities to deliver the targets set in the Climate Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department.

4.44 A public service agreement should be drafted for the Department of the Environment which would include a commitment to provide information and support to the other departments to help deliver the targets set in a Northern Ireland Climate Change Act and in the carbon budgets.

g. To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Bill.

4.45 The Coalition believes Northern Ireland should introduce its own primary legislation.

4.46 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050.

4.47 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

h. To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

4.48 The Environment Committee should share responsibility to scrutinise progress towards achieving the targets in the Act and within budgets with all other departments.

4.49 The ability of the Committees and the Assembly as a whole to scrutinise progress will be greatly enhanced by ensuring the Committee on Climate Change report to the Executive and the Assembly and that the Executive respond to their reports in the Assembly.

i. To produce a report on the findings and recommendations of the inquiry by September 2009.

4.50 The Environment Committee should recommend that the Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

4.51 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

5. Appendix

The Climate Change Coalition has made representations to eight of Stormont's Statutory Committees. The following details a range of actions that will help reduce emissions

Theme	Committee(s)	Ask	Supporting Evidence
Awareness	Culture, Arts and Leisure	Use libraries, British Council, etc displays, events and activities to promote CC awareness	
Awareness	Education	Incorporate Education for Sustainable Development more fully across all areas of teaching	ESD remains an unexamined component of the current curriculum
Awareness	Health, Social Services and Public Safety	Encourage healthier lifestyles which incorporate key health message and	Climate change will have direct implications in terms of ill health

Theme	Committee(s)	Ask	Supporting Evidence
		environmentally responsible citizenship	in the world but also in Northern Ireland (Michael McBride quote)
Energy Efficiency/ Renewable Energy	Culture, Arts and Leisure	Work on energy efficiency and renewable energy in Departmental buildings	
Energy Efficiency/ Renewable Energy	Education	Reduce carbon emissions by improving energy efficiency in existing and new buildings and offices	Northern Ireland schools, colleges and universities consume 744 million kWh of energy per annum at a cost of £36.5 (164 000 tonnes of carbon dioxide emission / 1/3 of energy spend for the entire Public Sector)
Energy Efficiency/ Renewable Energy	Enterprise, Trade and Investment	Demand reduction with energy efficiency in industrial buildings, energy efficiency, behavioural change and work on transport and agriculture	
Energy Efficiency/ Renewable Energy	Enterprise, Trade and Investment	Promote renewables (wind, wave, tidal), combined heat and power and distributed generation: e.g. introduce feed-in tariffs	Enormous potential exist in northern Ireland for renewable energy but at the present 6% of the electricity is generated from renewables + good potential for job creation (6.000 short term and 400 long term)
Energy Efficiency/ Renewable Energy	Finance and Personnel	Update Building Regulations to introduce zero carbon homes, mandatory micro generation	Between 8000 and 10000 sub optimal houses are built every year in northern Ireland (They are not "future proof")
Energy Efficiency/ Renewable Energy	Finance and Personnel	Introduce banded rates depending on Eco homes rating	
Energy Efficiency/ Renewable Energy	Finance and Personnel	Reintroduce Environment and Renewables Energy funding schemes to incentivise low carbon lifestyle	The EU energy package set a target for the UK to achieve a 15% share of renewable energy in its final demand by 2020. The domestic heat sector alone accounts for 49.2% of energy consumed in NI, excluding transport
Energy Efficiency/ Renewable Energy	Finance and Personnel	Deliver zero carbon government estate by 2015 (SDS Target), develop action plan towards 2015 target	
Energy Efficiency/ Renewable Energy	Health, Social Services and Public Safety	Reduce NHS's own carbon emission	NHS carbon emission are by a long way the largest of any government organisation

Theme	Committee(s)	Ask	Supporting Evidence
Procurement	Finance and Personnel	Promote fair trade, ethical trade, carbon accounting and life cycle Analysis	DFP has responsibility for central procurement
Procurement	Enterprise, Trade and Investment	Investment strategy Energy: A detailed action plan in the form of a long term energy strategy needs to be prepared	
Transport	Education	Encourage environmentally friendly methods of transport to and from school (including walking and cycling)	Only 3% of pupils cycle to school while 40% would like to: if they had opportunity and safe means to do so.
Transport	Culture, Arts and Leisure	Provide public transport to facilitate access to events	
Transport	Regional Development	Need of urgent action to tackle increasing transport emissions	Transport accounted for 33% of the Northern Ireland CO2 emission, and it rose by 41% between 1990 and 2005.

[1] The Stern Review; http://www.hm-treasury.gov.uk/stern_review_report.htm

[2] IPCC 4th Assessment report; <http://www.ipcc.ch/ipccreports/index.htm>

[3] Impact of regional climate change on human health; Patz, JA et al; 2005

[4] Food Poverty – Fact or Fiction; <http://www.phaii.org/index.cfm/section/publications/>

[5]<http://archive.niassembly.gov.uk/io/research/2008/9708.pdf>

[6]<http://archive.niassembly.gov.uk/io/research/2008/9708.pdf>

[7] Cooking up a storm, Tara Garnett, Centre for Environmental Strategy, University of Surrey, 2008. Prof G. Bentham, Centre for Environmental Risk, University of East Anglia

[8] Six degrees; Lynas M; 2006

[9]<http://www.defra.gov.uk/environment/localgovindicators/ni186.htm>

Climate Change Committee

Terms of Reference

a. To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

To meet the obligations laid out in the Climate Change Act (2008) the Committee on Climate Change set out recommendations for the level of UK carbon budgets in its inaugural report

"Building a low carbon economy – the UK's contribution to tackling climate change". The Committee advised that budgets apply to all greenhouse gases (GHGs), as defined in the Kyoto basket, and exclude emissions from international aviation and shipping, pending agreement on their treatment internationally. The UK budgets imply a reduction in emissions of 31% against 2005 levels by 2020, should a global deal to tackle emissions be reached, with a 21% reduction required in the interim. The Committee advised that no limit was required on purchase of EUA's in the traded sector, whilst the purchase of offset credits should be strictly limited in the Interim budgets to ensure a minimum level of domestic effort.

This advice did not specify precisely how budgets should be met, either at a sectoral or regional level. However, it did suggest that the pattern of abatement ought to reflect the costliness of emissions reductions, the actions required on the path to an 80% reduction in UK GHG emissions by 2050 and the availability of policy levers to unlock emissions reductions.

The Committee has made an initial assessment of Northern Ireland's share of abatement opportunities as a proportion of the UK total. This work identifies over 2 million tonnes of carbon dioxide equivalent (CO₂e) of abatement potential in Northern Ireland in 2020, including:

- Emissions from buildings and industry could be reduced by up to 1 MtCO₂ in 2020 by using energy more efficiently;
- More efficient vehicles and new transport fuels could deliver reductions of up to 1 MtCO₂ in 2020;
- Emissions from agriculture, land use and forestry and waste management sectors could be reduced by up to 0.5 MtCO₂e in 2020.

Given the indicative nature of the analysis for Northern Ireland to date, the Committee recommends that further work is required in identifying appropriate climate change targets in Northern Ireland. However, the Committee's work to date highlights that there are opportunities for significant emissions reductions in Northern Ireland.

The Committee also notes that the Climate Change Act 2008 does not require commitments to be made by Northern Ireland in relation to meeting UK carbon budgets.

b. To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

The Committee has not yet advised on the precise sectoral contributions or necessary actions required to meet carbon budgets. In the first progress report to the UK parliament, to be provided in September 2009, the Committee's focus will be to set out a UK level framework against which future progress in reducing emissions can be monitored.

A key component will be to develop a set of leading indicators to drive forward the emissions reduction pathway to 2020 and help measure progress in achieving a low carbon economy. There will be four levels of indicators:

- Sectoral emissions – recent, current and projected
- Drivers of sectoral emissions (e.g. average g/kWh for power generation, energy demand, g/km for new cars)
- Actions required (e.g. renewables capacity added, number of houses insulated, number of electric car charging points installed)

- Policy frameworks required to drive required actions (e.g. package to support energy efficiency improvement in homes)

The Committee is not currently in a position to advise on necessary actions or a sectoral road map for Northern Ireland. The principles established in the progress report will provide an appropriate framework around which to base an approach for Northern Ireland.

c. To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

The Committee estimates the UK macroeconomic impact of meeting carbon budgets in 2020 would be under 1% of GDP. Meeting required reductions to 2050 are expected to cost around 1-2% of GDP in the UK, or 1-3% of GDP globally.

The Committee believes that this cost is affordable and necessary if larger climate change costs and consequences are to be avoided.

The Committee has not estimated the macroeconomic impact in Northern Ireland.

d. To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO 2 emissions. (Akin to Regulatory Impact Assessments/Rural Proofing)

Not covered by CCC's analysis

e. To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

See response to 'b'.

f. To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

Not covered by CCC's analysis

g. To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Bill.

Not covered by CCC's analysis

h. To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

Not covered by CCC's analysis

Committee for Regional Development

Committee Office Room 402
Parliament Buildings
Belfast
BT4 3XX

Tel: 02890 521970
Fax: 02890 525927
Email committee.regionaldevelopment@niassembly.gov.uk

Mr Patsy McGlone, MLA
Chairperson of the Environment Committee
Parliament Buildings
Stormont
Belfast BT4 3XX

5 March 2009

Dear Patsy,

1. The Regional Development Committee has noted your Committee's inquiry into climate change and would make the following comments in response to the Environment Committee's call for evidence.

2. The Committee for Regional Development is aware that the Climate Change Act 2008 puts into statute the UK's target to reduce carbon dioxide emissions through domestic and international action by at least 60% by 2050, and at least 26% by 2020, against a 1990 baseline. In November 2007, the Prime Minister committed to a targeted reduction of 80% by 2050. It is important to note that, as the baseline used is 1990 levels, and the amount of carbon, methane and other greenhouse gases has increased significantly over the last 19 years, some estimate that the actual cut required will be more in the order of 90% of current levels.

3. The approval of the Northern Ireland Assembly for this Climate Change Act, and the duty on the relevant Northern Ireland departments was granted, by the Assembly, on 10 December 2007. This duty is reflected in the Programme for Government through the following Department for Regional Development Public Service Agreements (PSAs):

PSA 1: Productivity Growth

Objective 7 – Improve the Strategic Road Network by the advancement / completion of a range of major works schemes.

- Target - In line with PSA 13, by 2015 reduce journey times on Key Transport Corridors by 2.5% compared to 2003.

PSA 13: Improving the transport infrastructure

Objective 1 - Improve the Strategic Road Network by the advancement/ completion of a range of major works schemes.

- Target - By 2015 reduce journey times on Key Transport Corridors by 2.5% compared to 2003.

Objective 2:- Maintain the road infrastructure to keep it safe, effective and reliable through resurfacing, surface dressing and the timely repair of road effects.

- Target - At least 70% of the motorway and trunk road network is in satisfactory structural condition by March 2011. Other roads in the network to receive resurfacing treatment of 30% of that recommended in Best Practice Guidelines by March 2011.

Objective 3 - Promote increase in usage of public transport.

- Targets - Commence work on first Rapid Transit line in Greater Belfast by 2011.
- Achieve and maintain 77m passenger journeys per annum across all bus and rail public transport by March 2011.
- Support Translink to procure more than 200 new buses by March 2011.
- Support Translink to procure 20 additional new trains with the first trains introduced to service in 2011.
- Support Translink in a range of rail track and station developments.

PSA 14: Promoting safer roads

Objective 2 - Contribute to safer roads using a range of initiatives, including road safety engineering, traffic calming and further enhancement of the pedestrian and cycling network.

- Target: 50% reduction in total number of target collisions at treated sites over the 3 years following completion of collision remedial works.

4. In its response to the Budget and Programme for Government for the period 2008-11, the Committee noted with some concern that, although the Programme for Government includes as a priority to Protect and enhance Northern Ireland's environment and natural resources, the achievement of this priority has not been explicitly linked to the DRD transport related PSAs as outlined above. In addition, PSA 22 Protecting our environment and reducing our carbon footprint does not contain a DRD objective. Given the impact of public and private transport on levels of carbon emissions, air, environmental and noise pollution, it is worrying to the Committee that the role of DRD in this area has not been recognised.

5. The Committee noted that the Investment Strategy for Northern Ireland (ISNI) Measure Investment Proposal documents made substantial reference to the environmental impact of differing forms of infrastructure investment; however, it is not clear to the Committee that this has been followed through to the Budget and ISNI 2 allocation stage.

6. In light of the above, it is the view of the Committee that the link between transport and the reduction of emissions is not being made clearly or explicitly enough in the PfG and the DRD budget allocation does not appear to reflect the pressing need to address these reductions in any immediate or radical way.

7. The Regional Development Committee, at its meeting of 8 October 2008, received briefing from the Assembly's Research Service on sustainable transport issues. This scoping work was

undertaken as part of the Committee's consideration of an inquiry into sustainable transport planned for later this year.

8. At this session the Committee considered the high level findings of both the 2006 Stern Review on the Economics of Climate Change and the 2006 Eddington Transport Study, and would bring the following points to the attention of the Environment Committee in its inquiry into climate change:

- Eddington advised that a comprehensive and high-performing transport system is important to enable sustained economic prosperity;
- In mature economies with well-developed transport networks, it is transport constraints which are most likely to impact upon productivity and competitiveness;
- Emissions from the transport sector are a significant and growing contributor to the UK's overall greenhouse gas emissions;
- Transport is likely to be the last area to reduce its share of emissions; and
- Stern concluded that tackling climate change is the pro-growth strategy, and that ignoring climate change will ultimately damage economic growth.

9. It is the view of the Committee that it is the nature of demand for transport that makes addressing climate change in the transport sector such a complex issue. As Stern reported, demand for transport is derived demand – it is not demanded for its own sake, but rather for the things it enables people to do, such as getting to work, education and training, moving raw materials and finished goods from supplier to market, and accessing social and leisure services (2006). Growth in transport emissions is driven by factors such as income, cost, the availability of less carbon intensive alternatives, social choices and low carbon technological developments.

10. The Review of the Regional Development Strategy illustrates that main area of growth in emissions occurred in the transport sector, which rose by 40%, where private car usage rose rapidly to a point where there are now over 900,000 vehicles in Northern Ireland. Therefore reducing carbon emissions from transport will require a radical and cross-cutting approach to address the growth factors.

11. Looking further ahead, there are a huge number of major road schemes waiting to be rolled out, however only the Belfast Rapid Transit proposal is aimed at significantly increasing public transport services. The Committee has expressed its views on the Rapid Transit proposals for Belfast, and continues to work with the Department for Regional Development to bring this worthwhile public transport project to fruition. The Committee is also aware that work is ongoing on sections of the line from Belfast to Derry/Londonderry, and that lines such as the Larne line, would benefit from improvements to the track and trains.

12. At present 69% of the total DRD transport budget is spent on private transport and the rest (31%) on bus and rail. In three years time the budget indicates that 70% of the expenditure will be spent on roads. The Committee is aware that much of Northern Ireland's public transport is road based, and that splitting the DRD budget between roads and bus and rail may be a simplification of the situation. However, it is the view of the Committee that more must be spent on public transport in tandem with a range of cross-cutting measures such as public and private sector employer traffic and travel to work plans, car sharing, home working options and so forth. A modal shift will only be achieved when attractive and reliable alternatives are in place and when the public begins to see public transport as a positive travel choice. It is not a question of roads or public transport spending, rather of striking a balance between these two vital elements of transport expenditure that is economically, socially and environmentally sustainable.

13. It is the view of the Committee that the weight of evidence indicates that, at present, there are no clear linkages made in the PfG and the Budget between transport and greenhouse gases. Radical changes are needed if Northern Ireland is to even start to meet the very challenging targets established for the UK as a whole. Opportunities exist, with the development of the review of the Regional Development Strategy and the review of the Regional Transportation Strategy, and the Committee would urge the Executive to seize these opportunities without delay.

14. Thank you for the opportunity to contribute to this important inquiry.

Yours sincerely,

Fred Cobain, MLA
Chairperson of the Committee for Regional Development

Conservation Volunteers Northern Ireland



*Conservation Volunteers
Northern Ireland*

1. Background

1.1 Conservation Volunteers Northern Ireland has been a registered charity involving all sections of the community for 25 years. We're aiming for a better environment where people feel valued, included and involved. Every year Conservation Volunteers Northern Ireland, which is part of BTCV, connects with 29,800 people who make positive differences to their local communities and their environments. BTCV is a unique international volunteering organisation providing the bridge between global environmental ideals and local reality in the UK and overseas.

1.2 Conservation Volunteers' values are integral to all our work. They have been developed through two decades of a 'hands-on' approach to conservation activities. During this time we have adapted to meet the changing needs of communities, we care about people, the communities in which they live and the quality of their lifestyles and living environment.

1.3 Conservation Volunteers Northern Ireland aims to create a better environment where people from all ages, abilities and cultures feel valued, included and involved. Our mission is to create a more sustainable future by inspiring people and improving places. This is achieved through the delivery of projects under four broad themes: Health, Environments for All, Direct Action and Biodiversity.

1.4 If you would like to discuss these comments further we would be delighted to do so, please contact

Robert Shearman
Senior Development Manager

Conservation Volunteers
Dendron Lodge, Bangor

Tel; 028 9185 2817

E-mail; r.shearman@btcv.org.uk

www.cvni.org.uk

Conservation Volunteers Northern Ireland is a registered Charity 261009

2. Introduction

2.1 Conservation Volunteers Northern Ireland welcomes the Environment Committee's decision to conduct an Inquiry into Climate Change. The scientific evidence is now overwhelming: climate change is a serious global threat, and it demands an urgent global response.

2.2 Our actions now and over the coming decades could create risks of major disruption to economic and social activity, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century. And it will be difficult or impossible to reverse these changes. There is still time to avoid the worst impacts of climate change, if we take strong action now

2.3 If no action is taken to reduce emissions, the concentration of greenhouse gases in the atmosphere could reach double its pre-industrial level as early as 2035, virtually committing us to a global average temperature rise of over 2°C.

2.4 The Committee is right to focus its Inquiry at identifying how Northern Ireland can play its part in tackling climate change. The scientific and economic rationales for addressing human impact on climate change is well established and widely accepted.

2.5 Conservation Volunteers Northern Ireland agree that it is most appropriate to avoid and reduce emissions through changing behaviour, and that carbon offsetting is a second best option, when it is not possible or easy to avoid and reduce emissions.

2.6 The people of Northern Ireland are asking for leadership from the Assembly. A survey conducted in 2008 by Sustainable Northern Ireland for the Northern Ireland Climate Change Impacts Programme revealed that, "92% of respondents were willing to make changes to their lifestyles, especially if encouraged to do so by strong government leadership." The Committee should provide this leadership.

2.7 There is a great deal of expertise on climate change available in Northern Ireland and many groups are willing to play their part in facilitating moves towards a low carbon economy. The Committee should engage widely and openly.

2.8 Climate change will have significant social impacts on UK society, in particular physical & mental health, access to basic services (including water, shelter and food), education, employment and crime. As a result social deprivation will worsen.

2.9 Deprivation increases vulnerability to climate change and climate change increases deprivation.

2.10 People who are most likely to be most vulnerable are those who:- live in places at risk, are already deprived in terms of health, income, housing, mobility, lack awareness of the risk, do not have good support networks.

2.11 Conservation Volunteers already work with people who are considered to be most vulnerable to the effects of climate change.

2.12 Conservation Volunteers work to build the capacity of vulnerable communities will also contribute to building and maintaining communities which are resilient to climate change.

2.13 Conservation Volunteers work develops social networks, which are important in providing information, advice and support to those vulnerable to climate change.

2.14 Conservation Volunteers develops the confidence of individuals and communities to participate in the development and implementation of local adaptation response plans.

2.15 Conservation Volunteers want to show that seemingly insurmountable problems can be tackled by direct, positive action at a local level. To demonstrate that an individual sense of powerlessness can be overcome through collective action and common purpose and to deliver outcomes which are beneficial both for biodiversity and for local communities.

3. Response to Terms of Reference

A. To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

3.1 Climate change must be addressed urgently at the local, regional, national and international levels.

3.2 The Assembly should ensure that its voice is heard at the national and international level. It should categorically state its support for an international climate change agreement to limit global warming to no more than 2° Celsius above pre-industrial temperatures (most scientists accept that 'dangerous climate change' is much more likely above this temperature increase).

3.3 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

3.4 Adaptation is intrinsically linked to mitigation, and it is essential that both be addressed as a matter of urgency. The Northern Ireland Assembly should introduce cross-departmental policies and measures which will allow people, infrastructure, biodiversity and natural systems to adapt to changing climatic conditions.

B. To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

3.5 The actions outlined in the Committee on Climate Change's first report December 2008 do not go far enough to keep Northern Ireland on target to achieve its own 80% emissions reduction target. The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans.

3.6 Each government department should investigate the opportunities and obstacles to carbon reductions within their competency areas. The Public Sector procurement budget should be targeted as a tool to deliver significant emissions reductions.

3.7 Conservation Volunteers propose efforts to mobilise mass public action on climate change. Our experience is that trees/woodland/greenspace projects have enormous public appeal, and we see these as offering:

- Direct beneficial carbon impacts (eg through carbon sequestration by growing trees)
- A route to active engagement with the general public - raising awareness, and, more importantly, changing behaviour through practical action
- A powerful educational experience, in which "learning by doing" becomes a catalyst for further positive environmental behaviour (eg recycling, reduced car use etc).

The evidence for changed behaviour has been demonstrated by recent research, showing, for example, that

"with an increase in connectedness to nature, there is an increase in environmental awareness and responsibility and also an increase in environmentally friendly practice",

and also that

"A volunteer who has a high connectedness to nature is also likely to have high environmental awareness and responsibility and is likely to be practicing a number of environmentally friendly practices".

("Evaluating the impact of environmental volunteering on behaviours and attitudes to the environment. Department of Biological Sciences, University of Essex, March 2007).

C. To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

3.8 The Stern Review calculated that the dangers of unabated climate change would be equivalent to at least 5% of GDP each year. However, when more recent scientific evidence is included in the models, the Review estimates that the dangers could be equivalent to 20% of GDP or more. In contrast, the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year. The central message is that reducing emissions today will make us better off in the future: one model predicts benefits of up to \$2.5 trillion each year if the world shifts to a low carbon path.

3.9 The SNIFFER report on the impacts of climate change on Northern Ireland identified a number of direct effects, mostly negative, on human health, the economy, natural habitats and water resources, for example, the extent of flood risk to existing settlements remains unquantified compared with the situation in Great Britain.

3.10 Northern Ireland's Chief Medical Officer Michael McBride has said,

"Current predictions on climate change suggest greater long-term impacts on health than any current public health priority. To preserve health in a changing climate, we need to modify and strengthen the systems we have to adapt to the likely future impacts of global warming. We

must tackle this issue on all fronts, reducing our contribution to the problem and responding to the effects of climate change is a shared international responsibility."

D. To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO 2 emissions. (Akin to Regulatory Impact Assessments/Rural Proofing)

3.11 Conservation Volunteers believes that long term plans, supported by a strong legislative framework, are the best way to promote efficiency and innovation in policy and technology design and thus the best mechanism to minimise costs.

E. To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

3.12 Climate Change Adaptation Policy in the UK recognises the social justice implications but offers little in terms of action. More work is needed to ensure that adaptation responses involve, engage, empower and build the adaptive capacity of vulnerable people

3.13 In line with UK government adaptation programme principles, action should promote sustainable development, integrate social deprivation measures, be at a local and community level, work in partnership

3.14 The Committee on Climate Change Northern Ireland should provide greater emphasis on and support for community led adaptation, in particular

- Use community engagement techniques
- Integrate community engagement into planning
- Support the climate change work of NGOs who work directly with vulnerable people

3.15 Conservation Volunteers agree that carbon offsetting is not a 'cure' for climate change but it can help raise awareness and reduce the impact of our actions. Our ideal position would be that a regulatory system governing emissions reduction and trading schemes would sit alongside a wider campaign aimed at mobilising public opinion and changing behaviour. A code of best practice would "kite mark" both the mechanics of emissions control and organisations that can demonstrably shift public behaviour towards carbon reduction and offset.

F. To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

3.16 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

G. To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Act.

3.17 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

H. To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

3.18 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

3.19 Conservation Volunteers recognise that the challenge of climate change encompasses environment, society and economy, and that a cross sectoral response is required. Conservation Volunteers is committed, using its front line experience of tackling climate change, to help shape the policy debate within the NI Assembly, with third sector and private partners. Next steps include:

- Report and promote: Monitor range and extent of behaviour changes among individuals and communities involved, evaluate against baseline behaviours and present to various audiences
- Consultation response and discussion papers: Submit response to consultations on climate change etc
- Forums: Continued involvement in Climate Change Coalition NI, feed into CCCNI to strengthen lobbying power to make changes at highest strategic level

I. To produce a report on the findings and recommendations of the inquiry by September 2009.

3.20 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

Council for Nature Conservation and the Countryside

Summary

The Council for Nature Conservation and the Countryside (CNCC) is the statutory body providing advice to the Department of the Environment on nature and countryside conservation issues, particularly as they affect Northern Ireland. Considering that climate change will have considerable effects upon our countryside, its wildlife and its human population, CNCC has produced this paper to outline its overall position on climate change. Further information on the

Council's position on specific renewable energy sources is available in the Council's paper on renewable energy.

Recognising that there is now widespread acceptance, globally, that climate change is occurring, and that human-induced activities are contributing to these changes, CNCC accepts that there is an urgent need to consider what actions need to be taken in the years ahead in order to reduce or eliminate the adverse effects of climate change. One of the most important expert bodies dealing with climate change is the Intergovernmental Panel on Climate Change (IPCC), established in 1987 as part of the United Nations Framework on Climate Change. Composed of approximately 2500 scientists from all over the world, most of whom are climatologists, in its 2007 Fourth Assessment Report, signed off by all the world's governments, the IPCC wrote that

"Warming of the climate system is unequivocal". (1)

It is however both significant and worrying that even since the IPCC's Fourth Assessment Report, a number of studies have emerged which, based upon observed changes that were more severe (worse) than even the worst case scenarios previously painted by the IPCC and observations of positive feedback (where warming changes circumstances to the point where the new circumstances then create further warming) that strongly suggest that many of the IPCC's predictions were conservative and that the rate and scale of climate change could be much worse than the IPCC had predicted(2).

In summary:

- CNCC accepts that the climate is already changing and that further warming and change is inevitable. Consequently, CNCC believes a combination of mitigation and adaptation policies, as part of a long term climate change and energy strategy must be developed and implemented throughout all future Northern Ireland policies to help Northern Ireland better manage the threats to biodiversity and people from a changing climate. Where relevant, this should be done in co-ordination with neighbouring administrations.
- CNCC recognises that climate change is a natural phenomenon and that the Earth's climate is variable and has changed a number of times throughout the billions of years of the Earth's history. However, CNCC also accepts that the changes in climate that have been observed in the last few decades of the 20th Century and the changes in climate that are being predicted to take place throughout the 21st Century, and beyond, are outside of the range of normal variation in the climate and that these changes can only be adequately explained when one accounts for the additional input of greenhouse gases due to man's activities. Based upon the current body of evidence and what is currently the best available science, CNCC accepts that recent changes in climate are primarily the result of man's behaviour and that to tackle man made climate change, man must reduce the emission of greenhouse gases produced as a result of man's activities.
- CNCC supports the target which has been adopted by both the EC and the UK that global temperatures must not be allowed to rise by more 2oC above pre-industrial levels (of approximately 1750). All future policies must facilitate and be designed towards the achievement of this target.
- CNCC believes that a global temperature rise of more than 2oC above pre-industrial levels is likely to be 'dangerous' and must, if possible, be prevented. However, CNCC recognises that further warming, even if does not exceed the 2oC threshold, threatens to produce very serious negative effects for wildlife and people, both locally in Northern Ireland and globally.
- CNCC believes that in order to have at least a 50% chance of meeting the 2oC target, global emissions of greenhouse gases (GHGs), especially Carbon Dioxide (CO2) need to

peak no later than 2015 and then be reduced by at least 50% by 2050 so the global concentration of GHGs does not exceed 450 ppm CO₂ equivalent.

- Given the historical disproportionately large contribution of GHG emissions from developed countries, CNCC supports the principle of contraction and convergence (which is based upon a global fair share of GHG and CO₂ emissions) at a much lower level of emissions (at least 50% lower by 2050) in order to try to ensure greater fairness of energy availability. Accordingly, developed countries like the UK, will need to reduce their CO₂ emissions from 1990 levels by at least 80%, and probably closer to 95% by 2050.
- CNCC believes that because the costs of the unmitigated impacts of climate change are likely to be many times the costs of tackling climate change, Northern Ireland must take immediate and long term action to both mitigate and adapt to climate change. CNCC regards any attempts to justify inaction on the grounds of cost as unacceptable.

1. Background

Though climate change is one of the greatest challenges we face, action to tackle it is thin on the ground. There is no doubt that man is influencing the composition of the atmosphere and as a result, affecting the earth's climate. As long ago as 2001, the IPCC said

"Is the Earth's climate changing? The answer is unequivocally "Yes".(3)

The unequivocal nature of the IPCC's statements is indicative of the growing scientific consensus that the climate is changing. The evidence for change comes from marine, freshwater, forest and mountain ecosystems and from all corners of the world - from glacier melting in the Alps and Andes to sea level rise in Tuvalu – a small island state in the Pacific Ocean which has concluded a deal with New Zealand to evacuate the entire 10,000 population (4) - and the mangrove forests of the Sunderbans along the coasts of India and Bangladesh - which threatens millions of people and species such as the Bengal tiger. The break up of the Larsson B ice shelf in Antarctica in 2002 provided a stark demonstration of how gradual changes in the climate can, on occasion, precipitate very sudden, large scale, irreversible changes. The impacts of climate change on people and nature could potentially be catastrophic unless we act now and change our habits, and key to this will be energy policy and energy supply.

1.2. Greenhouse gases, global temperature rise and the 2oC target.

In 1996 the EU adopted a target, based on IPCC findings, to ensure global temperatures do not rise by more 2oC above pre-industrial levels. This same target was reiterated by the EU and UK at the G8 summit in Germany in 2007 and by the UN Human Development Report of 2007(5).

However achieving this target is only likely to be possible if we drastically cut our global emissions of greenhouse gases (GHGs) into the atmosphere, by at least 50% globally by 2050. According to recent research, an average global warming of 2°C by 2050 will result in dangerous and irreversible impacts (IPCC 2001 and PIK 2004 (6)) to the planet. These could result in an additional:

- 228 million people at risk from malaria
- 12 million people at risk from hunger as crop yields fall
- 2,240 million people at risk from water shortages, particularly in the sub-tropics
- 200 million people at risk from coastal flooding

The problem is, temperatures have already increased by approximately 0.80C in the 20th Century with recent warming growing at 0.20C per decade (7,10). Though this ties in very closely with the IPCC's Fourth Assessment Report (2007) figures of 0.740C rise, significantly, it is higher. The IPCC's 2007 figures were themselves higher than the 0.60C temperature rise predicted in the IPCC's Third Assessment Report of 2001. It is noteworthy that since 1980, Ireland's average temperatures have risen by 0.440C (0.79F) per decade, approximately twice the average global rate(8).

Since gases like Carbon Dioxide (CO₂) remain active in the atmosphere for many years, with approximately one third of the CO₂ remaining in the atmosphere after 100 years and approximately one fifth of the CO₂ remaining for more than 1,000 years (9), there will inevitably be further temperature rises, predicted to be around 0.60C (10), though this is also likely to rise as our emissions continue to rise. This leaves a very narrow window of time and temperature rise to act if we are to avoid dangerous climate change. The inevitability of further warming and change due to this long residence time of CO₂, also means that as well as mitigation, adaptation must be an integral part of future policies across the board, including, but not limited to, managing biodiversity and planning.

The primary cause of these changes, especially the most recently observed ones, is our combustion of fossil fuels with 80% of man-made CO₂ emissions due to the burning of these fuels, the remainder due to deforestation and cement production. As fossil fuels continue to be burned to provide heat, electricity, transport fuels and chemicals, increasing quantities of CO₂ are produced. CO₂ is one of the greenhouse gases that warms the planet by reflecting much of the sun's energy that once radiated out from the surface of the earth, which would otherwise escape into space. While life could not exist on Earth without this warming effect, CO₂ is being pumped into the atmosphere at excessive and unnatural rates and this is causing excessive warming that is contributing to climate change.

Global temperature rise is linked to increasing concentrations of GHGs in the atmosphere. Though the concentration of CO₂ in the atmosphere reached 387 parts per million (ppm) in 2008, the highest level for the last 650,000 years,(11) if we count other GHGs, like methane, which also have a warming effect, together these approach the equivalent of approximately 440 ppm CO₂ equivalent (or 440 ppm CO₂ eq). If we could stabilise at today's atmospheric concentration of GHGs, it has been estimated there is a more than 50% probability that we will not exceed the 2°C threshold. However this is highly unlikely because CO₂ levels are rising faster than ever before, at 1.9 parts per million (ppm) annually (10) (the average increase 1960-2005 was 1.4 ppm annually) (11). As was outlined in the Stern report,(12) at 450 ppm CO₂ eq. the chances of staying below the 2°C threshold in the long term is around 50%. It is generally accepted that we need to ensure we give ourselves at least this 50/50 chance of staying below the 20C target and given that the UK is and has been a disproportionate consumer of energy and producer of CO₂, stabilising atmospheric GHGs at that level means UK GHG emissions need to fall by 80-95% by 2050. It is worth noting that even a 20C temperature rise has associated risks and some commentators, most notably James Hansen, Director of the NASA Goddard Institute for Space Studies, has said the safe upper limit for atmospheric CO₂ is no more than 350 ppm (13)

2. Targets for Tackling Climate Change and Reducing Emissions

2.1 EU

The EU has three main climate change and energy-related goals for 2020: namely to reduce energy consumption through energy efficiency by 20%, to reduce GHG emissions by 20% and to have 20% of energy supplied from renewable sources. According to the terms of the EU package of measures announced on 23rd January 2008, one of the UK's legally binding targets is to

achieve a 15% share of renewables in the final energy demand by 2020. A series of interim targets were also agreed by the EU on the following basis: member states must achieve a 25% of their 2005-2020 renewables increase by 2012, 35% by 2014, 45% by 2016, and 65% by 2018. Together these targets would make up an "indicative trajectory" that each member states would be expected to follow. Since the EU Energy package looks at overall energy, which includes electricity, heating and transport demands, it is anticipated that in order to comply with this directive the amount of electricity from renewables in the UK will need to increase up to ten-fold – to approximately 40% from the 2007 levels of approximately 4%.

2.2 UK

The UK government is taking steps to address climate change and redress the balance to the natural world. In December 2008, the UK Climate Change Bill with both medium term (2020) and long term (2050) targets for reductions in CO₂ emissions gained Royal Assent and became law. This is the first such bill in the world and should be welcomed as a sign of global leadership on climate change.

Further to the advice of the Climate Change Committee (CCC) in October 2008 of the need for an 80% reduction in CO₂ emissions by 2050 the bill included this amended target. This 80% target reflects the evidence of the need for a global cut in emissions of greenhouse gases (GHGs) into the atmosphere by at least 50% by 2050 because in order to achieve this global reduction of 50%, industrialised countries will need to reduce their emissions by at least 80% by 2050. However it is important to note that some commentators, including senior IPCC scientists, have argued that even with an 80% cut in emissions damages will be significant and much more substantial adaptation efforts than those currently planned will be required to avoid much of the damage (14), and the reductions need to be of the order of 90% by 2050.

The Welsh Assembly Government's (WAG's) Renewable Energy Route Map targets include generating 100% of Wales' electricity demand from renewable sources within the next 20 years or sooner, that demand should not exceed the electricity consumption level of 2007, that all new buildings should be zero carbon by 2011 and supporting the development of distributed generation and energy supply companies.

Scotland revised its target to produce 40% of its electricity from renewable sources by 2020 upwards at the end of 2007 to 50% by 2012, having already met its 2010 target to produce 16% of its electricity from renewables in 2007. Scotland also has a target to reduce its CO₂ emissions by 80% by 2050 through the Scottish Climate Change bill. According to a 2003 report by WWF Scotland (15) nearly 50,000 new jobs could be created in Scotland in sectors such as wave and wind energy, recycling, public transport and organic farming, in addition to the 80,000 jobs that already existed.

Northern Ireland's target as of 2008 by comparison is to have only 12 % of electricity generated from renewable resources by 2012, though this will be reviewed as part of the redrafting of DETI's Strategic Energy Framework (SEF) in 2009, and at present has no long term (beyond 2030) CO₂ emissions reduction target. Though the potential for renewable energy sources such as wind and wave power are undoubtedly larger in Scotland than Northern Ireland, the potential in Northern Ireland is significant and should be explored and higher targets for the production of electricity from renewable sources in Northern Ireland set. Given the significant win-win economic benefits of investing in the development of renewable energy resources, CNCC believes that this should be progressed as a matter of urgency.

2.3 Republic of Ireland and all island issues

The Republic of Ireland (RoI) is planning to introduce a Climate Protection Act which will include a target of 80% reduction in CO₂ emissions by 2050, with an annual reduction of 3%. Launching his second Carbon Budget in October 2008 Mr John Gormley (Green Party), Minister for the Environment, Heritage and Local Government in the Republic of Ireland proposed an number of significant measures including increasing to 40% the target for electricity from renewable sources by 2020. This (40%) is roughly the level that was found to be feasible by a recent all-island grid study which reported in 2007 and concluded that a 42% contribution from renewable energy sources was possible by 2020. This has important implications for Northern Ireland given the single, all-island energy market.

Minister Gormley also proposed a plan to develop a strategy to have up to 10% of the road transport fleet electrically powered by 2020 and a plan to set up a high-level group to advise on the development of Ireland's Green Economy. Gordon Brown has outlined his intention to have all new cars sold in Britain to be electric or hybrid vehicles producing less than 100 g/km of CO₂ by 2020. In the light of this push for more electric vehicles in both the Republic of Ireland and across the UK, and the huge potential that exists in Northern Ireland for wind power, Northern Ireland really needs to grasp the opportunity offered by the electrification of the transport network as a matter of urgency. Some of the major car manufacturers already offer electric versions of established models and more are likely to come on line in the near future. Considering the previously identified economic benefits from investing in renewables, CNCC believes the Northern Ireland administration should work closely with the UK and Republic of Ireland governments in developing the opportunities for electric vehicles in relation to these proposals and ultimately should set firm targets for the electrification of Northern Ireland's transport system.

2.4 Northern Ireland

Northern Ireland also has an important part to play in addressing climate change and setting Northern Ireland specific emissions reductions targets, equal to or greater than those in the UK Climate Change Bill, would be an important step. The Carbon Trust Vision Study (CTVS) (16) published in 2005 outlined how Northern Ireland could reduce its CO₂ emissions by 60% by 2050 and estimated the cost of achieving this at £775 million. While both the 60% target is now generally regarded as insufficient and the costs of achieving it will likely have risen since the report was produced, in the absence of any Northern Ireland wide long term energy strategy the CTVS should provide a useful blueprint for how Northern Ireland can move towards a low carbon economy.

Though no Northern Ireland specific targets have yet been developed as part of the EU energy package or the UK Climate Change Bill, in order to facilitate the achievement of the national and international targets and also to guide the development of energy policy in Northern Ireland, CNCC believes there is a need for a long term (e.g. up to 2050) Northern Ireland energy strategy which sets much more ambitious targets for the generation of renewable energy in Northern Ireland than currently exists.

2.4.1. The need for Northern Ireland targets

CNCC considers that the 2007 Northern Ireland Programme for Government (PfG) should have been more ambitious in setting future renewable energy targets; the mere restating of already-published targets is unacceptable. It is also regrettable that the targets for the reduction of Northern Ireland's carbon footprint (stated to be 25% by 2025) are set below those of the comparable UK targets, both in terms of time scale and amount of reduction aimed for.

In addition, given that the interim target in the Climate Change Bill is to reduce CO₂ emissions by at least 26% by 2020 against a 1990 baseline, a target to reduce Northern Ireland's carbon

footprint by 25% by 2025 is also well below the comparable UK target, in terms of both the level of reduction and the time by which this has to be achieved, again reflective of a lack of ambition in Northern Ireland.

3. Tackling Climate Change and Reducing Emissions

The good news is that recent research suggests that a reduction in CO₂ of 80% by 2050 is achievable. According to "80% Challenge: Delivering a low carbon Britain" (17) a report published by the Institute for Public Policy Research, the RSPB and WWF in October 2007, the UK can reduce its CO₂ emissions by 80% by 2050, without new nuclear generation, and including international aviation and shipping emissions. Moreover, the level of economic growth predicted in the report would still be achieved by 2052, just 18 months later than would otherwise be expected, though with the most recent trends in the UK and global economy, previous predictions of the rates of economic growth may be less reliable.

When tackling climate change we must also take account of the impact of forests and oceans, both of which act as sinks because they absorb CO₂. The seemingly relentless felling of rainforest needs to be stopped, not only on ecological and humanitarian grounds, but also because, as the IPCC have pointed out, deforestation is now the third largest source of CO₂ emissions globally, accounting for approximately 20% of GHG emissions, behind coal and oil. To tackle climate change we need to reduce deforestation, and buying sustainable wood products, with the FSC logo, is one way of doing that. Disappointingly no targets for emissions reductions were set at the UN discussions on climate change in Bali in December 2007 and in effect decisions were deferred until the next meeting due in Copenhagen in 2009, though there was agreement on the need to reduce deforestation which is a timely and welcome first step.

The oceans have absorbed approximately half of all accumulated emissions since the industrial revolution began (18), slowing the effects of climate change. The addition of these gases to the seas however has meant the oceans have become more acidic. If this trend continues unchecked, it could inhibit calcareous shell formation, which would affect crustaceans, which are a major source of food globally, and coral reefs which comprise just 0.25% of all the oceans but are home to 25% of all fish species. Results of a decade-long study (19), show that in the North Atlantic, the most intense sink for atmospheric CO₂, uptake of CO₂ decreased by more than 50% between the mid-nineties and the early 2000s. This may slow down oceanic acidification, but if the seas absorb less CO₂, then more will go into the atmosphere and increase the warming and climate change.

3.1 Tackling climate change can create economic opportunities

There are also sound business reasons to tackle climate change and move to a low carbon economy, as highlighted in a speech by Gordon Brown at WWF's One Planet Future seminar in November 2007. He said that globally, the overall added value of the low carbon energy sector could be \$3 trillion annually worldwide by 2050, and it could employ more than 25 million people. If Britain maintains its share of this growth there could be over a million people employed in environmental industries within the next two decades.

A recent study by European Foundation for the Improvement of Living and Working Conditions found that the adoption of best available energy conservation technologies could create 500,000 extra jobs in the EU. (20)

A 2008 report by WWF France (21) concluded that a 30% reduction in CO₂ emissions by 2020 would create around 684,000 new net jobs in France.

The use of alternative power sources such as hydrogen or electric vehicles offer opportunities not just to reduce emissions and have cleaner air but to create jobs, as illustrated by the order for 10 hydrogen buses from the Mayor of London received by a Northern Ireland bus building company in November 2007(22). Hydrogen has many potentially very exciting applications as an energy source. For example, vehicles powered by hydrogen emit only water and if the hydrogen is produced with electricity from renewable sources, it can be made in a completely green life cycle. Iceland, which aims to have a hydrogen economy by 2040 is leading the way in the use of hydrogen.

Enormous potential exists for renewable energy, and yet currently only approximately 5% of Northern Ireland's electricity is generated from renewables. This compares to more than 16% in Germany, which has embraced green technology and has around 170,000 people currently employed in green industries. Germany's Federal Environment Minister Sigmar Gabriel has predicted the second package implementing the integrated energy and climate change programme will "create more than 500,000 additional jobs by 2020". (23) The German government already has a target to cut CO₂ emissions by 40% against 1990 levels by 2020, which it estimates will generate savings of €5bn in private households and industry by that time, and that on average, every tonne of CO₂ saved has a saving effect of €26(24)

The Yorkshire Regional Economic Strategy 2006-2015 found that meeting the region's targets to reduce GHGs by at least 30% by 2020 and 80% by 2050 and have 22% renewable electricity by 2010 could generate 13,000 new jobs.

Investing in renewables can also have significant economic benefits for Northern Ireland, primarily by ensuring that rather than leaving Northern Ireland, more of the money spent on energy consumed in Northern Ireland will remain in the Northern Ireland economy. According to the DTI's "Renewable Supply Chain Gap Analysis" produced in association with the Scottish Executive in 2004 more than half a million jobs (564,000) could be created in the UK as a whole from renewable technologies by 2020. Of course, the number of jobs created in Northern Ireland, or any other part of the UK, depends not only on the mix of technologies (wind, solar, wave, biomass and so on) pursued but also on the level of inward investment in these technologies in that region. Based upon those DTI figures, there is the potential to create between 8,000 and 33,000 jobs in Northern Ireland in an industry that could be worth almost £1,000,000,000. The employment potential from investing in renewables was illustrated by a 2006 report by Action Renewables which found that there is potential for 5,600 short term and 400 long term jobs in Northern Ireland from investing in indigenous renewables.

4. The Impacts of Climate Change

The primary effect of climate change is an increase in global temperature. This increase has been about 0.8°C over the past century, but half of this increase has occurred over the last 30 years. Projections suggest that by the end of this century the increase will be between 1.8°C and 4.0°C, but many commentators feel that these figures are now likely to be exceeded.

The most obvious result of the rise in global temperature is the melting of ice and snow, both at high latitudes and high altitudes. The melting of sea ice in the Arctic, which threatens the future of the polar bear, is seen as further clear evidence of climate change, and the Arctic summer melting in 2007 set new records. The record minimum of 2007 was 4.3 million km² when ice cover was 39% less than 1979-2000 mean and the lowest for the entire 20th Century based on monitoring from ships and aircraft according to data from the National Snow and Ice Data Centre(NSIDC). According to the NSIDC, the September rate of sea ice decline since 1979 is now approximately 10% per decade, or 72,000 square kilometers (28,000 square miles) per year (25). In December 2007, modelling studies led by Professor Wiesław Masłowski, which included co-workers at NASA and the Polish Academy of Sciences, indicated that previous projections for

sea ice loss were underestimates and that northern polar waters could be ice-free in summers by 2013. It could be argued that this projection of 2013 is already too conservative as Professor Maslowski's studies used data sets from 1979 to 2004 and did not account for the last two minima, in 2005 and 2007(26). Although this projection of an Arctic sea ice free in summer by 2013 is 30 years ahead of the projections in the IPCC Fourth Assessment Report of 2007 but it has been supported by other authors(27).

An ice free Arctic Ocean during summer is expected to further amplify warming because rather than being covered in ice, which reflects around 90% of incoming sunlight, the exposed sea will absorb more incoming sunlight which will in turn cause further warming, an example of a positive feedback (a consequence of warming causing further warming).

Frozen groundwater in the tundra regions will also melt, turning solid ground into swamp, and causing vast quantities of carbon stored as frozen organic matter to be released into the atmosphere as it breaks down. This will form another positive feedback mechanism as more greenhouse gases are released, leading to further warming. Arctic ecosystems may be squeezed into significantly smaller islands of high ground, with the resultant loss of both species diversity and genetic diversity.

The melting of so much ice and snow will lead to sea level rising by 20-60cm by the end of the century, resulting in the inundation of many low-lying coastal areas. Large parts of some countries, such as Bangladesh, could disappear under the sea, while many coral atolls will become uninhabitable. Coastal ecosystems like mangrove swamp and saltmarsh will shift inland where there is space for them, but will disappear where the hinterland rises steeply, or where efforts are made to protect the coastline with engineering solutions.

The temperature changes will also lead to shifts in thermo-haline circulation patterns in the world's oceans leading to changes in weather patterns that are less easy to quantify and predict. Rainfall patterns are likely to change significantly, with some places receiving much more rain and others suffering severe and prolonged droughts. Rainfall seasons may also change significantly, with some times of year becoming much wetter or drier, depending on the location. The semi-arid regions at the fringes of the sub-tropical zone, including the Mediterranean, the southwestern United States, southern Australia and southern Africa, are likely to become significantly drier as the adjacent desert areas spread towards the poles.

This shift of climate zones towards the poles has been highlighted by a study by the US National Center for Atmospheric Research (NOAA) published in December 2007 (28)

This shift will have a significant effect on vegetation zones, which may be further complicated by the shifts in rainfall. According to the study, the observed widening of the tropical climate zone appears to be occurring faster than climate models predict in their projections of anthropogenic [man-made] climate change.

Perhaps the most noticeable change is likely to be in agriculture, where some arable areas will become impossible to cultivate and revert to pastoral systems, while in other places there may be large changes in the type of crops that can be grown. As agriculture is one of the dominant land uses around the world this will have enormous implications for biodiversity as well as for human societies.

So what about Northern Ireland?

4.1 Climate change and Northern Ireland

4.1.1 Physical Effects of Climate Change

There is no doubt things are changing even on a local level. The State of Environment (2008) report stated (29)

"Climate change is occurring at an increasingly measurable scale"

According to the UK Climate Impacts Partnership report of 2007, temperatures in Northern Ireland have already risen by about 0.8°C since about 1980. (30)

As outlined in the 2007 SNIFFER report, (31) "Preparing for a changing climate in Northern Ireland", the climate of Northern Ireland is already changing. Air temperature is rising and the number of hot days is increasing; the proportion of rainfall in summer is decreasing, while winters are slightly wetter (EHS 2004). These changes are expected to accelerate over the coming century. Average temperature may rise by 3°C or more and summer rainfall may fall by up to 50% while winters may be 25% wetter (Hulme et al., 2002). In light of recent flooding problems, this is a worrying scenario.

In addition, this projected shift in precipitation patterns and distribution is likely to have a number of impacts on Ireland's biodiversity, agriculture and water availability. According to Sweeny et al (8) large parts of the south east of Ireland, around counties Cork, Waterford and Wexford, as well as Wicklow, Dublin, Louth and Down could receive less than half their current summer rainfall. On this basis the summer flow of the Boyne is predicted to drop by as much as 20% by the 2020s and up to 40% by the end of the century.

Further evidence of the potential impact of climate change in Northern Ireland was provided by the National Trust report Shifting Shores (35) the likely changes in the Northern Ireland climate include

- Annual temperatures in Northern Ireland are predicted to increase by between 1.5°C and 2°C along the east coast and between 1°C and 2.5°C on the north coast by the 2080s. The greatest warming is likely to occur in the autumn although warming is also expected to be greater in summer than winter.
- Wetter winters and drier summers. There is evidence that our winters have been getting wetter and our summers drier, relative to each other. During this century winter precipitation is likely to increase by up to 20% and summer rainfall to decrease by more than 40%. By the 2080s reductions in soil moisture content of 20% are probable on east and north coasts in the summer.
- Sea level rise of between 85cm and 100 cm likely by 2100.
- Increased frequency of extreme storm surge events/water elevations. The present day 1 in 50 year extreme surges are likely to happen every 1 in 3 years by 2050. By that time the new 1 in 50 year extreme storm events could raise extreme water levels (i.e. flooding levels) by 3-4 metres above today's mean sea level. This has implications for flooding and as such is an issue for a number of government departments.

The report also highlighted the potential impacts on coastal sites from increased erosion and flooding, changes to degradation and even loss of important habitats and wildlife,

increased land instability, roads and paths becoming unstable and risks to settlements

4.2 Impacts on Biodiversity

The SNIFFER report, (page 5) evaluated the implications for a number of sectors and the threats to biodiversity include:

- a change in distribution and species composition of habitats in response to warmer winters
- an increase in the range of invasive non-native species in response to warmer temperatures
- intertidal habitats, salt marshes and mudflats threatened through flooding and erosion
- loss of coastal grazing marsh
- estuarine and river ecology threatened by tidal flooding
- warmer sea temperatures affecting phytoplankton communities – the resulting decline in sand eel populations would adversely affect a wide range of seabirds

A number of studies have modelled and mapped the response of different species and habitats to the projected changes. These include the MONARCH project (Modelling Natural Resource Responses to Climate change)(34) was a seven year phased programme to assess impacts of projected climate change in Britain and Ireland and it has amongst other things examined the potential impacts on 120 UK BAP (Biodiversity Action Plan) species. When MONARCH then examined 32 of those species in greater detail it found that more than 90% (29) showed a substantial change in climate space over the timescale of the scenarios used (up to 2080). Species like the Song Thrush were found to be at risk of almost complete loss of suitable climate space, while other species such as the Lesser Horseshoe Bat, that is close to the northern limits of its range could become much more widespread. Some species may show little change in abundance but a shift in distribution, while others, such as the Tree Sparrow, may show little or no change in climate space.

Similar results have been mapped for birds in "A Climatic Atlas of European Breeding Birds", and for butterflies in "The Climatic Risk Atlas of European Butterflies". These show that as temperatures rise the majority of species will try to move northwards across Europe, but that for some this will not be possible. Changes in land use patterns mean that suitable areas of habitat are now often small and too far apart for sedentary species to travel between them. The impacts will vary depending on the habitat involved.

A report by the National Botanic Gardens in Ireland in November 2007 revealed a fifth of Ireland's native plant life is under threat from climate change with 171 species of flora out of Ireland's 850 species facing possible extinction by 2050, with a further 74 species on the Irish endangered list at risk of being pushed closer to extinction, including the Irish Ladies Tresses orchid, one of 37 UK priority species which occurs in Northern Ireland and Pyramidal bugle, which is protected under the 1985 Wildlife Order.

4.2.1 Marine and coastal

On Rathlin island, significant decreases in breeding success, which in some cases are total failures, have already been observed in seabird populations and similar failures in breeding success have been observed along the islands of the west coast of Scotland. It seems that a major factor in that decline is a decrease in sand eels, which again in turn appears to be the result of climate change and warming waters and reflects the predictions made by the SNIFFER report. However, the potential impact of increased storminess, which can have a negative effect on sea bird survival, may also be a contributing factor.

Shifts in species and habitats within Northern Ireland will vary. The thick toothed topshell (an intertidal mollusc) is shifting northwards along the County Down coast and this may be a response to climate change. However, not all species will be able to respond in this way – the UK Biodiversity Standing Committee suggested that climate change posed a significant risk to between 5-25% of UK BAP species. Whilst the serious implications of this are clear, what is also

clear from the range of this estimate is how difficult it is to predict likely outcomes for species that already are under threat.

Shifting Shores predicted that the Giants Causeway, Northern Ireland's only World Heritage Site and most visited tourist attraction, is likely to experience increased erosion from wetter winters, drier summers and more frequent and longer lasting storms. These conditions will have impacts on the habitats and species of the site including coastal saltmarsh and vegetated shingle and the narrow mouthed whorl snail (the only location for this species in Northern Ireland) which are of European significance.

Shifting Shores also evaluated the potential impact on Murlough, a six thousand year old dune system and one of the largest sand dune complexes in Northern Ireland which contains about 15% of the total UK resource of coastal dune heathland. Murlough was Northern Ireland's first nature reserve, designated in 1967 and is home to 334 species of moth and butterfly, including a significant population of Marsh Fritillary, a butterfly of European importance, which is also protected under the European Habitats Directive of 1992, as well as 326 kinds of plants, 150 species of beetle and 53 breeding bird species. Shifting Shores highlighted the risk of between 50 and 400 metres of existing dune frontage being eroded away by 2100. The loss of so much dune frontage could have a devastating effect on the huge community of flora and fauna in Murlough.

Strangford Lough is Northern Ireland's most protected marine site, for example it is a Special Area of Conservation under the Habitats Directive and Northern Ireland's only Marine Nature Reserve. Shifting Shores predicted that sea level could rise here by up to 25 cm. A 20 cm rise could result in the submergence of 20-30 metres of tidal mud flats, home to the marine grass *Zostera* a vital food source for around 80% of the East Canadian High Arctic population of Light Bellied Brent Geese that come to Strangford each autumn, as well as a host of other wildfowl and waders including shelduck, redshank, dunlin and oystercatcher. The movement of fine sediment from these mudflats into deeper water could have a disastrous effect on the already threatened Horse Mussel (*Modiolus*) community, and the efforts to re-establish it.

Furthermore, in 2005 DEFRA stated sea surface temp increased by 0.5oC from 1871 to 2000 and that waters around the UK have been warming since 1980's with the trend more pronounced in the southern North Sea and Irish Sea than elsewhere (36). It has also been observed by the Sir Alistair Hardy Foundation for Ocean Science that in the NE Atlantic cold water plankton have moved northwards by 10o latitude. Both of these changes could have major impacts on species higher up the food chain, including cod. There also seems to be evidence of a change in the distribution of basking sharks, which seems to be more concentrated around the SW of England and this could be in response to changes in the distribution of plankton, and in turn climate change.

As on land, arrivals of new species have been recorded with an increased North coast presence of blue finned tuna, sunfish, and leather backed turtles. The Red Mullet, a Mediterranean species has reportedly become so common off Ireland's coasts that they are being landed commercially for the first time(32).

Since Northern Ireland lies at the confluence of distributions of southern Lusitanian and Mediterranean species with those of sub arctic species, a warming of sea temperatures could well be signalled by population changes in both groups in our waters.

4.2.2 Upland habitats

The projected changes in precipitation, in particular the decrease in summer rainfall, could also have a negative effect on Ireland's peatlands. By 2075, it is estimated that almost half of

Ireland's peatlands will have gone (32). Many of Ireland's peatlands are ancient, with some dating back to the end of the last ice age, but across Ireland as a whole only approximately 21% of the area of original blanket bog and 9% of the area of original raised bog remains in a state worthy of conservation or of conservation importance and this is a matter of concern.(33) Having already experienced such high rates of loss, any further potential loss of such an ancient habitat so deeply ingrained in Irish history, society and culture and home to rare and unusual plants and animals including the carnivorous sundew and butterwort and the Irish hare, would indeed be a serious matter and a great shame.

The breakdown of the peat will also add to the problem in a different way, through the loss of the carbon stored within it. As it dries out this will oxidize, leading to further release of carbon dioxide into the atmosphere, thereby accelerating the greenhouse effect and acting as another positive feedback mechanism. To put this in context, if all the peat in the UK were lost it would be the equivalent of the total UK Carbon emissions over 35 years.

The effects of climate change will also be catastrophic for the small remnant populations of montane plants, already clinging on at the tops of our mountains. These would include the Parsley fern (*Cryptogramma crispa*) and Mountain Saw-wort (*Saussurea alpina*) in the Mourne, and Purple saxifrage (*Saxifraga oppositifolia*) on Benevenagh. Already at the tops of the mountains these plants would have nowhere to go and would become extinct.

4.2.3 Freshwater Habitats

The reduction in summer rainfall and rise in temperatures have serious implications for freshwater habitats, with river flows reduced, lower oxygen levels, and the drying out of many ephemeral wetlands. These latter habitats are of critical importance to our two species of amphibian, the frog and the smooth newt, which are already under pressure from habitat loss due to land drainage and pollution.

According to Hickey(32) a list of Ireland's seven most critically endangered creatures has been drawn up and at the top of the list is the Atlantic salmon, another species protected under the EU Habitats Directive. Indeed a 2007 report by the UK to the European Commission produced as part of the reporting process of Article 17 of the Habitats Directive described the prospects for salmon as 'poor'. The Atlantic salmon faces a number of threats including overfishing and fish farming and inappropriately low water quality but it appears that an additional factor affecting Atlantic salmon is climate change. Warming in rivers is an additional stress on salmon and also means salmon are tending to leave rivers for the sea earlier, leaving them out of synch with the peak abundance of their food.

Indeed, since, according to Hickey (32), four of the other seven most critically endangered species, namely the Freshwater Pearl Mussel, the Nore Pearl Mussel, the Twaite Shad and the Pollan are also freshwater species, the quality of our lakes and rivers needs to be a higher priority than at present. Unfortunately however, the percentage of rivers achieving good biological quality in 2006 was lower in Northern Ireland (54%) than England (71%), Scotland (88%) or Wales (82%)(40). For rivers In England, Scotland and Wales the percentage achieving good biological quality had risen since 2000, whereas in Northern Ireland the level had fallen, from 61% in 2000 to 54% in 2006. While the monitoring network in Northern Ireland expanded since 2000, this performance in terms of water quality is poor and is unlikely to help our freshwater species. It is a matter of concern that this already poor level of water quality is likely to be exacerbated by climate change in a number of ways including lower flows (mainly in summer), lower water quality due to lower oxygen levels, algal blooms, increased rainfall (mainly in winter) causing erosion of soil and leaching of agrichemical and agricultural wastes, storms causing more combined sewer overflows, higher evaporation and risks from invasive species.

In light of the aims and requirements of the Water Framework Directive (WFD), to achieve good quality status in our freshwater by 2015, but also the requirements of the Habitats Directive to protect habitats and species designated as Special Areas of Conservation, and because of the overall importance of our freshwater bodies for Ireland's plants and animals, it is clear that a much higher standard of water quality is needed across the island. The need for improvement was further demonstrated by the admission by the NI Environment Agency that more than 200 of Northern Ireland's rivers are defined as "polluted beyond acceptable levels" and that 66 rivers also failed to meet the quality criteria outlined under the EC Freshwater Fish Directive with regards to supporting fish life.(41)

It is CNCC's hope that in addition to full compliance with the WFD, significant improvements in the quality of Northern Ireland's entire freshwater system will be achieved and as a matter of urgency.

4.2.4 Woodlands

Climate change will have consequences for our woodlands, affecting both semi-natural and man-made habitats. The decrease in summer rainfall will put many trees under water stress as soils dry out, while increased storminess will lead to more wind damage in the winters. A study of Dartmoor suggests that western sessile oakwoods could disappear from South West England by the end of the century, with the consequent loss of a huge associated flora and fauna, from mosses and liverworts to Pied Flycatchers.

4.2.5 Agricultural Land

Changes in climate will inevitably lead to changes in agriculture, with a probable shift from grass-based livestock systems to more arable production. This will have inevitable consequences for wildlife since agriculture is the dominant land use across most of Northern Ireland, and forms the main barrier to the movement of species from one patch of habitat to another.

Any drop in summer rainfall could also have an impact on agricultural production. According to Sweeney et al, the predicted decrease in summer rainfall may no longer suit the growing of potatoes, and as a result "It is likely that potatoes will no longer be a commercially viable crop over much of Ireland".(8) Evidence for a change in potato growing was provided by Hickey (32) who stated that in 2001, perhaps 15% of Ireland's potato crop was being irrigated. Eventually more of the potato crop may be replaced by maize, which is likely to become a dominant crop while soybeans may also become a marginal specialist crop(8). Agriculture may change in other ways. For example, increased warming as well as increased storminess could have a negative impact on the Orchard County's most famous agricultural product, as apples need a certain amount of cold to complete their development.

4.2.6 Migratory species

Wildfowl and waders migrate to and from breeding areas in arctic and subarctic regions, overwintering in Northern Ireland. Terns, hirundines and other species like cuckoo move north into Northern Ireland from sub-Saharan Africa in order to breed here. Shifts in weather patterns could impact on the energy balance of migration patterns, for example an increase in frequency of headwinds due to shifts in the tracks of weather systems. Changes in weather in northern breeding areas could impact on breeding ecology – for example it has been suggested that breeding of light bellied brent geese may suffer from incursions of normally more southerly breeding birds, causing increased competition for limited food resources, and predation from hitherto unfamiliar predators. For the brent, already breeding in Canada's most northerly islands, there is literally nowhere to go further north. To the south, expansion of the Sahara could

threaten survival of swallows, house martin and various species of warbler coming to Northern Ireland to breed, by expanding the distance of hostile terrain they are required to cross.

With 2oC of warming there is also a risk that almost 20,000 dunlin, which come to Northern Ireland's shores in large numbers from October to March, could lose almost half of their Arctic breeding grounds over the next 20 years. If climate change continues at current levels, the earth will have warmed by 2oC (3.6 degrees F) above pre-industrial levels (c. 1750) some time between 2026 and 2060, leading to the loss of summer sea ice as well as important habitats for its wildlife.(37)

4.2.7 Invasive species

Finally, the major threat to native habitats and species from invasive alien species must always be guarded against as far as possible. With a warming Irish climate the situation is even more pressing as many may thrive better in such conditions. Co-ordination between both administrations on the island of Ireland is essential – for example, the arrival of zebra mussels in Northern Ireland was probably of animals that had bred in waterways south of the border. By contrast, the arrival of *Sargassum muticum* in Strangford Lough is thought to have been due to importation of seed oysters. Policies and practices, especially at ports and airports should be aimed at complete prevention. However, this may not always work, and there need to be well resourced fall-back procedures to eliminate certain aliens before they have a chance to become established on a widespread basis, when, experience has shown from the above examples, they are almost impossible to eliminate.

In some cases, little or nothing can be done to prevent certain alien species expanding their range to include the island of Ireland. For example, the Little Egret, common in the Mediterranean and Africa has become a breeding resident along the south coast of Ireland (7) and has made its way to the shores of Strangford Lough.

4.3 Adapting to climate change

In the course of developing the UK Biodiversity Strategy and the subsequent England Biodiversity Strategy, the Department of the Environment, Food and Rural Affairs (DEFRA) has developed a set of principles to guide the process of adaptation to climate change. These principles are fundamental to conserving biodiversity, and while many of their elements are not new, they demand a new impetus with the pressures and threats presented by a rapidly changing climate. CNCC believes that these principles need to be adopted here in Northern Ireland to guide our approach to adaptation.

The five main principles are :-

1. Take practical action now. We cannot wait to gather every last piece of evidence that change is taking place, but need to move with greater urgency to

- Conserve our existing biodiversity
- Conserve our protected areas and all other high quality habitats as the current biodiversity hotspots. We must press forward with our programme of designating Areas of Special Scientific Interest (ASSIs) which is now 15 years behind schedule. It is planned to complete the network of approximately 400 sites by 2016, but this target is under pressure as more resources are required to monitor and manage the sites already designated. In spite of this there are concerns about the condition of many of our ASSIs, as highlighted in the recent NIEA Assessment completed in 2008, which showed that overall 31% of the features for which sites had been designated were in unfavourable

condition. This overall figure masked some habitats, such as freshwater and woodland, for which the figures were very much worse.

- Reduce sources of harm not linked to climate change. Species and habitats faced with other threats, such as pollution, fragmentation, or invasion by alien species will be much more vulnerable to the effects of climate change. Implementing the Water Framework Directive is a good example of how this might be achieved for freshwater habitats.
- Use existing biodiversity legislation and international agreements. We have a considerable body of legislation to protect our biodiversity, and we need to use it more effectively. The recent review of the Wildlife Order should provide a major step in the right direction, with a number of loopholes being closed and outstanding issues addressed. CNCC remain concerned about both the level of fines and sentences that are imposed for "wildlife crime" and the perception of the seriousness of such offences in the eyes of the judiciary.

2. Maintain and increase ecological resistance.

- Conserve the range and ecological variability of habitats and species. It is vital to maintain the diversity, in terms of physical features, of our ecosystems. This will often involve active management through grazing, cutting of vegetation, removal of unwanted species, and control of water levels. Mechanisms such as agri-environment schemes must be used to effect this management on land that is not owned or managed by the government or conservation NGOs.
- Maintain existing ecological networks. Northern Ireland has a highly fragmented biodiversity resource. Much of the landscape is now intensively farmed with impoverished biodiversity. Wildlife corridors like good quality hedgerows, strips of woodland, naturally structured rivers and streams, are now a scarce commodity, but can provide a vital lifeline for species. Where we have areas of quality habitat like blanket bogs, these are already occupying the only areas that are suitable for them, though reversal of inappropriate forestry policies may help to some extent. The situation is similar for marine habitats and species – there are few areas of the Irish sea or along the north coast that have not been adversely impacted by fishing activity, but the contiguous nature of the marine environment is such that at least for those species producing dispersing planktonic larvae there are opportunities for transfer. As on land however, many species both dependent on certain habitats, or keystone species for habitats, may lack this ability.
- Create buffer zones round high quality habitats. One of the problems of our ASSI legislation is that only areas that are of exceptional scientific interest can be designated, so that the boundaries of such sites are vulnerable to pressures from outside sources. It is important that we seek methods of creating buffer zones around our most important sites, if necessary by acquisition of more land. This has been achieved in a few cases, such as around the Giant's Causeway World Heritage Site, where the National Trust has followed a long term acquisition policy for both coastal land and the immediate hinterland.
- Take prompt action to control the spread of invasive species. The major threat to native habitats and species from invasive alien species must always be guarded against as far as possible. With a warming Irish climate the situation is even more pressing as many may thrive better in such conditions. Co-ordination between both administrations on the island of Ireland is essential – for example, the arrival of Zebra mussels in Northern Ireland was probably of animals that had bred in waterways south of the border. By contrast, the arrival of *Sargassum muticum* in Strangford Lough is thought to have been due to importation of seed oysters. Policies and practices, especially at ports and airports should be aimed at complete prevention. However, this may not always work, and there

need to be well resourced fall-back procedures to eliminate certain aliens before they have a chance to become established on a widespread basis, when, experience has shown from the above examples, they are almost impossible to eliminate. In some cases, little or nothing can be done to prevent certain alien species expanding their range to include the island of Ireland. For example, the Little Egret, common in the Mediterranean and Africa, has already become a breeding resident along the south coast of Ireland (7) and has made its way to the shores of Strangford Lough.

3. Accommodate change. Conservation is essentially the management of change, and the pressures of climatic change bring this into a sharper focus. As populations change and move they will interact in different and novel ways with other species and habitats. We must :-

- Understand that change is inevitable. Habitats have never been static, and we need to find ways to work with the process of change rather than always trying to hold it back.
- Make space for the natural development of rivers and coasts. As sea levels rise many coastal habitats such as salt marsh or mudflat will become squeezed up against the shoreline, which is generally controlled and protected by man. Unless we are prepared to make room for these habitats by abandoning what we have considered to be "dry land" they will disappear. There is an urgent need to survey the coastline of Northern Ireland to identify where we can make this space in the process known as "managed retreat". CNCC would recommend that a pilot study is commenced immediately to create a plan for how sea level rise is managed around the shores of Strangford Lough, where a wide range of coastal habitats occur, most of them designated as National Nature Reserve or ASSI, as well as a wide range of human activities, ranging from intensive agriculture to aviation. This process could then be extended to the rest of the coastline.
- Establish ecological networks through habitat restoration and creation. Species and habitats vary enormously in their abilities to adjust to climate changes. Mobile species like insects and birds have already demonstrated their capacity to move, and 'jump' over unsuitable terrain, but successful re-establishment in new areas is still often dependent on the ability to find new suitable habitat - if it exists. Other groups, for example terrestrial molluscs, slow propagating plants like orchids and habitats like woodlands, are unlikely to be able to adjust in the timescales available unless given a 'helping hand'. The creation of wildlife corridors linking existing patches of habitat is one way of achieving this. Such corridors would include well managed hedgerows, woodland strips connecting areas of mature/ancient woodland, and interconnecting wetlands and water bodies to allow populations to migrate slowly, provided the management of such features is consistent over a long timescale. To achieve this, it is vital that planning, site designation, and agricultural policies are reviewed to accommodate this need. This landscape scale conservation work is being looked at by a wide range of bodies in Northern Ireland but requires strategic direction and well directed funding policies.
- Species translocation and ex-situ conservation. . While translocation should only be considered as a last resort because of feasibility, appropriateness and resource implications, it may, nonetheless be an option in certain cases where the source population is doomed in some way, for example complete loss of habitat from climatic causes or from development.
- Respond to changing conservation priorities. We need to recognise that we will be working with a potentially different community of species and habitats in our management of Northern Ireland's environment. Any new arrivals will most likely migrate from the Republic of Ireland, but could come from Britain, continental Europe, and in the marine environment from anywhere on the western waters of Europe or even further afield. We will need to identify susceptible areas and review their management regimes,

which may include accepting that the conservation value may decline, which in turn could necessitate putting possible additional resources into other areas.

4. Integrate action across partners and sectors. Biodiversity and natural ecosystems are generally undervalued when economic models are used to assess competing uses for land and resources, in spite of growing evidence of their importance in providing critical services such as clean water, carbon storage and flood relief. The scale of adaptation to climate change that is required is so large that it is vital to integrate conservation with economic activities rather than see them in constant competition. This requires us to :-

- Integrate adaptation and mitigation measures. Biodiversity can play an important role in carbon capture and storage, in peatland and woodland for example.
- Integrate policy and practice across relevant economic sectors. Adaptation measures can provide many wider benefits for society and it is important that these linkages are recognised and built on. Funding and delivery of adaptation is too great a burden for conservation organisations on their own, and it is essential that other beneficiaries, such as health services and water management bodies, become involved in effective delivery.
- Build and strengthen partnerships. The scale of adaptation and ecosystem conservation means that progress is dependent on large numbers of stakeholders, from individuals and communities to businesses and government bodies. While creating and maintaining partnerships can be time-consuming and create problems, adaptation strategies will only be successful if all relevant parties are involved and committed from the start. We are fortunate in Northern Ireland that our conservation bodies have a long history of working together, but this requires new approaches to joint working with partners that have not been considered previously. In addition we have a poor record of Government Departments working together which needs to be addressed if we are to make progress.
- Raise awareness of the benefits of the natural environment to society. The campaign to raise awareness, "Biodiversity – its in our Nature" ran in 2006-7, and succeeded in raising awareness levels about biodiversity with a series of events and extensive media coverage. However spontaneous awareness and understanding of biodiversity still remains low in the general population, and a continued effort is required. In particular it appears that there is little or no appreciation of the relationship between climate change and biodiversity, and the need for adaptation. This problem should be addressed in conjunction with messages about the environmental services provided by natural ecosystems.

5. Develop knowledge and plan strategically.

While considerable uncertainty remains about the effects and consequences of climate change we do have enough information to predict the general trends and the responses of many species. Using this information we can plan for the future and develop strategies to minimise the effects of climate change on our biodiversity. At the same time it is important to continue research and modelling of both our climate and its impact on our natural ecosystems so that we can continuously improve our adaptation measures. Specific actions would include:-

- Assessment of the vulnerability of different species. Some work has been done through the Monarch project and other work, and this approach can be built on to develop priorities for action.
- Piloting of new approaches. Assessments need to be made of different approaches, particularly when developing large-scale measures to link small patches of habitat to provide corridors for movement and spread of populations. There is work of this sort

going on across Britain and Europe that we can draw on, without having to repeat it for Northern Ireland, though it may be necessary to seek some purely local solutions.

- Identify the win-win solutions. These are measures that either deliver several adaptation measures at once and/or bring other social and economic benefits. Success with this sort of approach is likely to lead to further opportunities for cross-sectoral working.
- Improve the understanding of the role of biodiversity in providing ecosystem services. Support for adaptation will be greatly enhanced if a wide range of people and bodies are more aware of the very real benefits of maintaining biological diversity. There is an urgent need to look at ways of realistically valuing the economic contribution made by ecosystems to human wellbeing and prosperity.

4.4 How Northern Ireland's biodiversity can mitigate climate change and its effects

Careful management of biodiversity, permeating all aspects of our environment and fundamental to all aspects of social and economic development, has considerable potential to mitigate climate change. Conversely, misuse of biodiversity has the potential to make climate change more severe by releasing extra CO₂ and methane into the atmosphere at a time when we should be reducing it. In Northern Ireland there are several aspects of biodiversity that are relevant to this, both in terms of mitigation and adaptation.

Certain habitats can act as carbon sinks, for example, woodlands and particularly peatlands (both blanket and raised bogs) have considerable potential to lock atmospheric carbon, though in both cases, this only offers benefits in the long term. However, it should be stressed that extraction of peat for fuel and horticultural purposes releases carbon and methane very rapidly. This is a matter of concern especially as methane is 21 times more effective as a greenhouse gas than carbon dioxide i.e. 1 tonne of methane has the same warming effect as 21 tonnes of CO₂. It should also be stressed that while retaining Northern Ireland's peatlands is beneficial to Northern Ireland's environment, in global terms of climate change and biodiversity, we must ensure that the problem is not displaced to other countries by the replacement of Irish sourced peat with supplies of peat imported from other countries. The virtually pristine peatlands of Russia, Finland, Lithuania and other eastern European countries are now either facing the threat of exploitation for peat and/or are already being exploited for consumption by the horticultural market. This consumption needs to stop.

Peatlands and other wetlands, wet grasslands on floodplains, interdrumlin hollows, and willow carr all have the capacity to retain water, like a sponge. In addition to supporting rich biodiversity, both distinctive and important plant species notably in peatlands and other wetlands, breeding birds (eg waders in lowland wet grasslands), these habitats also regulate water flow. These habitats can not only hold back waters and slow down run-off in periods of excessive rain thereby reducing the impacts of or even potentially preventing flooding, and also act as a source of water to downstream habitats and species in times of drought. Such a function is likely to be of considerable, though unrecognised, economic value.

With some sections of low-lying coast becoming increasingly susceptible to storm events, the conservation of saltmarshes and low-lying marginal farmland can dramatically dampen the effects of severe wave action and in cases of very low-lying areas either eliminate or reduce the need for expensive sea defences. Allowing erosion to take place in other areas, providing a supply of sediments to biodiversity-rich habitats like dune systems and soft cliff areas can all conserve important species whilst stabilizing soft coasts.

4.5 Actions to safeguard Northern Ireland's biodiversity in relation to climate change

It is important to recognise that, given the predictions of inevitable further climate change, some species and habitats may eventually find life impossible in Northern Ireland. This will be mainly due to direct changes in climate but also could be due to competition from new species that become established here. This is an added worry given the existing threats to and pressures on our biodiversity. The process of designating Northern Ireland's ASSIs (Areas of Special Scientific Interest) is already 15 years behind schedule. The previous target, referred to as Target 2001, to complete ASSI designation of approx 400 sites by 2001 was not met. The most recent target is now to complete the ASSI designation process by 2016. Better monitoring and management of ASSIs and other protected areas is essential in a changing climate.

The State of the Environment (SoE) report (29) gives other grounds for concern. For example, of the 271 Northern Ireland priority species in 2004 over 50% were classed as declining (page 118). Only 2 out of the 88 UK priority species occurring in Northern Ireland and reported on as part of UK BAP were increasing. For 58 species there were insufficient data to report on changes and of the remaining, 7 were considered lost from Northern Ireland. Even our most important wildlife sites, for example, those with European designations such as the Special Areas of Conservation (SACs) designated under the EU Habitats Directive, suffered. The SoE report also outlined (page 114) how less than 30% of SAC features were in favourable condition. This level of performance where only 2 out of 88 species are increasing and so many of our protected areas are not in favourable condition can not be acceptable and places Northern Ireland's biodiversity at even greater risk from threats including climate change. This unfortunate trend must be halted and reversed.

In adapting to climate change we will need to identify susceptible areas and review their management regime, which may include accepting that the conservation value may decline, which in turn could necessitate putting possible additional resources into other areas. However it is also likely that a very wide range of species and habitats in Northern Ireland will continue to survive and even flourish in a warming regime. Three major issues therefore remain:

- To conserve and enhance those native species and habitats that are threatened by climate change
- To account for a potentially different community of species and habitats in our management of Northern Ireland's environment. Any new arrivals will most likely migrate from the Republic of Ireland, but could come from Britain, continental Europe, and in the marine environment from anywhere on the western waters of Europe or even further afield.
- To control invasive, alien species as these can threaten existing native habitats and species. Some alien species are already present in Northern Ireland and could expand in a new climate regime, while others have an increased potential to thrive if they enter.

Northern Ireland has a highly fragmented biodiversity resource. Much of the landscape is now intensively farmed with impoverished biodiversity. Wildlife corridors like good quality hedgerows, strips of woodland, naturally structured rivers and streams, are now a scarce commodity, but can provide a vital lifeline for species. Where we have areas of quality habitat like blanket bogs, these are already occupying the only areas that are suitable for them, though reversal of inappropriate forestry policies may help to some extent. The situation is similar for marine habitats and species – there are few areas of the Irish sea or along the north coast that have not been adversely impacted by fishing activity, but the contiguous nature of the marine environment is such that at least for those species producing widely dispersing planktonic larvae there are opportunities for transfer. As on land however, many species both dependent on certain habitats, or keystone species for habitats, may lack this ability.

4.6 Other economic and social implications of climate change

The threat to the planet and to people is stark. Seven years ago the World Health Organisation calculated 150,000 people die every year as a direct result of climate change. The area of the world stricken by drought has doubled from 15% to 30% between 1970 and the early 2000s(42). An estimated 25 million people (roughly equal to the combined population of London, New York and Tokyo) are displaced by environmental causes, more than double the 12 million political refugees (43).

The European heatwave of 2003 caused an estimated 40,000 premature deaths and cost \$13.5 billion. Based on evidence from ice cores and tree rings, the summer of 2003 was probably the hottest in Europe for 500 years and it is likely (confidence level >90%) that human influence has at least doubled the risk of a heatwave exceeding 2003 threshold magnitude. Worryingly, the likelihood of such events were predicted to increase 100 fold over the next four decades, with the result that by 2040 more than half of years would be warmer than 2003(44)

A changing climate also has implications for our economy, both in terms of businesses and householders. According to the WWF Report "Stormy Europe", the UK would be likely to see the most drastic increase in storm activity if CO2 emissions rise unabated. 3 out of 4 models show the number of severe storms would likely increase by up to 25% by the end of the century representing an increase of up to nearly 10 more storms over the 30 year period 2071-2100. This is of particular concern in terms of insurance losses because winter storms are the cause of nearly 70% of all insured losses in Europe, costing an average of over €2 billion in financial losses a year (Munich Re 2000: Climate Risk Management Ltd., 2005). Projections from the UK alone from the Association of British Insurers suggest that by 2050 the annual cost of weather claims will double to €3.3 billion while an extreme year might cost €20 billion.

According to the Stern review (10) the costs action, reducing GHGs to avoid the worst impacts of climate change are between 1% and 2% of global GDP, whereas

"the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year now and forever. If a wider range of risks and impacts is taken into account the estimates of damage could rise to 20% of GDP or more."

5. Conclusions and Recommendations

Accounting for the potentially catastrophic risks for the global economy and for people and wildlife, in Northern Ireland and further afield, from inaction as well as the very positive economic, health and general environmental opportunities that greater investment in green technologies and subsequent emissions reductions offers, it CNCC's view that action to tackle climate change must be a priority for the Northern Ireland administration and that this issue must be tackled on an integrated, collaborative cross departmental basis.

The scale of the threat from climate change is enormous, as was outlined by the former Environment Minister Arlene Foster who said, in introducing the legislative consent motion for the UK Climate Change bill in the Assembly on Monday 10th December 2007

"it is now accepted that climate change is the greatest environmental challenge faced by the world today."

and

"The UK Government, and each of the devolved administrations, are committed to tackling the issue, because we in Northern Ireland must play our part."

A motion was passed by the Assembly on 2nd October 2007 recognising the need to integrate climate change and sustainable development policies in

"all relevant areas of government"(45).

However, there appears to be very little evidence that the Executive has thus far ensured that environmental commitments on sustainable development and tackling climate change are mainstreamed in the Programme for Government.

CNCC therefore urges the Northern Ireland Administration to review its policies in order to ensure that Northern Ireland fully plays its part in tackling climate change by :-

1. Mitigation

- decarbonising Northern Ireland's energy supply
- reviewing the energy distribution system to ensure a greater degree of decentralised and renewable energy production
- increasing inward investment in alternative low and/or zero carbon technologies to create Northern Ireland based green jobs
- reducing Northern Ireland's consumption of fossil fuels while also increasing the generation of energy from renewable sources thereby reducing Northern Ireland's energy bill while also increasing Northern Ireland's degree of energy security and
- ensuring climate change and sustainable development policies are integrated in and across "all relevant areas of government".

2. Adaptation

- Taking practical action now to conserve our biodiversity
- Maintaining and increasing ecological resilience
- Accommodating change which is inevitable
- Integrating adaptation action across partners and sectors
- Developing our knowledge and planning strategically.

Malachy Campbell CNCC January 2009

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sustainable development and tackling climate change are mainstreamed in the Programme for Government."

CTS Projects Ltd



Alex McGarel
Clerk to CoE
Environment Committee Office
Room 245
Parliament Buildings
Stormont
BT4 3XX

26th February 2009

Dear Sirs,

**NORTHERN IRELAND ASSEMBLY ENVIRONMENT COMMITTEE INQUIRY INTO
CLIMATE CHANGE**

We wish to thank the Committee for including our organisation on the list of consultees for this important inquiry into Climate Change. We view Climate Change as the biggest challenge that will impact business, political and social issues over the 21st century. Our business involves providing sustainable solutions to the construction sector although my personal knowledge on this subject goes beyond through a degree directly related.

Climate Change is a misunderstood word. The climate of this planet has changed many times over the history of the earth. We have experienced Ice Ages and Warm Periods along with inter-glacial periods. These cycles in the climate have been analysed by leading world scientists through dendro-chronology and ice core samples. From this it has been found that there are three main variables that affect the climate on earth; the eccentricity (orbit shape around sun), obliquity (Axis tilt i.e. 23.5 degrees) and the Axial rotation. Each one of these has a different cycle time frame which means that at certain periods in time when all three variables meet we can have an Ice-Age. In this century we are witnessing some Climate Change due to these Milankovitch Cycles. There is nothing that we as humans or especially in Northern Ireland we can do to prevent these cycles, however the impact of CO2 must be taken into consideration.

Since the Industrial Revolution we have savaged the earth of its natural resources without a thought as to its impact. The burning of oil, coal, gas and nuclear fuels is a fuel that is not replenishing as we use it. It also has emitted large amounts of CO2 into the atmosphere which Scientists have proven to be accelerating the impact of Climate Change from the Milankovitch



the two airports of Northern Ireland in terms of containers and all imports

7. Incentivise farmers for Farm Diversification to the Bio-Fuel sector and also the production of Bio-Gas from Anaerobic Digestion from on-farm effluent

Long Term

1. Form an all-Ireland forum for reducing Co2 through cooperation (ecosystems do not stop at international borders)
 - a. Geography of Ireland and Climate Change are all inclusive
 - b. Marine life of Ireland is all inclusive
 - c. We share a sea with the UK – East West axis is also important
2. Improve and extend the rail network, including the electrification of lines and a high speed intercity rail network across the island
3. Place Northern Ireland in a Carbon Credit position so as to enable the region to trade Carbon Reduction on the EU Emission Trading Scheme up to 2020. This could bring huge revenues to the Regional Assembly for direct investment in NI.
4. Attract key international partner businesses to the northern hub of Ireland by offering them the opportunity to be based in a Carbon Neutral and Sustainable Environment helping them promote their image worldwide.
5. Re-invent the agricultural and land use of Northern Ireland to promote a more sustainable and economic prosperous industry through the implementation of new micro industries on the land and diversification towards new farming methods, co-ops, new crops and new machines.



Cycles. Therefore it is right that when the Committee look at this inquiry that they target CO2 to help alleviate the impact of Climate Change.

We are reaching levels of CO2 that is unprecedented in the history of the tree-rings or ice core samples previously mentioned. Therefore we are at a cross roads of uncertainty. We know we cannot stop Climate Change, but we have the power through tough economic, social, political and environmental decisions to alleviate the problems that will derive from the increase in CO2. We hope that some of our comments in the paragraphs below will give some thoughts on the future direction that the DOE can go into alleviating the effects of CO2 increases and prevent Climate Change refugees from Northern Ireland.

To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets

Northern Ireland Assembly must pass secondary legislation that encompasses the Climate Change Act from the UK and also The Carbon Emissions Reduction Target 2008-2011 paper. It is important to set core goals such as 3% reduction in CO2 pr year to 2050. This should be calculated from all buildings and industries currently through the effective use of Energy Performance Certificates (EPC's – DFP remit). From transport our bus services, trains and airports should be instructed to calculate their CO2 footprint. Calculations can be gathered from all sectors on the CO2 and then a 3% target reduction from each sector set per year. Every year in April the Finance Minister should publish the Green Budget for Northern Ireland detailing how each sector is performing in this target. This could be used as a good unique selling tool to attract global companies to Northern Ireland.

There should be a commitment to rebrand and expand the current Energy and Climate Change Committee at Stormont to include the following:

Stormont Sustainability Committee

- Address NI public on how to be more sustainable
- Set goals and standards for NI departments (link to EU targets and future International targets)
- Advise and scrutinise NIO, Govt Depts, and general public
- Advertise the need and cost effectiveness of reducing CO2



To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

Within Energy it is important that we pursue the use of Renewables and make Northern Ireland a World Leader. In Northern Ireland currently 4% of electric comes from Renewables and even less for heat from Renewables. In Sweden the Government has already exceeded its 40% European target of energy from Renewables – currently stands at 44%. The GDP of Sweden has continued to grow and has not cost the 1% GDP that the Stern Review mentions. We must have Invest NI help indigenous firms to promote and manufacture renewable energy technologies. We must see that our main centralised backbone for our electricity generation becomes Renewables, more large scale wind farms and the oil and gas plants changed to Biomass and other forms of non-fossil fuelled power stations.

Our transport network needs to be changed in Belfast and our other cities to electricity. We need a Belfast Rapid Transport network invested in for the future. We need to ensure that our train services and lines connect the surrounding towns of the main urban areas such as they did in years gone by. This will involved new train lines and the re-opening of old ones. These must be high speed trains and not the old smoke bumpy rides of years ago. Let's look at Japan for ideas on this. Translink needs to look at providing smaller buses in the rural areas at more frequent intervals rather than large double-deckers such as that in Killeel with a handful of people on them due to the time to navigate un-passable roads for such large vehicles.

Agriculture needs more innovation. We need to see higher costs on food imports to promote local products being consumed locally. This will reduce the CO2 food miles. Every label coming into Northern Ireland should contain a CO2 rating based on its origin and methods of farming. This allows the consumer to make a choice. Agriculture too has a key place to play in terms of our energy future. There is ground that could be used for Bio fuels such as Willow trees and Eucalyptus trees for Wood Pellet and Wood Chip production. Also other crops as on test at Loughry can provide oil equivalents and generate some export industries. The Report by the DARD Committee touches on most of these. We need to look at Bio-Gas production to pump into our gas network also.

Businesses should be encouraged to develop new products and innovations that can decrease our imports of fossil fuels and materials from long



distances. AN example of this would be our own need for finance to develop Northern Ireland's first Biomass Boiler manufacturer which would decrease imports of other Biomass Boilers, oil and gas. Businesses should also be given tax incentives for using renewable energy for electricity from Airtricity or other such players in that market. The proposed Heat ROCS and Electric ROCS should apply to businesses.

The Public Sector must lead by example, key points below:

Assembly of Northern Ireland Departments

OFMDEU

- Sustainable Development Policy (First Steps – P. Hain May 2006) This document needs to be used to scrutinise and measure against performance – it should be developed in line with the Sustainability Committee in Stormont and also the DFP Minister Green Budget

DARD

- We need to have farm diversification (perhaps grants to biomass production or cottage industries – re-use of old derelict mushroom houses for Pellet Production)
- Food needs to move to low mileage. Farm markets, co-ops in towns and education on the old techniques on growing vegetables in your own garden.
- The countryside management strategy needs to be implemented, with support and financial incentives to farmers to stay as our custodians of our countryside. More trees needs to be planted along with the use of the mountains more sustainably through farm diversification.

DCAL

- Waterways & Fisheries (inland) - The waterways of Ireland need to be opened up again and used for eco-tourism as around the Shannon. Lough Neagh is perfect for eco-tourism if controlled as well as inland fishing
- Architecture & Built Environment - DCAL need to be involved here to guide new architectural historic buildings. It is not sustainable to knock everything down and rebuild these impacts on CO2 wastage.

DE

- Children being educated in Sustainability - This is where it all starts. Sustainability needs to be part of the curriculum and recycling in



schools mandatory though the reasons must be taught if we are to avoid the damages of higher CO2

DEL

- Creating jobs local - One of the key points to sustainability is the creation of local jobs. It goes back to the whole ethos of acting local, thinking global. If we can live and work in the one area we reduce transport costs and improve work-life balances. This saves CO2 and alleviates Climate Change.

DEI

- Energy, Economic - This is a big issue as discussed previously. We need to reduce our energy consumption; Renewables need to be pushed harder into the mainstream

DoE

- Planning, Climate Change, Waste, Water, NIEA, PPS21 - Planning Policy Statement 21 and 18 need to be harmonised - we need aspect (house orientation) and tree cover at centre stage (south facing and window sizing) The waste hierarchy needs looked at in terms of reducing waste at the manufacturing stage to lower CO2 on sites. Water needs to be captured locally and distributed in estates locally - big area and is almost a policy on its own, this too will reduce the CO2 needed to move water through mains pipes across many miles.

DfP

- Building Regulations, Rates, Funding (EU, GB), Construction Building - Regulations need to be more proactive. There is a need to reduce the SAP rating in line with the Code for Sustainable Homes to have the highest energy performing buildings now. Rates are a good way of incentivising people. We should move to a Carbon Rating system asap - EPC's are the database to do this. We must not have the DfP Civil Servants persuading a minister to back down from the mandatory Renewables again as in April 2008. We are now left behind as in the rest of the UK the Planning System adopted Mandatory Renewables and in the Republic of Ireland the Building Regulations did so in July 2008.

DRD



- Public transport network, infrastructure, water & sewage, airports, seaports Public Transport needs increased to include inter-city fast connectors. We need to move our buses to electric as in Sweden. We could even have urban trains running on bio gas from animal waste
- Our water rates need to be introduced but the tax payer needs to know it's to improve our carbon emissions and CO2 so as we do not pay lump fines in later years. Sewage must all be treated before being passed into the system. There is technologies now were sewage can be adequately cleaned to be returned to allotments for organic vegetables. England has a plant operational.

DSD

- NIHE, HA (NIFHA), Warm Homes (Fuel Poverty), Urban Regeneration, Housing, travellers – Cosy Homes grants must allow Renewables to reduce CO2. Housing Associations should be encouraged to get higher Code Levels (CISH – DEFRA)
- Warm homes must allow Renewables but set targets and a sliding scale for the % improvement in Energy Efficiency i.e. 15% in year 1, 20% in year 2 and 25% in year 3
- NIHE must remove their gas policy, then oil and promote more Renewables (cost effective if it was open tender instead of EGAN form of contract)

To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved

The costs will be Social, Environmental and Economical if these targets and route maps are not out in place. Therefore it is important that all three are used as cost identifiers. Within a charity that I am a Board Member of, www.8020recycling.org we measure our CO2. This social enterprise is where we need all of the economy to go and the Green Budget.

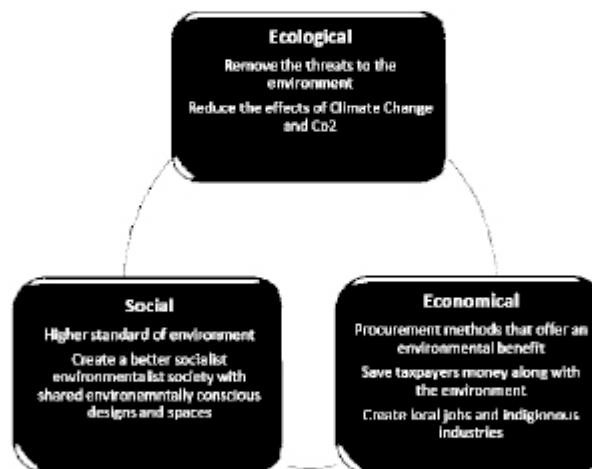
The Stern Review mentions 20% of world GDP will be the cost if we do not alleviate Climate Change. I beg to differ in that the Social costs to the way of life have not been measured. The amount of Climate Refugees is not taken into the equation. The depletion of Oxygen in the atmosphere has not been accounted for.

There is no cost to high to change our way of life to meet our continued existence.



To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change/CO2 emissions (Akin to Regulatory Impact Assessments/Rural Proofing)

The CO2 Costing Mechanism must take the Social, Economical and Environmental costs. We must look long term in what we procure. An example of failure to take all three costs into consideration is the current Warm Homes Procurement.



To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan

Please see above responses.

To ensure recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for



Government that will ensure Northern Ireland will meet its climate change obligations

Please see above under the section about the departments in the Northern Ireland Government and the need for a Green Budget

I hope that this short response has given the Environment Committee some considerations in this difficult inquiry. We remain available to provide any further comments or representations.

Yours faithfully

Mr Connaire McGreevy
Director



ANNEX – GOALS AND AIMS

Immediate Term

1. Introduce Green Rebates for all houses that have Low-Zero Carbon Technologies (LZC)
2. Set-up a Committee (or rebrand and give new remit to existing) on Energy and Climate Change
3. Insist that all homes being bought from private developers for social homes meet the DSD commitment to Code Level 3 (Code for Sustainable Homes – a Code assessment could be carried out)
4. Link PPS 18 & PPS 21 (PPS 14) to Building Regulations in terms of the Planning Service insisting on south facing aspects with large windows and small windows to the north to maximise solar passive gain which will help the SAP and SBEM ratings for buildings (lower Co2 and Energy)
5. DSD should remove the "gas where the gas line is and oil if no gas line" to allow the option to tenants for other forms of heating.

Medium Term

1. Introduce the Carbon Emissions Reduction Target to Northern Ireland as it has been in the rest of the UK
2. Convert all public transport to electricity run vehicles with power sourced from renewable energy
3. Match Building Regulations to the Code for Sustainable Homes and maybe even fast-track its implementation rather than the code always being ahead
4. Run an allotment programme for all Councils
6. Cooperate North South in terms of the two parts of South Down (Warrenpoint) and Louth (Greenore) competing against each other and not acting in the best efficient environmental manner. Same for

DOE

From the office of the
Minister of the Environment



Department of the
Environment
www.doeni.gov.uk

Patsy McGlone MLA
Chair of Environment Committee
Parliament Buildings
Stormont
Belfast
BT4 3XX

DoE Private Office
Room 717
Clarence Court
10-18 Adelaide Street
BELFAST
BT2 8GB

Telephone 028 9054 1166

Email: private.office@doeni.gov.uk

Your reference:

Our reference: SUB/170/09

15 March 2009

I am happy to provide the Environment Committee with evidence to its Inquiry on Climate Change. The input is factually based setting out key EU, UK government and NI Executive drivers for this Department's continuing actions on the climate change issue.

The Department will be happy to respond to the Inquiry Report once it is complete.

Yours sincerely

SAMMY WILSON MP MLA
Minister of the Environment

DOE INPUT TO INQUIRY ON CLIMATE CHANGE

Key European commitments

- To agree EU position on a comprehensive post-2012 agreement including the EU Emissions Trading Scheme.
- Committed to 20% reduction in greenhouse gas (GHG) emissions by 2020 on 1990 levels with 30% commitment if international UN agreement in Copenhagen in December 2009.
- an EU White Paper on adaptation is due to be published in April 2009.
- Whitehall Departments take UK lead, though DAs are consulted regarding the EU climate and energy commitments.

Key UK Commitments

- Key initiative has been UK Climate Change Act 2008. This provides for UK statutory targets to reduce carbon dioxide emissions (80% by 2050); an Independent Committee on Climate Change (CCC) established to advise on UK carbon targets and budgets; enabling powers for trading schemes; and on adaptation to climate change impacts risk assessment and programmes to deal with impacts.

- Development of Carbon Reduction Commitment (CRC) as a UK-wide mandatory cap and trade emissions trading scheme due to commence April 2010.

Northern Ireland Executive Position

- The Programme for Government (2008-2011) commits the NI Executive collectively to reduce GHG emissions by 25% on 1990 levels by 2025.
- Gave policy agreement for Climate Change Act 2008 to be extended to Northern Ireland.
- Support in principle and committed to proceed with UK consultation re Carbon Reduction Commitment.

DOE Contribution to PfG targets

- Responsible for progressing Climate Change Act 2008 reporting requirements including links with CCC and UK risk assessment on impacts of climate change.
- Input Northern Ireland relevant aspects to policy developments relating to EU climate and energy

including EU ETS, and UK policy development including CRC.

- Works with UK colleagues to provide for Northern Ireland greenhouse gas inventories and projections.
- Ensures Northern Ireland public service organisations are aware of impacts of climate change and of need to adapt. Published in January 2007 with Scottish and Northern Ireland Forum for Environmental Research (SNIFFER), the report "Preparing for a Changing Climate in Northern Ireland".
- Supports the Northern Ireland Climate Change Impact Partnership which is charged with improving climate change understanding in the business, government, non-government and voluntary sectors.
- On planning policy, Planning Policy Statement 18 (PPS 18) on renewables has been issued for consultation.
- PPS 15 'Planning and Flood Risk' sets out the Department's planning policies to minimise flood risk to people, property and the environment. DOE and the Rivers Agency jointly launched Flood Risk Maps in November 2008.

Energy Savings Trust Northern Ireland

Alex McGarel
Clerk to the Committee for the Environment
Environment Committee Office
Room 245
Parliament Buildings
Stormont
BT4 3XX

25 February 2009

Dear Alex,

Northern Ireland Assembly Environment Committee Inquiry into Climate Change

Thank you for giving the Energy Saving Trust the opportunity to respond to the above consultation. Please find enclosed a detailed response.

We hope our response provides a useful contribution to the Committees thinking, and would welcome the opportunity to provide oral evidence.

If you require any further information or would like to discuss this response in further detail please do not hesitate to contact me on 028 9072 6007.

Meanwhile I trust that you find our response helpful.

Yours sincerely

Noel Williams
Head of Energy Saving Trust
Northern Ireland

This is the response of the Energy Saving Trust to the Environment Committee's inquiry into climate change issued on 6 Feb 09. This response should not be taken as representing the views of individual Energy Saving Trust members.

The Energy Saving Trust was established as part of the Government's action plan in response to the 1992 Earth Summit, which addressed worldwide concerns on sustainable development issues. We are Northern Ireland (NI) and the UK's leading organisation working through partnerships towards the sustainable and efficient use of energy by households, communities and the road transport sector.

Our response focuses on the key areas of the Energy Saving Trust's activities and related issues.

- To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

The Energy Saving Trust believes that a regular series of targets needs to be set for the reduction of greenhouse gas emissions in NI and that within this sectoral targets need to be set so it is clear what each sector's contribution to emissions reductions targets will be.

In terms of setting targets, we note that there are practical issues associated with setting annual targets, in that the ability to meet them can be unduly impacted by changes in weather or economic activity. On the other hand, however, targets over a 5-year timeframe could be too infrequent to adequately assess progress towards meeting climate change targets. It is worthwhile noting that both approaches have been adopted across the UK, with the UK Climate Change Act adopting 5-year carbon budgets, and both the Scottish Climate Change Bill and the Welsh Assembly Government's draft Climate Change Strategy proposing annual targets. In this context NI might want to consider the option of rolling targets outlined in our response to the UK Climate Change Bill^[1], but we note this would add a degree of complexity.

We believe that commitments to ensure that NI 'plays a fair and proportionate role as part of the UK in meeting climate change targets' need to be based on a full analysis of the actual and

realistic potential for emissions reductions in NI. We believe that the detailed analyses within the recent Committee on Climate Change (CCC)[2] report should be used to guide decisions in NI. However, we note that while it explored the potential for such reductions at a UK-wide level, it did not break down the potential for NI, and we are not aware of any NI-specific work that does this job. Given that the potential for emissions reductions (at least for the household sector) varies considerably across the UK, such NI-specific work will be vital to determine what a 'fair and proportionate' contribution from NI would be.

Our views on emissions reduction targets for the household, transport and waste sectors are outlined below.

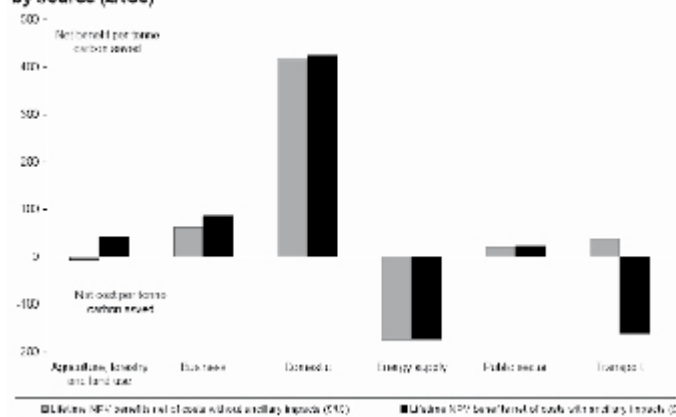
1. Domestic

When considering targets for the residential sector in NI it is important to take into account:

a)

The fact that it is more cost-effective to deliver carbon savings in the household sector than in any other (see table below).

Figure 2: Cost effectiveness (benefits net of costs per tonne of carbon saved), by source (£/tCe)



Source:

Synthesis of Climate Change Policy Appraisals, Defra, January 2007, see: <http://www.defra.gov.uk/environment/climatechange/uk/ukccp/pdf/synthesisccpolicy-appraisals.pdf>

Indeed the findings of the CCC's analysis[3] highlight that 'One key feature of the sectors covered, in particular of the residential sector, is that there appears to be scope for significant energy efficiency improvement at a cost to the economy and to individuals which is low, nil, or indeed negative (i.e. where upfront investment would be quickly repaid and give a good return).'

b) The potential for improvements to the housing stock in Northern Ireland.

The potential for the installation of energy efficiency and microgeneration technologies in NI is different to that of the UK as a whole. This is for a range of reasons including the different composition of the housing stock, the proportion of household on and off the gas grid, the historical rate of installations, etc. The Energy Saving Trust's analysis of the potential for energy

efficiency measures in NI (and the other countries of the UK is summarised in table 1 in Annex 1).

c) The conclusions of the CCC^[4] and DECC/CLG (outlined in the current Heat and Energy Savings Strategy consultation) that if the UK is to meet its climate change targets then emissions from existing housing will need to be reduced by at least 80 per cent by 2050, and that emission from buildings (by 2050) will be 'as close to zero as possible'.

d) CCC's analysis of potential realistic reductions for the household sector and DECC/CLG's proposed targets (outlined in the current Heat and Energy Savings Strategy consultation), including proposals that by 2015 all lofts and cavity walls should be insulated, where it is practical to do so and that by 2020 seven million homes will have had the opportunity to take up a 'whole-house' package of measures going beyond simply insulation, and that by 2030 all buildings will have received such a package.

We note that the above information suggests NI is likely to need to reduce emissions from its housing stock at a different rate than emissions reductions in this sector in the rest of the UK and as such interim percentage reduction targets for emissions in the sector may need to be different than those set for other parts of the UK.

We recommend that the NI Executive undertake more detailed analysis to determine the potential for household energy efficiency and microgeneration measures in NI. This analysis should also take account for actions that can be undertaken at the community level (distributed energy) as well as those that can be undertaken at the individual household level. This analysis should be used to set a challenging, but achievable, target for the residential sector in NI.

2. Road transport

Again, we believe it is important for account to be taken of the CCC's analysis of potential realistic reductions for the transport sector.

However, in the context of setting targets for the road transport sector in NI it is worthwhile highlighting that there are big wins that can be achieved now from existing infrastructure and technologies. For instance, choosing the lowest carbon vehicle in its class (so the consumer does not have to compromise on utility) can save 25 per cent of CO₂ emissions. Driving in the most efficient style (smarter-driving) can save up to 15 per cent of CO₂ emissions. Someone who normally drives alone instead choosing to car-share can save at least 50 per cent CO₂ (and fuel costs) off their journey, and more than this if they take more than one passenger. Replacing a local car journey with a bus journey can cut emissions by approximately 50 per cent; replacing a long distance car journey with a coach journey can reduce CO₂ emissions by 85 per cent and choosing the train over the plane about 65 per cent. Most efficient of all, walking and cycling journeys are zero carbon so any shift to this mode will save 100 per cent CO₂. However, it is important not to underestimate the need for investment into low carbon infrastructure such as public transport and walking and cycling to encourage modal shift and behaviour change.

3. Waste

Over the last six months we have been running waste pilots, testing the inclusion of waste into our advice offering. Our activity in this area has been developed in partnership with WRAP (Waste & Resources Action Programme) and has centred on three areas; food waste, home

composting and recycling. Four pilots ran during Jun to Sep 08 in London, Wales, North-East England and Northern Ireland. With early positive results including advising over 10,000 consumers on waste between Jun and Oct 08 and early indications showing that waste is a natural fit to the energy advice service, waste advice will be rolled out over the course of 2008/9 to some of the remaining advice centres. An evaluation of the original four pilots will be completed by the end of the financial year 2008/09.

Over the coming year we will be looking in more detail at the potential for waste related carbon savings through using our advice network channel. We look forward to sharing this data with the Committee later in the year.

- To consider the necessary actions and route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc).

1. Domestic

For the domestic sector the key actions that the Energy Saving Trust would like to see are as follows:

- The development of a forward looking strategy for emissions reductions from the housing sector, which includes a long-term of at least 80 per cent by 2050, together with interim targets, for emission reductions from NI's housing stock.
- A programme of public engagement to help gain buy-in into the technologies and policies required to effect the emissions reductions required.
- The next update of NI Building Regulations will need to extend coverage of triggers for improving the energy performance of existing homes, including extensions, loft conversions, etc. In addition NI ought to adopt the Code for Sustainable Homes or an equivalent mechanism.
- A signal that the recommendations of Energy Performance Certificates will become mandatory by a certain date in the future, say 2015, for home sales, rental, etc.
- A variety of incentives and awareness raising activities, developed around people's behaviour and the lifetime of their homes, in preparation for eventual mandation.

2. Transport

For the transport sector the key actions the Energy Saving Trust would like to see are as follows:

- The development of a forward looking strategy which includes a long-term target for the reduction of emissions from transport in NI together with interim targets.
- Implementation of measures to reduce transport emissions from driving which should include the promotion of smart-driving (saving 15% CO₂), signposting consumers to the lowest carbon vehicles (savings of up to 25% CO₂ if every consumer chose the most fuel efficient car for their needs), and car-sharing (can save over 50% CO₂ emissions). Our advice centres across the UK offer independent advice on energy saving. In Scotland and England this includes advice on the above issues, as well as modal shift (see below). This advice could and should be extended to NI.
- Implementation of schemes to encourage, a) car sharing which can save over 50% of CO₂ emissions and b) modal shift to walking and cycling, which are zero carbon transport modes. Smarter choice measures help people find less costly and less carbon

intensive ways to travel. A UK Department for Transport report showed travel planning can reduce car travel by 15% and 25% in peak hours in urban areas.^[5]

- Investment in low carbon public transport to ensure attractive, affordable and viable alternatives to travelling by car.
- In the longer term, a commitment to major low carbon infrastructure development (such as electric vehicle re-charging points and/or hydrogen re-fuelling stations) will be necessary if NI is to move towards advanced lower carbon vehicles. This would need to be part of a co-ordinated UK-wide approach.
- Planning can have a major impact on determining how people travel. All new developments should be designed so that they minimise car dependency and maximise low carbon travel options such as walking, cycling, and public transport.
- In Scotland and England the Energy Saving Trust offers free government funded advice to business to reduce the carbon footprint of their fleets. It delivers cuts in CO2 from business travel through cleaner vehicle purchase, efficient driving and reduced travel. And in Scotland the Energy Saving Trust offers free government funded travel planning consultancy for schools, businesses and other organisations. These are services that could be expanded to cover NI.

3. Waste

The NI Executive should work towards ensuring that:

- More people link waste to their carbon footprint, understand the relative contribution of waste to their carbon footprint, and understand how reducing waste can help tackle climate change.
- Consumers understand the importance of following the waste hierarchy: reduce, reuse, recycle and choose/use products that generate the least waste.

The NI Executive should help facilitate domestic waste minimisation by helping to coordinate the efforts of Councils. They play a key role in making waste minimisation easier for householders, and the current wide range of different services in different areas makes it confusing; people don't know what they can recycle and where, and don't understand why they can recycle some things in one area, but not in another.

- To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

We are not aware of any specific analysis that has been undertaken to look specifically at the costs of NI meeting delivering a 'fair and proportionate' share of the UK's climate change targets, and would be surprised if such analysis exists because NI's appropriate share has yet to be determined. In terms of the costs of delivering improvements to the energy performance of existing buildings it is worthwhile noting the findings of the CCC's analysis,^[6] which highlights that 'One key feature of the sectors covered, in particular of the residential sector, is that there appears to be scope for significant energy efficiency improvement at a cost to the economy and to individuals which is low, nil, or indeed negative (i.e. where upfront investment would be quickly repaid and give a good return).' It is also our view that additional work needs to be undertaken to look at costs (of improving the housing stock), including exploring marginal capital cost when measures are implemented as part of wider works, capital cost reductions with time and with volume installations etc.

It is also important to note that replacing car journeys by walking, cycling or car sharing can save money for consumers. Driving more efficiently or buying a more fuel efficient car reduces fuel bills, as well as CO2.

- To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

As noted above we believe that targets should be set for all sectors. We also believe that specific targets for microgeneration, and within this heat generating microgeneration should be set for NI. Long-term, as well as interim targets, should be set. The UK also has a role in meeting European 2020 renewables targets, and as such it is important that targets for the microgeneration and heat generating microgeneration are set for 2020 and are consistent with NI delivering an appropriate share of these targets. In this context we draw the Committee's attention to a key point that we have raised in recent submissions to the NI Executive, as follows: 'We are not aware of any NI-specific analysis that provides sufficient detailed analysis to allow an assessment of a) the potential for microgeneration, and in particular heat generating microgeneration, in NI or b) an appropriate target for renewable microgeneration, and in particular heat generating microgeneration for NI[7]. In this context we strongly recommend that DETI undertake further research in this area. The Energy Saving Trust has extensive experience of both managing and steering this type of work.'

Key actions that we believe should be taken in the housing and transport sectors are outlined in our response to the second bullet point above.

Table 1: Potential for energy efficiency measures in NI

	Wales		Scotland		England		Northern Ireland	
	number s	as % of all househol ds	number s	as % of all househol ds	numbers	as % of all househol ds	numbe rs	as % of all househol ds
Number of household s:	1,264,000	100%	2,237,000	100%	20,866,000	100%	680,000	100%
Insulation potentials:								
	250,000	20%	600,000	27%	6,500,000	31%	70,000	10%
Solid walled homes (assume all uninsulate d):	430,000	34%	500,000	22%	6,300,000	30%	130,000	19%
							- All complete ly uninsulat ed solid- wall homes; includes some homes with extensio ns with filled	

	Wales		Scotland		England		Northern Ireland		
	number s	as % of all househol ds	number s	as % of all househol ds	numbers	as % of all househol ds		numbe rs	as % of all househol ds
							cavity walls		
Under- insulated lofts:									
- Virgin	3,000	0.2%	100,000	4%	400,000	1.9%	- Virgin	30,000	4.4%
- 100mm or less	537,000	42%	980,000	44%	10,500,000	50.3%	- Less than 100mm	160,000	24%
Double glazing:									
- None	160,000	13%	260,000	12%	4,900,000	23%		95,000	14%
- Some	130,000	10%	40,000	2%	3,900,000	19%		126,000	19%

Please note that the categories used in the table above differ slightly than those for the other countries of the UK. This reflects the categories used in the NI house condition survey.

[1] See:

http://www.energysavingtrust.org.uk/uploads/documents/aboutest/Defra_Climate_Change_Bill_120607.pdf

[2] See: <http://www.theccc.org.uk/>

[3] See: <http://www.theccc.org.uk/reports/>

[4] CCC outline the potential (both technical and realistic) for the reduction in emissions across the UK, specifically that by 2020: In the residential sector there is technical potential to reduce emissions by almost 40 MtCO₂, over half of which is through negative cost energy efficiency improvements and lifestyle changes, and with much of the remainder costing less than our forecast carbon price of £40/tCO₂. Our assessment of realistic potential suggests that a reduction of 9-18 MtCO₂ could be achieved from existing buildings, with an additional 4 MtCO₂ from new buildings. And In addition the development of renewable heat sources (mainly biomass) and of microgeneration (solar photovoltaic) could save up to 65 MtCO₂ but at a much higher cost per tonne saved. Our assessment of realistic potential suggests a much lower reduction of up to 10 MtCO₂.

[5] Smarter choices – changing the way we travel, Cairns et al, DfT 2004

[6] See: <http://www.theccc.org.uk/reports/>

[7] While relevant analysis exists at a GB or UK level, given the substantial differences that exist between NI and the rest of the UK, it would make little sense to simply pro-rata suggested GB targets on the basis of, for example NI's population, as the potential for the installation of such

technologies in NI is likely to be considerably different. Indeed, we believe that that potential for such technologies is likely to be greater in NI than in other parts of the UK because substantial parts of NI are off the gas network.

Federation of Small Businesses



Northern Ireland Policy Unit
Federation of Small Businesses

Cathedral Chambers
143 Royal Avenue
Belfast
BT1 1FH

Environment Committee Office
Room 245
Parliament Buildings
Stormont
BT4 3XX

www.fsb.org.uk

20th February 2009

Re: Committee for the Environment – Inquiry into Climate Change

The Federation of Small Businesses is Northern Ireland's largest business organisation with almost 8000 members drawn from across all sectors of industry, and over 210,000 members throughout the UK.

The Federation lobbies decision makers to create a better business environment and welcomes this opportunity to input into the Northern Ireland Assembly Environment Committee Inquiry into Climate Change.

We trust that you will find our comments helpful and that they will be taken into consideration. The FSB is willing for this submission to be placed in the public domain. We would appreciate being kept apprised of further developments.

Regards

Wilfred Mitchell OBE
Northern Ireland Policy Chairman

Introduction

The FSB is supportive of measures to protect the environment and human health and encourage resource efficiency; however environmental legislation to date has continued to apply a 'one-size fits all' approach which presents many barriers for small businesses in their efforts to seek effective environmental solutions.

The current debates on climate change are very academic in nature and tend to focus on large businesses or householders. There must be a change in this focus, taking into the account the dominant role (98%) that small businesses play in the Northern Ireland economy.

Impact on Small Businesses

Future policy on climate change will have a significant impact on small businesses. Small businesses behave in a similar way to householders, in terms of expertise levels. The energy market remains a difficult one for small businesses and micro-businesses in particular, and their perception is that the situation will only get more difficult for them, in terms of cost, regulation, and the potential for legal penalties, and that this could have a knock-on effect on their ability to survive.

Professor Rob Baldwin of the LSE found that the burden of small businesses from regulation is five times higher than that of large businesses (employing 250 or more). As with all types of legislation and red tape, the FSB calls for a reduction in regulation, not an increase, and where possible, simplification and clear guidelines.

The long term risks to businesses not engaging in the climate change programme include increased costs and loss of revenue. However, climate change will also provide new markets and technologies for many small businesses. Energy prices are a particular and immediate concern. However, businesses who understand the issues surrounding climate change will be better equipped to maximise opportunities and mitigate negative impacts/risks.

A Mori survey in 2005 found that 87% of SMEs were of the view that climate change offered considerable opportunities to business yet only 19% saw climate change as a significant opportunity for their own business.

Lack of resources and awareness remain a barrier to small businesses exploring ways to mitigate rising energy costs. They know they have to do something but are unclear about the next steps.

The FSB has found that lack of clear advice and information, together with the constraints faced by SMEs has prevented many small businesses from taking steps to improve energy efficiency. A recent survey found that 60% of SMEs have taken some steps to increase energy efficiency (e.g. changes to heating and lighting) but notably 40% have taken no action. For small companies, technical problems and the cost of changing production processes are barriers to increasing efficiency but so too is a lack of quality information and advice.

In a recent FSB survey on Corporate Social Responsibility (2008), well over a third of respondents reported that they engaged in energy efficiency measures. Approximately 70% of those that provided information on energy efficiency did the following:

- Utilised low energy light bulbs
- Invested in low energy lighting
- Turned off PC/lights etc

- Changed heating systems
- Minimised electrical usage
- Reduced temperature in office

Engaging SMEs in the climate change debate will require a major shift in this perception of the opportunities and also the risks of climate change.

Environmental Taxation

The FSB is opposed to environmental taxation, which burden small businesses disproportionately. We would highlight the Climate Change Levy in particular, which FSB research (The Climate Change Levy – ‘Another Cost for Small Business’ 2002) demonstrated did little to improve energy efficiency among small businesses (and had no measurable effect on environmental behaviour).

Recommendations

Government initiatives to date have had a negligible impact on small businesses as FSB research demonstrates.

To be effective, the Northern Ireland Assembly needs to raise awareness of the requirements and objectives of legislation and to explore ways to incentivise support the small business sector in relation to environmental issues.

- A clear regulatory framework will reduce uncertainty but the particular position of small businesses must be taken into account at the outset.
- A practical, joined-up approach to climate change policy, including consideration of planning policy, is required. The technical nature of the language associated with debates on climate change is inaccessible to the average small business owner.
- Legislation/regulation to be applied proportionately and take into consideration the particular position of small businesses.
- Investment in technical innovation, capital and financial incentives on energy efficiency for small businesses would be an important contribution to these targets.
- Reduction of VAT on green energy sources to encourage take-up among small businesses.
- Present both the risks and opportunities tackling climate change and what it could mean to small businesses.
- Statutory authorities, together with suppliers should promote energy efficiency measures that SMEs can easily apply to their businesses. This should be developed in tandem with practical support and clear examples of how small businesses can maintain and improve profitability through energy savings.

Friends of the Earth



1. Introduction

1.1. Friends of the Earth would like to thank the Environment Committee for holding this inquiry into climate change and for inviting us to make a submission. We are heartened by the fact the Committee has accepted the reality of climate change and the inquiry does not include an exploration of the science or a call for a public debate. The debate is settled and further debating the issue merely postpones action when action is urgently needed.

1.2. Friends of the Earth believes the single most important action the Committee can take is to press the Executive to bring forward a Northern Ireland Climate Change Bill. While the Assembly has opted into the UK Climate Change Act, the targets in the Act are not disaggregated for the devolved administrations and the Committee on Climate Change has no authority to enforce the targets. For Northern Ireland to play its part fully in reducing greenhouse gas emissions, therefore, legally binding targets should be adopted in order to provide a clear for businesses, individuals and future Assemblies.

2. The terms of reference

To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

2.1. The global fair share of per capita carbon emissions has been calculated at about 1.65 tonnes per year. Northern Ireland's per capita emissions are about 13 tonnes per year, compared to a UK average of just under 10.5 tonnes. Plainly Northern Ireland is not currently playing a fair and proportionate role, either globally or as part of the UK.

2.2. There is scientific consensus that in order to prevent catastrophic climate change temperature rise must be limited to no more than 2oC above pre-industrial levels which corresponds to greenhouse gas concentrations of about 450 part per million by volume of CO₂ equivalent (ppmve). Current concentrations are around 430 ppmve.

2.3. Furthermore, research from the Tyndall Centre for Climate Change Research suggests that if current emission trends continue a global average temperature rise of around 4oC is likely with a 6oC rise being a distinct possibility. In the distant past temperature rises of this magnitude were associated with mass extinctions. Needless to say it is unlikely civilization as we know could continue under such circumstances.

2.4. The Committee on Climate Change recommended, and the UK Government accepted, a reduction of 80 per cent on 1990 emissions levels by 2050.

2.5. In order for Northern Ireland to do its fair share in meeting the targets set out in the Climate Change Act the Executive should introduce a Northern Ireland specific Climate Change Bill. Such a Bill should follow the precedent set in the UK Act and include a legally binding target to reduce our carbon dioxide emissions by 80 per cent from 1990 levels by 2050. This is the

minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

2.6. To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an intermediate target for emissions in 2020, a series of legally binding 5 year carbon budgets and an annual carbon reduction target at an average of at least 3 per cent per year. Combining indicative annual milestones with the legal framework of the budget periods should offer flexibility but with a firm steer.

2.7. The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans. The Committee on Climate Change's reports on progress and action plans to achieve the targets should be delivered to the Assembly and responded to by the Executive.

2.8. The Committee on Climate Change should help ensure co-ordination of emissions reduction efforts across the UK. Carbon emissions in Northern Ireland and the Republic of Ireland are closely interlinked. Therefore, provisions to enable joint achievement of emissions reduction goals should be made.

2.9. All plans, programmes and policies should be subject to full Climate Impact Assessments before implementation. If they do not contribute to carbon reduce policies they should be redesigned.

2.10. A supplement to Planning Policy Statement 1 for England and Wales was published in 2007 which sets out the principles that the Government should observe in formulating planning policies, making development plans and exercising its development powers in order to tackle climate change. A Northern Ireland planning Policy Statement on climate change would put tackling climate change at the heart of Assembly policy and provide a clear steer to both planners and energy companies.

To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc).

2.11. The Committee on Climate Change's statutory duty to Northern Ireland includes:

'To provide advice on the sectors of the economy in which there are particular opportunities for contributions to be made towards meeting the budgets through reductions in emissions.'

2.12. The Committee on Climate Change's first report was released in December 2008. It includes an analysis of what opportunities exist for making emission reductions in Northern Ireland. It states Northern Ireland could contribute emissions reductions of over 2MtCO₂e (Million tonnes of carbon dioxide equivalent) in 2020:

Emissions from buildings and industry could be reduced by up to 1 MTCO₂ in 2020 by using energy more efficiently;

More efficient vehicles and new transport fuels could deliver reductions of up to 1 MTCO₂ in 2020;

Emissions from agriculture, land use and forestry and waste management sectors could be reduced by up to 0.5 MtCO₂e in 2020.

2.13. The actions outlined above do not go far enough to keep Northern Ireland on target to achieve its own 80 per cent emissions reduction target. The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans.

2.14. Energy: The current electricity generation system wastes about 70% of the energy produced, either as waste heat or through transmission losses. A decentralised grid using small-scale generators close to the end user minimises transmission losses and also enables the waste heat to be utilised. Such a decentralised grid should be based around small-scale Combined Heat and Power.

2.15. Micro-renewables, such as solar thermal, heat pumps and biomass burners, should constitute a significant element of a decentralised network. The high upfront costs of installing micro-renewables mean uptake is likely to be small. To facilitate the adoption of micro-renewables the Reconnect grants should be re-instated.

2.16. Northern Ireland has some of the best renewable energy resources in Europe and they are currently under-utilised. On-shore wind is well developed, though there is room for further development, but off-shore wind remains undeveloped and marine technologies are still in the test stage. A sustainable energy infrastructure should include a range of renewable technologies sited to maximise exploitation of the resource. By using a range of renewables, intermittency problems can be eliminated.

2.17. It is likely that a greater proportion of our energy needs will be met by electricity as fossil fuel use for space and water heating decreases. It is important, therefore, that the inefficiency inherent in a large-scale centralised system are minimised and greater use is made of decentralised grids. There is also potential for using off-peak renewables for generating electric heat for storage, or for recharging electric vehicles. The use of off-peak electricity should therefore be encouraged and the Department of Enterprise, Trade and Investment's target of reducing electricity use by 1 per cent annually until 2012 could be problematic unless it is targeted at fossil fuel derived electricity.

2.18. A sustainable energy infrastructure will require significant new development in decentralised grid and renewable technologies and effective use of the planning system will be required to facilitate the necessary level of development. A Planning Policy Statement on climate change would create the necessary policy context and place action on climate change at the heart of planning policy.

2.19. It is regrettable that the proposal to amend Building Regulations to include mandatory renewables for new build developments was dropped by the Department of Finance and Personnel. Such amendments would provide clear guidance to the building sector and facilitate the development of renewable energy technologies.

2.20. The Energy Act, which became law in November 2008, includes a provision to introduce a feed-in tariff (FIT) for renewable electricity and renewable heat incentives. These, if implemented correctly, will give a long-term guaranteed payment to homes, businesses and communities for installing renewable electricity and heat technologies. Such a provision should be extended to Northern Ireland. A similar system operates in parts of Europe and, more importantly, in Republic of Ireland. If the Single Electricity Market is to function there must be compatible incentive systems north and south of the border.

2.21. It is likely that a European supergrid will be developed to facilitate greater use of renewables and to enable sharing of renewable energy resources. For example, a supergrid could include German photovoltaics, Icelandic geothermal and Spanish concentrated solar.

Enhanced electricity interconnection would enable Northern Ireland to tap into, and contribute to, a European supergrid.

2.22. Transport: investment in public transport is essential if cuts in transport emissions are to be realised. Other measures to encourage a modal shift from the private car include walking and cycling. The balance of transport is currently about 80 per cent roads and 20 per cent for other measures. Such a balance is likely to lead to higher transport emissions rather than achieving cuts.

2.23. Emissions from transport are closely linked to land-use planning. How our villages, towns and cities are planned will dictate what method of transport will be most convenient, and most used. A PPS on climate change would put climate considerations at the heart of the planning system.

2.24. Electric vehicles offer the potential for reducing carbon emissions associated with transport, but only if electricity generation is de-carbonised. Assuming there will be a significant increase in the use of renewables, greater efficiency in electricity generation and a conversion to gas for large power-stations still using fossil fuels then electric vehicles will be a viable low-carbon option.

2.25. Agriculture: modern food production is very resource and energy intensive. The single most significant source of emissions is the production of chemicals such as fertilisers and pesticides. Organic and other low input farming methods have significantly lower carbon emissions associated with them. They also tend to be more labour intensive than conventional agriculture so there are also job creation opportunities with low input farming.

2.26. A focus upon the localisation of food and farming implies the development of local food economies. Local food economies emphasise the importance of shorter, less centralised food chains, and subsequently lower emissions, involving much closer and greater contact between farmers and the consumers, processors, retailers and caterers that they serve. They deliver an integrated suite of benefits and are unique as agents of sustainable development by occupying a point of convergence between four main issues – economic development and regeneration; environment and climate change; social cohesion and community development; and health.

2.27. Meat and dairy production has a particularly large environmental footprint. Intensive farming methods in Europe, which rely on high-protein animal feeds, have created a global food chain in which Northern Ireland poultry, pigs and cattle depend on feed crops from the other side of the world. The livestock sector is responsible for an estimated 18 per cent of global greenhouse gas emissions and deforestation is a significant source. Reducing the impact of the livestock sector is critical if we are to prevent dangerous climate change. Friends of the Earth is not advocating a vegetarian diet, but a reduction in meat consumption must be part of any coherent plan to tackle climate change.

2.28. It should be possible to satisfy the twin demands of agricultural waste management and greenhouse gas reductions through the use of anaerobic digestion (AD) of biodegradable waste linked to small-scale combined heat and power (CHP). Such a combination can vary in size from very small on-farm units to larger units suitable for food processing plants.

2.29. Business: According to the Carbon Trust report Climate Change – a business revolution report, implementing measures which are compatible with the need to tackle climate change has the potential to increase a company value by up to 80 per cent. Conversely, failure to position itself for a low-carbon future could devalue a company by 65 per cent. Saving can be made in energy efficiency in much the same way as for the domestic sector. In addition, industry should be encouraged to invest in modern, efficient motors.

2.30. The shift to a low-carbon economy is likely to create the environment in which low-carbon businesses succeed at the expense of inflexible, high-carbon industries. The biggest winner is likely to be the building insulation industry.

2.31. There is much scope for the development of businesses designing, constructing and fitting green technologies. Harland and Wolff may have missed the initial phase of wind power development but are now assembling turbines and are developing wave power devices. The Assembly should actively encourage the development of green businesses.

2.32. Micro-renewables offer businesses the opportunity to cut energy bills and, if Feed-in Tariffs are extended to Northern Ireland, to make additional money by supply excess electricity to the grid. The Energy Act, which became law in November 2008, includes a provision to introduce a feed-in tariff (FIT) for renewable electricity and renewable heat incentives. Such a provision should be extended to Northern Ireland. A similar system operates in parts of Europe and, more importantly, in the Republic of Ireland. If the Single Electricity Market is to function there must be compatible incentive systems north and south of the border.

2.33. Domestic: Energy efficiency is the single most cost effective way of reducing domestic carbon emissions. There is great potential to bring Northern Ireland's housing stock up to very high standards of energy efficiency through insulation, use of efficient appliances and simple lifestyle changes. The average SAP rating in Northern Ireland's housing stock is 50 points out of a possible 100. The technology and techniques already exist which would enable significant efficiency gains to be made. The Carbon Trust Northern Ireland Vision Study (2005) concluded it is possible to achieve 60 per cent reduction in emissions from households by 2050 with energy efficiency being key component. High upfront costs can discourage home-owners from fitting insulation materials though. A wholly or partially funded programme of improving energy efficiency should be introduced. Such a programme would save people money, create good quality skilled and semi-skilled jobs and help to stimulate the market in energy efficiency measures.

2.34. Micro-renewables, such as solar thermal, heat pumps and biomass burners, should constitute a significant element of a decentralised network. As with energy efficiency, the high upfront costs of installing micro-renewables mean uptake is likely to be small. To facilitate the adoption of micro-renewables the Reconnect grants should be re-instated.

2.35. Householders and landlords should be encouraged to install key-pad electricity meters. One in four already use the NIE keypad meter, supplied free by the utility, for prepayment purposes. But the meter also allows consumption to be monitored. Households with keypads use 5 per cent less electricity on average than those without.

2.36. It is regrettable that the proposal to amend Building Regulations to include mandatory renewables for new build developments was dropped. Such amendments would provide clear guidance to the building sector and facilitate the development of renewable energy technologies. Although this is not an area the Environment Committee has responsibility for, it should recommend the proposed amendments be adopted.

2.37. Public sector: the Assembly could be showing leadership and stimulating the market by improving the energy performance of the public sector. The civil service estate has a target to be carbon neutral by 2015. This target should be met through tangible carbon reduction measures such as insulation, micro-renewables and behaviour changes rather than through offsetting schemes. In addition, the target should be extended to the entire public sector.

2.38. Public sector buildings are often large traffic generators. The Stormont estate, for example, has thousands of visitors each day and most come by car. Public transport provision to the

estate is infrequent and free car-parking makes driving an attractive option. The Assembly should encourage public servants to use sustainable means of transport such as public transport, walking and cycling. Remove free car-parking spaces along with enhanced public transport would facilitate such a shift.

To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

2.39. The Stern Review calculated that the dangers of unabated climate change would be equivalent to at least 5 per cent of GDP each year. However, when more recent scientific evidence is included in the models, the Review estimates that the dangers could be equivalent to 20 per cent of GDP or more. In contrast, the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1 per cent of global GDP each year. The central message is that reducing emissions today will make us better off in the future: one model predicts benefits of up to \$2.5 trillion each year if the world shifts to a low carbon path.

2.40. The renewable sector in Germany supports 170,000 people and existing German government support measures promoting renewable energy could create 130,000 new jobs by 2020 according to the German environment ministry.

2.41. The Prime Minister stated that the overall added value of the low carbon energy sector by 2050 could be as high as \$3 trillion per year worldwide and that it could employ more than 25 million people.

2.42. The Carbon Trust estimates that more than 70,000 jobs could be created in the UK by investing in and developing offshore wind technology. Action Renewables estimate that almost 6,000 short term and 400 long term jobs could be sustained in Northern Ireland, exclusively by developing renewable energy within the region.

2.43. Government should see investment in a low carbon future as a way to stimulate the local economy, as recommended in the New Economics Foundation's Green New Deal report. President Obama has already established a plan to kick start the economy which includes significant investment in green technologies. The move to renewable fuels may help develop industries that will provide economic opportunities and jobs. Given the huge potential that exists around our shores for wind power there are sound economic and environmental reasons for ensuring that a significant proportion of these jobs are developed in Northern Ireland.

2.44. The SNIFFER report on the impacts of climate change on Northern Ireland identified a number of direct effects, mostly negative, on human health, the economy, natural habitats and water resources, for example, the extent of flood risk to existing settlements remains unquantified compared with the situation in Great Britain.

To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO 2 emissions. (Akin to Regulatory Impact Assessments/Rural Proofing).

2.45. All plans, programmes and policies should be subject to strict Climate Change Impact Assessments to determine their contribution to or impact on achieving carbon budgets. The process should be initiated at the start of policy design to maximise outcomes and minimise costs and would be similar to equality screening.

2.46. The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans: sharing this resource with the rest of the UK should help minimise costs.

To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

2.47. The key climate targets that the Sustainable Development Strategy should deliver are those identified in a future Northern Ireland Climate Bill.

2.48. The Sustainable Development Strategy should also help deliver the recommendations from the Committee on Climate Change.

To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

2.49. A public service agreement should be drafted for the Department of the Environment which would include a commitment to provide information and support to the other departments to help deliver the targets set in a Northern Ireland Climate Change Act and in the carbon budgets.

2.50. Specific responsibilities to deliver the targets set in the Climate Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department.

2.51. To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Act.

2.52. The Northern Ireland Assembly should introduce its own primary legislation in the form of a Climate Change Bill with binding carbon dioxide gas reduction target of at 80 per cent on 1990 levels by 2050; 5 year carbon budgets and an annual carbon reduction target at an average of at least 3 per cent per year.

To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

2.53. The Assembly should consider concentrating climate change related responsibilities in one department in a similar way to how the UK Government created the Department for Energy and Climate Change.

2.54. The Environment Committee should share responsibility to scrutinise progress towards achieving the targets in the Act and within budgets with all other departments.

2.55. The ability of the Committees and the Assembly as a whole to scrutinise progress will be greatly enhanced by ensuring the Committee on Climate Change report to the Executive and the Assembly and that the Executive respond to their reports in the Assembly.

Greener Horizon Films Ltd

request to provide oral evidence

From: McCann, Sean
Sent: 27 February 2009 09:00
To: Long, William
Subject: FW: Gobal warming enquiry

Attachments: Ann McElhinney bio.doc; Phelim McAleer bio.doc

From: ann mcelhinney [mailto:annmcelhinney@gmail.com]
Sent: 26 February 2009 18:44
To: +Comm. Environment Public Email
Subject: Gobal warming enquiry

Dear Sir/Madam

We are writing to you to suggest that we should speak to your committee's enquiry on Global Warming.

We have been approached by a number of MLAs who believe our research would be useful to your committee.

We are a Northern Ireland based film production company who have just completed Not Evil Just Wrong, a documentary on Global Warming which is due to be released in up to 400 US cinemas in the summer.

We have investigated the issue for two years and have given interviews on the topic on the BBC, RTE, ABC, CBC (Canada) and have toured Australia, Ghana and Bulgaria looking at the financial cost of extreme environmentalism.

Our documentary concentrates on the cost of Global Warming legislation on working families, those on fixed or low incomes and the people of the third world who need industrial development to rise out of poverty.

You can view the trailer of our documentay here
<http://www.youtube.com/watch?v=sHMOEVRysWE>

We have attached our bios.

Thank you

Ann McElhinney
Phelim McAleer

Greener Horizon Films Ltd
29 Coolnagard Grove
Omagh, Co.Tyrone,
United Kingdom
BT78 1AW
+ 353 86 209 2942 Cell Ireland)

Visit the website www.noteviljustwrong.com

annmcelhinney@noteviljustwrong.com

Watch the Trailer of Not Evil Just Wrong here
<http://www.youtube.com/watch?v=sHMOEVRysWE>

Submission from Helena Rafferty

SUBMISSION TO THE COMMITTEE FOR THE ENVIRONMENT.
INQUIRY INTO CLIMATE CHANGE.

As a former teacher of Biology, I have been aware of the evidence for climate change for a considerable period of time. I trust that you will bear with me if I review the major ideas and findings about climate change, and point to some practical implications relevant to the way we live our lives in Northern Ireland.

The consensus findings of the Intergovernmental Panel on Climate Change (IPCC) indicate that sea temperatures are warming due to rising levels of greenhouse gases. This panel has over 1000 climate scientists contributing research data and analysis, with a view to predicting medium to long-term forecasts. Knowing how temperature and rainfall will change over the next few years will be invaluable to many people, from farmers to the tourism industry, to those in charge of water supplies and water management. It is a new and controversial field, but predictions made two decades ago are pretty close to the mark. However global warming does not mean that each year will be warmer than the preceding one. In the short term, natural variability may cloak the underlying trend, and this can make it harder to convince people of the urgent need for action.

Basically the short-term weather is down to movements of air and moisture in shifting weather systems. However climate is dictated by ocean cycles, and these depend on temperature fluctuations. It takes the oceans a long time to heat up and cool down. The oceans are crucial because they store so much heat. Since the 1960s, 90% of the excess heat due to higher greenhouse gas

levels has gone into the oceans, 7% into land and ice, and just 3% into warming the atmosphere. In the long term, warmer oceans inevitably mean a warmer atmosphere, as the overall heat content of the planet rises. But the oceans have alternate heating-up and cooling-down oscillations, which are very slow to change. These cycles last about 10 years for the Pacific, and at the moment a cooling phase. But those people who remember the 1990s and early 2000s will recall the scorching summers. They haven't gone away you know!! Even a decade of planetary cooling will not change the long-term prospect of a warmer world. We can expect more of the same. It is essential to get this message across. The decade-long oceanic cycles will come and go, but the carbon dioxide we are putting into the air will stay there for centuries. Politicians have a responsibility to take the long view, and use this opportunity to plan and implement changes in advance of the expected warming-up phase from 2014 onwards.

The oceans transfer heat back to the atmosphere, and it cannot escape out to space because of greenhouse gases. So the atmosphere heats up and affects climatic trends on land ---increasing the intensity of Indian monsoon rains; increasing droughts in the Sahel, and in Australia, and in the western US; affecting the number and intensity of Atlantic hurricanes; changing rainfall patterns the world over; melting of polar ice, to mention a few effects.

Chief culprit among the greenhouse gas emissions is carbon dioxide. We must reduce and eventually stop its accumulation in the atmosphere. The respectable scientific and evidence-based consensus is that burning fossil fuels causes carbon dioxide to enter the atmosphere, and we need to reduce our burning, or use catalytic converters to trap the gas before it leaves the exhaust pipe or power

station chimney (recapture technology). We also need to reduce our demand for non-renewable forms of energy, so the power stations burn less, and electricity is generated instead using sustainable sources like wind, solar and tidal.

Reducing energy use and cutting down on greenhouse gas emissions saves people money, reduces use of scarce resources, and encourages exploration of new forms of electricity generation - all of these very worthwhile in their own right, if we are to become independent of scarce oil supplies.

Traditionally there are two ways to get people to change behaviour at a population level. The first is by legislation, as exemplified by the Clean Air Act following the pea-soup smogs of the 1950s. In the same way the EU took action against industrial pollution of the atmosphere in the 60s and 70s, when acid rain destroyed forests and buildings in Europe, as well as wildlife in major rivers.

Secondly by education/information. The people of Northern Ireland need to have their awareness heightened if they are to fully understand how climate change will affect their lives.

Advertising campaigns are one way to do this. The curriculum in schools is another. The leadership and example needs to come from the top, and it needs to be high-profile, and sound (not publicity gimmicks)

The effects of climate change are only beginning, and already we have seen the impact of short sharp bursts of heavy summer rain as on 16th Aug 2008.

The consequences for flooding alleviation and planning decisions about building on flood plains need seriously addressed and enforced. The flood-risk maps are out-dated and need to be updated and made accurate and current. The so-called development of many towns has outstripped the ability of the

infrastructure to cope with sudden additional load, leading to out-of-sewer flooding, etc..

Lastly, but by no means least, we have a moral responsibility to do everything we can to minimise the impact of climate change on other animal species, and on other human beings. The melting of the Arctic ice is a good example. It threatens the extinction of the polar bear, and it threatens the life of millions of the worlds poorest people living in low-lying oceanside countries like Malaysia, Bangladesh, India Sri Lanka etc.. We have a duty to try to protect them from our indulgent lifestyle. So free transport for over60s is an excellent idea since it reduces their carbon footprint, and utilises public transport more efficiently. Same for schoolchildren, since it reduces the school traffic. Shared transport is ideal, and public transport is the best example. Road tolls for single-occupant cars?? Free public transport for public servants to and from work? In a dampened economic climate, Northern Ireland should be positioned to take advantage of "green technologies" so that the local workforce can benefit from new employment opportunities.

We need to reduce, reuse and recycle, and with renewed incentives for these activities. We need to invest in and subsidise reliable alternative technologies and their development. We need to get the message out there loud and clear. We need access to information, not its prohibition! We cannot ignore the environment any longer, nor subject it to the short-termism of a political perspective, the so-called "pragmatic approach". The electoral cycle is short but the oceanic cycle is long.. What lies ahead is flood, drought, hurricane, and extinction of species. Time for action.

Helena Rafferty.

A handwritten signature in black ink, reading 'Helena Rafferty'. The signature is written in a cursive, flowing style with a large, stylized 'H' and 'R'.

Committee Clerk
Room 245, Parliament Buildings
Belfast
BT4 3XX

17 February 2009

Dear Mr McGarel,

Thank you for inviting me to submit a written response to your Committee.

Let me start with a brief summary about the basic properties of carbon dioxide, followed by a synopsis summary based on the terms set out in your invitation. In addition, there are nine attachments, four by UN IPCC Expert Reviewers, and each of which by itself should make your Committee think twice about climate change mitigation measures, a bandwagon process by which countries around the world are pressured to make widespread and costly commitments without an absolute or even a vague assurance that the phenomenon exists.

The UN's IPCC bases its dire forecasts on nothing more than computer models that regard the earth as a flat disk bathed in a constant 24 hour haze of sunlight, without north and south poles, without clouds and without any relationship to the real planet we live on.

Despite much rhetoric and research over the past two decades, there is still not a single piece of actual evidence that the now-maligned carbon dioxide molecule causes global warming (or "climate change").

To over 40,000 fellow scientists from around the world and to myself this is no surprise, for no such evidence can ever be found.

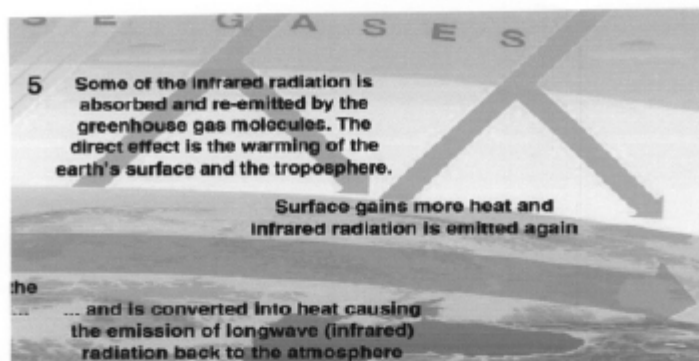
Carbon dioxide, at less than 400 parts per million by volume, does not and can not influence either the atmospheric temperature or the climate in a measurable way. Only laboratory experiments with heat lamps can make carbon dioxide do what climate change proponents want it to do, that is, warm the flasks that contain CO₂. Yet this is not principally how the open atmosphere gets heated and no laboratory experiment can mimic actual air dynamics or be extrapolated to represent them.

The earth's air hugs the surface like a thin shell which is encapsulated by a perfect thermal insulator: the vacuum of space. Earth does not need a "blanket of greenhouse gases" to keep it warm or protect it from the cold of space, because space is not cold at all, having no temperature of itself. In other words, it is a major misconception that the earth's temperature needs insulation to begin with, let alone that a trace gas at barely 400 parts per million by volume is providing this insulation. The as yet poorly understood adiabatic processes generate enough heat to keep the earth at a near-constant temperature with near-constant solar radiation providing the extra heat and energy for life as we know it.

Although the issues involved may seem hugely complex, they are simple if one looks at carbon dioxide's potential to warm the atmosphere or the earth.

First and foremost, air does not respond well to the electromagnetic radiation which CO₂ reacts to and re-emits.

Consider a microwave oven, where the interior's air is not warmed by the microwaves but by the heated food instead. This roughly simulates how the surface of the earth warms the swirling air that comes into contact with it. Yet the IPCC has it that energy radiated by the earth is re-radiated back by "greenhouse gases" which make the system ever warmer. This second-hand infrared energy supposedly causes a warming of the troposphere, as depicted in this UN IPCC graphic:



Without a cause, however, there can be no effect. This is why the predicted greenhouse tropospheric "hot spot" is missing. Not only is the hot spot not there, it cannot be there! *For without a cause there can be no effect.*

As per the same IPCC graphic, re-radiated infrared energy is also supposed to warm the earth. In reality, energy that is re-radiated by a molecule spreads out in three dimensions. Thus only about 35% at best can be directed back to where it came from.

But, **critically important**, *re-radiated energy cannot make a heat source any warmer than it was in the first place!* If it could, we would have found the holy grail of energy, a perpetuum mobile whereby more energy is extracted than what goes in. If reflecting heat back to a heat source raises its temperature, then just keep reflecting it to raise its temperature even more, and so on, till a one watt input generates a billion watts of power. Clearly impossible. *Yet this child's version of science has charmed much of the world into uncritical belief.*

Secondly and of equal importance is the fact that human activities constitute about 3% of the yearly emissions total. More than 98% of this total is absorbed within a year (thus contradicting the long residence claim). Since 1.5% is left over, which is recorded as the increase of atmospheric CO₂, the human contribution is only 3% of this 1.5%. This means that, as a maximum, only some 14 ppmv (parts per million by volume) of the increased levels of carbon dioxide can be ascribed to human activities, as indicated by figures provided by the US DOE and IPCC:

Gas	Sources			Absorption	Annual Increase in Gas in the Atmosphere
	Natural	Human-Made	Total		
Carbon Dioxide (Million Metric Tons of Gas) ^a	770,000	21,160	791,160	781,100	11,760
Methane (Million Metric Tons of Gas) ^a	239	359	598	575	22
Nitrous Oxide (Million Metric Tons of Gas) ^a	9.5	5.9	15.4	12.5	3.8

Energy Information Administration
Office of Integrated Analysis and Forecasting
U.S. Department of Energy

Source: Intergovernmental Panel on Climate Change, Climate Change 2001: The Scientific Basis (Cambridge, UK: Cambridge University Press, 2001).

Third is the inconvenient fact that the world hasn't been warming for a decade, anyway, despite a steady and ever climbing carbon dioxide level, proof enough by itself that no influence over global temperatures is to be gained from carbon dioxide.

From this short summary, coupled with my further comments below and the attachments hereto, I sincerely urge your Committee to demand positive proof from alarmist scientists to indicate that it is carbon dioxide and nothing else that has ever - now or in the past - caused any warming of the earth.

Actual observed evidence needs to be put on the table, not computer model outputs or presumptively-inferred evidence. Glaciers are not melting in alarming fashion, the Greenland icecap is not collapsing and the Arctic is not about to become ice-free. Neither is the Antarctic melting away and sea levels are not rising any faster than they have done for the past 11,000 years, etcetera etcetera etcetera - there is simply no irrefutable evidence.

Any and all alarmist predictions and observations have been decisively disproved over the past decade, whilst global temperatures have been going down rapidly instead of ever up as had been so widely predicted by the constant tweaking of climate models.

Based on the behaviour of the one and only true climate driver, our sun, your Committee as well as the UK Government would be better advised to prepare for longer, colder winters and shorter growing seasons for many decades to come.

With respect,



Hans Schreuder
Analytical chemist (ret.)

hans@ips-pix.biz

www.iiovermycarbondioxide.com/carbon dioxide.html

Enc:

- Synoptic summary
- Climate Change, by Richard Courtney, IPCC expert reviewer
- The Global Warming Scam, by Vincent Gray, IPCC expert reviewer
- Spinning the Climate, by Vincent Gray, IPCC expert reviewer
- CFC Destruction of Ozone, by Bob Ashworth, Chem. Eng. (En. & Env.)(ret.)
- Burn and Bury?, by Viv Forbes, geologist and mineral economist
- Letter to Ministers, by Piers Corbyn, astrophysicist (QMC)
- Under the weather, by Karel Beckman, editor-in-chief of European Energy Review
- Three essays on climate models, by Henk Tennekes, former dir. of research KNMI
- Selected additional excerpts, by the author

Hyperlinks to these attachments can be found on the Summary page.

This Submission is also online at <http://www.tech-know.eu/NISubmission/index.html>

Total number of pages of this Submission: 109.

Submission from Hans Schreuder re Climate Change Inquiry

From: McCann, Sean

Sent: 10 February 2009 08:12

To: Long, William

Cc: McGarel, Alex

Subject: FW: Northern Ireland Environment Committee Climate Change Inquiry

From: Hans IP [mailto:hans@ips-pix.biz]
Sent: 09 February 2009 22:07
To: McCann, Sean
Subject: Re: Northern Ireland Environment Committee Climate Change Inquiry

Sean,

Earlier than planned, but due to your NI Minister for the Environment, Sammy Wilson, being attacked for standing up for the truth, I hereby send you the first draft of my Submission - for the sole purpose of passing it along to Sammy Wilson.

Please allow me to reserve the right to change the final Submission, as I may wish to include further up-to-date scientific papers, which are coming out almost every day now.

The days of alarmism are over and Sammy Wilson needs all the support he can get.

Kind regards,

Hans Schreuder

**First Draft Submission - For the specific attention of Sammy Wilson,
Minister for the Environment**

Committee Clerk
Room 245, Parliament Buildings
Belfast
BT4 3XX

For the attention of Sean McCann, Environment Committee Staff

Dear Sean,

Thank you for inviting me to comment to your Committee.

I will start with a brief summary of the basics of carbon dioxide's properties, then follow with a synoptic summary based on the terms set out within the invitation. In addition, you will find six attachments, three by UN IPCC Expert Reviewers, and each of which by itself should make your Committee think twice about climate change mitigation measures, a bandwagon process by which countries around the world are pressured to make widespread and costly commitments without an absolute or even a vague assurance that the phenomenon exists.

The UN's IPCC bases its dire forecasts on nothing more than computer models that regard the earth as a flat disk bathed in a 24 hour haze of sunlight, without north and south poles, without clouds and without any relationship to the real planet we live on.

Despite much rhetoric and research over the past two decades, there is still not a single piece of actual evidence that the now-maligned carbon dioxide molecule causes global warming (or "climate change").

To over 40,000 fellow scientists from around the world and to myself this is no surprise, for no such evidence can ever be found.

Carbon dioxide, at less than 400 parts per million by volume, does not and can not influence either the atmospheric temperature or climate in a measurable way. Only laboratory experiments with heat lamps can make carbon dioxide do what climate change proponents want it to do, that is, warm the flasks that contain CO₂. Yet this is not principally how the open atmosphere gets heated and no laboratory experiment can mimic actual air dynamics or be extrapolated to represent them.

The earth's air hugs the surface like a thin shell and is encapsulated by a perfect insulator: the vacuum of space. Earth does not need a "blanket" of special gases to keep it warm or "protect" it from the cold of space, because space is not cold at all, having no temperature of itself. In other words, it is a major misconception that the earth's temperature needs insulation to begin with, let alone that a trace gas is providing this insulation.

Although the issues involved may seem hugely complex, they are simple if one looks at carbon dioxide's potential to warm the atmosphere.

First and foremost, air does not respond well to the electromagnetic radiation which CO₂ reacts to and re-emits.

Consider a microwave oven, where the interior's air is not warmed by the microwaves but by the heated food instead. This roughly simulates how the surface of the earth warms the swirling air that comes into contact with it. Yet the IPCC has it that energy radiated by the earth is re-radiated back by "greenhouse gases" which make the system even hotter. This second-hand infrared energy supposedly causes a warming of the troposphere, as depicted in this UN IPCC graphic:

Without a cause, however, there can be no effect. This is why the predicted greenhouse tropospheric "hot spot" is missing. Not only is the hot spot not there, it cannot be there! For without a cause there can be no effect.

As per the IPCC graphic above, re-radiated infrared energy is also supposed to warm the earth. In reality, energy that is re-radiated by a molecule spreads out in three dimensions. Thus only about 35% at best can be directed back to where it came from. But, critically important, re-radiated energy cannot make a heat source any warmer than it was in the first place! If it could, we would have found the holy grail of energy, a perpetuum mobile whereby more energy is extracted than what goes in. If reflecting heat back to a heat source raises its temperature, then just keep reflecting it to raise its temperature even more, and so on, till a one watt input generates a billion watts of power. Clearly impossible. Yet this child's version of science has charmed much of the world into uncritical belief.

Secondly and of equal importance is the fact that human activities constitute about 3% of the yearly emissions total. More than 98% of this total is absorbed within a year (thus contradicting the long residence claim). Since 1.5% is left over, which is recorded as the increase of atmospheric CO₂, the human contribution is only 3% of this 1.5%. This means that, as a maximum, only some 14 ppmv (parts per million by volume) of the increased levels of carbon dioxide can be ascribed to human activities, as indicated by figures provided by the US DOE and IPCC:

Third is the inconvenient fact that the world hasn't been warming for a decade, anyway, despite an ever climbing carbon dioxide level.

From this short summary, coupled with the attachments below, I sincerely urge your Committee to demand positive proof from alarmist scientists to indicate that it is carbon dioxide and nothing else that has ever - now or in the past - caused any warming of the earth.

Actual evidence needs to be put on the table, not computer model outputs or presumptively-inferred evidence. Glaciers are not melting in alarming fashion, the Greenland icecap is not collapsing and the Arctic is not about to become ice-free. Neither is the Antarctic melting away and sea levels are not rising any faster than they have done for the past 11,000 years.

Alarmist predictions have been decisively disproved over the past decade, as global temperatures have been going down instead of ever up as had been so widely predicted by the constant tweaking of climate models. Based on the behaviour of the one and only true climate driver, our sun, your Committee as well as the UK Government would be better advised to prepare for longer, colder winters and shorter growing seasons

With respect,

Hans Schreuder
www.ilovemycarbon dioxide.com/carbondioxide.html

Synoptic summary based on the terms of reference as set out in the stakeholder invitation.

To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

Climate change is far beyond the realm of humans to control and nothing humans do will change the climate from its natural and cyclical behaviour, which right now appears to be heading towards a lengthy period of colder winters and shorter growing seasons.

To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

No amount of action in whatever sector of the NI economy will have even the slightest influence over the climate, not in NI or anywhere in the world, even if the entire world co-operated with whatever the NI Government would want to implement.

To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

There will be huge costs associated with any kind of climate change directive with no benefits to or from the climate on any timescale.

To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO2 emissions. (Akin to Regulatory Impact Assessments/Rural Proofing)

Carbon dioxide does not have any influence over the climate. Despite billions of dollars spent on research, not one single piece of actual observational evidence has ever been presented to categorically indicate that it does. This is because no such evidence exists.

To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

Without knowing the details of the Plan referred to here, commenting would not be appropriate, other than to say that wind farms are an unreliable and highly inefficient source of energy requiring constant maintenance and destroying the habitats in which they are constructed.

To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

The entire issue of climate change obligations and legislation should be scrapped. Nothing at all that any government could possibly promote will have the slightest effect on the global climate. Issues of genuine pollution and wastage of energy should instead be addressed.

To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Act.

No secondary legislation should be considered, as no action that the NI Government may consider will have the slightest influence on the climate, neither locally nor globally.

To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

The Assembly would be well advised to appoint an independent board of enquiry made up of unbiased scientists who's brief it must be to provide actual evidence that carbon dioxide affects the climate, that carbon dioxide acts as a forcing agent to increase the temperature of the atmosphere, to prove conclusively that carbon dioxide - by whatever means - can increase the temperature of the atmosphere beyond the temperature that the atmosphere would reach by solar radiative input alone and finally, to prove beyond any doubt that the open atmosphere of our earth acts like a Fourier style greenhouse in warming up and thus increase the temperature of the atmosphere beyond the temperature that the atmosphere would reach by solar radiative input alone.

- To produce a report on the findings and recommendations of the inquiry by September 2009.

Should such a report conclude that specific actions are needed to curb emissions of carbon dioxide in order to influence the climate, then the Inquiry will have failed in its purpose of truthfully reporting on the actual state of not only our atmosphere but also the direction in which our climate appears to be heading due to the natural and cyclical behaviour of the climate as influenced by the sun, our position in space relative to the sun and various other celestial parameters over which we clearly have no control whatever.

Links to papers from some of the world's leading experts in climate science and related disciplines.

1. Climate Change: a constant policy challenge, by Richard Courtney, IPCC expert reviewer

http://www.ilovemycarbondioxide.com/pdf/Climate_Change-a-constant-policy-challenge.pdf

2. The Global Warming Scam, by Vincent Gray, IPCC expert reviewer

http://www.tech-know.eu/uploads/GLOBAL_SCAM.pdf

3. CFC Destruction of Ozone, by Bob Ashworth, Chem. Eng. (Energy & Environment)(ret.)

http://www.ilovemycarbondioxide.com/pdf/CFC_Destruction_of_Ozone.pdf

4. Burn and Bury?, by Viv Forbes, geologist and mineral economist

http://www.ilovemycarbondioxide.com/pdf/Burn_and_Bury.pdf

5. Letter to Ministers, by Piers Corbyn, astrophysicist (QMC) and first class Physics Imperial College

http://www.ilovemycarbondioxide.com/pdf/letter_to_ministers.pdf

6. Selected other excerpts, by Hans Schreuder, analytical chemist (ret.)

http://www.ilovemycarbondioxide.com/pdf/Hans_Schreuder_SUPPORTIVE_INFORMATION.pdf

end of first draft Submission

From: McCann, Sean

To: Hans IP

Sent: Monday, February 02, 2009 8:24 AM

Subject: RE: Northern Ireland Environment Committee Climate Change Inquiry

Hans

You could send me an electronic copy.

Thanks

Sean

From: Hans IP [mailto:hans@ips-pix.biz]

Sent: 30 January 2009 16:28

To: McCann, Sean; hoi@ilovemycarbondioxide.com

Cc: Long, William

Subject: Re: Northern Ireland Environment Committee Climate Change Inquiry

Sean,

Thank you for inviting me to submit a written response on the issue of climate change.

In due course and within the time limit set out in the terms of reference, I will submit my comments and would appreciate knowing if this could be done electronically or whether one or more hard copies need to be delivered to the address provided.

Kind regards,

Hans Schreuder
Ipswich, UK
www.ilovemycarbon dioxide.com

From: McCann, Sean
To: hoi@ilovemycarbon dioxide.com
Cc: Long, William
Sent: Friday, January 30, 2009 3:08 PM
Subject: Northern Ireland Environment Committee Climate Change Inquiry

Hans

Please find attached a letter inviting submissions to the NI Environment Committee's Climate Change Inquiry along with the Terms of Reference.

Thanks

Sean McCann
Environment Committee Staff
02890 521720

Kenny Boyd - request to provide oral evidence

From: patsymcglonemla@yahoo.ie [mailto:patsymcglonemla@yahoo.ie]
Sent: 23 February 2009 17:16
To: McGarel, Alex
Subject: Fw: Sammy Wilson

Alex, Mr Boyd would like to have his correspondence formally placed before the Committee and he would like to present to the Public Enquiry on climate change. Thank you. Patsy

Sent from my BlackBerry® wireless device

From: Kenny Boyd
Date: Sun, 22 Feb 2009 14:42:00 +0000
To: <p.mcglone@sdlp.ie>; <patsymcglonemla@yahoo.ie>
Subject: Sammy Wilson

Dear Patsy

We met at the UTV debate on climate change in December in which you were on the panel and I was in the audience. I have spent 15 years working in sustainable development here and in England. In 2007 I became the first man to swim bareskin across the Rathlin Sound raising money for Concern to buy hand held radios to alert of extreme weather events in Bangladesh. Last year I pioneered a race across the Rathlin Sound calling for a zero carbon future for Northern Ireland (www.swimforlife08.org)

I wanted to write to you in your capacity as Chair of the Environment Scrutiny Committee with regards to Sammy Wilson's recent comments and actions relating to climate change. Like so

many people across NI I am deeply saddened that we have no political leadership on this pressing issue. That our political system allows one individual's personal views influence his ministerial brief to such an extreme is a travesty of democracy and moral responsibility and is reprehensible. You know well that everything we do to avert catastrophic climate change is good for us in terms of enhanced energy efficiency, energy security, jobs and economic stability.

I recently had the pleasure of meeting and interviewing the Environment Minister for Bangladesh in Dhaka courtesy of Concern. He had not longed launched a Climate Change Strategy and Action Plan and the country is showing leadership with limited resources. We spoke of NI's approach and indeed the attitude of Sammy Wilson which was rather humiliating whilst listening to a political leader dramatically illustrate how his country is being ravaged by climate change (attributable to man made greenhouse gases). I also saw for myself how the country is being blighted and the daily struggle for survival as demonstrated by a mother who offered me her baby boy, such was the desperation of her situation.

Someone once said that "its not enough that we do our best, we have to do what is necessary."

I firmly believe (like so many others) that this is to steer our economy towards a zero carbon future as a matter of great urgency. I would urge you Patsy as a politician with moral skill and courage to use your considerable influence to ensure that bold steps are taken to ensure that this is the case.

Yours sincerely

Kenny

Kenny Boyd
boydkenny@hotmail.com
+44(0)7877309684

Met Office submission to the Northern Ireland Assembly Environment Committee: Inquiry into Climate Change



Introduction

1. The Met Office has a world-leading standing: because of its scientific excellence in both Numerical Weather Prediction and Climate Research and because - uniquely - both activities are carried out within one organisation using a single modelling suite. This combination of scientific expertise and operational capability means that the Met Office can provide "seamless" prediction - on timescales from an hour to 100 years - and is uniquely placed to understand how short or medium term forecasting and warning services can be used to manage some of the impacts of climate change.

2. Scientists from the Met Office's Hadley Centre made a significant contribution to the Intergovernmental Panel on Climate Change (IPCC) 4th assessment report and to the internationally recognised UK Stern review on the economics of climate change.

Climate Change is a reality

3. Climate change is real and getting worse. The earth is already nearly 0.8°C warmer than it was in around 1900. Without large and rapid global emissions reductions it is very likely that global warming will exceed 2°C over the coming decades .

4. The present day concentration of the main man-made greenhouse gas, CO₂, is already around 380 ppm. Other greenhouse gases add an equivalent CO₂ of around 70 ppm. Some estimates suggest that greenhouse gases would have to be stabilised at or below 500 ppm CO₂-eq to give a good chance of limiting eventual global temperature rises to between 2 and 3 °C above pre-industrial levels. The Met Office Hadley Centre models warn that an even lower level of 450 ppm would most likely be required. Even if we can limit global warming to between 2 and 3 °C, and local changes may be considerably larger over most of the globe, there will be significant changes in the world's climate, some of which may be irreversible.

Uncertainties in Climate Change

5. Although there is now a clear consensus on the reality of anthropogenic climate change there is a great deal of uncertainty in local detail particularly in relation to extreme weather events.

6. Detail in local predictions are limited because:

- Temperature changes are comparatively easy to predict, currently other parameters – such as cloud and wind – are subject to much greater uncertainty;
- Regional predictions can be subject to considerable uncertainty. For example for northern parts of the UK different climate models do not agree on the sign of summer rainfall changes. This results in wide range of predicted outcomes for many climate variables such as rain and wind. For some variables, this will make the predictions difficult to use for planning purposes;
- Computer limitations mean that climate predictions are generated at relatively coarse resolutions that do not represent important weather features, such as intense storms, as well as current weather forecast models;

7. Climate models are not suitable for assessing low frequency, high impact extreme events, for example 1 in 50 or 100 year events. It is not yet clear how far UKCP scenarios can be pushed in terms of assessing such extremes, though guidance is being developed for the release in April 2009. Given known model deficiencies in representing a range of important modes of climate variability, it is unlikely that they will be suitable for assessing the risk of extremes with periods of 1 in 20 years or greater.

8. Uncertainties in climate predictions are driven by several factors, including

- Climate sensitivity: the response of the climate to change in concentrations of greenhouse gases and aerosols;
- Carbon cycle: how climate effects the natural uptake of carbon;
- Regionalisation of climate response;

- Uncertainties in emissions pathways;
- Natural variability.

9. UKCP09 will, for the first time, provide estimates of the probability of a particular level of future change for a given weather variable – unlike UKCIP02 which only provided a single ‘most likely’ prediction. The estimation of uncertainty across a range of parameters is particularly valuable as, for example, predictions for temperature are likely to be significantly more reliable than for precipitation, wind and cloud.

10. There are good scientific reasons to believe that significant progress can be made over the next 5-10 years, to provide more reliable predictions at local scales, with reduced (and better quantified) uncertainties. However, achieving this will require a coordinated science programme, bringing together climate scientists across the UK and abroad, together with significantly enhanced supercomputing capacity.

11. Legislation should therefore remain as flexible as possible to accommodate increased understanding. Correct interpretation of the UKCP reports is vital to any future mitigation and adaptation strategies; the Met Office is well placed to support the Northern Ireland Assembly’s understanding of this work, and how it can best be applied in directing future policy and planning.

Mitigation and Adaptation

12. Fundamental to all strategic planning should be an understanding of the uncertainties of climate change and of the impact of mitigation activities on adaptation plans. If mitigation actions are themselves dependent on climate change (eg: implementation of some renewable energy sources, or non-fossil fuel energy sources such as nuclear) then the associated infrastructure (eg: siting of power stations) should take future climate changes and impacts into consideration.

13. The use of return periods for critical weather events in planning is useful in putting these into historical perspective. With climate change playing an increasing role in the evolution of current and future weather patterns, the use of return periods should not be used to predict the future likelihood of occurrence. Simply put, the past is no longer an adequate guide to the future.

14. Whatever emissions scenarios are realised over the next few decades, ‘inertia’ in climate system means that the extent of global warming is likely to remain broadly constant across the scenarios over the next 30 years. Consequently, a significant amount of adaptation will be required by both the public and private sector.

15. The time periods of 2020, 2050 and 2100 should all be considered if changes over these time periods affect decisions eg: on the development of infrastructure. In the near term (2020 or before), natural climate variability should be taken into account in addition to human-caused climate change.

16. Decadal forecasting techniques are being developed by the Met Office Hadley Centre to assist with decision-making affected by climate change on these timescales. In the longer term, the main driver of change is expected to be human-caused emissions of greenhouse gases. Again, climate modelling by the Met Office Hadley Centre can assist with that, including regional climate modelling such as that provided for UKCP09

17. Policy and adaptation planning requires an in-depth scientific understanding of future trends and risks. To be successful, early and coordinated intervention requires a sound understanding of the impacts of climate change and the impact of both the proposed adaptation and the impact of ongoing mitigation activities.

18. Adaptation must be seen as an ongoing requirement, not a single alteration or adjustment. Strategy must be flexible enough to accommodate increased understanding of climate change impacts. Key to adaptation is understanding the likely extent of future climate change, including the effects of mitigation, on the rate of change. In turn, the key to greater understanding of how climate change will evolve is to ensure we continue to align the advances in technology and in science to better model the global climate system. Future predictions will improve only if model complexity and model resolution improves in line with advances in the supporting science.

19. The Met Office is a world leading organisation, both in the field of weather forecasting and climate prediction which supports the UK's high profile policy role on climate change issues. Scientists from the Met Office's Hadley Centre made a significant contribution to the Intergovernmental Panel on Climate Change (IPCC) assessment reports and to the internationally recognised UK Stern review on the economics of climate change. We are at the forefront of world leading climate research, funnelling data from diverse natural sciences into climate prediction models that will produce, for example, the UKCP09 projections.

20. This, and our commitment to provide the best advice to science based policy, means we remain well placed to provide the guidance needed by the Northern Ireland Assembly to ensure policy remains flexible enough to react to increased understanding of climate change impacts, and that actions realise the greatest benefits as well mitigating the highest risks.

NI Branch of the Institute of Highways and Transportation (IHT)

**CLIMATE CHANGE AND SUSTAINABLE TRANSPORT –the challenge for
transport professionals**

**THE INSTITUTION OF HIGHWAYS AND TRANSPORTATION
TRANSPORT POLICY BOARD**

October 2008

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Project Team

CLIMATE CHANGE AND SUSTAINABLE TRANSPORT – *the challenge for transport professionals*, was produced by the Institution of Highways and Transportation's Transport Policy Board.

The core team of contributors was drawn from the Sustainable Transport Panel and comprised:

John Parry	Chairman, Consultant to Waterman Group
Dr Kit Mitchell	Independent Consultant
Stephen Atkins	MVA Consultancy
Jacqui Wilkinson	Department for Transport
Jon Parker	Integrated Transport Planning
John Waugh	Transport Consultant
Grant Butterworth	Nottingham City Council
Iain Macbeth	JMP
Professor Stephen Potter	Open University

Additional support, contributions and advice was provided by:

Jon Harris	Owen Williams
Dr Bachar Hakim	Scott Wilson
Robin Henshaw	Construction Products Industry Consultant
Richard Turner	Freight Transport Consultant

In addition to those already listed, helpful comments on drafts of the document were received from:

Bert Baillie	Transport Consultant
Cameron Kemp	Highland Regional Council
Nassar Malik	ATKINS
Mike Link	West Sussex County Council
Phil Sivell	TRL

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FOREWORD

For transportation professionals the increase in the demand for transport represents a major challenge at a time when society is beginning to acknowledge and come to terms with the global impact of 'climate change'. Consequently, with growing road usage and increasing congestion on the UK highway network already being seen as unsustainable, there is a clear opportunity for members of the Institution to take the lead in helping to deliver sustainable transport systems.

In this context it is also recognised that the promotion of sustainable transport systems and developments requires that we do things in a way that does not damage our environment for future generations.

Scientific evidence has clearly linked global warming with the increasing emission of greenhouse gases, with much of the increase in developed countries coming from transport. Because emissions from transport are increasing whilst emissions from other sectors are at constant or reducing levels, transport attracts much attention. This is of particular relevance for the UK where transport-related emissions represent about a quarter of the total produced.

IHT understands the importance of a high performing transport system to the economic prosperity of the UK, whilst also recognising that the demand for travel derives from complex interactions. Factors involved in this include economic issues, behaviour choices, and availability of travel options to meet the demand for travel to work, school, shopping and leisure, as well as the movement of goods and provision of services.

To address these issues and work towards mitigating the causes and impact of climate change, IHT has produced this report to help its members to achieve these objectives.

On behalf of the Institution, I am pleased to commend "*Climate Change and Sustainable Transport - the challenge for transport professionals*". I am sure it will make a worthwhile contribution to professional practice and assist all disciplines involved in the transport sector to address the consequential impacts of climate change.

David Tarrant, IHT President 2008 - 2009

PREFACE

The UK Climate Change Programme (2006) sets out the Government policies to reduce carbon footprint and greenhouse gas emissions in six sectors: transport, agriculture, energy, business, domestic, and public sector.

The Climate Change Bill was introduced in Parliament on 14 November 2007 and completed its passage through the House of Lords on 31 March 2008.

The Committee Stage of the House of Commons was completed in July 2008.

The aim is to receive Royal Assent in Autumn 2008. The Bill will create a new approach to managing and responding to climate change in the UK through: setting ambitious targets, taking powers to help achieve them, strengthening the institutional framework, enhancing the UK's ability to adapt to the impact of climate change and establishing clear and regular accountability to the UK Parliament and devolved legislatures.

The Government announced on 18 February 2008 that a review of the target to reduce the UK's CO₂ emissions by at least 60% by 2050 will become a statutory duty under the Climate Change Bill and has provided details of the terms of reference for that review.

In considering the transport sector and to bring these issues to the attention of members, the Institution of Highways and Transportation Transport Policy Board has undertaken this assessment by identifying transportation issues that are considered to be affected by, or assessed to have an influence or direct impact on, a changing climate. Five themes have been identified, within which the transport issues are set out in separate chapters.

In each chapter, consideration is given to the issues within the wider sustainability discussion and either the action which is being developed to mitigate the impact affecting climate change directly or indirectly or, in the absence of such action, the promotion of a way forward which will help to achieve the objectives of the Climate Change Bill.

The five themes are as follows: -

- Managing Demand

- Changing Behaviour
- Accessibility and Social Equity
- Technology and Safety
- Administration and Finance

Chapters within each theme attempt to provide background knowledge and information on current initiatives, with ideas and recommendations to address sustainable transport and to assist all disciplines involved with the transport sector.

For the wider population and consumer there is a real need for an appreciation of the impact of climate change on everyday life and activities.

It is considered that for all transportation and associated professionals this need now provides a real challenge and an opportunity to take the initiative and facilitate such an appreciation.

This document has been prepared to help transport professionals meet that challenge and to support their mission to promote and achieve sustainable transport systems and practices, with the overall objectives being to assist in reducing the causes of climate change and to minimise its impact.

John Parry
Chairman
IHT Sustainable Transport Panel

1. INTRODUCTION AND CURRENT POSITION

Introduction

For transportation professionals the increase in the demand for transport represents a major challenge at a time when society is beginning to assess the global impact of 'climate change'. Growing road usage, congestion and casualties from road collisions are already being seen as unsustainable.

Scientific evidence has clearly linked global warming with the increasing emission of greenhouse gases, with much of the increase in developed countries coming from transport. The Stern Review¹ confirmed that emissions have been, and continue to be driven by economic growth, yet stabilisation of greenhouse gas concentrations in the atmosphere is feasible and compatible with continued growth. The report concludes that with strong deliberate policy choices it is possible to 'decarbonise' developed and developing economies on the scale required for climate stabilisation while maintaining economic growth in both.

1.1 Sustainable Development and Transport

To reinforce the optimism in "Our Common Future", the World Commission on Environment and Development (Chairman Gro Harlem Brundtland)² stated that humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainable development does imply limits - not absolute limits but limitations imposed by the present state of technology and social organisation on environmental resources and by the ability of the biosphere to absorb the effects of human activities.

But technology and social organisation can be both managed and improved to make way for a new era of economic growth. The Commission believed that widespread poverty is no longer inevitable. Poverty is not only an evil in itself, but sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfil their aspirations for a better life. A world in which poverty is endemic will always be prone to ecological and other catastrophes.

Meeting essential needs requires not only a new era of economic growth for nations in which the majority are poor, but an assurance that those poor get their fair share of the resources required to sustain that growth. Such equity would be aided by political systems that secure effective citizen participation in decision-making and by greater democracy in international decision-making.

Sustainable global development requires that those who are more affluent adopt lifestyles within the planet's ecological means - in their use of energy, for example. Further, rapidly growing populations can increase the pressure on resources and slow any rise in living standards; thus sustainable development can only be pursued if population size and growth are in harmony with the changing productive potential of the ecosystem.

Yet in the end, sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs. It can therefore be concluded that by definition sustainable transport is transport operating in a way that can go on being used for ever.

The process of moving towards sustainable development and sustainable transport is not easy, nor will it be straightforward; difficult choices will have to be made. Thus, in the final analysis, sustainable development must rest on political will.

Background

At present, powered road transport is not sustainable, primarily because it is depleting a finite reserve of fossil fuel and emitting a rising amount of carbon dioxide and other gases, but also because of the number of casualties from road collisions, which are particularly large and rising rapidly in developing countries such as China, India and Brazil. Following the development of low-cost travel, which helped to generate the industrial revolution, there is a real need to address its environmental impacts such as noxious emissions and noise, encouraging unsustainable land development that causes extended journey patterns, and of course the casualties of road traffic.

Key Issues

Sustainable transport is a phrase established in the late 20th century to describe primarily all forms of transport, which minimise emissions of carbon dioxide and pollutants.

As interest in the sustainability of the various modes of travel has grown, the issue has also become more complex. Cycling and walking remain demonstrably quite sustainable travel modes but they will not replace the mobility provided by the motor car.

An initial enthusiasm for biodiesel, electric and hybrid fuel sources has become tempered by an appreciation that even here there are sustainability issues, such as the impact of growing crops for biodiesel on world food markets. Further questions are raised over the unsustainability of some means of electricity generation, the environmental impact of manufacturing

vehicles and providing the roads on which they operate all of which add uncertainty to an otherwise commendable rush for these alternatives.

There is a growing understanding of these issues with an increasing certainty of how best we can still meet mankind's continuing appetite for mobility, while reducing the resultant impact on the world's irreplaceable resources.

To respond to these demands it is considered that the transition to an environmentally sustainable transport system involves a combination of technological and demand-side transport policies and practices. Regulatory, educational and economic instruments can be used to encourage the development of cleaner transport technologies as well as the shift from road-based towards more environmentally benign modes of transport.

To address the delivery of effective sustainable transport, including infrastructure and associated activities, this report will examine the key issues and risks in terms of environmental and economic impacts, including social equity.

1.2 Current Position - Greenhouse Gas Emissions

The earth's climate is being changed by the emission into the atmosphere of a number of gases that alter the balance between heat reaching the earth from the sun and the radiation of heat from the earth into space. These gases are called 'greenhouse' gases because they increase the extent to which the atmosphere acts as a greenhouse, trapping heat.

The atmosphere has always acted as a greenhouse, and makes life possible by raising the temperature of the earth's surface about 33°C from the -18°C it would average without the atmosphere. The most important of the natural greenhouse gases is water vapour. Others are carbon dioxide, methane and nitrous oxide. As a result of man's activities, additional carbon dioxide, methane and nitrous oxide are being emitted, plus a number of industrial gases such as the CFCs. All of these are greenhouse gases.

The average temperature of the earth has been rising for at least the past century, though with a period of cooling in the 1960s and 1970s. Figure 1 shows the average annual temperatures for Central England since 1664 and for the whole world since 1861 (Hadley Centre for Climate Prediction and Research).

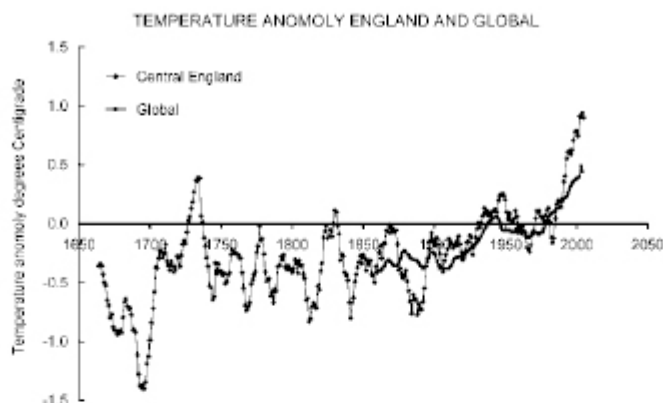


Figure 1
 Average annual temperatures in Central England and globally

The inventory of greenhouse gases emitted as a result of man's activities in the UK consists of 84% carbon dioxide (CO₂), 8% methane and 6% nitrous oxide. The remainder of this chapter will concentrate on the emission of carbon dioxide.

**Greenhouse Warming Potential (GWP) for UK Emissions of Greenhouse Gases
 in 2004**

Direct GHG	Emissions (kt) in 2004	GWP (100 years)	Global Warming Equivalence (equivalent kt of CO ₂)
CO ₂ (as carbon) ¹	153,601	3.7	568,322
CH ₄	2469	21	51,857
N ₂ O	132	310	40,794
HFCs ²	5.4	140 - 11,700	8,667
PFCs ²	0.05	6,500 - 9,200	352
SF ₆	0.05	23,900	1,127

¹ The emissions given here are on a United Nations Economic Commission for Europe (UNECE) basis and do not include emissions due to land-use change

² A range of GWPs are used as this refers to a group of compounds.

Source: UK Emissions of Air Pollutants 1970 to 2004
 UK Emissions Inventory Team, AEA Energy & Environment

Carbon Dioxide in the Atmosphere

As a result of man's activities, the concentration of carbon dioxide in the atmosphere has risen from around 280 ppm (parts per million) in pre-industrial times to 383 ppm in 2007, and is currently rising at about 2 - 3 ppm per year. Carbon dioxide emissions are rising in most countries and in the world as a whole³ (Figures 2a and 2b).

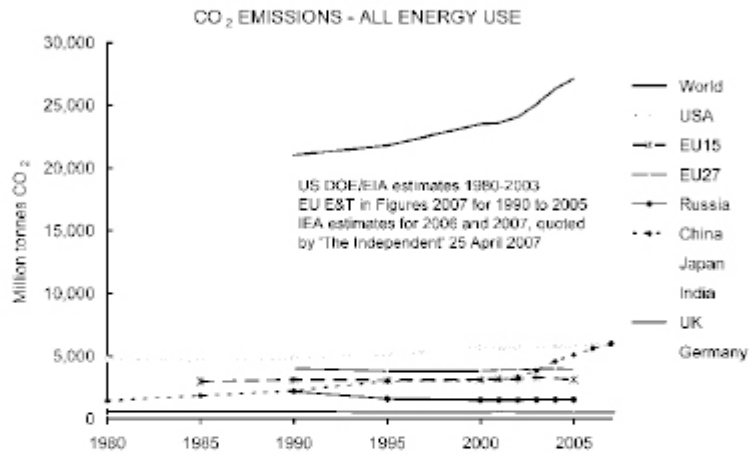


Figure 2a Carbon dioxide emissions from energy use – World, E.U., and selected large countries

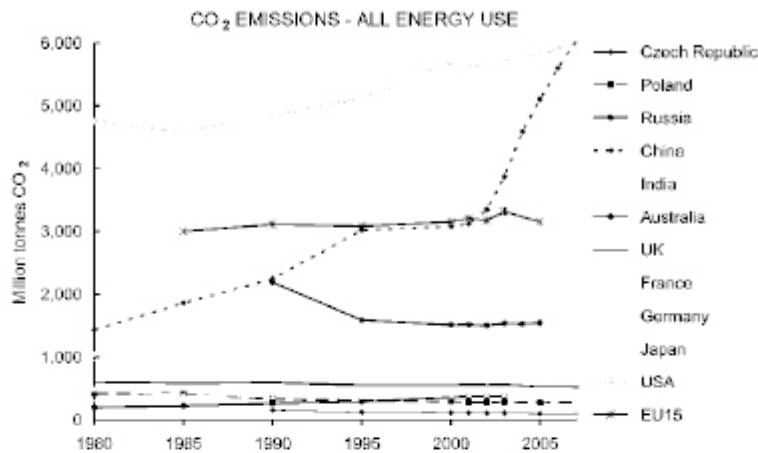


Figure 2b Carbon dioxide emissions from energy use – E.U. and selected countries

The Intergovernmental Panel on Climate Change (IPCC) considers that it would be wise to avoid the concentration of carbon dioxide and other greenhouse gases exceeding about 550 ppm CO₂ equivalent, and many scientists recommend a lower safe limit of 450 ppm CO₂ equivalent. This is to limit the anthropomorphic temperature rise to about 2°C. To achieve this limit, the worldwide emission of carbon dioxide needs to be reduced by at least 60% from current levels². This will require changes in the ways that almost all the activities of the developed countries are performed.

If rising prosperity in the developing world means that the emission of carbon dioxide per person becomes more equal between developed and developing countries, then the reduction in CO₂ emissions in the UK, and other developed countries, will need to be *much more* than 60%.

The Climate Change Act 2008, enacted on 26 November, sets the duty of the Secretary of State to ensure that the net UK carbon account for the year 2050 is at least 80% lower than the 1990 baseline. The Committee on Climate Change published its first annual report on 1 December 2008, in which it recommends intermediate targets for the periods 2008 – 2012, 2013 – 2017, and 2018 – 2022. It also suggests that deep emissions cuts in road transport can be achieved through improved fuel efficiency of new cars and vans in the first three budget periods.

UK Emission of Carbon Dioxide

The total UK emission of carbon dioxide in 2004 was 153.6 million tonnes of carbon (563.2 million tonnes of CO₂). Of this, 35.2 million tonnes (22.9%) was from all domestic transport, of which 32.7 million tonnes (21.3%) was from all road transport and 19.1 million tonnes (12.4%) from cars³ (Figure 3). The biggest single domestic source is public electricity and heat production, at 56.8 million tonnes, with residential heating and manufacturing industry almost equal at about 23 million tonnes each. However, emissions from transport are increasing, while emissions from all other sectors are reducing or steady, which is why transport attracts so much attention from policy-makers and environmentalists.

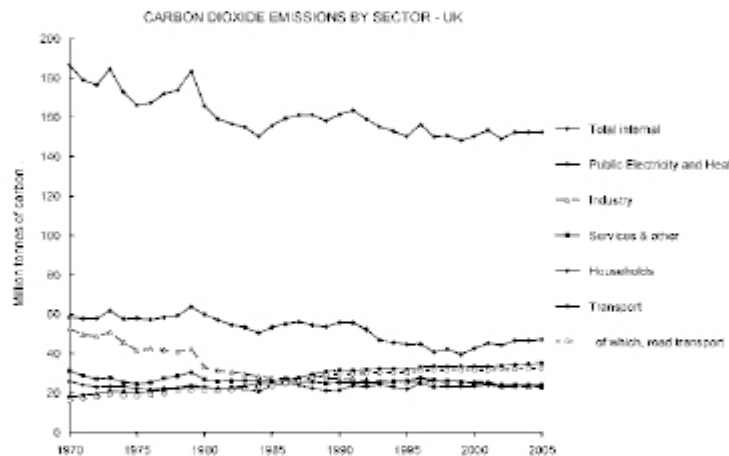


Figure 3 Carbon dioxide emissions by sector – United Kingdom

Emissions from international aviation and international shipping do not count as part of the UK emissions total, but in 2005 the quantities involved were 9.5 million tonnes from aviation and 1.6 million tonnes from shipping. Thus emissions from international aviation departing or arriving in the UK are about 6% of total UK emissions (but additional to that total).

As can be seen from Figure 4, total emissions from car traffic have not increased significantly since the early 1990s, and by 2005 were falling slightly. This shows that the fuel efficiency of the car fleet is improving as rapidly as traffic is growing. Emissions from goods vehicles, both light and heavy, are growing.

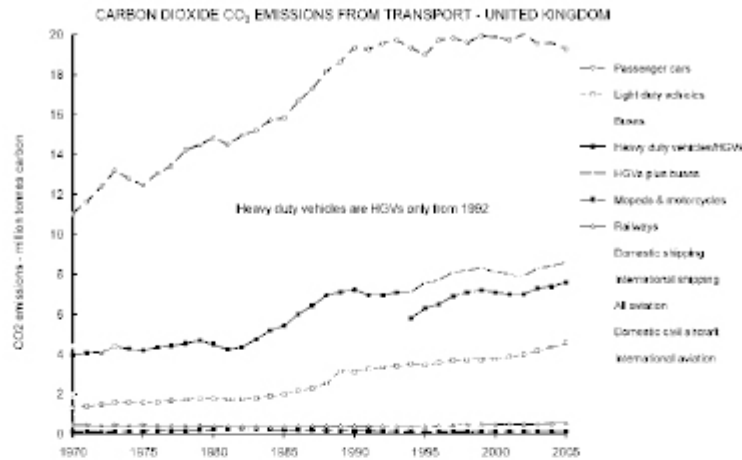


Figure 4 Carbon dioxide emissions from transport – United Kingdom

Emissions from the car fleet could be much less, if cars were smaller and more fuel efficient. Fuel consumption increases very approximately with engine capacity and vehicle weight. This, and the implications of moving to alternative fuels, is considered in more detail later in the paper in the chapters in Technology.

Conclusions

Emission of anthropomorphic greenhouse gases has raised the concentration of carbon dioxide in the atmosphere from around 280 ppm before the industrial revolution to 383 ppm in 2007. In the last century the global average temperature has increased by about 0.9°C and the average temperature in central England by about 1.4°C (Fig 1). Emission of carbon dioxide is rising in many countries, though in EU27 it is falling.

In United Kingdom, production of public electricity and heat is responsible for 31% of total emissions of CO₂, all transport produces 23% of emissions, and car traffic 12.7% in 2005. Industry, households and services each produce about 15% of total emissions.

Emission of carbon dioxide from all car traffic was almost constant between 1993 and 2003, and is now falling. This implies that the fuel economy of the average car in service is improving faster than traffic is growing. Carbon dioxide emissions from road traffic are growing, but this growth is due to growing emissions from freight transport.

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2. MANAGING DEMAND

General Introduction

Growing demand for travel threatens to cause unsustainable requirements for energy and for the capacity of transport systems, resulting in unsustainable emissions, congestion and casualties from transport collisions. Some of these consequences can be mitigated by improvements to technology but, to achieve a sustainable situation, it is inevitable that steps to manage and limit demand for travel will have to be taken.

Demand for travel can be managed by measures that persuade people not to travel, or to travel at times and in ways that are sustainable. These are called 'soft' measures, and in order to be successful require the options that they are persuading people to adopt to be convenient, easy to use and affordable. In addition, and more usual at present, are so-called 'hard' measures, that deter or prevent people from travelling at times or in ways that are not sustainable.

The great majority of journeys are made to access an activity, product or service, not for the pleasure of travelling for its own sake. Therefore the need to travel is generated by the activities, products and services that people require, and by their locations relative to each other. Land-use planning is fundamental to the generation of demand for travel, and sustainable transport will require land-use patterns, and the provision of transport options, that allow people and goods to move in sustainable ways.

The reasons that people travel and goods are moved can be classified into a small number of general headings. For people, the main purposes of travel can be expressed as the average number of trips per year per person for various activities, and the average distance a person travels (Table 1). The figures are averages for the whole population, and should be read in the context of the percentage of people who go to work, go to school, and participate in the other activities listed.

Commuting only accounts for 15% of all journeys and 19.5% of the total distance travelled. The activity that generates most travel is visiting friends, at 20% of total mileage, with shopping and leisure activities each generating 13% of the miles travelled. The travel generated by commuting has fallen slightly over the past decade.

Of course, commuting and education trips happen at peak times and contribute disproportionately to congestion and to demands for increased capacity for transport systems.

TABLE 1 Travel per person per year by purpose – Great Britain 2006

Journey purpose	Trips per year	Distance per year, miles	Average trip length, miles
To/from work	160	1,391	8.7
In course of work	35	682	19.4
To/from shopping	219	926	4.2
Personal business	105	488	4.6
Education	62	205	3.3
Escort	141	588	4.2
Visiting friends	168	1,414	8.4
Leisure and sport	137	914	6.7
Holiday	11		

	525
	47.7
All purposes	1,037
	7,133
	6.9
Source:	National Travel Survey 2006

This chapter considers approaches to strategic planning for sustainable development. This includes planning policy for urban and rural developments, design of residential areas and the locations of activities, and responses to population growth. Demand for the movement of goods is considered later.

A key element of sustainable developments is access to consumer goods and services. Shopping accounts for around 20% of all trips made in Britain. Shopping is changing, with the development of out-of-town retail centres over the past forty years and the current growth of on-line shopping. At the same time globalisation has increased the viability of supermarkets providing 'out of season' goods throughout the year and, more generally, an increasing percentage of consumer goods are imported. All these trends affect travel for shopping by consumers and the movement of goods.

The chapter considers how transport can either take a reactive role in responding to the consumer demands for goods and services, or work more proactively with the retail sector to influence future patterns, including the need for a proper evaluation of the impacts of making food products available out of 'local' season.

The final section of this chapter considers the efficiency of freight transportation in terms of fuel use and operation. The cost of fuel is a very significant part of the cost of freight operations, so anything that can be done at a reasonable price to reduce the amount of fuel used will be done for commercial reasons. On the other hand, transport costs are a small part of the costs of the manufacture and retailing of goods, so an efficient distribution system is a higher priority than minimising the cost of transporting goods. This

may militate against making changes to manufacturing, distribution and retailing arrangements, to reduce vehicle kilometres and fuel used by goods vehicles.

2.1 Planning Policies, Residential Standards and Strategic Assessment of Infrastructure and Resource Needs

Introduction

As a densely populated country, transport planning and land-use planning are inextricably linked. In fact, it could be argued they are the same thing. In simple terms, everyone needs a home, many people need a job, some need access to education, and all need access to shopping, health services, friends and leisure activities. Planning the best locations and layouts of residential developments and the activities that people need to access has to recognise and assess the availability and affordability of transport choices, both those existing and those that could be secured as part of the development process. Travel to work and school has particular impacts on peak travel flows, so that once these two primary drivers are established, services such as health, retail and leisure provision can follow.

Considering how the availability and affordability of transport can be improved in the context of existing and emerging planning frameworks is a challenge to both the land-use and transport planning professions. Wider fuel and environmental factors will undoubtedly colour this picture increasingly over the coming decades, and it is necessary to be open, responsive and innovative to ensure that UK Plc continues to compete in an increasingly global economy. Professionals are continually seeking to resolve the problems caused by planning mistakes made over the previous 30 years or so and attempting to avoid the repetition of such mistakes.

Availability

Historically, concentrations of people, markets and services converged organically around our early towns and cities. The need for local transport improvements was self-evident, and generally driven without Government intervention. Following the turnpike operators and the canal builders, the Victorian railway companies developed major strategic inter-urban transport networks and many of their investment decisions continue to have very real impacts upon the competitiveness of our towns and cities today.

There are signs that the way in which competition has been introduced to travel modes over the past 20 years is being reconsidered. The Rail Regulator is struggling to ensure that acceptable standards of customer satisfaction are being achieved on the rail network. Outside London the efforts of the major bus operators to achieve high levels of customer satisfaction and to arrest the underlying decline in bus use would appear to have failed in many areas, although there are examples of success in cities such as Cambridge, Brighton

Nottingham and Reading, where quality services have led to increased patronage.

Many of our transport networks and services are still currently operated as commercial activities. Although the safety net of tendered bus services represents a significant proportion of registered mileage, the bus super groups have delivered many more miles of services operated than pre-1985, albeit not with the levels of patronage growth the Government of the day might have desired.

Recent growth in bus patronage as a result of the introduction of free travel for older people masks the decline of fare-paying passengers. This is creating major funding issues for local authorities with an accelerating decline in funds available for supporting uneconomic but socially desirable bus services. Discussions continue as to whether increased control of bus services by local authorities will increase the attractiveness of bus travel.

The role of the Traffic Commissioners is also under review for their part in the operation of the country's bus networks. There is little doubt that increased bus services offer the potential for a highly cost-effective and significant instrument of modal shift away from private car use.

A constrained national rail market mechanism has delivered some benefits alongside some difficulties such as overcrowding and spiralling unregulated fares.

Market factors have not played a full part in road network provision, although cost-benefit analysis seeks to test the financial value of road investments, and schemes such as the M6 Toll and some bridges provide tentative models which could be applied on a wider basis, maybe alongside new congestion charging schemes.

However, these transport networks and services are only one part of a two-sided situation. To what extent have developers of housing, employment sites, schools, health, retail and leisure sites over the last 20 years contributed to providing, supporting and sustaining transport services?

Certainly Section 106 Contributions have delivered many local enhancements (usually highway improvements) directly attributable to a relevant development. In areas where development pressures are strongest or political governance is straightforward (London) the negotiation process can secure wider, more innovative, prizes. The challenge of achieving sustainable transport infrastructure for cyclists and pedestrians and complementary pump-priming bus services with revenue funding or capital support through vehicle purchase and subsequent contract price suppression can be met, but only with persistence and a reasonably responsive developer.

Differences over priorities can occur in two-tier authority areas or in the former Metropolitan areas where Passenger Transport Authorities might have different objectives (or political control) to those of the planning authorities.

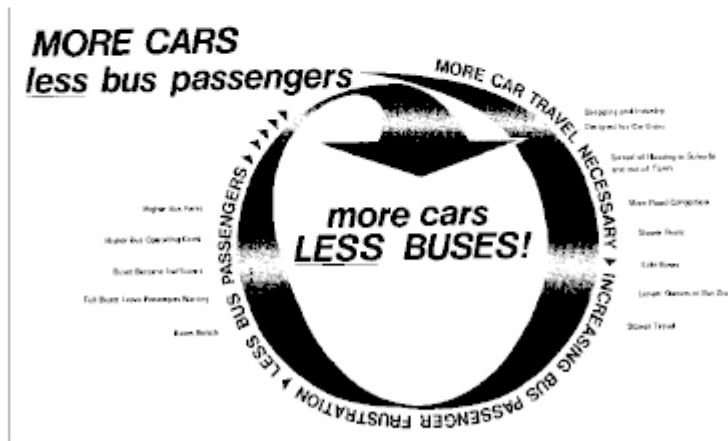
Debates over the appropriate structure of local governance as prompted by the Sub-National Review and the Transport Bill are covered in the theme Administration and Finance. However, resolution of some of these conflicting priorities should not be shelved, particularly in the context of emerging new mechanisms and policies of the Government, set out further below.

Affordability

The sustained economic growth of the last ten years or so has been enjoyed in the context of low but volatile and highly-taxed fuel prices. The cost of travel by car has remained constant up to 2008, while the costs of bus and rail travel have increased. On these trends, assuming car use is unconstrained, public transport will remain an option of last choice.

But, despite the abandoning of the fuel duty escalator, car use is not unconstrained. Whilst national politicians may be uncomfortable with admitting to policies which discourage the use of the car, local government applies a variety of measures such as reducing the number of parking places, charging for parking and, in London and Durham, road pricing.

Where car use is constrained, public transport not only survives, but also thrives. Back in the heady days of the 1970s, this was understood. The vicious circle of public transport decline set out in Nottingham's 'Zone and Collar' Prospectus remains as true today as it was then.



National Planning Guidance dictates how local authorities should balance development pressures, consider the transport implications of developments

and set the level of parking provision, but to some people (including some planners) it is still a black art, summarised in four highly simplified steps as shown in the box.

How does Residential Planning Work?

Step 1

A 'black box' demographic formula, driven by population trends and projections and balanced with the demands for homes as evidenced by household formation and house prices, is employed by Government statisticians and associated advisors to come up with national housing targets.

Step 2

These numbers are disaggregated to the Regional Planning Bodies (currently the Regional Assemblies, from 2010 the Regional Development Agencies) who through extensive negotiations between constituent planning authorities come up with a proposed level and distribution of housing across the respective local authority areas. This proposed distribution is tested at:

Stage 3

A Public Examination where authorities, agencies and interest groups can all have their say in whether the housing numbers are correctly identified and allocated. It is at this stage the extent and robustness of supporting plans and programmes for transport infrastructure, foul drainage, waste, energy and education can in theory be tested. The report of the Examination Panel is then passed to the Government who come up with a final distribution of housing numbers, which is then apportioned to District levels or Unitary Councils in the form of of Statutory Planning Guidance.

Stage 4

Local Planning authorities then allocate sufficient sites within their Local Development Frameworks to accommodate the required housing numbers. New Guidance requires that authorities without a defensible five-year supply of available land with housing allocations will face difficulties resisting speculative residential development proposals in the planning appeal system.

In assessing the four stages Step 3 is an interesting one. In theory, existing or proposed road, rail and public transport investment schemes should be assessed to determine how the travel demands caused by developments could be served or supported.

In reality, the uncertainties over transport scheme delivery beyond the approved 3-year Regional Funding Allocation (RFA) mean that decisions need to be based on many assumptions and assertions rather than firm commitments, particularly in the case of rail initiatives.

Major schemes within Local Transport Plans are becoming costlier to design and develop, and less likely to gain approval within constrained RFA Budgets. If they do get approved, councils now need to find local financial contributions towards the schemes, in the context of decreasing available budgets and increasing budget pressures.

The Highways Agency (HA), is also in an invidious position; new schemes are now required to secure endorsement via the RFA process, overcoming the twin obstacles of local authority self-interest promoting their own schemes, and the inadequacy of the regionally devolved RFA Budgets to handle the scale and cost of traditional HA projects.

Step 4 is proving a real problem, not yet fully recognised by the Government. The new planning process is very prescriptive, and much more prone to legal challenge and delay than the previous one. It requires the ability to coordinate a vast range of spatial plans and programmes of agencies, most of which are at very different stages in their approval cycles. Developers are becoming increasingly frustrated by the lack of adopted planning documents to guide the development process.

A Brave New World?

Times however are changing, and fast. The Government has responded to the increasing price pressures in the housing market with a raft of new policy initiatives. The Housing Green Paper sets new, more ambitious, housing delivery targets. More houses, more quickly. Local authorities stand the chance of losing planning appeals for residential schemes if they fail to demonstrate a robust and available five-year supply of land. The Government's main tool for managing planning performance, the Planning Delivery Grant, has to date been applied to encourage authorities to determine applications within the 8 week Best Value Performance Indicator, (BVPI) target. It is now to become the Housing Planning and Delivery Grant, focused instead on housing delivery.

The Sub-National Review on Economic Development trails an aspiration for devolution of funding via the Regional Development Agencies, with more effective local scrutiny. Bringing transport into Local Area Agreements (LAA) in theory means more local control over allocation of funding, with fewer national targets to constrain local decision-making. The abandonment of Planning Gain Supplement and development of a new form of the Development Charge tariff system will offer a potentially huge boost to support housing delivery. The Treasury and Department for Communities and Local Government (DCLG) are reviewing the implications of these changes.

The Comprehensive Spending Review, (CSR), 2007 was not as bad for transport as some predicted, but there is still incentive for local politicians to hold their nerve on Congestion Charging, which could unlock significant new funding for transport via the Transport Innovation Fund, (TIF), (and more importantly the borrowing that the revenues from potential schemes will deliver?). TIF can provide revenue as well as capital funding, and potential could overcome the problem of local authorities unable to provide schemes that require revenue support.

But perhaps the most immediate, biggest wave of change about to flow over and through the development process could be the Growth Point Programme¹. To date there are already significant numbers of authorities across England who have 'volunteered' to become Growth Points and more are due to follow; they will take responsibility for delivering more houses, more quickly. They aspire to access new Government Growth Point funding, and gain priority access to existing programmes, including the next RFA round.

The new concept of 'Eco-towns' is also generating a very heated debate, with vocal concerns being expressed about large-scale new settlements being encouraged 'outside' the planning process. There is scepticism about whether the Government's expectations of high environmental standards and challenging modal split targets will prove deliverable, particularly in the current uncertain housing market conditions.

Many of the substantial sites proposed for eco-towns and those emerging within many Growth Point programmes have no formal planning status, yet do have real significance for existing and developing transport programmes not least those of the Highways Agency. Many of the sites advanced will be highly profitable urban extensions on land released from Green Belts across the country.

Developers holding options on such sites are already lining up applications and courting the HA and local authorities with offers of substantial inducements to support this new wave of suburban expansion. And herein lies a very real and present danger.

A New Residential Standard

Planning of previous waves of suburban development has not proven to be without its mistakes. Large estates on the urban edge, designed around cars rather than people, with low densities, high levels of parking provision and dispersed or disconnected services have proved to be attractive to affluent, middle-class, and 2/3 car owning families, largely at the expense of higher density inner city areas.

Declining levels of bus patronage, cycling and walking reflect the lack of an integrated approach, and patterns of social exclusion have been compounded and exacerbated by much of the housing development built in the 1970s, 80s and 90s. In the 1950s and 60s, attempts at higher density urban development

failed at an even more basic level with catastrophic social breakdown and riots in some inner cities.

Regeneration and reuse of Brownfield land is disadvantaged by high levels of reclamation costs and/or the land assembly challenges of multiple ownership, as opposed to the convenience of open green field sites, easily accessed and often easily obtained with one or two simple transactions. Developers have tried to rebalance returns in the inner cities with high numbers of single- and two-bedroomed flats, often driven by 'off-plan' investment funding. Yet the patterns of occupancy of such developments often do not seem to be able to deliver the balanced, sustainable mixed communities sought by local authorities.

'Affordable Housing' quotas can be desirable objectives but can sometimes play against balanced community objectives. In deprived inner city areas the planning system may well aspire to deliver less affordable homes to regenerate the area.

The current situation presents a dichotomy in that the incentives provided by the Government to deliver more houses will be very strong and powerful, and local authorities will be chasing these incentives keenly. Those that succeed in the short term may in the long run regret hasty decisions unless the development conceived and delivered is of an appropriate quality, and this is the real challenge facing land-use and transport planners.

For the proposed development of eco-towns, such challenges will be particularly relevant for the design of street networks and the strategic opportunity in influencing travel behaviour through the provision of smarter travel choices. However, growth is not just about urban expansion. There is a need to transform existing neighbourhoods within cities and towns, shaping places in ways which attract and retain families as well as the single-person households encouraged by the current 'black box' formula.

In terms of design we have a once-in-a-generation opportunity afforded by Manual for Streets² and Guidance on Transport Assessment (GTA)³, with the new Government emphasis on design quality and place shaping. Exemplars are emerging but they are far from the norm.

Conclusions on Planning Issues

The new economic drivers are considered, in the medium term, likely to work with, rather than against, integrated transport where it can serve new developments. Sustaining integrated urban and suburban living patterns will become even more of a priority as fuel prices increase.

Reducing the need to travel will not be just an environmentalist objective, but it will become one necessitated by daily and weekly household budgeting. It will play an increasing role in choices about where to buy a house or where to seek work.

If this is recognised as we pursue the Government's new agenda for growth, will we prove capable of delivering new residential standards of which we can be proud in 30 years time, rather than yet another failed attempt at intervention?

References

- ¹ "Partnership for Growth", Ministerial Announcement, Department for Communities and Local Government, June 2006
- ² "Manual for Streets" (MfS), Department for Transport, March 2007. This supersedes 'Design Bulletin 32', and its companion guide, 'Places, Streets and Movement' which have now been withdrawn in England and Wales
- ³ "Guidance on Transport Assessment (GTA)", Department for Transport, March 2007. The guide is for England only and should be read in the context of relevant Government policies

Issues and Recommendations

- In areas where development pressures are strongest, the negotiation process through Section 106 Contributions can secure wider sustainable transport infrastructure for cyclists, pedestrians and complementary pump priming for bus service enhancements.
- Local Planning Authorities can benefit from a defensible five-year supply of land as part of their Development Framework in order to avoid speculative residential development pressures in the planning appeal system
- Many of the substantial sites, emerging within many Growth Point Programmes, have no formal planning status. However, they do have real significance for existing and developing transport programmes, especially those of the Highways Agency. Moreover, integrated transport provisions should be used by transportation and planning professionals for the planning and design of new housing estates (many of which will be suburban extensions). This can be achieved by adopting the principles of the DfT's Manual for Streets and Guidance on Transport Assessment (GTA).

2.2 Measures for Managing Travel Demand

Introduction

Demand for travel can be affected by measures that rely on persuasion and by measures that deter travel in a variety of ways. The effect of so-called 'soft' measures is reviewed in the next chapter "Changing Behaviour". The conclusion is that, provided attractive alternatives to the car are available, soft measures can be more effective than is appreciated by most transport planners.

Hard and Soft Measures

'Hard' measures depend on making car use less attractive at times or in places where good alternatives exist. Measures frequently employed are:

- Reducing the number of parking spaces in city centres;
- Increasing the cost of parking;
- Transferring road space to bus lanes;
- Providing direct bus routes with priority lanes while forcing cars to take tortuous routes;
- Closing residential roads to block through routes;
- Creating pedestrian or no-car areas; and
- Road pricing or congestion charging.

Measures such as those listed above should be combined with improved provision of public transport, park and ride schemes, additional parking to serve railway stations and tram stops, car clubs, cycle lanes and cycle parks and improved conditions for pedestrians. Many schemes in continental Europe provide excellent examples of packages of measures that have achieved transfer from car to public transport, cycle or walking.

'Soft' measures are reviewed in detail in the next chapter, "Changing Behaviour". These include:

- Workplace travel planning;
- School travel planning;
- Personalised travel planning;
- Public transport information and marketing;
- Car clubs and car sharing; and
- Teleworking, teleconferencing and home shopping.

Studies show that workplace travel plans typically reduce commuter car driving by between 10% and 30%, school travel plans cut school run car traffic by between 8% and 15%, and personalised travel planning achieve

reductions in car use of 7% -15% in urban areas and 2% - 6% in rural and smaller urban areas.

2.3 The Retail Sector and Transportation

Introduction

Shopping accounts for around 20% of all trips made in Britain. In 2006, the Commission for Integrated Transport, (CfIT) produced a report "Sustainable Transport Choices and the Retail Sector"¹. The aims of this research can be summarised as:

- To assess the nature of the relationship between mode of travel and retail spending in various retail sectors;
- To compare patterns of expenditure and mode of travel between different retail sites at town centre, edge-of-centre and out-of-town sites;
- To establish spending levels among those who travel by car compared to those who travel by bus, taking account of income levels;
- To identify the effect of local transport policy on shopping locations; and
- To establish the main transport priorities of shoppers in various locations.

The study examined spending patterns in various types of shop, at various types of location, by customers who travelled in various ways. In general, public transport users are slightly more likely to spend over £10 per visit than private transport users in the city centre, but unsurprisingly spend less at less convenient locations and in general are still less likely than private transport users to spend over £30. Those who walk and cycle are likely to spend less than car users in any location. In general, however, the differences are modest and do not suggest that the contribution of public transport users to the local economy on an individual basis is of a different order of magnitude to that of private transport users.

Public transport users are both more dependent on town centres and also more likely to spend more of their income there. Trips to supermarkets are dominated by car usage, as much because of the limited alternatives as by the need to have a car in order to convey shopping. Overall, the average public transport user contributes more to the local economy in the shape of local convenience stores and town centre stores whereas private transport users are more likely to patronise supermarkets and out-of-town locations. The availability of public transport services to the former and free parking at the latter mean that this is not an unexpected outcome.

In a study of six cities, car users spent more per trip than public transport users, but the difference was on average no more than 20%. Public transport

users do, however, make slightly more shopping trips, and are more likely to make their purchases in their local shops and city centres.

Parking is the main policy issue of concern to the retail sector. The cost of parking in the city centre is considered to be a threat, yet the provision of Park & Ride is viewed positively although its implementation can be problematic¹. The one residual concern with Park & Ride is that it is less attractive for those with heavy goods. Home delivery services overcome some of these concerns, but availability is not universal.

"People are willing to drive further if they are getting cheaper or free car parking like to Portslade or Lewes. People will also have day-trips to Bluewater because it has the same shops and is undercover."

"I have lost customers because there's not enough car parking outside the shop...customers can't stay and look because their [parking] tickets will run out."

Some larger retailers seemed more aware of the benefits that sustainable transport policies bring to both the city and the retail sector, for example, by putting in measures that reduce traffic and that are beneficial to the environment. Congestion on the highway network is also a concern but appears to be considered as less of a determinant on choice of destination than the problems of parking. Public transport was recognised as being beneficial, notably in Nottingham and Brighton where a step change in service quality has been recently achieved.

Retail Shopping Trends

Over the past decade, the average number of shopping trips per person per year has declined from 237 to 219, and the distance travelled has fluctuated between 879 and 963 miles. The average trip length has fluctuated between 3.9 and 4.4 miles, but the percentage of shopping journeys that are by car has risen from 54% to 62%. Journeys on foot for shopping have reduced from 33% to 25% of all shopping trips².

The impact of on-line shopping also looks set to continue, changing transport demands, particularly the increase in 'white van' movements.

Annex A2.3, "Retail Sector Impact on Transport", considers in more detail how transport can either take a reactive role in responding to these demands, or work more proactively with the retail sector to influence future patterns. This includes the need for a proper evaluation of the ability to receive food products out of 'local' season against the global environment health and influence on climate change.

Conclusions

Retail activity has changed over the past 20 years and retailers are continuing to adapt to the changing demands of consumers as technology advances, lifestyles change and as local and national government policies are changed and introduced.

Key drivers for successful retailing are accessibility and consumer choice. Transport therefore plays a significant role either directly or indirectly in the future success of retailing in the UK and policies should reflect this.

The cost of parking is a significant issue, and local authorities have an unenviable balancing act to perform. Parking charges levied to deter all-day parking for employment can improve journey reliability and reduce journey times for public transport, but equally could deter retail customers. The availability of free parking at out-of-town locations and the reliance on the private car to access them are significant factors that show little sign of change.

Current trends suggest that e-shopping will become increasingly popular over the coming years, and while this may not reduce the number of trips to be made, it may change the type of trips that are made, with greater numbers of home deliveries.

Transport is only one element that influences decisions to undertake some or all production in non-local locations. It may be argued that if the public was prepared to pay the higher costs associated with more local production, or only consume goods in season, transport emissions could be reduced. The downsides to this approach may be loss of choice and the impact on developing countries whose economies depend on such business.

Overall, retail patterns have, do and will change to adapt to consumer demands. It is necessary therefore to adopt policies that can adapt and cater for changing demand, or adversely, adopt policies which will push, and shape where future demand is desired by authorities.

References

- ¹ "Sustainable Transport Choices and the Retail Sector", Commission for Integrated Transport, 2006
- ² "Future of Retail Transport: Access, Information and Flexibility", British Council of Shopping Centres, 2006
- ³ "Motoring Towards 2050, Shopping and Transport Policy", RAC Foundation, 2006
- ⁴ "The Validity of Food Miles as an Indicator of Sustainable Development", Report for Defra by AEA Technology, July 2005

- ⁵ "The Sustainability of Food Transportation and Production, (food miles)", Foodaware; the Consumers' Food Group, Jan 2007, <http://www.foodaware.org.uk/index.htm> - accessed July 2008
- ⁶ "A Recipe for Change", Greenpeace, October 2006, <http://www.greenpeace.org.uk/media/reports/a-recipe-for-change> - accessed September 2008

Issues and Recommendations

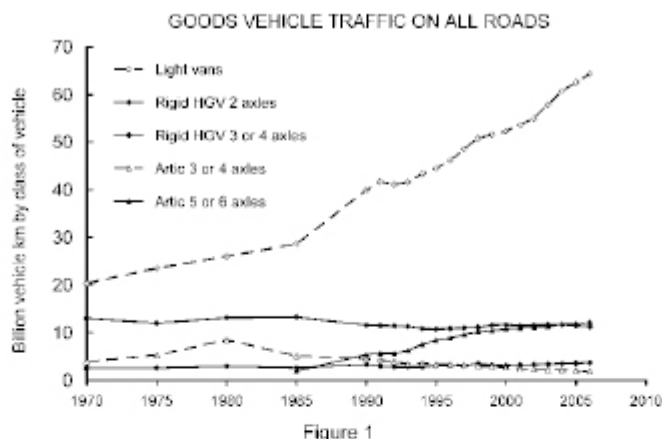
- In the UK, agriculture and food accounts for nearly 30% of goods transported by road and food miles rose by 15% between 1992 and 2002. In 2002, food transport accounted for 25% of all HGV vehicle kilometres in the UK. Of imported produce, 95% of the fruit and 50% of the vegetables sold in the UK is grown abroad and the amount of food being flown into the UK doubled in the 1990s. The direct environmental, social and economic costs of food transport are over £9 billion each year and are dominated by congestion.
- In addition to the reliance factor of UK imported produce, it would be an advantage if Governments would also address the wider implications of the above facts, in terms of the unsustainable transportation impact.
- In the planning and assessment of proposed new retail and shopping outlets, which includes the establishment of Farmer's Markets, a priority should be given to the accessibility and servicing by sustainable forms of transport such as good public transport, walking and cycling links with appropriate facilities.
- The introduction of other traffic management policies and improvements to public transport could improve the accessibility of town centres. Following the Traffic Management Act, if implemented effectively, travel around urban areas should be more efficient for consumers and thus potentially make the urban centres increasingly accessible. It is important to understand the value that consumers place upon time and that congestion is a major factor in influencing the time taken to access retail facilities.

2.4 Potential for Demand Management in Freight Transportation

Introduction

Over the past decade, the annual consumption of diesel fuel has increased steadily to 9 million tonnes by Heavy Goods Vehicles (HGVs) and 5 million tonnes by light goods vehicles. The cost of fuel represents around 30% of the total cost of operating a goods vehicle¹.

Fuel consumption has increased because the total mileage travelled by goods vehicles has increased (Figure 1). The fastest growth has been for light vans, followed by articulated HGVs; traffic by rigid HGVs has not increased.



Fuel consumption of individual HGVs has not increased, and remains steady at about 7 or 8 miles per gallon.

Freight distribution is a wholly commercial activity. The cost of fuel is a very significant part of the cost of freight operations, so anything that can be done at a reasonable price to reduce the amount of fuel used will be done for commercial reasons. On the other hand, transport costs are a small part of the costs of the manufacture and retailing of goods, so an efficient distribution system is a higher priority than minimising the cost of transporting goods. This may militate against making changes to manufacturing, distribution and retailing arrangements, to reduce vehicle kilometres and fuel used by goods vehicles.

Freight Activity

Freight traffic is generated by the activities for which the goods are moved. For Heavy Goods Vehicles, these activities can be classified as:

- Moving goods, almost all in containers, to and from sea ports as exports and imports;
- Moving materials and goods as part of the manufacturing process;
- Moving materials for building and other construction;
- Distributing manufactured goods, food and drink to retail outlets and hotels and restaurants, often via one or more distribution centres; and
- Moving documents and packages for the long haul 'trunk' leg of their journeys.

For vans and light goods vehicles, the activities are somewhat different:

- Collecting and distributing documents and packages from and to individual addresses, often as the final stage of shopping by mail or email;
- Collecting and delivering smaller goods items, often for a manufacturer, food producer or retailer; and
- Supporting a tradesman, including carriage of tools and materials.

The Department for Transport, (DfT) Survey of van activity 2004 estimates that 32% of van mileage is for the collection and/or delivery of goods, 32% is travelling to and from work and 24% is travelling between jobs⁴.

Haul Lengths by Road

The total mileage of HGVs has increased because the haul length of most classes of goods moved by road has increased steadily until about the year 2000¹. Figure 2 shows the average haul lengths by road for food, petrol and chemicals, miscellaneous manufactured goods, and bulk materials (minerals, timber and building materials). The haul length for food increased substantially from 1980 to 2000, but has since dropped back a little. Similarly for manufactured goods, for which the peak haul length was in 1999. These trends may reflect increases in the cost of road freight, and the increasing pressure on supermarkets to provide local/organic produce.

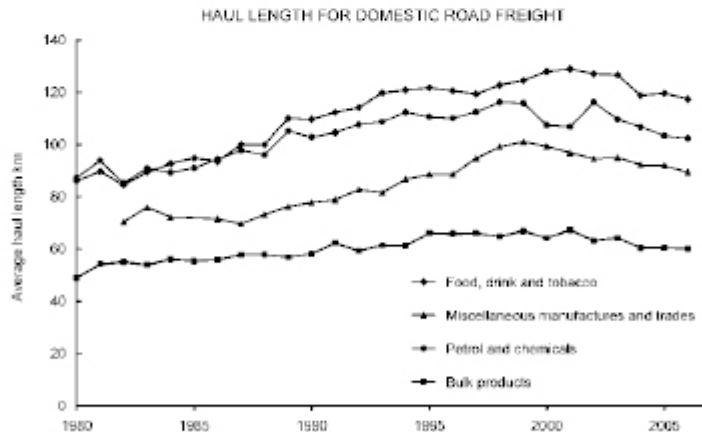


Figure 2

The total mileage by vans has increased because of the steady increase in the economic activities served by vans - courier services, mail and email shopping, visits by service engineers and tradesmen of all kinds.

The Impact of Foreign Freight

In 2006, of the 2,045,000 thousand tonnes of domestic freight in Britain lifted by road and rail, about 20% was imports or exports being moved from or to ports. The tonnage of imports and exports by sea in 2006 was 439,477 thousand tonnes, of which 168,142 thousand tonnes was liquid bulk traffic, some of which would have contributed to the 159,100 thousand tonnes lifted domestically by pipeline (another 69,428 thousand tonnes of liquid bulk cargo was moved coastwise, and 14,506 thousand tonnes brought ashore as one-port traffic - i.e. oil extracted offshore landed in the UK from tankers, as opposed to pipelines from production platforms).

Figure 3 shows the total tonnage of foreign freight as a percentage of domestic freight lifted. The percentage has increased from 10% in 1965 to 22% in 2006, demonstrating the extent to which goods for use in the UK increasingly come from overseas. Figure 4 shows how the tonnage of foreign trade has grown steadily since 1985, though the balance between exports and imports has varied. Between 1965 and 2006, the tonnage of foreign trade more than doubled, demonstrating both the globalisation of economic activities and the increase in the extent to which goods are moved around the world.

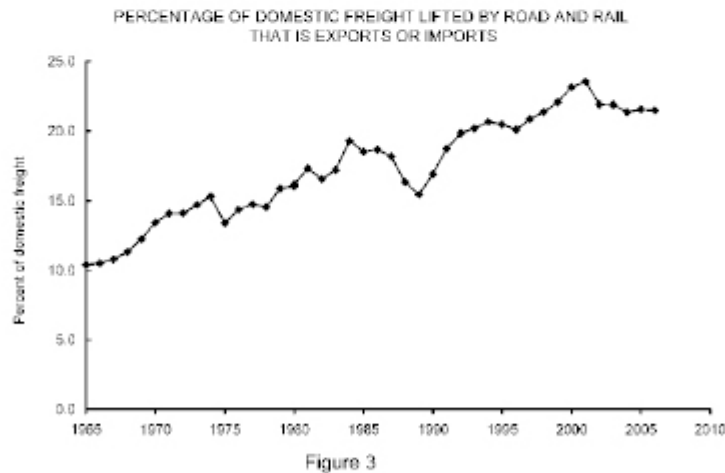




Figure 4

Manufactured goods tend to be shipped in containers. Figure 5 shows the tonnage of goods moved in containers since 1992. In fourteen years the tonnage of goods in containers through UK ports has increased by 72%, again indicating the trend to globalisation of manufacturing industry.

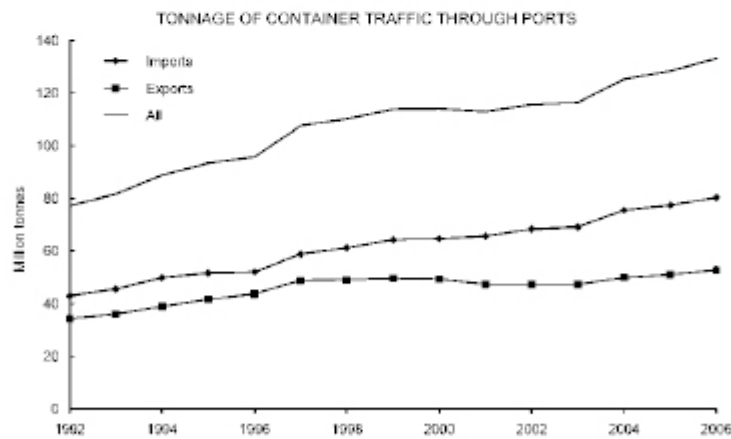


Figure 5

Reducing the Movement of Freight by Road

There are a number of complementary actions that could in theory reduce the movement of freight by road. These are being promoted by the Freight Best Practice programme³, and a number of case studies are showing significant savings.

- Reduce empty and part-loaded running by the better utilisation of goods vehicles. Empty running of HGVs for particular commodities has reduced slightly, particularly for the movement of manufactured goods and petrol, but the changes are small (Figure 6). Trips by numerous goods vehicles to service retailers located close together are being reduced by combining loads onto a single vehicle.
- Transfer goods from road to rail or water. Pilot projects in the food distribution industry have shown that long-distance road freight can be transferred to rail for the trunk stage of a journey. Most freight origins and destinations are not rail served, and rail is most suitable for goods that can fill a complete train, that is easy to load and unload, and that is moved long distances on a regular schedule. This considerably limits the potential for transfer from road to rail.
- Reduce the distances that goods are moved. This would require major changes in the supply chains and manufacturing processes that are served by road freight. This is not impossible, although supply chains, distribution arrangements and depot locations have been optimised, and the disincentives to change them are great. However, the reduction in average haul length since 2003 for food and drink may well reflect a real change in consumer's preference for local produce, which would lead to changes in supply. Also, as fuel prices increase, it may become more efficient to reduce the distances that goods are moved during manufacture and distribution.

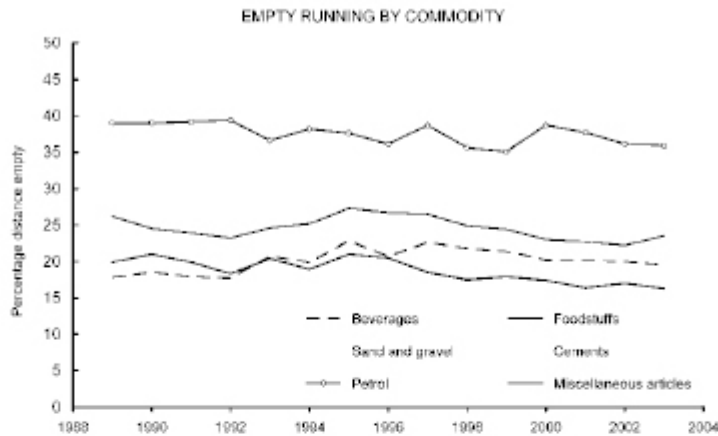


Figure 6

- Overall, there is scope for some reduction in the movement of freight by road, but much less than is popularly perceived. Transfer to rail or water is most viable for long-haul traffic – say over 300 km – and this only accounts for 5% of the tonnes lifted and 21% of the tonne km moved. For the 43% of tonne km moved less than 150 km, using rail or water would probably require a greater distance on roads for access to rail heads than would be required for the direct journey. However, several large freight rail/road transport terminals are now in the planning process in the East Midlands and North West representing positive initiatives in support of this objective.

Conclusions

Fuel consumption by road freight has increased because the total mileage by goods vehicles has increased. The fastest growth has been for light vans, followed by articulated HGVs; traffic by rigid HGVs has not increased.

Fuel consumption of individual HGVs has not increased, and remains steady at about 7 or 8 miles per gallon.

Freight distribution is a wholly commercial activity. The cost of fuel is about 30% of the cost of freight operations, so anything that can be done at a reasonable price to reduce the amount of fuel used will be done for commercial reasons.

The total mileage by vans has increased because of the steady increase in the economic activities served by vans - courier services, mail and online shopping, visits by service engineers and tradesmen of all kinds.

About a quarter of the total tonnage of domestic road freight are goods travelling to or from ports as imports or exports.

Empty running of HGVs for particular commodities has reduced slightly, particularly for the movement of manufactured goods and petrol, but the changes are small.

Reducing the distances that goods are moved would require major changes in the supply chains and manufacturing processes that are served by road freight. This is not impossible, although supply chains, distribution arrangements and depot locations have been optimised, and the disincentives to change them are great.

Transfer of freight from road to rail or water is most viable for long-haul traffic – say over 300 km – and this only accounts for 5% of the tonnes lifted and 21% of the tonne km moved by road. For the 43% of tonne km moved less than 150 km, using rail or water would probably require a greater distance on roads for access to rail heads than would be required for the direct journey.

References

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- ² "Light Goods Vehicles Survey", Department for Transport, 2004
- ³ "Freight Best Practice Programme - (HGV Fleets in the Public Sector)", Department for Transport, <http://freightbestpractice.org.uk> – accessed Sept 2008

Issues and Recommendations

- Improved operation management leading to the better utilisation of goods vehicles can reduce empty and part-loaded running.
- Pilot projects in the food distribution industry have shown that long-distance road freight can be transferred to rail for the trunk stage of a journey. Therefore, it is recommended that Freight Managers would consider strategic transfer of goods from road to rail or water.
- It is possible to reduce the distances that goods are moved by engaging with Manufacturers and supply chain operators at an early stage particularly where development planning processes are required. This would require major changes in the supply chains and manufacturing processes that are served by road freight.

ANNEX A2.3

Retail Sector Impact on Transport

Historically, towns and cities developed and grew as “central places of trade for the benefit of the members living there,... benefits included reduced transport costs”. Trading developed in those areas that were most accessible.

Today, trading, and in particular retail outlets are still located in areas that are most accessible, and this has tended to mean the most accessible by car (often at the expense of accessibility by other sustainable modes). The car dominates travel to and from retail outlets at present. A British Council of Shopping Centres (BCSC) study estimated that cars currently account for 60% of all shopping trips and over 80% of shopping mileage (BCSC, 2006)¹. National Travel Survey gives 62% of journeys and 82% of distance travelled. The average length of trips to access retail outlets has increased since the mid 1990s despite the average number of retail trips per person falling by 13% over the same period.

While the most accessible location has historically been the urban centre, a more recent trend has seen the demand for, and development of, out-of-town and edge-of-town locations that are more accessible by car. Since 2001, edge-of-town retail locations have become the most successful retail location with sales growing by over 40% to £72bn (RAC Foundation, 2006)². Despite a tightening environment for land-use and transport policies, this trend is expected to continue as the number of hypermarkets is expected to increase from 637 in 2005 to well over 800 by 2010 (RAC Foundation, 2006)².

On the other hand, many town centres have lost market share to the new developments. The key reason for this is accessibility, “success of retail is dependent on good accessibility” (Sarah Winterton, British Retail Consortium quoted in “High Street Britain”)³. It was suggested by Bernard Hughes of Asda that “schemes aimed at cutting congestion and making town centres more attractive places for pedestrians can have unintended consequences for the accessibility of the car-borne consumer”. He continued, “It is self defeating to make it difficult to park; customers simply go elsewhere”. Such views go some way to explaining the reason behind retail developments in recent years. The RAC Foundation put forward four key reasons for the decline of town centre retail locations:

- Congestion;
- Difficult parking;
- Environmental problems – town centres can be unwelcoming and threatening at certain times of the day; and
- Poor high street management by local authorities – more concerned with control than with customer care.

It is not all negative for town centre locations. One recent trend that has resulted in investment in town centre retail locations has been the introduction of smaller 'metro' formats of supermarkets catering for the change in consumer lifestyles. This 'convenience' style of shopping is meeting demand from young, small, urban households who want to buy small amounts on a daily basis (rather than large amounts on a weekly basis) and is often linked to the renaissance of fashionable urban neighbourhoods. This growth in inner-city residential floor space is often in developments that provide limited car parking provision, which tend to be associated with very low levels of car ownership, further increasing the demand for local services accessible by more sustainable forms of transport. This change in consumer lifestyles is one factor that has led to a change in retail development and future lifestyle changes could put different demands on retailers. What is not known are the lifestyle trends that will shape future demand for retail and future demand to travel to retail locations.

Aside from the traditional retail formats, internet shopping is gaining an increasing share of the retail market. According to Verdict Research, e-shopping is growing 15 times faster than the overall retail sector and now accounts for 3% of all retail sales. It is predicted that this sector will continue to grow further as developments in IT make e-shopping easier. In addition, with increasing numbers of the population gaining access to broadband internet services they are becoming increasingly able and willing to shop online. While online shopping results in the consumer not having to travel to the retailer, the goods still have to be delivered. However, if e-shopping requires more than one delivery from more than one delivery company, there could be more trips made than one return car journey to, say, a town centre location to access numerous retailers in one visit.

There is also evidence that some consumers, despite purchasing the goods online, actually travel to the retailer to view the goods beforehand and then compare prices online and purchase at the cheapest price, thus creating two trips. Research undertaken by B&Q suggests that consumers still want to choose their purchases in store despite the information available online. This suggests that while e-shopping will grow in terms of market share, it might not have the same impact on travel as it first appears.

The Global Market Influence on Food Miles

Within the UK, agriculture and food accounts for nearly 30% of goods transported by road. A recent report by Department for the Environment, Food and Rural Affairs (Defra)⁴ stated that food miles rose by 15% between 1992 and 2002. In 2002, food transport accounted for 25% of all HGV vehicle kilometres in the UK, and produced 19 million tonnes of carbon dioxide, representing 1.8% of the total annual UK CO₂ emissions, and 8.7% of the total emissions of the UK road sector.

Transport of food by air has the highest CO₂ emissions per tonne, and is the fastest growing mode. Although airfreight of food accounts for only 1% of food

tonne kilometres and 0.1% of vehicle kilometres, it produces 11% of the food transport CO₂ equivalent emissions. The direct environmental, social and economic costs of food transport are over £9 billion each year, and are dominated by congestion.

The increase in food miles has been attributed to a number of factors:

- The centralised systems of supermarkets have increasingly taken over from local and regional markets. This can result in goods being shipped from where they are sourced to be centrally processed and packaged, and then to be returned for sale close to their point of origin;
- Imported produce, for example 95% of the fruit and 50% of the vegetables sold in the UK are grown abroad, with the amount of food being flown into the UK doubling in the 1990s;
- Comparative labour costs, for example some British fish is now sent to China (where labour costs are much lower) for processing, then sent back to the UK to be sold; and
- Changes in consumer tastes and demands. Not only have consumer tastes changed to demand seasonal products year-round, encouraging the air transshipment of seasonal fruits but they also travel further and more often by car, for the weekly shop. Each year, the average UK adult travels about 135 miles by car to shop for food.

The overall environmental impact of food miles is undoubtedly a complex issue. For example, it is often difficult to determine how far, or indeed how sustainably, food has travelled, due to the complex nature of the shipping in terms of distance, processing impacts and the type of travel.

Environmental impact is further complicated by the fact that there are other aspects which need to be assessed alongside transportation. For example it is suggested that it is more environmentally damaging to source tomatoes in the UK, (out of season), than it is to ship them from Spain. There, the product is grown outdoors without the need for the artificial heating of greenhouses, which outweighs the transport disbenefits.

This global trade has also reached a stage where many goods are no longer imported solely for sale and consumption. They are now imported, processed and re-exported by many economies. Examples include milk, which is produced in the UK and Ireland, transported to continental Europe for processing into dairy products and subsequently reimported. Prawns harvested in the North Atlantic are frozen in Scotland and dispatched to Thailand for shelling before re-export back to Europe for packing and sales.

The concept of food miles also includes waste, for example the average household throws away more than 3 kilograms of food and 14 kilograms of food packaging per week. Buying local British produce in season clearly helps negate the need for artificial heating in glasshouses. Buying organic food can also help, although it is important that this is locally grown, since a typical

basket of 26 imported organic foods may have travelled a distance equivalent to six times around the equator⁵.

Supermarkets and food retailers are becoming increasingly aware of changing consumer demands and understanding of food miles, and responding in positive ways. For example, Marks and Spencer have been commended, (by Greenpeace)⁶ for the positive stance they have taken on the catching, processing and sale of seafoods. This includes their approach to ensure the entire supply chain is audited and properly assessed for sustainability and environmental impact.

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3. CHANGING BEHAVIOUR

Introduction

The need to change travel behaviour to achieve sustainability objectives has been recognised for many years. However, the existence of convenient, affordable and acceptable options is essential. The provision of such options, timely information about travel opportunities, better marketing and advertising have long been advocated by transport planners, with good implementation initiatives such as Travelwise (now ACT Travelwise).

In recent years transport policy has also placed even greater emphasis on encouraging voluntary change to use more sustainable modes of transport by these so-called 'soft measures'. Travel planning for schools, hospitals and other public institutions was soon complemented by requirements for travel plans through planning obligations for all major new developments.

The 'Smarter Choices' Report¹, published by the Department of Transport in 2004, helped to publicise and promote what could be achieved by these methods. Government funding for transport professionals has also helped encourage greater voluntary take-up of travel plans by commercial and other organisations. More recently personalised travel planning has been trialled in many places and encouraging results suggest that this will be applied more widely in future.

There are still legitimate professional concerns. Monitoring and enforcement of travel plan commitments is often weak and greater continuing attention needs to be paid to ensure initial results are not diluted over the longer term. There is also concern that the outcomes in terms of absolute numbers of vehicles on our streets do not always seem to reflect the cumulative effects of trip reductions reported in various trials.

Since 1998, the DfT has played a leading role in considering behavioural change issues and some of the history of changing travel choices is described. This background leads into the consideration and introduction of soft measures with a brief summary of some of the key and recent findings on travel choice initiatives. To demonstrate the promotion of 'changing behaviour' an account of the trials in Darlington under the Department's 'Sustainable Travel Towns' Initiative with key findings is also provided.

It is believed that these findings will assist IHT members and others seeking to make the case for smarter choice measures to politicians and businesses. Although it is recognised that such decision-makers can sometimes remain sceptical on these matters, it is considered essential that the argument for such initiatives succeeds.

3.1 Changing Travel Behaviour and the UK Experience

Background

The first decade of the 21st century has seen a quickening interest in increasing travel choices to include sustainable options, like walking, cycling, public transport, car sharing or indeed challenging the assumption that journeys need to be made in the first place.

The number of initiatives at national and local level has increased to encourage people to travel in a more sustainable way and funding for these has increased radically. Interest has been generated, not least by the media, over issues such as congestion, global warming and health and the impact of Al Gore's film *'The Inconvenient Truth'*. Major reports such as Eddington, Stern and the King Review have raised awareness of the role of transport in our economy, the economics of climate change and the potential for reducing CO₂ from transport.

In 1998, the Government made a commitment through its integrated transport white paper 'A New Deal for Transport: Better for Everyone', to encourage local authorities, business, community organisations, schools and hospitals to introduce 'travel plans' to cut down on car use. Measures encouraging people either not to travel or, if they do, to travel in a more 'sustainable' way can be introduced separately. Although, such measures frequently work best when packaged together as a travel plan. For example, a workplace travel plan might include a car-sharing scheme; improved cycling facilities; a dedicated bus service or restricted car parking allocations; flexible-working practices such as remote access and video conferencing.

Initially, travel plans were focused on large organisations at single sites and commuting and business trips (Enoch 2007)¹. Travel plans have since been developed to deal with different types of situations: for example - school travel plans to overcome congestion on the school run; residential travel plans to mitigate the impact of new developments on local traffic, infrastructure and to improve accessibility; and visitor travel plans to assist access to leisure attractions and sports events.

Recognition of the potential benefits of smarter choices was initially slow to be acknowledged. However, in 2000, the Government encouraged local authorities (outside London) in the first round of Local Transport Plans (LTPs) for 2001-2006 to set out an integrated strategy for reducing car use and improving children's safety on the journey to school and encouraging widespread adoption of travel plans by major employers. The main difficulty was the limited evidence that such measures would work.

For the second round of LTPs, which came into operation in April 2006, the DfT expected all authorities to focus on delivering a smaller set of key outcomes, reflecting the shared priorities agreed between central and local

government. These were improving access to jobs and services, particularly for those most in need, in ways that are sustainable; improved public transport; reduced problems of congestion, pollution and safety. Among the key strategies to help local government deliver these outcomes were:

- Looking at ways to make services more accessible so that people have a real choice about when and how they travel;
- Promoting school, workplace and personal travel plans to encourage people to consider alternatives to using their cars; and
- Creating a culture and improved quality of local environment so that cycling and walking are seen as an attractive alternative to car travel for short journeys, particularly for children.

A boost for the role for smarter choices has also been given through three important studies:

- Sir Rod Eddington² in his study of "Transport's Role in Sustaining UK's Productivity and Competitiveness" (2006) highlighted the vital role that transport plays in supporting the economic success of the UK. He argued for a targeted approach to the most seriously congested parts of our urban, national and international networks. For urban, regional and local networks, he acknowledged that small local schemes such as promotion of buses, cycling and walking and enhanced local travel networks could often represent excellent value for money.
- Sir Nicholas Stern's Review⁴ on the "Economics of Climate Change" (2006) found that urgent action was needed to tackle emissions of CO₂ and other greenhouse gases and there was an economic case for doing so:

"Climate change is the greatest market failure the world has ever seen, and it interacts with other market imperfections. Three elements of policy are required for an effective global response. The first is the pricing of carbon, implemented through tax, trading or regulation. The second is policy to support innovation and the deployment of low-carbon technologies. And the third is action to remove barriers to energy efficiency, and to inform, educate and persuade individuals about what they can do to respond to climate change."

(Stern Review⁴: Executive Summary).

- The King Review³ examined the potential for CO₂ reduction. Part I of the report, published in 2007, set out a positive message about

the potential for reducing CO₂ both in the next few years and in the medium and longer term to bring considerable benefits for the UK. Part II of the report published on 12th March 2008, picked up on the challenges set out in Part I and made a series of recommendations. These included "using lower carbon alternatives to the car: promoting public transport, walking and cycling, through increasing their availability and attractiveness and improving information, and encouraging people to make efficient use of cars – for example through car sharing and car clubs – for journeys where this is the best option".

3.2 Travel Behaviour and Effectiveness of Smarter Choices

Overall, smarter choice measures appear to be substantially more effective than many transport professionals originally expected. There was relatively little evidence to show that the measures would work. However, in 2003, the DfT commissioned a major research project that reviewed national and international evidence to assess the overall effect of a combination of such measures on traffic levels under UK conditions as well as 24 case studies across the UK.

The research looked in detail at:

- The impact of workplace travel planning in Buckinghamshire, Birmingham, Bristol, Cambridgeshire, Merseyside, Nottingham and York;
- School travel planning in Buckinghamshire, Merseyside, York and Milton Keynes;
- Personalised travel planning in Gloucester, Bristol, London and Nottingham;
- Public transport information and marketing in Brighton and Nottingham;
- Car clubs in Edinburgh and Bristol and car sharing in Buckinghamshire; and
- Teleworking, teleconferencing and home shopping.

The final report, entitled '*Smarter Choices – Changing the Way We Travel*'¹ was published in July 2004 in tandem with the DfT's new white paper '*The Future of Transport*'. It provided evidence of the impact that, what were now to be called, 'smarter choices', could have on traffic.

The key findings were:

Applying smarter choices with a high intensity, nation-wide all traffic could be reduced by about 11%. With a low intensity, there could be a nation-wide reduction in all traffic of 2%-3%. Workplace travel plans typically reduce commuter car driving by between 10% and 30%.

School travel plans, on average, cut school run traffic by between 8% and 15%, with high-performing schools commonly achieving reductions of over 20%, and sometimes considerably more.

Personal travel planning initiatives typically report reductions in car use of 7% -15% in urban areas, and 2%-8% in rural and smaller urban areas.

Public transport information and marketing has delivered clearly recorded increases in bus use, with evidence suggesting that it can cause patronage increases from service improvements to double. City-wide budgets for such work of £60,000 - £300,000 per year (including public and private sector investment) have helped to deliver city-wide increases in bus use of 1.5%-5% a year, when combined with other improvements.

Travel awareness campaigns vary in nature, from relatively general campaigns to closely targeted intensive approaches. Both types report evidence of car use reductions, although intensive approaches tend to achieve higher levels of individual change.

Car clubs have been associated with a reduction of about 5 private cars per car club vehicle, with car club members significantly increasing the amount they walk, cycle and use public transport.

Organised car-sharing has effects on overall car use, but these depend on other factors, including parking regimes, the balance of users drawn from car driving or from other modes, and the amount of informal car-sharing already taking place. Subsequent research for the DfT 'Making Car Sharing and Car Clubs Work' demonstrated that well-planned closed community car sharing schemes reduced the number of single occupancy cars on site by an average of 21%.

Teleworking is growing rapidly, and at present typically results in a reduction of between 2 and 6 homework journeys per teleworker per week. Evidence suggests that changes in car use for other purposes, or by other household members, or due to changes in home location, do not substantially offset these reductions and, in some cases, there may be further cuts in car use. Costs are likely to be offset by business savings.

Teleconferencing typically reduces business travel by between 10% and 30% in organisations that promote its use.

Home shopping currently accounts for less than 5% of the grocery market, but is estimated to reach 10%-15% over the next decade, leading to potential reductions of 7%-11% of all food shopping traffic

Cost-effectiveness of smarter choices measures are:

- The public expenditure cost of reducing car use is estimated as 1.5 pence per vehicle kilometre saved for a well-designed package of

different soft initiatives, i.e. £15 for removing each 1000 vehicle kilometres of traffic; and

- Current official practice calculates the benefit of reduced traffic congestion to be about 15p per car kilometre removed, and more than three times this level in congested urban conditions.

Thus, every £1 spent on well-designed soft measures could bring about £10 of benefit in reduced congestion alone, more in the most congested conditions, and further potential gains from environmental improvements, provided that the tendency of induced traffic to erode such benefits is controlled. In *'Managing Our Roads'*, DfT 2003 it stressed the importance of 'locking-in' the benefits of congestion reduction policies by demand-management measures to control induced traffic. The Smarter Choices study found that this was also vitally important for delivering the full potential of soft measures. It argued that without this, smarter choices could still succeed in changing which individuals were using cars but may have much less impact on area-wide traffic levels, congestion or environmental impacts.

Personal Travel Planning (PTP)

In 2007, the DfT published the report *'Making Personal Travel Planning Work'*⁶. This brought together the latest thinking on 'personal travel planning' (PTP) which is a targeted marketing technique, involving raising awareness of travel decisions and provision of information, advice, motivation and incentives. It seeks to overcome habitual use of the car, enabling more journeys to be made on foot, bike, bus, and train or in shared cars.

Although PTP can be applied in a number of contexts, e.g. schools, workplaces and residential communities, this report considers residential-based PTP. It contains evidence collated from 12 in-depth case studies, 10 smaller vignette case studies and contributions from a panel of 17 experts in the field of PTP and smarter choices measures. The case study sites provide extensive evidence, collectively accounting for PTP programmes that have targeted 229,000 households.

Within the UK, PTP has been reported to typically reduce the distance travelled by car by 12%. As a result of, and in addition to, reduced car use, successful PTP projects also deliver:

- Increased walking and cycling, with associated health benefits;
- Increased public transport use, making services more feasible and profitable;
- Increased viability of local shops and businesses;
- More sociable and 'liveable' neighbourhoods;
- Stronger partnerships between the agencies and organisations involved;
- Improved local air quality; and

- Reduction in carbon emissions.

PTP programmes typically cost between £20 and £38 per targeted household, or in the order of £0.02 to £0.13 for each vehicle kilometre travelled reduced in the first year. International experience of cost-benefit analysis of PTP has demonstrated that over a 10-year period PTP offers a £30 return for every £1 invested. Increasing the scale of a project makes it more cost effective.

- Two cases in Darlington, involving 10,744 and 11,470 people, reduced car travel by 6% and 11% at a cost of £0.03 and £0.09 per vehicle kilometre saved.
- In a case of 6,500 persons in Peterborough, car travel was reduced by 15% at a cost of £0.02 per vehicle kilometre saved.

Sustainable Travel Towns

In 2003, the DfT decided to set up a project to *demonstrate* what could be achieved through smarter choices and provide an opportunity to *communicate* the results to others. This would involve building on and pulling together previous programmes, as well as drawing on the experience of local authorities that had invested the most in smarter choices.

The aim was to create three showcase sustainable travel demonstration towns⁷ to act as models for other local authorities by showing what could be achieved through combined packages of measures to increase sustainable travel. From invited expressions of interest for the project, over 50 towns across England responded with Darlington, Peterborough and Worcester being chosen. Between them, they would provide a range of scenarios with resonance for as many other local authorities as possible.

The project formally began in April 2004 with the DfT providing £10m in revenue funding to assist the towns in introducing intensive, comprehensive and strategic packages of smarter choices and hard measures to promote safe and pleasant walking, cycling and bus use for all kinds of trips on a town-wide basis. A key element of the plans of each of the towns was the use of the personal travel planning technique known as 'individualised travel marketing' (ITM), which tailors travel information to the needs of each household.

Although the DfT is overseeing the project, the towns themselves were responsible for developing their proposals and implementing them, drawing in relevant experience as necessary. An important component is the monitoring and evaluation of the results. The project began with baseline studies of all three towns with interim results produced regularly. The project will formally conclude in March 2009.

The DfT has commissioned a study to analyse what has happened and been achieved in the three towns. The research is being formatted to provide a

follow-up study, albeit on a smaller scale, to the 2004 Smarter Choices research and carried out by the same researchers.

For all three towns, in order to fully involve the local communities, communications played a vital role in their plans to introduce radical changes. A brief description follows of the communication campaign being run by Darlington Borough Council to support their programme of sustainable measures.

Darlington's 'Local Motion'

When the project started in April 2004, the first communication campaign was called 'Darlington a Town on the Move'. This was developed into a new campaign launched by a Kylie Minogue look-alike in June 2006 called 'Local Motion' under which all their activities could be branded.

The campaign connected with Darlington's place in history through the use of the locomotive on the first public railway (Stockton & Darlington) and called upon that pioneering spirit to think about new ways to travel locally. 'Local Motion' was therefore the ideal choice. Kylie's hit song 'Do the Locomotion' revamped to 'Do the Local Motion' tied perfectly into the campaign to inspire real action among the residents of Darlington.

As part of the project promotion, much effort was given to communication initiatives with particular emphasis on working with children.

The brand was marketed heavily to incorporate all types of sustainable travel activities taking place in the town and generate ongoing interest and participation. Ten thousand residents joined the Local Motion Club and are kept involved in and informed about the campaign through regular news-sheets.

Initiatives rolled out under the Local Motion campaign include:

- An individualised travel marketing programme targeted at 40,000 households;
- 8000 cycle maps, bus maps and other travel-related leaflets personally distributed to householders;
- Local Motion travel centre located within Darlington Information Centre, opened in April 2006;
- A range of family bike and walking events;
- Journey share web site;
- Journey planner web site;
- Range of guidance documents on walking and cycling around Darlington;
- Free cycle loan scheme for residents;
- Cycle delivery of the Council's internal mail; and
- Launch of Local Mover multi-operator bus ticket.

Working with Schoolchildren.

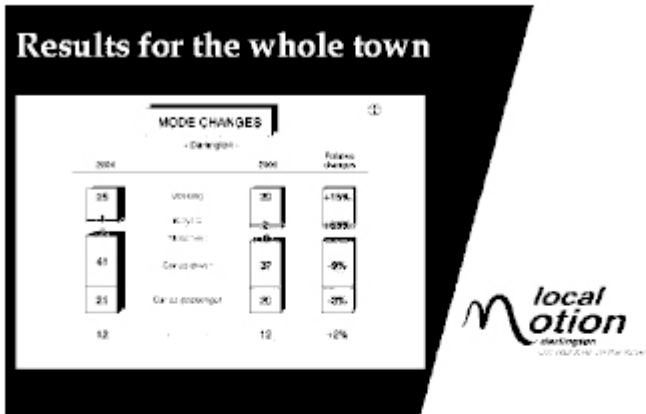
- By March 2006, school travel plans had been completed in 78% of schools;
- Cycling levels had increased by more than fourfold, with some schools seeing levels of cycling of between 10 and 15%;
- Cycle and pedestrian training in all Primary Schools;
- 'Medal Motion' campaigns involved 8000+ primary school pupils where children receive medals for walking or cycling to school, 26 out of the 30 primary schools in Darlington taking part;
- 'Safe routes to schools' provided, including new cycle paths, dropped kerbs, cycle storage, 20 mph zones;
- Organised events including Whealie Wednesdays, Bike to School week, bike maintenance classes and assemblies and Biker Breakfasts; and
- Highly successful 'Walking on Wednesdays' 'WOW' schemes in two schools.

Darlington



So has the campaign worked? Between 2004 and 2006, Darlington has produced results for the whole town, which show an increase in walking of 15% and a 65% increase in cycling! The 2006 household travel research, which took place in the area visited by Team Local Motion Travel Advisers in 2006, (one third of all households in the town), shows that overall car mileage fell by 12.8 million km. This is equivalent to over 2000 tonnes of CO₂ per year. This would offset the domestic emissions from heating around 800 homes per year.

Outcomes – Travel behaviour research



The interim results from Peterborough and Worcester have also been impressive. These figures cover the targeted populations for their individual travel marketing initiatives:

Peterborough - covering 18,250 households

Walking: +15% Bus: +8%
 Car: -11% Cycling: +23%

Worcester - covering 14,900 households

Walking: +18% Bus: +15%
 Car: -12% Cycling: +32%

Cycling Demonstration Towns

The dramatic increase in cycling in Darlington reflects its role as one of the six cycling demonstration towns (along with Aylesbury, Brighton, Derby, Exeter and Lancaster (with Morecambe) which have been funded since 2005).

Due to the success of their achievements, Ruth Kelly, Former Secretary of State for Transport, announced on 19 June 2008, 11 new cycle demonstration towns and small cities together with the first large city of Bristol. The new towns are: Blackpool, Cambridge, Chester, Colchester, Leighton-Linslade, Shrewsbury, Southend, Southport, Stoke, Woking and York.

The Cycling Demonstration Towns programme will be provided with £47million of DfT funding until March 2011. The local authorities are required to at least match-fund the grant. Therefore the total investment in cycling in these places will be around £100 million - in other words, £16 per head of population. This will mean that throughout England over 2.5 million people will experience a level of spend only seen in the very best European cycling cities.

Conclusions

Since the realisation that the philosophy of 'predict and provide', to keep pace with traffic growth, was not sustainable, a healthy awareness by transport professionals has emerged to consider alternative strategies and apply innovative measures to manage demand. However, to complement such rethinking the case for accepting such measures and achieving behavioural change by the travelling public needs to succeed.

Provided sustainable measures are implemented within a supportive policy context, smarter choices can be sufficiently effective in facilitating choices to reduce car use. They offer sufficiently good value for money that they merit serious consideration for an expanded role in local and national transport strategy.

While personal travel planning projects have demonstrated effective outcomes based upon area-wide approaches, there is a long-term opportunity to support this work by building upon existing networks and communication channels. Appropriate opportunities to target people would include during life-changing moments, when individuals may be most likely to deliberate about travel behaviour and break established habits. These could include when moving house or school, applying for a new job, obtaining an over-60 public transport pass and changes in public transport provision.

Darlington is now planning its strategy for ensuring that work on promoting sustainable travel across the town will continue. It sees the Local Motion campaign as an important way of achieving this. It is to be hoped that the initial success continues, is itself sustainable and can be replicated in other towns.

The need to change travel choice behaviour to achieve sustainable objectives and project the existence of convenient, affordable and healthier acceptable alternative options is a priority. The provision of such options, timely information about travel opportunities, better marketing, advertising and good implementation initiatives have long been advocated by transport professionals. It is therefore considered appropriate for transport professionals to take the initiative, where possible, to engage with society to establish and promote such communication schemes.

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Issues and Recommendations

- Travel plans should be developed to deal with different types of situations including school, hospital, residential and commercial business travel plans to mitigate the impact of new developments on local traffic and infrastructure to improve accessibility. Such schemes are considered essential particularly for new developments and implemented using the guidance provided by DfT.
- If the benefits accrued by the schemes delivered to date are to be sustained across the country, greater and more sustained investment of smarter choice measures at the local level, combined with a programme to lock-in the benefits can be considered.

4. ACCESSIBILITY AND SOCIAL EQUITY

General Introduction

For this theme, consideration is given to assess how the provision of fundamental accessibility, as required in a modern society, can be achieved in a sustainable manner. Four 'modal' chapters are considered, followed by a further chapter on social sustainability generally and review the current and potential performance of the modes that are often called "sustainable".

A review of the promotion of walking and cycling is undertaken including the introduction of new policies and guidance to facilitate these healthy modes of travel.

An assessment is made of initiatives to gain better use of existing networks, considering current trends, the policy context and likely future. The third modal chapter is an overview of the sustainability of public transport performance, both rail and bus, noting that their "green" credentials are not always justified. The argument is made for essential improvements in the provision of quality services, particularly for buses.

The fourth chapter further considers the issue of highway demand management and describes the task of getting the most out of our existing road space including by congestion charging. This covers both congestion charging and road pricing generally, including the use of parking controls as a demand management tool.

The final chapter on this theme takes a rather different perspective with an assessment of social sustainability, reviewing some of the ways in which transport can influence the wider social objectives of achieving a safe, healthy, just and fair society. This includes the issues concerning equity, the distribution of transport costs and benefits between different groups of people, recognising what the United States of America transport planners now call "environmental justice".

4.1 The Promotion of Walking and Cycling Journeys

Introduction

There has been an overall decline in cycling trips since the 1950s, with cycling trips declining by 20% in the last decade (National Travel Survey: 2006¹). The cumulative cost of this decline in terms of health, pollution and congestion has been estimated at £600m. However, if by 2015 cycling trips returned to 1995 levels the value that could be generated in savings to health, pollution and congestion is approximately £500m².

The average number of walking trips also fell by 16% between 1995 and 2005; however the average distance walked remained the same, which indicates an increase in average trip length from 0.6 to 0.7 miles.

The average car trip length data, (all purposes, 8.44 miles), demonstrates scope to encourage modal shift from the car to walking and cycling for some shorter journeys. This is substantiated by the recent intensive work undertaken through the baseline travel surveys for the Sustainable Travel Town (STT) initiatives. These consistently show that (across the three towns of Darlington, Peterborough and Worcester) there is a high prevalence of local trips across all modes (less than 5 miles in length). Nationally, more than half of all trips (56%) are less than five miles long and 23% are less than two miles – approximately the same distance as the average cycle trip².

The STT research also identified that a significant proportion of these local trips could be undertaken by sustainable modes without significant changes to infrastructure or service provision. The Cycle Demonstration Towns, (CDT) of Aylesbury, Brighton, Darlington, Derby, Exeter and Lancaster, have seen dramatic increases in cycling levels. As a consequence many of the changes made to the infrastructure have simply improved permeability to the town centre, and increased access to employment centres and leisure facilities.

Policy Environment

Over recent years there has been a shift in policy to encourage the improvement of conditions for walkers and cyclists. Walking and cycling policy came to the forefront in the Government's White Paper on Transport (DETR) published in July 1998. This had a stronger emphasis on sustainability than previous policy documents. Planning regulations (PPS6) have also been altered to give greater emphasis to walkers and cyclists in town centres.

In February 2008, the Department for Transport (DfT), announced a significant investment package for cycling of £140m, which also includes a contribution from the Department for Health in recognition for the role that cycling plays in increasing daily activity. This will result in further investment for the Six Cycle Demonstration Towns, and the establishment of a Cycle City and eleven new Cycle Towns (Greater Bristol, Blackpool, Cambridge, Chester, Stoke, Colchester, Leighton and Linlode, Shrewsbury, Southend, Southport and Ainsdale, Woking, and York).

The Government publication, "Walking and Cycling: an action plan", DfT, (2004) cites survey findings which noted that around a third of people would walk and cycle more if the facilities on offer were improved. Improvements that would encourage walkers included safe walking routes and, as a slightly lower priority, better maintained footpaths. For cyclists they included on- and off-road cycle lanes and the provision of better bicycle parking facilities. Now that the Six Cycle Demonstration Towns have proven that relatively small changes to infrastructure can bring about increased cycling levels, the challenge is set for the next three years to showcase best practice on a much wider scale.

The promotion of walking and cycling is further supported through the package of measures considered under the 'smarter choices' agenda (for example workplace and school travel plans, which deploy a range of tools to promote alternatives to the private car). Good examples of this can be found in Darlington and Aylesbury.

Aylesbury in particular has provided some of the smallest changes to infrastructure of the Six Cycle Demonstration Towns, but their innovative colour coded route branding (the Gemstone Cycleways) system is supported by individual route marketing, targeting residents living within 500 metres of a cycleway. People using a bicycle as a main mode of transport are reported to have tripled in the first two years of the Cycle Demonstration Towns project (<http://www.cycleavlesbury.co.uk>).

Cycling specific guidance

Whilst planning and designing high-quality infrastructure involves developing localised solutions in close consultation with local people, there are some basic requirements that need to be satisfied. The underlying principle is that measures for cyclists (and pedestrians) should offer positive provision that reduces delay, diversion and danger (as defined in draft Local Transport Note 1/04 Cyclists and Pedestrians⁵). The basic principles of good cycling infrastructure design, approved by the Department for Transport, are:

1. Coherent
2. Direct
3. Attractive
4. Safe
5. Comfortable

The Institution of Highways and Transportation have published specific guidance⁶ targeted at planning for cycling, notably:

- "Cycle Friendly Infrastructure", which is currently being updated, and will be issued as a Local Transport Note.
- "Guidelines for Cycle Audit and Cycle Review".

Through the Cycle Towns' projects, Cycling England is keen to ensure effective continuity and quality of route. This will require a more proactive approach to increasing priority for cyclists and pedestrians at road junctions, particularly where off-road cycle routes cross the road highway. Quality can be defined in many ways and reflects the cycling environment just as much as a well-maintained surface.

Cyclists and pedestrians can operate in harmony, and the Cycling England Design Checklist has the following advice on the subject: "Allowing cycling

through vehicle-restricted (pedestrianised) areas should be the rule rather than the exception⁶. The recently released Manual for Streets⁷ provides a platform for good design, to create more people-orientated places.

The improvement of existing shared cycling and walking facilities and the development of new cycling and walking facilities should also ensure compliance with the Disability Discrimination Act (DDA) 2005. This now includes providing safe access to transport services. Where shared surfaces are implemented, consideration should be given to those pedestrians who have visual or hearing impairment. The use of trapezoid lines along routes and measures to reduce cycling speed at crossings are examples of how conflict might be minimised. A visually impaired pedestrian may not be able to see or hear an approaching cyclist and therefore is likely to believe it is safe to change direction unless forewarned by infrastructure measures.

The barriers

The risks, real and perceived, sensed by walkers and cyclists can have a constraining effect upon efforts to promote these modes of travel. While Health Professionals^{8,9} are increasingly appreciating benefits that result from these forms of activity, efforts to address these fears are showing positive results with cycle use increasing in locations where priority measures have been provided, for example in Nottingham, London and the Six Cycle Demonstration Towns. However, heightened fear of crime, both to the person as well as cycle theft, is a powerful force which can keep car use as a chosen travel option.

When considering opportunities to encourage walking and cycling there are a number of areas that warrant consideration, these include:

1. prioritisation of walkers' and cyclists' safety, mobility and access needs over those of car users, in particular when increasing permeability to town centres and employment centres;
2. design of roads and surrounding areas where the mobility issues for walkers and cyclists take precedence over those for car users;
3. sympathetic treatment of situations where walking and cycling modes meet and interact with all motor vehicles, particularly within public transport priority improvements;
4. better cycle parking which is both secure and well located with consideration of the promotion of multimodality-bike racks at transport interchanges such as bus shelters and train stations where cycle use can be associated with onward travel;
5. better enforcement of cycle and pedestrian zones; and

6. education / promotion / direct marketing campaigns to raise awareness of the benefits of active travel modes.

Conclusions

Walking and cycling have strong contributions to make in creating sustainable places, increasing accessibility, enhancing neighbourhood cohesion, improving individual fitness and well-being, and reducing the environmental impact of transport.

Increases in cycling can also result in significant savings in relation to health, pollution and congestion. As such, they must be placed at the top of the transport hierarchy, and actively promoted through a range of infrastructure and 'smarter choices' measures.

The challenge would not appear to be insurmountable, where as many as 31%⁶ of schoolchildren would prefer to cycle to school and yet 2%¹ currently do so. Attitudinal surveys supporting the development of school and employer travel plans across the country consistently identify high levels of preference towards cycling and walking, provided safety and accessibility issues are addressed.

These barriers need to be addressed in a safe and coherent way to ensure that conflicts are minimised, and that access to specific destinations such as the town centre, employment centres and leisure facilities is made easier through the development of continuous, quality driven routes.

It is important to ensure that walking and cycling are promoted, as they are also key elements of any journey undertaken by public transport.

References

- ¹ "National Travel Survey: 2006", National Statistics, DfT, 2006
- ² "Valuing the Benefits of Cycling", SQW Consultants and Cycling England, January 2008
- ³ "Policy, Planning and Design for Walking and Cycling" Department for Transport, Local Transport Note LTN1/04 and subsequent updates
- ⁴ "Cycle-friendly Infrastructure - Guidelines for Planning and Design", Department for Transport, Institution for Highways and Transportation and CTC, 1996, ISBN 0 902237 17 9 (In revision)
- ⁵ "Manual for Streets (MfS)", Department for Transport, March 2007. This supersedes 'Design Bulletin 32', and its companion guide, 'Places, Streets and Movement' which have now been withdrawn in England and Wales

- ⁶ "Cycling: towards health and safety", BMA Publication, Oxford University Press, 1992
- ⁷ "Take Action on Active Health", National Institute for Clinical Excellence, 2008
- ⁸ National Children's Bureau Young Transnet (website) 2005

Issues and Recommendations

- Measures to promote and develop walking and cycling should take the highest priority for investment in the urban transport hierarchy. Walking and cycling can result in significant savings in relation to health, pollution and congestion and strongly contributes to creating sustainable places, increasing accessibility and enhancing neighbourhood cohesion.
- Survey findings found that around a third of people would walk and cycle more if the facilities on offer were improved. Hence, improvements of facilities that would encourage walkers and cyclists, such as safe walking routes, better maintained footpaths, off road cycle lanes and the provision of better bicycle parking facilities might encourage more people to cycle and walk.
- Measures for cyclists (and pedestrians) should offer positive provision that reduces delay, diversion and danger with good design principles providing coherent, direct, attractive, safe, and comfortable infrastructure facilities.

4.2 Better use of Existing Networks

Introduction

The Eddington Study¹ recommended that measures that make better use of the existing transport network, without changes to the basic infrastructure, should form an important part of the policy for meeting the Government's economic, social and environmental objectives.

In particular Rod Eddington noted that small-scale measures that can be readily implemented offer the potential for good returns in terms of easing congestion, addressing capacity constraints and improving the reliability of the transport system.

Implementation

Better use of existing networks can be achieved, from small-scale improvements, to the efficiency of traffic signals at isolated junctions, to large-scale Active Traffic Management Systems (ATMs) as delivered on the M25, M42 and M6.

An important distinction also exists between 'demand side' and 'supply side' measures. The former includes schemes designed directly to influence travel attitudes, choices and behaviour, (as demonstrated in this document theme, 'Changing Behaviour') and the latter, schemes that achieve their objectives through adaptations to the existing infrastructure to increase capacity or throughput.

Demand-side measures include incentives and 'soft' measures such as: publicity and awareness campaigns, work and school travel plans, personalised travel planning, cycle training, and car clubs.

Supply-side measures include infrastructure improvements for pedestrians and cyclists including new or improved paths and routes, and improving bus stops. Infrastructure measures designed to reclaim streets and reduce the dominance of road traffic through traffic calming, rerouting and traffic restrictions are of particular relevance.

In terms of design there is now a once-in-a-generation opportunity afforded by Manual for Streets², which provides excellent guidance for such schemes.

Infrastructure improvements designed to reallocate road space e.g. High Occupancy Vehicle lanes and bus lanes have been a demand management supply tool for many years. Such schemes are often objected to but they have gained strength, particularly in the last ten years, assisting the enhancement of public transport operations in urban areas.

More recently such ideas have been proposed in rural areas including on the motorway network. However, such initiatives need careful consideration in

terms of overall benefits against implications of lane capacity loss since there are other practical options in terms of capacity improvement on inter-regional road networks.

It is considered that to complement the ATM schemes, now accepted as positive moves to assist congestion hot spots, the legislation and concept of 'undertaking' on highways of three or more lanes should be fully examined. Driver behaviour is a key part of this discussion in that the evidence of consequential loss of lane capacity because of the 'middle lane' misuse by drivers is self-evident throughout the motorway network.

With a projected major motorway-widening programme, which includes several schemes widening to four lanes, such a review is considered essential.

Conclusions

To facilitate and achieve better use of existing networks has been a particular objective since the realisation that the philosophy of 'predict and provide' for traffic growth was unsustainable¹. Such acceptance has clearly presented a real challenge, with opportunities for transportation professionals to take the initiative and such action is achieving success.

The agenda is now extended from reducing congestion to the complementary and real need to secure greater benefits to reduce the impact of climate change. The whole network needs to be considered with continued vigour and innovation much in line with Circular 02/07⁴, which includes the formal request to consider Traffic Demand Measures first, ahead of hard infrastructure solutions.

References

- ¹ 'Transport's Role in Sustaining UK's Productivity and Competitiveness', Sir Rod Eddington, HM Treasury, 2006
- ² 'Manual for Streets (MfS)', Department for Transport, March 2007
- ³ 'Transport: The New Realism', P Goodwin, S Hallett, F Kenny and G Stokes, Transport Studies Unit, University of Oxford, 1991 and 'Solving Congestion', P Goodwin, inaugural lecture for the Professorship of Transport Policy, University College London, 23 October, 1997
- ⁴ 'Planning and the Strategic Road Network', DfT Circular 02/07, Department for Transport, 2007

Issues and Recommendations

- Better use of existing networks can be achieved, from small-scale improvements, to the efficiency of traffic signals at isolated junctions; to large scale Active Traffic Management Systems (ATMs) as delivered on the M25, M42 and M6 should therefore be essential early option considerations.
- Infrastructure measures designed to reclaim streets and reduce the dominance of road traffic through traffic calming, rerouting and traffic restrictions are of particular relevance. In terms of design, there is now a once in a generation opportunity afforded by the DfT Manual for Streets as an excellent guide for such schemes.
- If appropriate, infrastructure improvements designed to reallocate road space e.g. High Occupancy Vehicle lanes and bus lanes can be included as demand management supply tools. Such schemes are of particular value in assisting the enhancement of public transport operations in urban areas.
- In terms of capacity improvement on inter region road networks, it is considered that to complement the ATM schemes, which are now accepted as positive tools to assist congestion hot spots, the legislation and concept of 'undertaking' on highways of three or more lanes should be fully examined by the DfT.
- Better use of existing transport networks can also be achieved by the promotion of publicity campaigns to affect more efficient use of motorways by targeting driver behaviour for improvements in lane discipline.

4.3 Public Transport Quality, Accessibility and Integration

Introduction

For many people the phrase "sustainable transport" is equivalent to saying "public transport, walking and cycling". Public transport is commonly regarded as a "green" mode with positive environmental credentials over the car and other powered modes. However, whilst generally true, this is a gross oversimplification and sustainability performance varies considerably by mode, by occupancy, by power source and by service type. Sustainability does not just mean environmental performance, but should take into account the other "pillars" of sustainability – economic and social considerations too.

In this chapter basic information is provided on the patronage of public transport in the UK and its comparative performance. This is followed by a look at the influence of public transport on each of the three main components of sustainability: the economy, the environment and society. The chapter concludes with an assessment on what needs to be done for public transport to meet the rising expectation of high quality in all our consumer services.

Public Transport Patronage

In 2004, buses and coaches carried 48 billion passenger-kilometres and rail 52 billion¹. Total movement in GB was some 797 billion passenger kilometres,

meaning that both buses and coaches and rail had a market share of some 6% each. In terms of passenger journeys, national rail and London Underground each carried approximately 1 billion journeys. Buses carried some 4.7 billion and tram and light rail some 175 million. On average, each person in Great Britain made 1044 trips per year of which 63 were by bus and 23 by rail. Other data is shown below.

Mode	Trips / year
Walk	245
Cycle	14
Car Driver	435
Car Passenger	236
Bus	63
Rail	23
Other Public	15
TOTAL	1031

Thus public transport represents only some 10% of trips made in Great Britain, or just 12% of total travel, taking into account the longer average journey lengths by rail.

Economic Impacts

The Eddington Report² has drawn attention to the vital contribution of transport to securing the UK's economic productivity and competitiveness. Public transport supports the country's economy by moving people to workplaces, to education establishments, to shopping centres and markets and to places of recreation and entertainment. It therefore facilitates economic exchanges. Public transport is particularly efficient for moving large numbers of people to congested destinations in town and city centres. Indeed London would scarcely be able to operate without the accessibility supplied by the public transport networks to the central area and its business centres. As Britain has moved from a manufacturing to a knowledge-based economy, the centres of our towns and cities have become of increasing importance to the city and regional economies³. These centres are served by commuter and intercity rail services and by bus services from more local catchments.

Traditional transport economics looks at the direct user benefits, the externalities achieved by reducing highway traffic to manageable levels and, increasingly, the wider economic benefits such as agglomeration, where businesses operating in close proximity stimulate higher productivities⁴.

Against this must be set the public support for rail and bus. Government support for the railway is running at some £6 billion per annum, including support for Network Rail and to the train operating companies through franchising arrangements. Support to the bus industry is estimated at £2.5 billion in 2007⁵, including fuel duty rebate and supported services purchased by local authorities where insufficient service is provided commercially by private operators.

Environmental Impacts

Climate Change is the most pressing contemporary issue. Emissions from transport sources comprise about 28% of total GB carbon emissions, but bus and rail contribute about 1% each to the overall national statistics, with other road vehicles making up the greatest proportion (24% out of the 28%).

Transport emissions also contribute to poor air quality and several pollutants (CO, Hydrocarbons, NO_x, PM10, SO₂)⁶ have been identified as causing damage to health. Diesel, a key power source for both buses and rail, is a strong contributor to PM10 and NO_x. However, the introduction of ultra-low sulphur diesel (ULSD) allows the use of exhaust treatments that can substantially reduce these emissions and road-based emissions using Euro 3 and Euro 4 specifications are substantially cleaner. Rail is currently trialling ULSD with a view to making its supply universal.

The usual comparative statistics on carbon and other emissions looks at emissions per passenger-kilometre. In general, public transport is more energy efficient and less polluting than the private car and this provides the fundamental justification for its environmental credentials. This effect is most pronounced when occupancies are high. But overall sector-based analysis can be misleading and, for example, the emissions per passenger-kilometre from electric powered high-occupancy commuter rail services produces one-tenth of the emissions from a diesel powered rural rail service with relatively low occupancy.

Rail has also suffered some poor comparisons since the relatively long asset lives means slower progressive introduction of less polluting technologies, particularly compared to the highway private vehicle fleet. Further details on comparative emissions and rates are shown in Figure 4 in the "Introduction and Current Position" section of this document and in the Rail Industry Report "The Case for Rail".

Social Impacts

Sustainable Development must not only secure economic competitiveness and environmental protection but also contribute to the achievement of a strong, healthy, fair and just society (see also the chapter on Transport and Social Sustainability in this theme). Public transport, being available to almost everyone, provides the basic underlying accessibility to goods, services and opportunities that underpins a healthy society. Communities experiencing social exclusion and deprivation are particularly dependant on public transport accessibility.

Using public transport is a sociable experience. Passengers have to share space with each other and to respect their needs and interest. While this interaction can sometimes be the cause of conflict and dispute, for the most

part travelling by public transport helps to train young people to have regard for their fellow citizens.

Treating people with dignity and respect is a key aspect of a fair and just society and it is important that transport operators treat their staff well, avoiding any unfair discrimination in terms of recruitment, training and promotion. Transport staff should treat passengers with respect and similarly help and expect passengers to show similar courtesy.

Another aspect of a fair and just society is the right to be consulted on decisions that affect the well-being of individuals and communities. Those commissioning and providing transport services are now expected or required to consult with those who may be affected by service changes, including both new provision and service withdrawal. Some operators go further and publish corporate social responsibility reports, showing how they administer fairness to their staff, customers and the communities they serve, including, for example, charitable activities undertaken in the area.

Quality in Delivery of Public Transport Services

Customer expectations of quality have grown across the myriad of goods and services that are supplied commercially. This expectation applies to public transport services particularly where a majority of the population has direct access to the use of a car. Increasing wealth and sophisticated marketing techniques have brought more discerning attitudes in all aspects of our lives, and poor quality products or services are unlikely to be purchased.

If we are to persuade more people to travel by public transport from choice, then the quality of service, the provision of information and ease and simplicity of use are all highly important. These will often be judged against the quality and comfort standards supplied by car manufacturers.

For too long, public transport, most particularly bus services, has been seen as the mode for those too old, too young or too poor to have any alternative. Fares that have risen faster than motoring costs, poor reliability and low standards of customer care for a captive market are not the way to grow patronage and economically sustain a service.

There are increasing examples of organisations procuring exclusive transport services, to meet their specific needs, such as multi-site hospitals and educational establishments being the most common. This has come about primarily because of the loss in confidence and reliance on the general bus service provision in the neighbourhood, which was not supplying adequate capacity, quality and reliability for their purposes.

Some of the University bus services, such as Southampton and Hertfordshire, have become important services for the wider community too. Some cities have established free City Centre Shuttle services, which appear to be very successful (e.g. Southampton, Leeds).

Transport for London (TfL) has been very successful in attracting more passengers to use the bus with some of the factors explaining this rise being high frequencies, flat-rate fares, Oyster cards to reduce boarding times and hence delays and unreliability, extensive bus priorities, and congestion charging in Central London.

Outside London the few towns with successful and growing bus patronage, such as Brighton, Nottingham and Oxford, combine strong limitations on car parking with simplified bus routes, strong route branding and flat-rate fares, all of which contribute to making it easier to use buses, for all sections of the community.

Conclusions

It is accepted that public transport cannot be a substitute for many journeys – particularly those in less built-up and rural areas with diverse origins and destinations.

As pressure increases for more sustainable transport, whether this arises from reduced availability and increasing cost of fossil fuels or from policies such as carbon rationing to limit climate change, then public transport will have an increasingly crucial role to play. This is particularly important in delivering accessibility in many of our communities.

We should therefore be striving for a high volume, high quality public transport network that meets the needs of discerning customers, if we are to meet the challenges of future mobility.

References

- ¹ "Transport Statistics Great Britain", Department for Transport, 2006 edition
- ² "Transport's Role in Sustaining UK's Productivity and Competitiveness", Sir Rod Eddington, HM Treasury, 2006
- ³ "Our Cities are Back" and "Competitive European Cities: Where do the Core Cities Stand?", Department for Communities and Local Government CLG (formerly ODPM), 2004
- ⁴ See Web TAG Unit 3.4.12
- ⁵ Source: Secretary of State for Transport speech to Parliament, 12 December 2006
- ⁶ "The Case for Rail 2007", Rail Safety and Standards Board, 2007, www.rssb.co.uk – accessed June 2008

Issues and Recommendations

- The quality and quantity of public transport can be genuinely enhanced with greater innovation, thought and challenge. Public transport should therefore sit at the heart of local transport policy and practice.
- Sustainable Development must not only secure economic competitiveness and environmental protection but also contribute to the achievement of a strong, healthy, fair and just society. Public transport, being available to almost everyone, provides the basic underlying accessibility to goods, services and opportunities that underpins a healthy society. Communities experiencing social exclusion and deprivation particularly require public transport accessibility. Finally, it is important to note that where car use is constrained public transport thrives.
- If more people are to be persuaded to travel by public transport from choice, it is essential that the quality of service, the provision of information, ease and simplicity of use will need to outweigh the quality and comfort standards supplied by car manufacturers.
- Treating people with dignity and respect is a key aspect of a fair and just society and it is important that transport operators treat their staff well, in terms of recruitment, training and promotion. It will also be an advantage if transport staff treat passengers with respect and similarly help and expect passengers to show similar courtesy.
- It is advisable that those commissioning and providing transport services would consult with those individuals and communities who may be affected by service changes, including both new provision and service withdrawal.
- It is considered that if the challenges of future mobility are to be met, then public transport has a crucial role in delivering accessibility in many communities. To achieve this, local transport organisations should strive for a high volume and high quality public transport network that meets the needs of discerning customers.

4.4 Road User Charging and Parking Demand Management

Introduction

The potential scope of transport demand management (TDM) measures to influence travel behaviour has been recognised for some time. There are a wide variety of TDM measures including those that improve transport options, those that offer incentives to reduce driving, parking control measures, land-use planning measures and policy reforms.¹ This chapter specifically examines the role of road user charging and parking control measures.

Road User Charging

The concept of road user charging has been present in economic literature stretching back to 1844². It has also been on the Government agenda for

some time. In 1964 the report *"Road Pricing: The economic and technical possibilities"* was produced by a panel set up by the Ministry of Transport (now the Department for Transport). The issue of road user charging of some kind has been raised again and again at decreasing intervals ever since.

For example, the 1993 report *"Paying for better motorways: Issues for discussion"* identified two benefits of charging for road use pertinent to this chapter: firstly it was suggested that any scheme may contribute to lower emissions from motorised transport and secondly that there would be an element of landscape protection due to a reduction in necessary road capacity.

The Transport Act 2000 contained the enabling legislation for charging in the UK. It offered two charging options for local authorities: road user charging – direct charging for road use; and workplace parking levies – charging businesses for provision of workplace parking.

In 2002, the DfT's *"Managing our roads"* report stated that *'any scheme of nationwide road user charging should deliver environmental benefits'*. There have been numerous other reports concerning road user charging (specifically urban cordon based schemes) as a TDM measure, indicating that it could be a highly effective tool to address some of the country's current transport issues.

However, to date this evidence has only led to the establishment of two schemes in England, the London Congestion Charge (an area licensing scheme) and the congestion-charging scheme in Durham city (a barrier based cordon charging scheme).

Figure 1 shows the typical overlapping objectives of charging schemes.

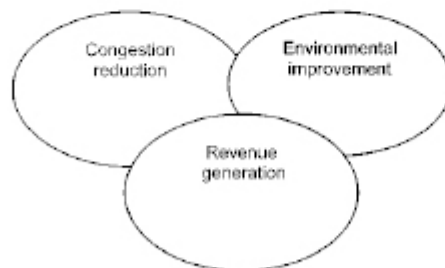


Figure 1: Road User Charging Objectives

There are a number of areas currently involved in the Government's Transport Innovation Fund (TIF) "pump-priming" studies looking at the potential of TDM

measures to address congestion. Each of these includes examination of the role of road user charging as part of a potential solution. These investigations may in some cases lead to firm road user charging scheme proposals in due course.

The area with the most advanced scheme is Greater Manchester, which has secured Programme Entry status for its package of investment and charging proposals and will undertake formal consultations this year. Other areas considering charging include Bristol and its three adjoining unitary councils making up the West of England Partnership, and Cambridge, Reading and Leeds.

It is important to note that road user charging is not limited to schemes such as those operating in London and Durham. It also extends to include multi-cordon and zonal charging schemes; distance based charging schemes and others such as toll roads (for example the M6 Toll road north of Birmingham) and toll bridges.

Figure 2 shows the predicted impacts of charging schemes, and demonstrates how, in addition to a direct impact on car use resulting from increased cost of travel, they also have potential to raise revenue to support improvements to alternative modes of travel to the private car, particularly public transport services, which in turn enables behavioural change.

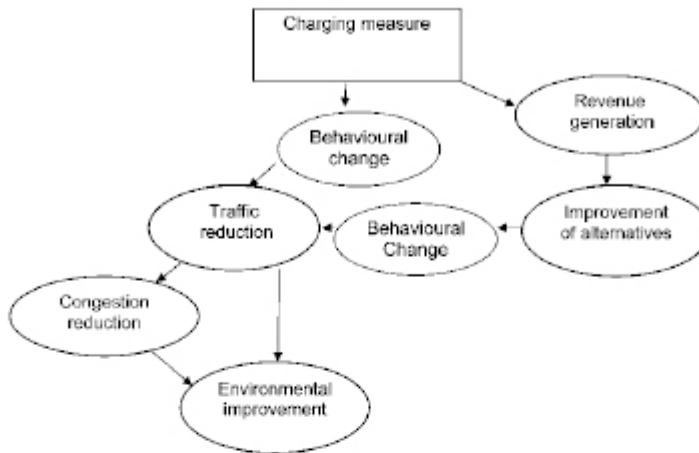


Figure 2: Road User Charging Impacts

There are numerous reasons why, in spite of a growing body of evidence for the benefits of road user charging, few projects have been advanced beyond the planning stage. It is suggested that the primary reason is the negative attitude of the general public towards the suggestion of any road user-charging scheme as a consequence of a range of real and perceived concerns.

The main objections as summarised by Kokac *et al* (2003)³ include the perceptions that: motorists are being penalised (due to the lack of alternative modes of transport); charging is not an effective means of reducing congestion; charging represents 'just another tax' and as a tax it is not fair. There are also technology and privacy concerns. That public feeling is considered to be so negative presents a real challenge for politicians who are considering the possibility of road user charging.

One reason, which has been cited for such strong negative public opinion, is the way in which the concept has been publicised. There has been little clarification of exactly what the Government means by road user charging leaving the public and press to define it themselves. In addition, where the TIF pump-priming bids have been detailed in the local press, the terms road pricing or road charging have frequently been used, thus leading the reader away from the more positive connotations associated with terms such as congestion charging. Further, references to associated public transport improvements have been vague or even absent (IPPR, 2006)⁴.

However there is evidence to suggest that these perceptions can be altered if the concept is presented in an alternative way. Where road user charging is presented as part of a package of measures including, for example, improvements to public transport services and reductions in taxation, it is much more readily accepted.

It is acknowledged that cutting congestion can have an impact on the levels of harmful air pollutant and greenhouse gas emissions generated by transport. Further it is recognised that the implementation of road user charging creates a disincentive to travel by car and therefore results in fewer cars on the roads. There is some published evidence which backs up this proposition.

In Stockholm a seven-month road user charging trial was conducted to test the effects such a scheme would have on the city. The scheme was based around 18 control points located at the entrances and exits to the city. The results of the trial indicated that there had been a drop in local air pollutant emissions of between 8% and 14%, with a 40% reduction in greenhouse gas emissions across the city⁵.

There is also some published data on the effects on air quality of the London Congestion Charge. It is estimated that, as a direct result of the scheme, Nitrogen Oxide (NO_x) emissions have fallen by 8%, particulate matter by 7% and Carbon Dioxide by 16%⁶.

In Durham City an 85%⁷ reduction in vehicle traffic (in the congestion charging zone) would suggest an associated decrease in vehicular emissions (although no monitoring has been conducted in this case). Further, in Stockholm a 25% reduction in traffic volumes was reported and in Rome a 10% reduction⁸.

However, there has been some concern that the effect of road user charging on the climate is under investigated. The DfT has suggested that *the impact upon carbon is not entirely clear-cut*⁹. This is due to the possibility that such schemes may discourage people from buying more fuel efficient cars, if the charge was the same regardless of emission rating of vehicle and the potential that no reduction in traffic would be achieved if the scheme was cost-neutral¹⁰. That is if a scheme was implemented alongside reduced fuel duty and/or vehicle excise duty thereby eliminating any overall increased cost to the public).

Parking Control Measures

Limiting the availability of parking spaces, charging for their use or a combination of both is currently one of the most well-known demand management tools used in city centres. However, as discussed earlier, reducing congestion levels in a specific area does not necessarily have the predicted impact on greenhouse emissions.

Car park charging specifically has long been posited as a method of reducing congestion because it increases the overall journey cost. As far back as 1956

¹³ Ibid

¹⁴ "A review of the impact of parking policy measures on travel demand", B P Feeney, Transportation Planning and Technology (13:4, pp 229 – 244), 1989

¹⁵ "Making travel plans work: Report on case studies", Department for Transport, HMSO, London, 2002

¹⁶ "Parking subsidies and travel choices: Assessing the evidence", RW Willson & DC Shoup, Transportation Planning and Technology (17:2, pp 141 – 157), 1990

Issues and Recommendations

- Road user charging has an important role to play in an integrated and equitable transport network with particular reference to urban areas. However, the arguments to promote such schemes need to be well prepared and that the benefits in terms of reduced congestion, CO₂ emissions, and improved public transport services are clearly demonstrable.
- The Transport Act 2000 contained the enabling legislation for charging in the UK, offering two charging options for local authorities and should be considered in the context of the above:
 - o Road user charging – direct charging for road use; and
 - o Workplace parking levies – charging businesses for provision of workplace parking.

It also extends to include multi cordon and zonal charging schemes, distance based charging schemes and others such as toll roads (for example the M6 Toll road north of Birmingham) and toll bridges.

4.5 Transport and Social Sustainability

Introduction

Sustainable development is commonly regarded as having three constituent elements: environmental, economic and social. While the relationships between transport and the first two "pillars" of sustainability are now generally well known, the connections between transport and social sustainability are less well defined and less well understood by transportation professionals. This chapter sets out to describe and explain some of these linkages.

Definitions of social sustainability generally reflect a concern about the rights of individuals and communities to enjoy the pursuit of healthy and socially rewarding lives, free from discrimination, danger, crime and antisocial

behaviour. Social sustainability often reflects a concern about the distribution across society of non-material goods and well-being. In the United States this has become known as "environmental justice"¹ or, for transport applications, "just transportation".

The transport issues of most relevance to this discussion are those that affect the lives and well-being of the community including, for example, safety; personal security; accessibility for disabled people; health impacts; community engagement and consultation; social inclusion; equal opportunities and fair treatment for customers and staff. As transport becomes subject to new types of scrutiny, such as health impact assessments and equality impact assessments, such knowledge will become increasingly important to all working in the transport industries.

Types of Social Impacts

Transport impacts on society broadly fall into three categories. First, transport provides access to goods and services, many of which are necessary for achievement of personal social welfare and satisfaction. The facilities that provide opportunities to meet these needs and desires are spatially distributed and access to these facilities requires use of a transport system with particular characteristics and qualities of service. The combination of the spatial location and these service characteristics determines the passenger capabilities and resource requirements necessary to attain access. But as these resources are not equally available between different people, there is a social impact where some people are unable to reach the places they want to visit, or the cost, time or effort is too great. The best single reference source for more detailed descriptions of these issues remains the report on "Making Connections" by the Social Exclusion Unit².

Examples and issues here include:

- physical capabilities of travellers – can elderly or disabled people get to and board the vehicle?
- financial resource – can those on low income afford the fares to reach their destination?
- time – do the transport service routes and frequencies allow the trip to be made at the desired time of day and within a reasonable elapsed time?
- does the transport service offer acceptable conditions – for example in terms of perceived personal safety and avoidance of experiencing anti-social behaviour?
- is information about the transport service available and easily understood by everyone, for example people with learning difficulties or those with limited English?

A number of consequences flow from this definition. First, it is clear that the capabilities and characteristics of the individual traveller are important in determining whether they can utilise the transport system. The issues of

social impacts are inevitably bound up with the distribution of costs and benefits to different groups or classes of people and hence social and distributional issues are often discussed together.

Second, there are considerable knock-on consequences of failure to gain access. If someone is unable to visit an elderly relative then alternative caring arrangements may be required. This not only has a financial cost, but also an emotional cost for both parties. If a healthcare journey is too arduous people may defer a visit to the doctor with consequent impacts on their health and well-being. If people are not able to meet with friends and relatives their lifestyle, quality of life and happiness may be adversely affected.

These can all have real long-term societal and community consequences and financial costs in terms of healthcare, mental health services, social services, etc.

Third it is also clear that access to independent personal means of mobility, such as a car, is an important contributory factor to personal well-being. People without such access are essentially captive to their local facilities and lack the opportunity to travel to reach destinations offering higher qualities of service.

The second group of transport social impacts concerns the externalities of transport systems in terms of the pollution, noise, disturbance, health and safety impacts that they create. Analysis of road safety impacts involves an understanding of the pain, grief and suffering experienced by the victims of road collisions, their relatives and friends. Increasingly there is recognition of the trauma suffered by drivers of public service vehicles who have been involved in an incident, for example train drivers who have been involved in suicide incidents.

The effects on health of prolonged exposure to pollutants caused by transport emissions, or noise levels that affect health and performance of everyday tasks, can also be counted as a social effect. Traffic flow in a street with its potential for creating severance is a key determinant of the amount of social interaction between neighbours, an important indicator of social well-being.

Finally, the third set of issues on transport and social sustainability concerns rights and social justice. Transport passengers should be treated with dignity and respect as they interact with transport service providers, their agents and information bureaux. Transport staff, especially front-line staff, should also be treated well not only by their customers, but also by their employers and management. Fair recruitment and selection procedures are an integral part of a fair and just society and contribute to social well-being and satisfaction.

Increasingly people expect to be consulted about transport proposals that affect them, for example in terms of railway franchise service specifications. Consultation and the way in which it is managed, contribute to standards of social justice that are valued as important to personal and community well-being. Many enlightened organisations are now making voluntary public

reports on their corporate social responsibility performance, including not only environmental performance, but also their wider contribution to society through their treatment of staff and engagement in other external charitable activities that support the local communities on whom they rely for their custom. This community engagement and accountability is a part of the social sustainability agenda 'to create a strong healthy and just society'³.

Conclusions

There is an increasing recognition that our intrinsic well-being or happiness is not simply related to economic and environmental welfare, but includes, perhaps more strongly, other influences on life satisfaction. Although material welfare is an important component of personal satisfaction, there are many other influences including personal status and fulfilment, good physical and emotional health, respect from peers, relationships with family and friends and participation in community activities.

As we seek to recognise and take account of these issues in Government investment programmes, awareness of the transport influence on social sustainability are likely to increase in importance. Equality Impact Assessments and Health Impact Assessments of transport policies, projects and schemes seem likely to become more frequent and transport professionals will need to understand better the social impacts of our activities.

However, the evidence would suggest that such considerations of transport influence and consequential social impact importance are still not always recognised. Even for key service organisations such as The Post Office, would so many Post Office closures resulted if Equality and Health Impact Assessments of consequential personal transport implications been included in the considerations?

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- ¹ "Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low -Income Populations", US Department of Transportation, 1994, <http://www.fhwa.dot.gov/environment/ej2000.htm> - accessed August 2008
- ² "Making the Connections: Final Report on Transport and Social Exclusion", Social Exclusion Unit, Cabinet Office, 2003
- ³ "UK Sustainable Development Strategy", DEFRA, 2005

Issues and Recommendations

- Accessibility is directly related to quality of life, and is influenced by a broad range of stakeholders beyond the transport sector. As such, there is a need for closer co-operation between sectors (in particular transport, health, education, social services, media, culture, and sport) to develop truly sustainable society.
- Definitions of social sustainability generally reflect a concern about the rights of individuals and communities to enjoy the pursuit of healthy and socially rewarding lives, free from discrimination, danger, crime and anti-social behaviour. With regards to transport, transport professionals should particularly consider the issues that affect the lives and well being of the community. These include safety, personal security, accessibility for disabled people, health impacts, community engagement and consultation, social inclusion, equal opportunities and fair treatment for customers and staff.
- It is contended that as transport becomes subject to new types of scrutiny (e.g. health and equality impact assessments), such knowledge will become increasingly important to those working in the transport industries and an understanding of how transport impacts on society will be essential. For example, the social impacts which occur when people are unable to reach the places they want to visit could include high cost, time or effort.
- It is clear that the capabilities and characteristics of the individual traveller are important in determining whether they can utilise the transport system. The issues of social impacts are inevitably bound up with the distribution of costs and benefits to different groups or classes of people and hence social and distributional issues should be discussed together. The knock-on consequences of failure to gain access can clearly be considerable.
- Equality Impact Assessments and Health Impact Assessments of transport policies, projects and schemes seem likely to become more frequent and therefore transport professionals will need to understand better the social impacts of society activities.

5. TECHNOLOGY AND SAFETY

General Introduction

The concept of sustainable development does imply limits, which are set by the current state of technology and by the biosphere's ability to absorb the effects of human activity. With the clear evidence of climate change, using technology to allow economic growth without further detrimental impact on the global environment has become a priority.

A sustainable future will require both technology, to enable activities to be conducted in ways that cause less damage to the environment, and management of the demand for activities, including transport. At the same time, society must adapt to the effects of climate change that cannot now be avoided.

This theme covers what can be done to reduce the consumption of fossil fuel by road vehicles, and the changes that are needed in the construction and maintenance of highway infrastructure to enable it to perform well under the climatic conditions expected in the next few decades. It also summarises the current position on transport safety, concentrating mainly on road safety.

5.1 Vehicle Efficiency and Alternative Fuels

Introduction

Reducing carbon emissions from road transport will involve demand reduction, but also involves improving the efficiency of vehicles and the use of fuels and energy sources that emit less carbon than burning petroleum. To date, the limitation of carbon emissions by the UK car fleet has been achieved wholly by improvements in vehicle efficiency, which is politically much easier to achieve than reductions in demand for travel.

This paper reviews how road vehicle efficiency can be improved, the value of alternative fuels such as biodiesel and the scope for alternative energy sources. It will consider both freight and passenger transport. In passing, it should be noted that similar improvements have been occurring for other modes of transport. The switch from steam to diesel for railways greatly improved the energy efficiency of trains, and civil aviation has improved its fuel consumption per passenger kilometre very substantially, but not enough to match the growth in demand for air travel.

During 2007 and 2008, a number of studies have been made of ways to reduce carbon emissions from road transport. The most significant of these are from the Commission for Integrated Transport: 'Transport and climate change – Advice to the Government from the Commission for Integrated

Transport" (2007)¹; "The King Review of low-carbon cars – Part I: the potential for CO₂ reduction (2007)² and Part II: recommendations for action (2008)³"; and "The Gallagher Review of the indirect effects of biofuels production" (2008)⁴.

The Commission for Integrated Transport, (CIT) report is mainly about policy ways to reduce carbon emissions from transport. For cars, its main advice is to seek to adopt a mandatory target for new car sales in the EU to achieve an average 100 g CO₂/km by 2020 complemented by a package of supporting measures. It also recommends reinforcing positive driver behaviour through a combination of measures to sustain fuel prices, encourage eco-driving techniques and promote greater adherence to road speed limits. The King and Gallagher reviews provide considerable information on technical topics, and results from these studies will be used in this section.

It is not generally realised how well the fuel economy of new cars has improved in Britain. Excluding 4-wheel drive vehicles, the fuel economy of new cars has improved from 28.9 miles per gallon in 1977 to 37.9 miles per gallon in 2004 (Figure 1). (DfT Transport Statistics GB 2006 Table 3.5)

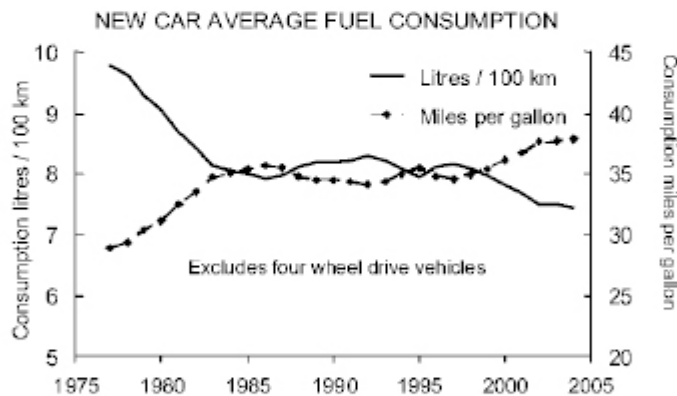


Figure 1 New car fuel consumption, excluding 4 wheel drive vehicles - Great Britain
 Transport Statistics GB 2006 Table 3.5

However, including 4-wheel drive vehicles, the fuel economy of the car fleet in service has only improved from 31 mpg in 1993 to 33 mpg in 2005 (9.2 to 8.7 litres/100 km, about 6%) (Figure 2) (DfT Transport Statistics GB 2006, Table 3.5). This result is based on reports by drivers in the National Travel Survey, and is not consistent with the measured total fuel consumption for the car fleet

that has not increased since 1995 despite an increase in car traffic of almost 15% over the same period.

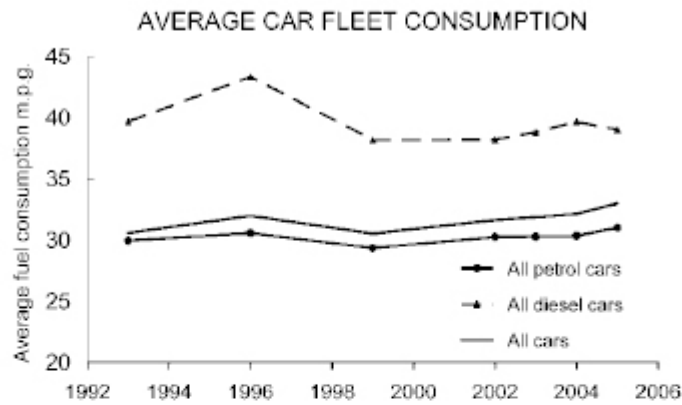


Figure 2 Fuel consumption of car fleet in service, including 4-wheel drive vehicles
 Transport Statistics GB 2006, Table 3.4

Goods vehicle fuel consumption has also improved, but not enough to match the increased mileage by goods vehicles in service (Figure 3).

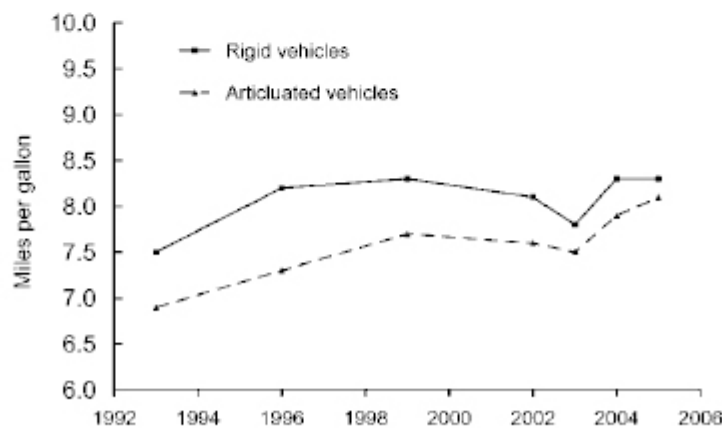


Figure 3 Fuel consumption of heavy goods vehicles in service
 Transport Statistics GB 2006, Table 3.4

Factors that Reduce Fuel Consumption-Cars

Despite its age, a good general research report on the efficiency of cars propelled by internal combustion engines is "Research on fuel conservation for cars" by Waters and Laker⁵. This identifies the four factors that affect fuel consumption as the driver, the vehicle, the road system and traffic conditions.

For otherwise similar conditions, drivers can change fuel consumption by about 12% by driving more or less economically. Department for Transport figures from the introduction of safe and fuel-efficient driver training (SAFED) in the freight industry point to fuel savings of between 2% and 12% across 15 case studies (CfIT, 2007). Other research studies show reductions in fuel consumption in the range of 5% to 15%. In addition, because fuel consumption is abnormally high for the first few kilometres after a cold start (double after 1 mile, 65% up after 2 miles, 10% up after 12 miles), a driver can save fuel by not making very short journeys.

Fuel consumption of a car is affected by the mass of the vehicle, the rolling resistance, aerodynamic drag, the transmission and the size and type of engine. Sensitivities to these factors depend on the driving conditions (aerodynamic drag has little effect at low speed in urban areas); indicative sensitivities for urban and rural driving from this 1990 paper are shown in Table 1.

Table 1 Sensitivity of car fuel consumption to design changes

(TRL LR 921)

Factor	Urban driving	Rural driving
Vehicle mass	20% reduction saves 6%	20% reduction saves 4%
Rolling resistance	20% reduction saves 3%	20% reduction saves 3%
Aerodynamic drag	Little effect	20% reduction saves 6%
Final drive gear ratio	Little effect	Overdrive saves 10%
Diesel engine	At least 25 - 30% saving	At least 25 - 30% saving

The report summarises these savings as the following potential gains in fuel consumption for the car fleet.

Reduced weight, drag and rolling resistance 10%

Matching engine and transmission for fuel saving	10%
Change to higher efficiency engine	25%
Reduction of out-of-tune condition	5%

Overall, this would have led to a reduction in fuel consumption from 10 litres/100 km to 6 litres/100 km, which has largely been achieved.

A more recent study considered how the fuel consumption of road vehicles was affected by speed, engine capacity, fuel type and whether the engine was cold ("Methodology for calculating transport emissions and energy consumption" TRL Project Report SE/491/98, 1999, Deliverable 22 for the European Commission project MEET (Methodologies for estimating air pollutant emissions from transport))⁶.

This shows the benefits of smaller engines and the use of diesel fuel (Table 2 and Figure 4).

Table 2
 Effect of speed and engine capacity on carbon dioxide emissions
 from EURO 1 cars

Fuel type	Cylinder capacity litres	Speed range km/h	Emission factor g/km
Petrol	CC < 1.4	5 - 130	$157 - 2.07V + 0.0172V^2 + 1835/V$
Petrol	$1.4 < CC < 2.0$	5 - 130	$231 - 3.62V + 0.0263V^2 + 2526/V$
Petrol	CC > 2.0	5 - 130	$294 - 5.50V + 0.0393V^2 + 3513/V$
Diesel	All categories	10 - 130	$286 - 4.07V + 0.0271V^2$

Source TRL Project Report SE/491/98 Tables A.17 and A.19

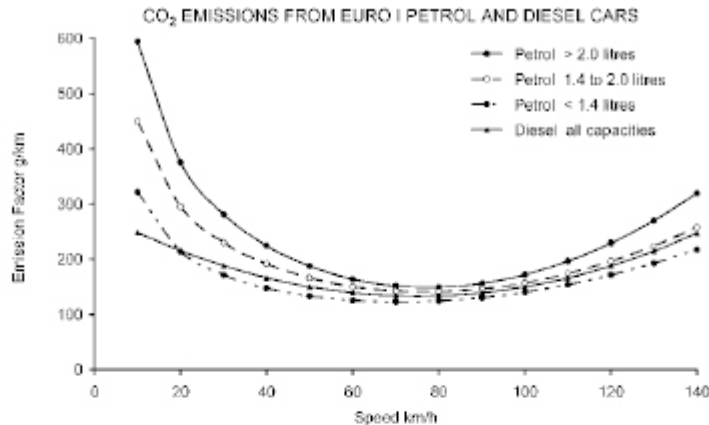


Figure 4 CO₂ emission factors from TRL Project Report SE/491/98

The King Review Part I concludes, that "In the long-term (possibly by 2050 in the developed world), almost complete decarbonisation of road transport is a possibility. If substantial progress can be made in solving electric vehicle technology challenges and, critically, the power-sector can be decarbonised and expanded to supply a large proportion of road transport demand, around a 90 per cent reduction per kilometre emissions would be achievable across the fleet...

...it is also important to start reducing emissions in the short term, through development and implementation of improvements to established automotive technologies... This Review's analysis indicates that, by 2030, emissions per kilometre could be around 50 per cent below 2000 levels. This would be partly offset by the projected increase in distance travelled, implying an overall reduction in UK emissions from car use of approximately 30 per cent by 2030...

To achieve this goal, substantial progress is needed across the board:

- cleaner fuels;
- more efficient vehicles; and
- smart driver choices."

"In the nearer term, considerable CO₂ savings can be achieved through enhancements to conventional vehicle systems. Technology that can reduce CO₂ emissions per car by 30 per cent (on a like-for-like basis) is already close to market and could be standard within 5-10 years. Despite the likely vehicle cost increases (estimated at £1,000 - £1,500 per new vehicle), many of these

changes are likely to represent good economics to the purchaser, as a result of their impact on fuel economy. However, demand-side and supply-side barriers are currently delaying their deployment. Ensuring these technologies are quickly brought to market constitutes a major policy challenge and will have a major impact on emissions reductions from road transport in the coming years."

"Technology achieves nothing if it is not adopted. Consumers must be engaged in order to reduce substantially CO₂ from road transport. The Review estimates that savings of around 10-15 per cent could come from consumer behaviour, much of this over the next few years.

Many small things can have a significant cumulative impact:

- demanding new technologies: choosing the most fuel-efficient model in the range or market sector can substantially reduce CO₂ and, critically, ensure low-carbon technologies are brought to market earlier. Downsizing vehicles would save much more;
- making the most of technologies: simple aspects of driver efficiency (for example, keeping tyres pumped up, controlling acceleration and not carrying unnecessary weight) make several percentage points difference to fuel consumption; and
- small reductions from avoiding low-value journeys, use of alternative means of transport, and more car sharing, would reduce emissions as well as congestion."

Development of higher-powered small petrol and diesel engines, and low resistance tyres, continues. The King Review makes clear that the fuel economy of small cars will continue to improve. One threat to this is the trend to heavier vehicles as a result of improved occupant protection and the fitting of air conditioning, more extensive consumer electronics and entertainment systems, and a whole raft of features to improve comfort and convenience.

Road systems that permit steady running at constant speed reduce fuel consumption. When driving a small car in the range 70 to 110 km/h, at any speed the fuel consumption on a motorway is about 1.7 litres/100 km less on a motorway than on general purpose roads (typically 6.7 litres/100 km compared with 8.4 litres/100 km at 80 km/h) (TRRL LR 921).

Congestion causes the achieved average speed to drop and fuel consumption to increase. On general roads, if average speed is reduced by congestion from 50 km/h to 15 km/h, fuel consumption per km doubles. Traffic management that achieves smoother driving at steady speed can save a few per cent of fuel consumption.

Factors that Reduce Fuel Consumption- Goods Vehicles

There is less scope for reducing the fuel consumption of goods vehicles, partly because they already use very efficient diesel engines and transmissions, and partly because their role means that they cannot be made lighter or physically smaller (they exist to move mass and/or volume of goods). Engine performance continues to improve. A vehicle that used a 10-litre engine in 1980 would use a 7-litre engine today and will soon be using a 5 - 6 litre engine, for the same performance. Air drag is now being reduced by better streamlining, and can save 10-15% of fuel.

Figure 3 shows that fuel efficiency is improving, and will probably continue to improve, but is currently not improving as fast as goods vehicle traffic is growing. However, actions that reduce the total fuel used by HGVs are being promoted by the Freight Best Practice programme⁷. These include technical means such as streamlining, tyres with lower rolling resistance, improved engine efficiency, etc. and also by driver training, which can achieve a 10-15% reduction.

Alternative Power Plants

Alternatives to the conventional internal combustion engine include hybrid propulsion (a vehicle fitted with an internal combustion engine, generator, electric motors and a large battery or fuel cell, so that it can be operated electrically or by internal combustion, depending on driving conditions), and solely electric propulsion using either batteries or fuel cells to store electrical energy.

Hybrid power plants can save energy overall, provided the greater efficiency of the combined propulsion system outweighs the greater mass of the vehicle. At present the benefits are rather marginal. There are also currently concerns regarding the life-cycle carbon impact of hybrids due to the materials required in their construction.

Electric propulsion is limited by the weight of batteries and their limited capacity for energy storage. This tends to limit vehicle range to around 100 - 150 km. Batteries are improving, but only very slowly. Fuel cells offer great potential, but are still in an early stage of development for use in small motor vehicles.

In the longer term, road transport must move towards electrical propulsion to reduce carbon emissions. As the King Review makes clear, this then puts responsibility for low carbon energy provision on to the electrical generation industry. This will inevitably cause the industry to invest in a mixture of technologies, including nuclear, tidal and/or wave power, wind power, and possibly coal-powered generation with capture and storage of CO₂ from the power station exhaust.

However, if the electricity is provided by oil or coal burning power stations, the overall carbon emissions for an electric vehicle fleet can be greater than would be produced by burning petroleum in internal combustion engines. There are also concerns over the capacity of Britain's generating and distribution system to handle the extra demand if the whole fleet of road vehicles were converted to electric propulsion.

Alternative Fuels

There is current interest in alternative fuels for road transport, to reduce carbon and other emissions. These fall into a number of categories².

- Gas, either compressed natural gas (CNG) or liquefied petroleum gas (LPG). These are slightly different chemically, which has an effect on their emission characteristics. They are used in spark-ignition engines.
- Bio-fuels, including:
 - Ethanol (alcohol), made by fermenting sugar from sugar cane, beet or other crops. Mixed with petrol and used in spark-ignition engines.
 - Biodiesel; fuel usable in a diesel engine made from one of a number of sources, such as oil palm or corn oil, waste cooking oil, processed biomass (food waste, fibrous vegetable matter, etc.). It is usually mixed with diesel fuel for compression-ignition engines.
- Hydrogen, used in spark-ignition engines.

Both the King Review and the Gallagher Review of the indirect effects of biofuels production consider the merits of the various alternative fuels. Comments from these reviews are included in the section that follows. Smith (2007)³ considers specifically biofuels in terms of the carbon emissions from the complete life-cycle, and possible adverse effects on land-use and food production, and concludes that there are unanswered questions over biodiesel.

King comments "There is a large number of different fuel types (and sub-types) that could be used to power a car. Moreover, there are often several different ways of producing the same fuel (using different primary energy sources and production techniques)..."

"Biofuels can be made from a wide range of feedstocks: food crops (e.g. maize and sugar); non-food parts of crops (e.g. straw); dedicated energy crops (e.g. poplar, switchgrass and jatropha); agricultural waste; municipal waste and even algae. The importance of non-food feedstocks in expanding biofuel production sustainably is discussed later in this chapter."

"Biofuels can offer significant CO₂ savings compared with petrol and diesel. These savings vary widely depending on feedstocks used, farming method

and production technique. While CO₂ emissions from the tailpipe are exactly offset by those absorbed in the growing of feedstocks, there can be significant CO₂ emissions associated with farming (particularly the use of fertiliser) and the production process. Moreover, there are severe adverse climate change impacts if forest or grassland is cleared to provide land to grow feedstocks, because large quantities of CO₂ "locked-up" in the plants and soil are released."

The Gallagher Review of biofuels⁴ concluded that "that feedstock production *must* avoid agricultural land that would otherwise be used for food production. This is because the displacement of existing agricultural production, due to biofuel demand, is accelerating land-use change and, if left unchecked, will reduce biodiversity and may even cause greenhouse gas emissions rather than savings. The introduction of biofuels should be significantly slowed until adequate controls to address displacement effects are implemented and are demonstrated to be effective. A slowdown will also reduce the impact of biofuels on food commodity prices, notably oil seeds, which have a detrimental effect upon the poorest people."

Overall, the general view could be summarised as supporting the position that first-generation biofuels are not sustainable and probable release as much or more carbon over their life-cycle than conventional fuels. Second-generation fuels are expected to mark a significant improvement in their life-cycle carbon emissions and result in a net benefit.

Ethanol added to petrol has been used successfully for many years in Brazil, where car ownership is low and land for sugar cane growing has, until now, been available.

Gas was used widely in New Zealand, but only when subsidised through the fuel tax system. When the subsidy was removed, use of gas ceased. Gas is being used in buses and taxis in a number of cities, to reduce noxious emissions, usually as a result of regulation. Hydrogen propulsion is being developed by all motor manufacturers. Problems include storage (either cryogenically at very high pressure or in metallic matrices), and the production of hydrogen which requires much electrical power.

Conclusions

The fuel economy of cars has improved by about 24% since 1997, and there is no reason this improvement for cars will not continue. The fuel consumption of the car fleet, including 4 x 4s and MPVs, is reported to have only improved by 6% since 1993, although this is inconsistent with the slight fall in the total fuel used by cars since 1993, despite a 15% increase in car traffic. One reason for the relatively small reported improvement is the fashion for using large, heavy, bluff four-wheel drive vehicles on normal roads, as these have poor fuel consumption.

The fuel consumption of goods vehicles is being reduced, but the scope for savings is less than for cars.

Alternative electric propulsion is in an early stage, mainly because of the need for development of better batteries or fuel cells. Road transport must ultimately move to electric propulsion, but this will only reduce carbon emissions when electricity generation becomes much less carbon intensive.

The benefits of alternative fuels, other than hydrogen, which is in a very early stage of development, are marginal, with only small reductions in carbon emissions and possible adverse impacts on land-use and food production.

However, even if the first generation of bio-fuels are not sustainable and probably release as much or more carbon over their life-cycle as conventional fuels, the second-generation fuels are expected to achieve a significant improvement in their life-cycle carbon emissions and result in a net benefit.

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⁷ Freight Best Practice Programme, Department for Transport,
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⁸ "Cars, Trains or Planes? Biofuels – food or fuel?", Gail Smith,
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Issues and Recommendations

- The fuel economy of cars has improved by about 24% since 1997, and there is no reason to believe that this improvement for cars (excluding four wheel drive vehicles) will not continue. The fuel consumption of the car fleet has improved by 5% since 1993. One reason for the relatively small improvement is the fashion for using high powered cars and particularly large, heavy, bluff four wheel drive vehicles on normal roads, as these have poor fuel consumption. These factors should be considered by fleet managers in order to successfully promote fuel economy.
- The cost of fuel represents 30% of the total cost of operating a goods vehicle. A reduction in fuel consumption per vehicle kilometre driven can be achieved by technical means such as aerodynamic streamlining, the use of tyres with lower rolling resistance and improved engine efficiency.
- Driver training has been shown to achieve a 10% reduction in fuel consumption (SAFED, a one-day course on Safe and Fuel Efficient Driving has been shown to produce a typical reduction in fuel consumption of 10%).
- Alternative electric propulsion is in an early development stage, mainly because of the need for development of better batteries or fuel cells, but should be considered for urban area use. Road transport must ultimately move to electric propulsion but this will only reduce carbon emissions when electricity generation becomes much less carbon intensive.
- The description of Bio-fuels as a single category is over-simplistic. Some bio-fuels offer real savings in carbon emissions over the complete fuel cycle with few adverse environmental effects. Others offer little or no saving in carbon emissions and have large effects on land use and food production. It is necessary to assess the benefits of different bio-fuels separately and promote those that are truly sustainable.

5.2 Changes required in Engineering Design Standards and Material Specification

Introduction

It is only in the last few years that scientific evidence regarding climate change has been gaining wider acceptance. Exceptional flooding and sustained high temperatures have produced devastating results for populations worldwide with the UK experiencing meteorological event maximums since records began.

For engineers and transport professionals it is considered that a new awareness is required to recognise that current design and material specifications must be sustainable and reflect more appropriately the forecast changes in climatic conditions particularly for the UK.

Background

The key issues of higher temperatures and associated events of flooding, wind, drought and storm will therefore need a review of infrastructure design approaches to safety, durability, and sustainability to prepare for these forecast changes and resultant 'severe' conditions projected for the UK. For example it is projected that the June 2006 high temperatures experienced in France and the UK will represent the average summer by the mid 2040s. In addition, predicted changes to UK extremes by the 2080s (UKCIP02)¹ suggest ten to twenty times increase in hot summer days with 50% reduction in frosts and substantial reductions over the whole UK of snowfall totals, but three times the number of heavy winter rainfalls.

The flooding across the UK in July 2007 promoted sustained high levels of media cover with the result that £200M was added to the flood defence budget and for the Environment Agency to decide how to spend it. However, for highway authorities of both central and local government, the need to consider such severe events and their impact on road pavements, bridges, culvert, embankments and earth retaining structures should also be given equal priority.

Particular reference should also being given to design criteria for future infrastructure developments to withstand such forecast severe events. All key elements of the highway and rail infrastructure in such sensitive areas are already at various levels of risk as experienced in the West Midlands, particularly Gloucestershire in the same July flooding and in Devon at Dawlish where the rail line was flooded.

Considerations for Construction Design

Engineers need to recognise that current design and material specifications must be sustainable, reflect the forecast changes in climatic conditions for the UK and manage such risks. To respond to such an agenda, the formulation of appropriate audit procedures is proposed such that the potential impact of climate change on road pavements, bridges, culverts, embankments and earth retaining structures in high-risk areas can be fully ascertained.

Equally, for new infrastructure proposals, particularly involving geotechnical sensitive embankments and cuttings, the design process should include risk assessments against such forecasts of extreme events. To some extent, such risk assessments are already being undertaken based on current guidance. For example, the Environment Agency advises that rainfall intensities, used to calculate design storm flows, must include allowance for climate change of a 20% contingency.

However, investigated 1 in 1, 1 in 5, and 1 in 30 year daily maximum events of medium-high and high emissions indicate that an annual 20% contingency

underestimates the 30-year event by the 2080s. The seasonal 20% contingency is also likely to underestimate, with the one-year event projected to increase by 30-40% in winter by the 2080s. The forecast change to the pattern of rainfall to heavier, more intense, downpours will clearly exacerbate problems with storm water run-off, particularly in urban areas. The events in Greater Hull during 2007 were an example of the worse case scenario.

Such challenges demand high-quality innovative solutions to design and build infrastructure with resilience to meet the impact of a changing climate. For example, to safeguard downstream flooding, the concept of retaining storm water run-off from large paved areas is well understood. Such designs include the use of porous wearing course surfaces with sub pavement retention reservoirs. Such design approaches should now be considered as a priority option and be established as standard practice.

Similarly, consideration should be given to the use of large hydro-brake controlled storm overflow culverts incorporated below and part of new estate roads. Such options can be used instead of using balancing ponds and saving valuable land-take. Consideration should also be given to the concept of roads becoming dual purpose and used as 'shallow canals', the design of roads in flood-risk areas being re-profiled and constructed with resilience to withstand saturation conditions. The aim would be to provide retention capacity, whilst at the same time to concentrate flood water away from adjacent properties with complementary efficient drainage systems.

For pavements, traffic loading and environmental variations are the two main factors known to contribute to pavement deterioration. The environmental variations include temperature, which leads to asphalt rutting in hot weather and cracking in cold weather. Moisture variations during the pavement life also affect the sub-grade stiffness and hence pavement performance. Additionally, thermal stresses due to temperature variations can cause concrete slab cracking.

To date, standard pavement design methods have been calibrated using full-scale pavement monitoring in order to relate the pavement design assumptions to actual performance. The calibration procedure is typically performed to match the predicted distress and pavement observations. The current design methods have all been developed from experience with standard material specifications, pavement thicknesses, environmental condition and traffic loading. Hence, in principle, they are restricted to the conditions for which they were originally developed. The introduction of new materials or higher traffic loading can be considered by using mechanistic/analytical pavement design methods.

However, the impact of climate change on pavement design and materials specification as indicated is now an essential consideration. This includes the higher expected temperatures and their effect on asphalt and concrete layer performance and higher moisture content due to an increase in water table levels and higher density storm events.

Unlike other countries, the UK temperatures are quite uniform with not much variation between day and night. The design standards account for few asphalt mix design. Whereas design standards in other European countries such as France have to account for the project locations to consider, cold, hot, wet and dry climatic conditions. The UK design standard proposes stiff asphalt materials with low penetration binder to improve pavement-bearing capacity or reduce its thickness for the same traffic level. Nationally, no formal design specifications are used to account for differing conditions. However, in practice the local environmental conditions are considered in the design of materials.

Other overseas design standards, such as that adopted in California, use different binder penetration to suit the environmental condition. A compromise between soft mix with good fatigue resistance and stiff mix with good deformation resistance in hot weather is optimised. Asphalt mix modification such as the incorporation of polymer-modified binder is considered in standard highway pavement design.

It is considered that the impact of climate change and resultant global warming on materials specification and pavement design therefore might not be so significant. However, that assumes that in the future environmental conditions are properly assessed in the design of materials. Asphalt mix modification such as aggregate grading, voids content and binder content can be considered to optimise the design. Materials specifications and practice exists in other parts of the world that can inform materials choices for the future conditions expected for the UK.

It is therefore proposed that designing for whole pavement life should be the adopted procedure. When pavement work involves existing pavement materials, recycling represents an important opportunity to achieve several environmental objectives including that of reducing the impact of global warming.

Developments in Recycling

Growth in the utilisation of recycled and secondary aggregates and in recycling techniques over the past 10 years has been particularly noticeable. This is as a result of EU/Government policies encouraging the development of a more sustainable construction industry through legal incentives including the landfill tax, aggregates levy and the Local Authority Agenda 21 targets. The key objectives are to reduce waste generation and disposal through increased reuse. Complementary to the climate change issues the actions also aim to reduce the use of finite materials and material movements.

The recorded growth shows that, from 30 million tonnes in 1989 and 50 million tonnes in 2001, 70 million tonnes of recycled and secondary aggregates were used in 2006² representing 26% of the total aggregate market in Britain.

Future potential growth in higher-value applications for recycled aggregates by 2011 shows the following:

- | | |
|------------------------|------------|
| • Concrete Aggregates | 7% to 17% |
| • Asphalt aggregates | 5% to 14% |
| • Sub-grade Aggregates | 18% to 35% |

However, barriers to future growth will still need to be addressed to overcome issues such as confidence and perceived risk, availability of standards/guidance, and Waste Regulation.

With regard to confidence and risk the idea that secondary is 'second best' being a concern can very quickly be dealt with through advice such as that available in HD 35/04 –HD35/95 and BRE 433³.

Of the other concerns such as design guidance, performance-based specifications, and difficulties obtaining departures and approvals for new materials, all are now being successfully lifted with Specific Standards and Guidance, (see References)³.

Waste Regulation does remain a key issue to future growth success in that new EU case law has affected the definition of when waste ceases to be waste, (when fully reused). However, the term "fully reused" also needs clarification since the EU interprets it as the point of final placement. Representation has been made to the Waste and Resources Action Programme (WRAP), who in turn has raised this matter with the European Commissioner. It would appear that to change its status, as a "waste" will require lengthy legal changes. It seems to be accepted by the Commission that this is an unintended consequence of legislation.

Notwithstanding this, research continues to facilitate the desired growth in recycling processes with several initiatives promoting sustainable road construction.

One such example is that of The City of Edinburgh Council (CEC) which has formed a joint venture company to develop and promote sustainable road construction. It has been facilitated in this venture with financial support from the Waste and Resources Action Programme (WRAP) and the Department of Trade and Industry. The joint venture is collaboration with the Council as client and user, Abertay University for research and Proficio to commercialise the processes and products.

As previously indicated, there is a recognition that the two factors of economy and environment combine to require a step changing in approach to road reconstruction by employing technology to meet required performance criteria. This approach acknowledges the increased traffic loading, especially PSVs, the impact of utility interventions in the road structure and the limit to funding to reverse the net decline in road pavement over the past decade. Additionally it appreciates that aggregate tax is now levied on primary quarry materials as well as landfill tax, which increases the net cost of road maintenance.

Environmentally it is appreciated that the traditional and convenient "dig and dump" approach is neither economic nor environmentally sustainable. Consequently a changed approach is required so as to comply with the Climate Change Framework.

In summary, this is a new approach employing technology, using well-understood principles. However, it does require a change in attitude toward design and construction yet one with assured outcomes. It recognises the changing demands from traffic loadings and provides a design mechanism to enable adequate performance to match site conditions.

The performance-based approach ensures that the "hit and miss" approach in the use of recycled materials is avoided and credibility and repeatability assured. In cost terms the commercialisation of products and systems can be determined to ensure it is fit for purpose over primary materials. Importantly the design approach takes account of the overall structure and consequently the performance criteria required to be met by each layer. Significantly the normal range of acceptable variation of materials and their production is factored into the process to assure required performance.

This is then translated into a method statement, which is then approved by the contractor prior to the commencement of construction, thus providing assured outcomes to specification, plus saving time and money through effective risk management. Environmentally it ensures that the existing road pavement construction material is seen as an asset that can be reconstructed in a manner to meet appropriate standards while minimising the use of primary aggregates and avoiding the need for landfill. The net outcome is economical and environmentally sustainable while meeting the demands for transport and travel.

Alternative Pavement Material Strategies

For many years the discussion and debate on rigid versus flexible pavements has generally focused on economics and noise as the key issues. However, in terms of sustainability and an accepted need to reduce the demand for imported carbon base materials, there is now a strong reason to review the arguments for the wider use of rigid construction pavements through further proactive research. Such research objectives include engineering benefits, economic performance including whole-life costing, and sustainability. For sustainability the assessment should embrace the impact of climate change with particular indirect benefits in terms of carbon emission.

In terms of major road widening and strengthening little use has been made of concrete pavements, even though they are stronger than bituminous pavements for a given thickness. Noise would appear the main concern, resulting in the Highways Agency instigating a resurfacing programme to be carried out on 74 stretches of roads opened since 1968 with a first phase of 26 (costing £77 million)¹. This is notwithstanding that the Highways Agency, Design Manual for Roads and Bridges provides a design advice guide for rigid

pavement designs⁵, albeit using flexible surfaces. The use of concrete in composite pavement construction is clearly an alternative material and when sustainability arguments are converted into economic evidence it is anticipated that the market would increase with resultant environmental benefits. It is suggested that complementary focused research into surface finishes to mitigate the impact of 'road noise' should be undertaken following that already undertaken e.g. TRL 576 based on the wider agenda to respond to climate change and sustainability.

Current Developments

Since 2005, research has been undertaken in the use of microsilica to improve concrete strength and hence long-term performance. Microsilica's use in concrete to obtain high strength is not new but recently it has been seen as an appropriate material to use against cement. The former is a by-product and the latter is high on energy hence the carbon footprint is high with high cement content concretes. High strength concrete will improve long-term performance but it will also require higher control against cracking. However, 'repair & maintenance' strategy for these materials is simpler than for less rigid materials'.

Due to the expected increase in air traffic movements around the world and its impact on the environment, the requirement to build more sustainable and low maintenance airfield infrastructures has also become very important. Consequently, the use of new materials in airfield pavement construction has become a priority to provide a better sustainable whole-life cost solution.

As a result the use of high strength concrete as well as improved asphalt materials in UK airfield pavement construction has been investigated^{6,7,8} including materials such as; BBA (Bétons bitumineux pour chaussées aéronautiques), a French airfield surface/binder course, and EME2 (Enrobé à Module Elevé 2) base.

According to the findings of the report⁷ an average layer thickness reduction of 15% is possible using EME2 compared to Marshall Asphalt without loss of mechanical strength.

Unlike Marshall Asphalt it can also incorporate recycled asphalt plantings -10% in the surface course and 20% in the binder course. It should be noted that following the publication of the UK 'Design Manual for Roads & Bridges' Vol. 7, EME2 has been introduced as a permissible base material for flexible composite design. Transport Scotland has already sanctioned its use following trials on the M876.

Whole-life pavement cost includes the initial cost of pavement construction or rehabilitation, all the costs of routine maintenance and planned strengthening over the pavement life, and the value of the asset at the end of its life. In addition there is a need to add Life Cycle Assessment (LCA) of raw constituents, material production, laying, etc. An inventory needs to be

developed for each material chain (this will include carbon footprint) and an associated cost attributed.

Repair and Maintenance cost should also be included in the LCA. Both Life Cycle Costing (LCC) and LCA are a function of the pavement layout, etc. Pavements today are evaluated on best performance, best value, best constructability and also best LCC and LCA; the latter includes the effect on the environment from the pavement.

Other factors include traffic management cost during pavement treatment and users' cost as a result of delay and increase in aircraft operating cost. In addition, where the cost of traffic disruption during pavement maintenance and strengthening is high, as in the case of the majority of busy airports, constructing a high performance durable pavement will be a major advantage.

Conclusions

The response to the impact of severe meteorological events must be high on the agenda for engineers and highway professionals, but they must also address the wider causes of climate change.

The need to reduce the demand on natural resources where possible and particularly that of finite stocks of fossil fuels must also be seen as an important objective.

Such uses of asphalts, bitumens and tar binders in pavement construction represent important materials for specification review. This includes both the search for alternative suitable materials and the maintenance of progress in the use of recycling in pavement construction.

Industry has been well aware of the need to address whole-life costing. However, with forecast climate change impacts, better knowledge of the causes and recent severe events, infrastructure designs for change, innovation and sustainability must also now be given due agenda priority.

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Issues and Recommendations

- With current knowledge and understanding regarding the increase in CO₂ emissions by transport and climatic change, impacts on infrastructure, technology research, innovation and reviews of engineering design standards and practice should be an essential priority.
- The key issues of higher temperatures and drought with associated events of flooding, wind and storm requires a review of infrastructure design approaches to safety, durability, and sustainability in order to prepare for these forecast changes and resultant 'severe' conditions projected for the UK.
- Considerations should include the early identification of high-risk infrastructure with particular reference to public safety. Highway authorities of both central and local government need to consider such severe events and their impact on road pavements, bridges, culvert, embankments and earth retaining structures. These factors should be given equal priority.
- Particular reference is given to design criteria for future infrastructure developments to withstand such forecast severe events. This would include the use of sub-pavement reservoirs below car parks, storm overflow culverts below estate road networks and using urban roads as shallow canals in flood risk areas.
- The implications for drainage systems and design assessments indicate a clear need to audit current facilities against such event forecasts. Although current Environment Agency guidance suggests an allowance for Climate Change of 20% contingency, the possibility of 30% should also be considered.
- For new infrastructure proposals, particularly involving geotechnical sensitive embankments and cuttings, the design process should include measured risks assessments against such forecasts of extreme events.
- The impact of climate change, with global warming on pavement design and materials specification as indicated is also an essential consideration. This includes

the higher expected temperatures and its effect on asphalt and concrete layer performance and higher moisture content due to increase in water table level and higher density storm events. However, it is considered that under the circumstances, the impact of climate change on materials specification and pavement design might not be so significant providing the future's properly assessed environmental condition is incorporated in the design.

- Asphalt mix modification such as aggregate grading, voids content and binder content can be considered to optimise the design for whole pavement life. For example, in France, cold, hot, wet and dry climatic conditions are considered according to project location. Materials specifications and practice exist in other parts of the world that can inform materials choices for the future conditions expected for the UK.

5.3 Safety

Introduction

Britain can be proud of its position with regard to road safety. Until recently, Great Britain had the safest roads in the world by all the main measures, and Northern Ireland had roads that were very safe, though less safe than Britain's. Even so, over 3,000 people die on Britain's roads every year, and road collisions cost over 1% of GDP (around £13,000 million in 2006)¹. This cannot be regarded as acceptable or sustainable.

Current Position

For the world as a whole, there are an estimated 1¼ million road collision deaths each year. Road collisions represent a cause of death, disability and serious injury comparable to a major disease such as malaria, and are becoming the largest single killer of young people at the start of their period of economic productivity².

Sweden has introduced 'Vision Zero'³ as a road safety policy, based on the concept that while collisions that cause only damage are relatively unimportant, it is not acceptable for anyone to be killed or seriously injured by road traffic. The Netherlands has introduced a policy of sustainable road safety, which is similar but less extreme than Vision Zero. Both countries are investing more per head in road safety than Britain, and both now have roads that are safer than Britain's (as does Switzerland).

Vehicle manufacturers have greatly improved the occupant protection provided by new cars, partially under pressure to achieve '5-star' NCAP ratings for occupant protection. The European Road Assessment Programme (Euro RAP) is focusing attention on providing '5-star' roads to match '5-star' vehicles, based on the concept that all motorists make mistakes (about 1 in 500 decisions are incorrect), so the transport system must be designed to be tolerant of error, and a single mistake should not cause a death.

Notwithstanding, driver behaviour is a constant focus for road safety, with particular reference to the need for regular publicity and education programmes to achieve safer driving techniques and the reasons for it.

Road collision fatality rates for Britain have reduced greatly since the late 1960s, and also vary considerably with age and gender. Figure 1 shows how fatality rates have changed for different age groups. It is notable that the lowest fatality rates, by a large margin, are for those aged under 16. The highest fatality rates are for 16 to 19-year-olds, 20 to 29-year-olds and those aged 80+. However, for the 16 to 19 and 20 to 29 age groups, 72% and 63% casualties are car occupants and 11% pedestrians, while for those aged 80+, 50% of fatalities are pedestrians and only 39% car occupants (Table 1).

Overall, about three times as many males as females are killed in traffic collisions (Figure 2). For males, the total fatalities have reduced only a little since the mid-1990s, from 2,552 in 1992 to 2,401 in 2006. For females, fatal casualties continue to fall, from 987 in 1998 to 771 in 2006.

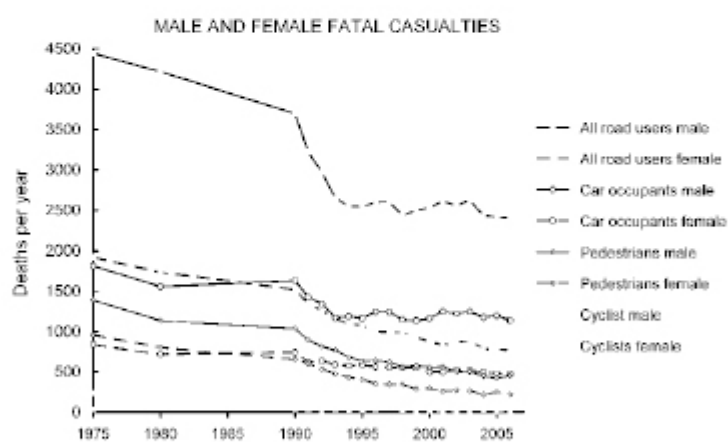


Figure 1

Table 1 Fatality rates, 2006

Age group	Deaths per 100,000 population	Percentage of deaths by mode			
		Car occupant	Pedestrian	Motorcyclist	Pedal cyclist
0 - 15	1.5	36	42	3	18
16 - 19	12.9	72	11	15	1
20 - 29	9.5	63	11	22	2
30 - 59	4.8	41	18	30	6
60 - 69	3.5	55	24	8	7
70 - 79	5.5	47	40	3	5
70+	7.1	43	45	2	3
80+	9.7	39	50	1	2
All ages	5.4	51	21	19	5

Source Road Accidents GB DfT 2007, Tables 30a and 31



Figure

Table 2 Deaths and injuries per billion passenger km travelled by different surface modes.

	2000			2004			2005		
	Deaths per bn pass. km *	KSI ² per bn pass. km *	All casualties per bn pass. km *	Deaths per bn pass. km *	KSI ² per bn pass. km *	All casualties per bn pass. km *	Deaths per bn pass. km *	KSI ² per bn pass. km *	All casualties per bn pass. km *
Rail	0.3	All injured	13.2	0.2	All injured	12.8	0.1	All injured	11.6
Bus or coach	0.3	11	195	0.4	9	167	0.2	7	149
Car	2.7	32	335	2.5	25	260	2.6	23	275
Motorcycle	122	1,493	5,712	105	1,194	4,606	97	1,109	4,232
Pedal cycle	31	666	4,953	35	597	4,309	33	533	3,739
Pedestrian	49	543	2,404	37	409	1,907	36	384	1,795

* KSI - casualties killed or seriously injured

* bn pass. km = billion (10⁹) passenger kilometres

Source TSGB 2007 Table 1.7

The table shows how much safer per kilometre bus and rail journeys are than journeys by car, and how much safer per kilometre journeys by car are than journeys by motorcycle, pedal cycle and on foot. However, because car journeys are longer than pedestrian and cycle journeys (typically 9.6 km by car, 2.4 km by pedal cycle and 0.7 km on foot), the risk per journey by car, pedal cycle and on foot are more similar, with risks of death per billion passenger journeys of 22 for journeys by car, 25 for journeys on foot but 80 for journeys by pedal cycle (Table 3). The risk per journey by rail is about 3 deaths per billion journeys, about ten times less than for journeys by car, but about three times more than the risk per journey by local bus.

Table 3 Deaths and injuries per passenger journey

	2000			2004			2005		
	Deaths per bn pass. journeys *	KSI ^x per bn pass. journeys *	All casualties per bn pass. journey *	Deaths per bn pass. journeys *	KSI ^x per bn pass. journeys *	All casualties per bn pass. journey *	Deaths per bn pass. journeys *	KSI ^x per bn pass. journeys *	All casualties per bn pass. journey *
Rail	9.4	All injured	413	5.9	All injured	375	3.2	All injured	375
Bus or coach	1.4	51	897	1.8	41	768	0.9	32	685
Car	24	278	2,920	22	220	2,460	22	196	2,370
Motorcycle	1,180	14,500	55,400	1,240	14,100	54,400	960	11,000	41,900
Pedal cycle	78	1,670	12,400	84	1,430	10,300	79	1,280	8,970
Pedestrian	29	326	1,440	26	286	1,340	25	269	1,260

^x KSI - casualties killed or seriously injured

* bn pass. journeys = billion (10⁹) one-way journeys of average length

Source: TSGB 2007 Table 1.7 and National Travel Surveys 1999-2001 and 2005

Risks per kilometre travelled have reduced over time, particularly for car occupants (Figures 3a and 3b). However, the risk for motorcyclists has increased since the 1990s (Figure 3b).

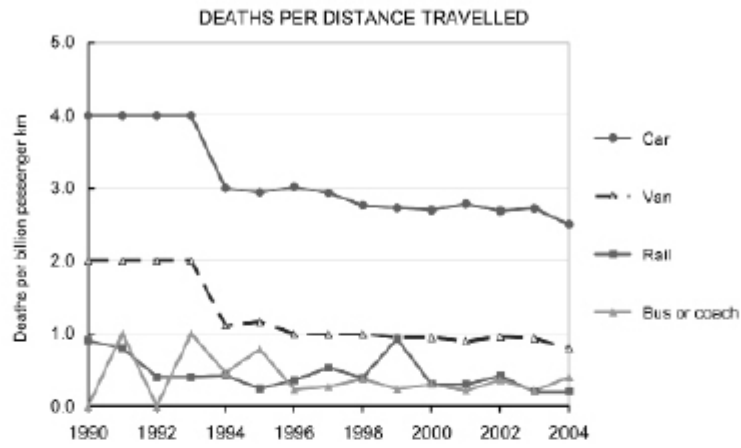


Figure 3a

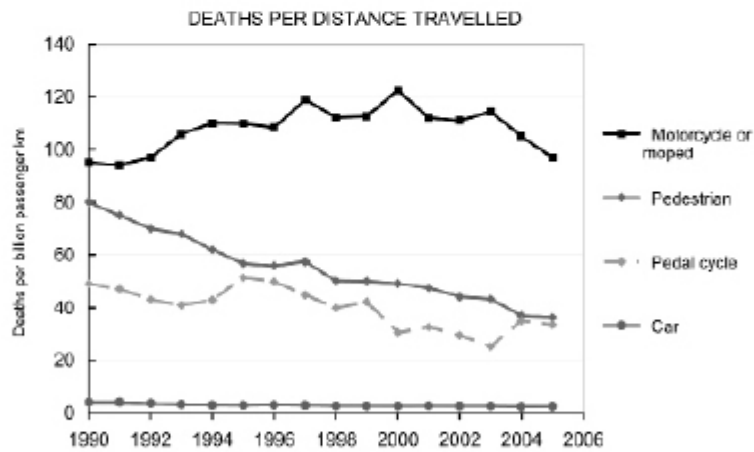


Figure 3b

Britain has one of the safest road systems in the world. Figure 4 shows the fatality rates in the UK and a number of other countries.

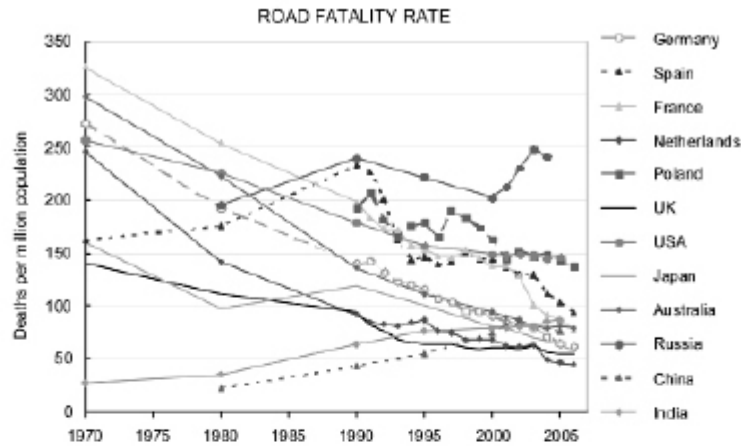


Figure 4

Of the countries shown in Figure 4, the highest fatality rates are in Russia, Poland and USA. Western European countries that did have high fatality rates, have improved moving much closer to the average for western European countries. In the past three years, Sweden and the Netherlands have achieved fatality rates lower than that in Britain. Despite low levels of car ownership, fatality rates in China and India are rising, and are now higher than those in the safer western European countries. Because of under-reporting, it is likely that fatality rates in both China and India are at least double the rates derived from official data.

Infrastructure Design and Safety

As indicated, the evidence of the UK accident record shows improvement year-on-year since the late 1960s and of particular note, coming at the same time as the introduction and development of the motorway network. Having such well-designed roads with the capacity to carry high volumes of traffic safely clearly demonstrates the importance and benefit of providing 'fit for purpose' infrastructure.

Consequently, transport professionals with the responsibility for the design and maintenance of safe road and street networks should see the introduction and impact of the 'motorway' as a key success, particularly in terms of collision reduction and as a motivator to achieve another step change in road collision reduction through focused data analysis and good design. This is

supported by European Road Assessment Programme (EuroRAP) that has shown that the design of roads can have a major effect on collisions and casualties⁴.

Whilst recognising that fatal collisions can be attributed to a variety of causes, transport professionals must clearly make every effort to create a safe road network for all users. The availability of good recorded data and collision investigation analysis now provides better opportunities for transport professionals to make appropriate improvements and safer conditions.

As an example, an examination of the age grouping of fatal collisions, Table 1, shows that the age group under 15 years are most at risk as pedestrians and cyclists. With the principle of such data-gathering used in a local context, the options to effect focused improvements or introduce safety action initiatives should make the task that more effective and rewarding.

To complement such an evaluation approach to reducing collisions, the recent publication of the DfT 'Manual for Streets'(MfS)⁵, provides designers with an excellent guide to assist in the provision of a safer road and street network.

Designers and funding decision makers must recognise the required change in approach and emphasis to help reduce collisions involving pedestrians and cyclists. As recommended in the MfS, "the street design process needs to apply to a user hierarchy with pedestrians at the top", an objective transport professionals should note.

Conclusions

Until recently, Great Britain had the safest roads in the world by all the main measures. However, over 3,000 people still die on Britain's roads every year which is socially unacceptable. Further reduction in casualty figures needs strong leadership, as has been shown by the successes in Sweden, the Netherlands and France. With road collisions costing over 1% of GDP (around £13,000 million in 2006), these casualties are unsustainable and urgent action is essential to reduce them.

Driver behaviour plays a key part in the potential for reducing road collisions and where appropriate transport professionals should promote publicity and arrange education programmes to achieve safer driving techniques and emphasise the reasons for it. Transport professionals with the responsibility for the design and maintenance of safe road and street networks should see the introduction of the motorway as a key success in terms of 'fit for purpose' and collision reduction.

The availability of good recorded data and collision investigation analysis now provides the opportunity to achieve another step change in road collision reduction.

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Issues and Recommendations

- Sweden and the Netherlands have shown that strong leadership can produce substantial improvements even in countries where roads are already relatively safe.
- Whilst recognising that fatal collisions can be attributed to a variety of reasons, transport professionals must clearly make every effort to create a safe road network for all users. The availability of good-recorded data and collision investigation analysis now provides excellent opportunities for transport professionals to make appropriate improvements and safer conditions.
- Designers must recognise a required change in a design process to reduce collisions involving a user hierarchy with pedestrians and cyclists at the top.
- Driver behaviour plays a key part in the potential for reducing road collisions and where appropriate transport professionals should promote publicity and arrange education programmes to achieve safer driving techniques and emphasise the reasons for it.

6. ADMINISTRATION AND FINANCE

General Introduction

Key elements in considering the need to achieve a sustainable transport system include the future plans and policies of Central Government and the funding mechanisms that support its objectives.

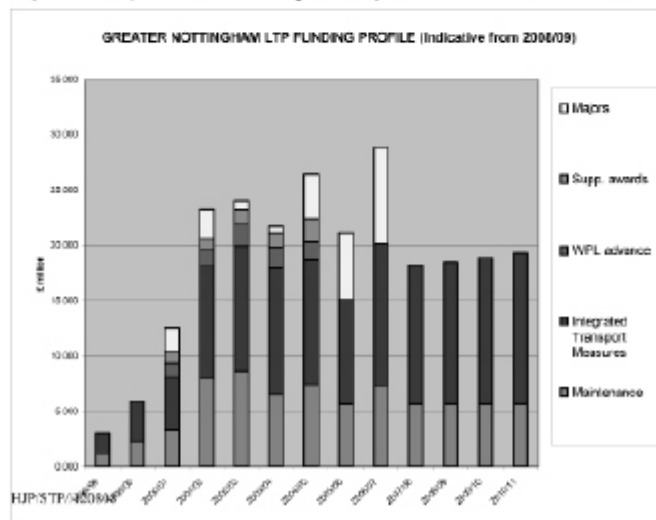
Following the publication of the Stern and Eddington Reports^{1,2} there is a clear challenge for Government to review its priorities, particularly taking account of its stated aims of reducing CO₂ emissions and addressing growing levels of traffic congestion in the UK.

To address these issues, consideration is given to current transport funding mechanisms, the changing emphasis of Government funding and delegation of its management and the application of fiscal instruments on road transport.

6.1 Investment for the Local Transport Plans process, including funding constraints, and Treasury influence

Introduction

The current system of local transport funding has existed for seven years. This has been resourced well by the Government, and all local highway authorities have seen a sustained increase in funding since 1998/99³, in some places by as much as tenfold. It could be argued that the Government has also done well out of the Local Transport Plan (LTP), system, as it has a sophisticated performance management system which directs local authority



expenditure and energies into delivering on agreed targets.

This picture is not consistent across the country and as always there are winners and losers, but some of the system's characteristics benefit all authorities, especially when contrasted with the former Transport Policies and Programme (TPP) with its annual bidding focus. Authorities now benefit from planning evidence and indicative funding advice for three to five years, which enables forward planning of schemes with more confidence. The system offers flexibility of funding allocations within and across blocks, allowing local politicians discretion to react to their own priorities, albeit in the context of a performance reward mechanism which tracks outcomes and checks against central Government expectations.

This system does come at the cost of hugely increased expenditure on monitoring and data collection - again contrasting very strongly to the TPP system where very little scrutiny was applied to whether schemes completed met their original objectives. In many cases these objectives were not even set out clearly or specified by the Government.

The Private Finance Initiative (PFI) offers a further route for substantial investment in transport schemes including light rail, street lighting and maintenance projects and programmes.

Local authorities who have engaged and embraced the new opportunities of the LTP system can be seen as true partners with Westminster and it is interesting to reflect that authorities rated as 'Excellent' and offered the freedom of not having to prepare an LTP have almost always chosen to continue having one. Clearly, there is some overall consensus in this funding system and an expectation that it will continue in some form.

Shared Objectives?

The Comprehensive Spending Review (CSR) in 2004 challenged us to:

CSR 2004 Objective I:

Support the economy through the provision of efficient and reliable interregional transport systems by making better use of the existing road network; reforming rail services and industry structures to deliver significant performance improvements for users; and investing in additional capacity to meet growing demand.

1. By 2007-08 make journeys more reliable on the strategic road network.
2. Improve punctuality and reliability of rail services to at least 85% by 2006, with further improvements by 2008.

Objective II:

Deliver improvements to the accessibility, punctuality and reliability of local and regional transport systems through the approaches set out in Objective I and through increased use of public transport and other appropriate local solutions.

3. By 2010, increase the use of public transport (bus and light rail) by more than 12% in England compared with 2000 levels, with growth in every region.

4. By 2010-11, the ten largest urban areas will meet the congestion targets set in their local transport plan relating to movement on main roads into city centres. The target will be deemed to have been met if, on target routes in the ten largest urban areas in England, an average increase in travel of 4.4% is accommodated with an average increase of 3.6% in person journey time per mile. The local targets on which this is based include:

In London, accommodate an increase in travel of 3% with an increase in journey time of 1.5%;

In Manchester, accommodate an increase in travel of 1.5% with no increase in journey time; and

In the West Midlands, accommodate an increase in travel of 4% with an increase in journey time of 5% (the target is expected to change-possibly to 3%-if full funding is granted for the Urban Traffic Control system in 2006/07).

Objective III:

Balance the need to travel with the need to improve quality of life by improving safety and respecting the environment.

5. Reduce the number of people killed or seriously injured in Great Britain in road accidents by 40% and the number of children killed or seriously injured by 50%, by 2010 compared with the average for 1994-98, tackling the significantly higher incidence in disadvantaged communities.

6. Improve air quality by meeting the Air Quality Strategy targets for carbon monoxide, lead, nitrogen dioxide, particles, sulphur dioxide, benzene and 1,3 butadiene. Joint with the Department for Environment, Food and Rural Affairs.

7. To reduce greenhouse gas emissions to 12.5% below 1990 levels in line with our Kyoto commitment and move towards a 20% reduction in carbon dioxide emissions below 1990 levels by 2010, through measures including

energy efficiency and renewables. Joint with the Department for Environment, Food and Rural Affairs and the Department of Trade and Industry.

Objective IV:

Improve cost-effectiveness through sound financial management, robust cost control, and clear appraisal of transport investment choices across different modes and locations.

The CSR in 2007 set out further National Transport objectives in Public Service Agreement 5:

Journey time on main roads into urban areas

By 2010-11 minimise increases in journey time, accommodating an average increase in travel of 4.4 per cent within an average increase of 3.6 per cent in person journey times per mile.

Journey time reliability on the strategic road network, as measured by the average delay experienced in the worst 10 per cent of journeys for each monitored route

Level of capacity and crowding on the rail network

By 2013-14 increase capacity to accommodate an expected increase of 14.5 per cent in rail passenger kilometres from 2008-09 while achieving the train load factors specified in the Government's High Level Output Specification (HLOS) for the railway.

Average benefit cost ratio of investments approved over the CSR07 period

These were, and in some cases still are, challenging objectives. However the LTP system has delivered on key targets such as reducing road casualties and many towns and cities can demonstrate positive outcomes which make a real difference to people's lives. The Annual Monitoring Report requirement might have been relaxed in the past two years, but ongoing reporting of many local transport objectives across the country continues to demonstrate progress on tangible things.

In cities like Nottingham, for example, through LTP investment subways have been filled in, a city centre 'Clear Zone' introduced, and a whole range of bus investment programmes for services, infrastructure and information developed. In residential areas home zones, footway enhancement programmes and street scene improvements have been rolled out.

Elsewhere, many rural authorities have been able to address the backlog of maintenance on main roads, though minor roads remain a big problem. There has also been good support from Government for innovative solutions to

public transport in rural areas, though time-limited funding has been running out recently and sustainable solutions have not always emerged.

In many places LTP contributions now form part of area allocations where spending decisions are delegated to local committees, giving local people a real voice.

An Agreed Way Forward?

This last point highlights a dilemma. The Government is torn between retaining the ability to manage performance and investment and trying to release authorities from the burden and constraints of reporting to a huge number of centrally imposed targets.

An emerging transport funding arena is the Local Area Agreement (LAA) process. LAAs are agreed via partnerships of local authorities, police, health and Government agencies with the objective of aligning or pooling resources and effort to tackle locally specified priorities over a three-year period. Whilst the jury is out on the success of the first round of LAAs, their scope and extent was broadened significantly, including transport in 2008.

Whilst in the end LTP capital was not incorporated in the LAA process and will still come from the Department for Transport (DfT), the prioritisation of transport will be in a wider Sustainable Community Strategy and LAA context. This could pull resources toward more local objectives than currently directed by the well-developed performance management LTP machine.

This may prove to be a welcome return to localism - authorities with the ability to secure senior political buy-in and support to transport plans and priorities will be best placed to maintain progress on the ground on local rather than national objectives. If Local Strategic Partnership (LSP) partners can be engaged and motivated to support transport investment plans for social, economic and environmental reasons, all the better.

There should be some easy wins. Health promotion objectives sit well with investment in walking and cycling schemes, and improving accessibility to services is a crosscutting objective of most public agencies.

All Change

It is not just about LAAs. Whilst Stern¹ and Eddington² and the debate commenced through the DfT's 'Towards a Sustainable Transport System' debate place transport investment again at the centre of discussions on the sustainable future of the country, the Treasury's response is not yet fully clear.

Delivery of the ambitious house building aspirations of the recently enacted Housing and Regeneration Act 2008³ will require significant transport and infrastructure investment. The current market conditions will see increasing

pressure placed on public finances as private sector-led delivery stutters. Higher environmental building standards will put further pressure on the ability of developers to deliver quality and affordability. The jury is out on whether the Eco-Town concept will mature into reality; but if Government wants to secure their delivery in the current economic climate there is a danger that funding may be diverted from existing investment priorities and programmes.

The ramifications of the Nichols Review⁵ are now becoming clearer in terms of the impact on committed schemes. The medium- and long-term response to projections of continually increasing oil prices will radically challenge the 'traditional' way of doing things in the transport sector. The new Growth areas should receive priority funding, but these resources will be spread more thinly as the Government increases the number of authorities eligible for such investment. Areas which are brave enough to trial congestion charging, will be rewarded via the Transport Innovation Fund (TIF), but takers for this option are, at this stage, relatively few.

At the national level it is still frustrating to see many Government departments promoting policies that increase the demand for travel.

The Sub-National Review of Economic Development talks of devolving funding down through the Regional Development Agencies more quickly and transparently to local authorities or agencies, which are best-placed to deliver.

Extensive discussions are now testing how sub-regional structures may or may not feature in these new arrangements. Alongside this, the completion of the first Multi-Area Agreements should confirm the potential benefits of collaborative joint working between authorities, whilst the Transport Bill⁶ has generated a more structural debate on transport governance and delivery in most of the former metropolitan cities.

The first round of Regional Funding Allocations (RFA) challenged regional partnerships to undertake a real and meaningful prioritisation exercise, within the constraints of actual as opposed to inspirational budget. Whilst this was painful for some of those involved, the Treasury (and most regions) deemed it a success. The RFA2 process will repeat the exercise, through the scope and financial envelope of guidance issued in July 2008.

It is all a long way from the TPP and, despite talk of double devolution and local accountability, behind many of these initiatives local government will still be expected to deliver on Westminster policy imperatives and national performance targets. These joined-up aims are laudable if the Government allows politicians, local or national, true freedom of discretion on funding issues. However, there is a danger that less glamorous things like structural maintenance of bridges, or strategic road reconstruction will not appear near the top of manifesto pledges.

The TPP and LTP mechanisms were developed for a reason: to develop and maintain crucial infrastructure. Transport investment is important, expensive and complex to deliver. It is not always delivering to popular choice or

opinion, but when our transport services or networks fail, the public are quick to complain and rightly so.

Conclusions

It is down to the transport profession to make a clear and cogent case for continued prioritisation for investment, to be open to working in new partnerships such as LAAs, Multi-Area Agreements (MAA) via the new Growth Points or Integrated Regional Strategies to secure wide-ranging understanding and support of our objectives.

The profession is well-positioned through experience in responding to the previous challenge set by the LTP Process and should learn lessons from this and move forward with optimism. If it doesn't, it will not be enough just to blame it on the Treasury.

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Issues and Recommendations

- The more that transport can be placed in underpinning the Government's integrated and cross cutting agendas around sustainable and affordable economic growth, the better the case will be strengthened for securing and sustaining resources. This can particularly be successful when reduced environmental impacts are demonstrated.
- The current economic outlook with uncertain housing market conditions, lack of liquidity, fuel and commodity price inflation suggests that a prudent approach to budget and medium term financial planning is necessary.

6.2 Fiscal Instruments on Road Transport

Introduction

The impact of fiscal instruments relating to road transport has become a significant topic of discussion over the last couple of years, particularly in the context of climate change and carbon obligations. In terms of sustainability, this has focussed to a large extent on the cost of motoring, which is a key political issue in the delivery of change. Consideration of the various fiscal measures currently deployed is therefore relevant in the future direction of sustainable transport. In this context, it is useful to understand the UK's four most important national taxation measures affecting road transport, which are:

- Fuel Duty on petrol and diesel;
- Discounted Fuel Duty rates for alternative road fuels, including natural gas, liquefied petroleum gas, electricity, and biofuels;
- Varying Vehicle Excise Duty by vehicle CO₂ emissions; and
- Varying Income Tax levied on company cars by vehicle CO₂ emissions.

Taxes on Car Use-Fuel Duty

Between 1992 and 1999, both Conservative and Labour Governments in the UK operated the 'Fuel Duty Escalator'. Linked to the abolition of Car Purchase Tax, Fuel Duty was increased above the rate of inflation, initially by 5% per annum and, from 1997, 6% per annum. This policy was justified as a major contribution towards the reduction of CO₂ emissions. Fuel demand elasticity studies (e.g. Glaister and Graham, 2000¹; Goodwin, 2002²) suggests that the tax increases resulted in 10% less demand for fuel in 2000 than if the duty rates had only increased at the same rate as inflation. Department for Transport (DfT), statistics show that road traffic grew by 18% in the six years 1987 to 1993 and by 13% in the six years between 1993 and 1999 when the Fuel Duty Escalator was operative (DfT, 2004)³. The UK Government (cited in Marsden, 2002)⁴ calculated that the fuel duty escalator saved between 1 and 2.5 million tonnes of carbon emissions. This would have occurred as a result of a range of behavioural responses, including the suppression of some travel demand.

Most EU states have had a version of the 'escalator' if generally somewhat slower and less steep. By September 2007, the Netherlands had the most expensive petrol in the EU (102.5p per litre) with Germany next and the UK third at 94.4p/l. Belgium and Finland were close behind (93.2p and 92.7p). However, the rise in oil prices will now make it difficult to introduce even inflation-level increases in fuel duty.

Following blockages of oil refineries by lorry drivers and farmers in 2000, petrol and diesel duty was cut and the Fuel Duty Escalator policy abandoned. Only two inflation-level rises have been added since then and in the wake of oil price increases in 2008 the announced 2008 inflation-level increase in Fuel Duty has been deferred, if not abandoned. This has resulted in a steady drop in Government income from fuel duty over the past 8 years.

The use of road-fuel gases (liquefied petroleum gas and natural gas) is not as extensive in the UK as in some other European countries, notably the Netherlands and Italy. Discounts on Fuel Duty have increased in recent years and are now equivalent to 75% of the duty paid on petrol (Parkhurst, 2002)⁵. The cost of the fuel itself is higher, which means the cost to the consumer of gases is about half that of petrol. The fuels are now available in around 10% of filling stations, and use is increasing.

Charges on using road space within the EU include bridge/tunnel tolls, road tolls and cordon/congestion charging in city centres. Bridge and tunnel tolls are commonplace and road tolls (usually only for motorways) exist in Austria, France, Germany, Greece, Italy, Portugal, Spain, and Norway. City centre congestion charging is one of the new car tax measures specifically designed to manage traffic, raise revenue (usually hypothecated), and address environmental aims. It has been introduced in several Norwegian cities (Leromonachou et al, 2006)⁶ and recently in Durham and London in the UK and Stockholm in Sweden. A policy move towards the UK implementing national road user charging was announced in 2004 (DfT 2004⁷). The first stage was to be exploring charging system design through a series of area-based Transport Innovation Fund (TIF) schemes, but some of these have been abandoned and the general policy seems to have stalled. However, the most advanced scheme is in Greater Manchester, which has secured Programme Entry status for its Package of Investment and charging proposals with consultations this year, (2008).

Vehicle Excise Tax

Fiscal measures can be placed at three crucial points in the life-cycle use of cars. These are:

- Tax on the initial purchase of a vehicle,
- Tax on the ownership of a car (annual registration tax and company car taxation), and
- Tax on the use of vehicles (fuel, road space and parking).

In addition to VAT, most EU states have a specific car purchase tax, with the UK and Germany being notable exceptions. The UK used to have a 10% car purchase tax, but in 1992 it was replaced by the UK policy for high fuel duty. Other EU states have retained vehicle purchase taxes, and many have reformed these to favour fuel-efficient or low-carbon vehicles.

In Finland there is a reduction for low emission vehicles and in the Netherlands car purchase tax is 45.2% with counterbalancing fixed allowances of €1540 for petrol and LPG cars, €580 for diesel cars and other allowances for cleaner vehicles. This fixed allowance cuts the charge significantly for smaller and more fuel-efficient cars and raises the price of larger and less fuel-efficient vehicles.

In the 2008 Budget, plans for the effective reintroduction of a UK purchase tax were announced. This is a modification of the UK's circulation tax ((Vehicle Excise Duty (VED) - see below)). From 2010 there will be a higher 'first year VED' rate for cars emitting more than 160g/km (with an additional charge over the normal VED rate of £495 for the highest band). This is detailed in the next section, but represents only a small additional charge for the highest-emitting vehicles, amounting to less than a half a percent of the purchase price (compared to the 10% purchase tax that existed in the early 1980s).

Annual Registration Tax

All EU countries have a graded annual registration (or 'circulation') tax entitling owners to use the public highway. It is often varied by engine size or power of a car, but some nations have implemented an eco-reform to this tax. In Denmark the tax varies with fuel consumption, whereas Germany links tax liability directly to the Euro emission standards, with the least polluting car paying only 20% of the rate of the most polluting car. However, the overall tax is so low (about €50 per car) that its impact on car choice is negligible.

For cars registered from 2001, the UK has adopted a CO₂ emission-based system that has been incrementally developed to now involve in seven bands (A-G), with the charge ranging from zero for cars emitting up to 100 grams of CO₂ per kilometre, £35 for 101-120 g/km, up to £400 for 226g/km and above. The rates from April 2008 are shown in Table 1.

A similar system has also been introduced for road freight vehicles, with seven charge bands according to emissions and amount of road wear imposed.

**Table 1: Annual UK Vehicle Excise Duty (Circulation) Tax Rates (£),
 2008-09**

VED Band
 CO₂ emissions
 Diesel car
 Petrol car
 Green car***

A
 Up to 100 g/km
 £0
 £0
 £0

B
 101-120 g/km
 £35
 £35
 £15

C
 121-150 g/km
 £120
 £120
 £100

D
 151-165 g/km
 £145
 £145
 £125

E
 166-185 g/km
 £170
 £170
 £150

F
 Over 185 g/km
 £210
 £210
 £195

G**
 Over 225 g/km
 £400
 £400
 £385

*For cars registered before March 2001, the VED rates are charged according to engine size -
 £120 up to 1550cc and £185 for larger engine sizes.
 **For cars registered on or after 23rd March 2006.

***Alternatively fuelled cars

From April 2009, VED will be totally restructured with 13 new bands (A to M) as shown in Table 2. VED will still be based on CO₂, and band A will continue to apply to all cars with CO₂-emissions of up to 100 gCO₂/km, but most bands will be narrower and the highest band M will apply to cars with emissions of over 255 gCO₂/km (currently the highest band applies to cars with over 225 gCO₂/km). The 'Green Car' discount for alternatively fuelled cars will be reduced and phased out by 2011.

It is planned to build on this change in April 2010, with the introduction of a new first-year rate for all new cars during the first year of ownership. Cars emitting up to 130 gCO₂/km or less will have a zero-rated first-year rate, cars with emissions between 131 and 160 gCO₂/km will pay the normal first-year rate, but all new cars with emissions over 160 gCO₂/km will pay a higher first-year rate, with a maximum additional VED supplement for the most polluting cars of £495 in 2010-11.

Table 2: Proposed annual UK Vehicle Excise Duty (Circulation)

Tax Rates 2009-10 and 2010-11 (£)

VED Band
 CO₂ emissions
 Standard rate
 2009-10
 First-year rate
 2010-11
 Standard rate
 2010-11

A
 Up to 100 g/km
 £0
 £0
 £0

B
 101-110 g/km
 £20
 £0
 £20

C
 111-120 g/km
 £30
 £0
 £35

D
 121-130 g/km
 £90
 £0
 £95

E
 131-140 g/km
 £110
 £115
 £115

F
 141-150 g/km
 £120
 £125
 £125

G
 151-160 g/km
 £150
 £155
 £155

H
161-170 g/km
£175
£250
£180
I
171-180 g/km
£205
£300
£210
J
181-200 g/km
£260
£425
£270
K
201-225 g/km
£300
£550
£310
L
226-255 g/km
£415
£750
£430
M
Over 255 g/km
£440
£950
£455

Company Cars

Company car taxation is a sector-specific circulation tax. In the UK, around half of cars are purchased by commercial organisations for their employees for both business and private use. Until 2002, income tax was charged on 35% of the car's value per annum, with discounts for high business travel. For many years the Government was criticised for this taxation method, as the reductions for high business use encouraged employees to drive more in order to cut their personal tax bills.

A major reform in UK company car taxation took effect from 2002 when the tax charge was related to a car's CO₂ emissions. The charge rises from a

base level of 15% of a car's purchase price, for cars emitting 140 g /km CO₂, in 1% steps for every additional 5g/km over 140g/km. The emission rates have gradually been lowered (the base level was originally 165g/km); this encourages the migration to lower emission cars.

The maximum charge is 35% of a car's price. Diesel cars not meeting Euro IV emissions standards incur an additional charge of 3%, up to the 35% ceiling. There are further reductions for company cars using cleaner fuels and technologies (e.g. a 3%-point reduction for hybrids). The charges are revised annually, generally increasing more for the higher emitting cars. Additionally, in 2002 discounts for high business mileage were abolished, together with most age-related discounts, which had provided an incentive to drive further and to use older, more polluting cars¹.

An initial assessment of the impact of this tax change, (Inland Revenue, 2004)⁸ showed that, in the first year of the new system, average CO₂ emissions of new company cars decreased from 196 g/km in 1999 to 182 g/km in 2002. The number of business miles was reduced by over 300 million miles per year and the overall effect was to reduce the emissions of carbon from the company car fleet by around 0.5% of all CO₂ emissions from road transport in UK.

This policy has proved influential due to the large changes in tax liability produced. A car costing £20,000 used mainly for business purposes under the old system would have cost an employee paying the standard rate of tax £690 a year. If the car is a fuel efficient one then the new tax bill will be similar. If it is an inefficient one, the bill is more than doubled to £1,600 per annum. This is in contrast to the relatively small tax gains of the VED reform. The latter saves users only about £100 per annum, which for most purchasers of new cars is arguably too little to influence car choice, although there may be a greater influence^{Footnote 1} on the used car market.

Tax Reform and Tax Regime Change

Over the last ten years there have been significant reforms to the UK's car taxation regime. This has met with varying degrees of success and very variable degrees of political support or opposition. By 2000, the policy to redirect tax from the purchase of cars to the use of cars through the Fuel Duty Escalator was starting to achieve results. In this context the reform to VED could have provided a useful supporting measure. However, with the Fuel Duty Escalator put into reverse in 2000, the VED reform alone stood no chance of having any impact. The more recent increases appear likely to have some impact, particularly in conjunction with the substantial rises in fuel prices now taking place. For high CO₂-emitting cars, VED is now a significant cost. A key lesson is that, because company

¹ Notably, "taxi cars" are excluded from the tax and also contain other tax provisions, and a minority effect has been to encourage the ownership of such cars by company vehicles. They are by definition old, and generally produce high levels of emissions.

car tax was a major cost to users, its reform has been effective in influencing vehicle choice.

Overall, the Government has increasingly retreated from tax measures on car use, even to the extent of distancing itself from London's congestion charge and now retreating from their original national road user charging proposals. Regulations and ownership measures to improve fuel economy and encourage cleaner fuels have been maintained but, with the notable exception of the company car tax reform, have proved ineffective in the absence of strong complementary car use measures.

The transport policy White Paper, published in July 2004 (DfT)⁶, made official the retreat from car use tax measures. Despite a certain amount of rhetoric, the 2004 White Paper contains little on managing transport demand. It focuses on the competent management of the Government's transport investments and cutting costs (of the railways in particular). This produces a dilemma. The intellectual and research case for transport demand management is well proven. Even if energy and environmental considerations were discounted, trying to tackle congestion without strong demand management measures would be futile.

Politically this truth is unpalatable, so the White Paper ends up arguing for demand management measures, but relegates them to politically less sensitive (and less effective) areas. Therefore motorway capacity enlargement is being implemented, but the complementary measures (tolling or other measures such as high occupancy lanes to 'lock in' the benefits of new capacity) seem to have been abandoned.

There remains an unresolved policy dilemma. On the one side is the retreat from pricing measures on road transport, while on the other there is an acceptance that transport demand management is inevitable and that simply reforming existing tax measures is not enough.

Targeting Measures

In summary, the UK has limited tax measures on purchase and a useful circulation tax on company cars but VED reform on its own has been an insufficient policy measure. Overall, in the UK, the major tax impact is on fuel, which has been avoided as a policy mechanism for seven years, but has recently come to fore as a result of high oil prices.

The situation over the concept of national road user pricing is looking confused. However, as conceived, it is proposed as purely a congestion/traffic management measure and is entirely separated from environmental policy objectives. Indeed, the 2004 Transport White Paper conceded that the policy for national road user pricing was not to address CO₂ emissions and that there was uncertainty about whether road pricing would increase or decrease emissions.

The Paper also noted that the most cost-effective way of reducing CO₂ emissions from transport would be measures affecting the cost of fuel, the price of energy efficient vehicles and the efficiency of road haulage. This raises the issue that were a national road user charge to replace in full or part Fuel Duty and VED it would skew the situation further to taxes on the use phase. If the aim of transport policy is only to manage the volume of traffic, then this emphasis is justifiable.

However, current taxation instruments are also intended to affect the type of vehicle purchased - both cars and freight vehicles. Taxation is part of the UK's policy to have a market transformation to cleaner and more fuel-efficient cars, vans and goods vehicles. Unfortunately, efforts to promote cleaner and more fuel-efficient vehicles have been ineffective to date.

For both cars and road freight, the price premium for cleaner technologies is prohibitive in the bulk of situations (Potter and Parkhurst, 2005)¹⁰ and now even the technically modest CARS 21 target has failed to be met.

Fuel duty has to date only delivered an indirect influence upon car purchase. In practice, people and businesses making car purchases put fuel economy well down their list of priorities. Whilst the recent increases in fuel costs has had a short-term effect on this decision-making process, (and a significant impact on the second-hand car market), this short-term adjustment could soon be absorbed into household budgets.

In real terms, the cost of motoring has fallen significantly over the last 20 years. So although costs, (buying a car, running a car and the cost of fuel) have risen, after inflation has been taken into account it is still 28% cheaper to buy and run a car, excluding fuel costs, in 2008 than 1988.¹¹ In effect, the increase in the total cost of motoring since 1988 is well behind the overall increase in the cost of living.

Although the increasing cost of fuel tends to increase the perception that the costs of motoring have increased significantly, the reality is somewhat different. Should fuel costs stabilise, it is likely that the short-term behaviour change will lose momentum. It is considered that a direct tax measure on purchase or on circulation would have a much stronger and longer lasting influence.

If fuel taxes are replaced by a road user charge then even this indirect influence on vehicle purchase is broken. At the moment the national road-pricing proposal is to vary the charge only by congestion. We therefore have a serious problem of the unravelling of existing measures to promote cleaner cars. This could be compensated for in one of two ways:

- To weight the road user charge by CO₂ emissions (say into the existing VED bands).
- To accept that national road pricing is only to manage traffic volume and to introduce a separate strong purchase measure.

If this is to be fiscal, the prime candidate is a new car purchase tax highly graded by emissions, fuel economy or vehicle power. Alternatively VAT could

be grouped into three bands (e.g. 5%, 17.5% and 25%). Regulation, such as a quota on sales of vehicles by fuel efficiency bands, is possible but could be very difficult in practice.

Whether or not there is a shift to national road pricing, there is a need for taxation measures that will stimulate the purchase of cleaner vehicle and fuel technologies. As currently envisaged, moving to a national road pricing would worsen an existing weakness in the UK's policy to cut the car's environmental impacts.

Other Transport Taxation Change

In addition to the more obvious types of transport taxation, other types of fiscal measures will need to come within the policy frame, particularly to address the inevitability of serious transport demand management.

More effective demand management measures such as workplace parking levies or road user charging (be it city, on motorways or wider area-based schemes) could stimulate people and businesses to relocate to low charge areas. A policy response could be in terms of the planning system, for example through more stringent land-use controls. However, these have not in the past proved to be very effective in controlling traffic-generating decentralisation and sprawl, especially when the issue of land value is taken into account.

Furthermore, planning controls affect only changes in land use. People change their pattern of activities in response to changes in transport costs with relative ease and speed. Metropolitan decentralisation and the dispersal of land uses is often linked to increasing car and energy use, but most of the increase in car dependency occurs through people changing their behaviour *within* the existing land-use pattern. A radical pricing change, such as Road User Charging, would have an immediate impact on activity patterns and only a gradual effect on land-use development.

There could be rapid shifts in activity patterns away from high-charge areas to low-charge areas, shifting congestion, generating new areas of congestion and increasing travelling distances. This would exacerbate the existing trend for traffic growth to be highest in low-congestion (rural, small town) areas. In the longer term this would be joined by increased decentralisation of land uses, so acting against the policies for sustainable communities and liveable cities.

This highlights the need for more locally targeted fiscal measures to counterbalance such negative effects. This is a much-neglected area, with all attention being at the national level. Measures could include Workplace Parking Levies, Business Improvement Districts or changing the basis of calculating Council Tax and the Business Rate. They could be weighted to fiscally favour accessible locations and so counterbalance effects of the higher road user charge in such places.

This could take the form of a variation on the Dutch ABC accessibility zoning. However, rather than being used for development control, the accessibility zones would represent council and business tax bands. In addition, parking spaces (now often identified separately for business rate assessment purposes) could be subject to a premium rate above a locally set ratio. Workplace Parking Levy (WPL) is a charge made for each parking space provided by an employer. Employers are required to apply for an annual licence for the maximum number of spaces, and then receive an annual bill to cover the levy for the number of agreed spaces. This income stream can provide a cost-efficient funding source for high-quality public transport alternatives if ring fenced appropriately. It is also envisaged that it will encourage employers to actively manage their car parking requirements and reduce the level of car commuting, which is a key method of managing congestion at peak periods. Such a scheme is currently being promoted in Nottingham and referred to in the chapter on parking control measures.

The other half of the tax 'sticks' are tax 'carrots' - tax exemptions and reforms favouring accessible locations that reduce travel demands and more environmentally-friendly travel modes. Some measures have already attracted very limited tax concessions. These include Travel Plans, but the main effect of recent tax concessions has been to reduce tax disincentives rather than provide positive incentives.

Furthermore, there is no real tax incentive for employers to provide a Travel Plan benefit (with the possible exception of the current cycle purchase scheme). The corporate tax regime is the weak link in the chain and all the personal tax regime concessions will count for little if the corporate tax regime does not positively encourage employers to offer Travel Plan benefits to staff. This could be addressed by capital and revenue allowances for specified Travel Plan expenditure (Travel Plan Tax Credits) and credits for developers including Travel Plan infrastructure.

Conclusions

Although the increasing cost of fuel tends to increase the perception that the costs of motoring have increased significantly, the reality is somewhat different. Should fuel costs stabilise, it is likely that any short-term behaviour change will lose momentum. It is considered that a direct tax measure on purchase or on circulation would have a much stronger and longer-lasting influence.

In assessing the application of motoring taxation, the evidence indicates that in real terms the cost of motoring has fallen significantly over the last 20 years. It is well behind the overall increase in the cost of living over the same period and it could be argued that there is an obvious opportunity to mitigate the environmental impact of motoring through fiscal instruments.

However, based on recent experience, there is also a clear responsibility for transport professional advisers and decision makers, to use all the available evidence, to effect better understanding, need and acceptance of such action.

This is particularly important at a time when society is beginning to assess the global impact of 'climate change', with growing road usage, congestion and casualties from road collisions already being seen as unsustainable.

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Issues and Recommendations

- In future, fiscal instruments will need to cover a range of national, local and sector-specific measures to promote fuel economy and innovative clean fuels. These measures are currently progressing but in order to achieve maximum benefits, their progress should be accelerated. Such action is currently gathering pace but progress needs to be stronger.

- Additional measures, which will complement integrated transport policies, should consider the introduction of locally targeted fiscal measures including Workplace Parking Levies, Business Improvement Districts or changing the basis of calculating Council Tax and the Business Rate. These could be weighted to fiscally favour accessible locations and so counterbalance potential effects of road user charge in such places.
- It may also be beneficial to promote and achieve sustainable travel benefits through the introduction of tax exemptions and reforms, favouring accessible locations that reduce travel demands and using more environmentally friendly travel modes. Some measures have already attracted very limited tax concessions using Travel Plans, but much more could be achieved in adopting this approach.

IHT NI Branch - Submission on Climate Change to the Northern Ireland Assembly Environment Committee

The Northern Ireland Branch of the Institution of Highways & Transportation welcomes the opportunity to contribute to the NI Assembly Environment Committee Inquiry into Climate Change.

We note that the Aim of the Inquiry is initially to understand the implications of climate change for Northern Ireland. While we recognise that there is ongoing debate and scientific study into trends in 'climate change' locally and globally, we believe that it is not appropriate to ignore the issues which may be contributing to those trends, actual or perceived. We also note the Committee's wish to make recommendations on government policies to mitigate the impacts, to examine economic implications and identify suitable adaptation initiatives.

The Institution of Highways & Transportation is a learned society with over 11,500 members. It is concerned specifically with the planning, design, construction, maintenance and operation of land-based transport systems and infrastructure.

IHT recognises that for transportation professionals the increase in the demand for transport represents a major challenge at a time when society is beginning to acknowledge and come to terms with the global impact of 'climate change'. For that reason, in November 2008, it published 'Climate Change and Sustainable Transport – the challenge for transport professionals' to contribute to professional practice and to assist all disciplines involved in the transport sector to address the consequential impacts of climate change. Our contribution to the Inquiry is based around the advice within this publication couched in terms of Northern Ireland's unique position within the United Kingdom. A copy of the Executive Summary and the full document are attached.

Climate Change and Sustainable Transport

Long-term road transport, powered by fossil fuel, is not sustainable. It is contributing to the depletion of a finite stock of fossil fuel and emitting a rising amount of carbon dioxide. There is a need to address environmental impacts such as noxious emissions, noise and unsustainable land development that cause extended journey patterns. The transition to a sustainable transport system involves a combination of technological and transport demand policies.

However we accept for the needs of society and the economy of Northern Ireland good road infrastructure is essential to serve the transport needs of the community for the short to medium term.

We are alert to scientific evidence that has linked global warming with the increasing emission of greenhouse gases, with much of the increase in developed countries coming from transport. The fact that emissions from transport are increasing whilst emissions from other sectors are constant or reducing is of particular relevance for the UK where transport related emissions represent about a quarter of the total produced .

We also recognise the importance of a high performing transport system to the economic prosperity of the UK, and the key role of Northern Ireland's strategic links to the rest of the UK and to other European and world markets and destinations.

The Stern Review into the economics of climate change confirmed that emissions have been, and continue to be, driven by economic growth. Stern estimates that the costs of reducing the emission of green house gases are substantially less than the costs of repairing the damage caused by climate change.

Whether we believe in climate change or not, if we do nothing we may find that it will not be possible to turn back the clock and recover the lost opportunities of acting now.

Emissions and transport

Emission of anthropomorphic greenhouse gases has raised the concentration of carbon dioxide in the atmosphere from around 280 ppm before the industrial revolution to 383 ppm in 2007. In the last century the global average temperature has increased by about 0.9°C and the average temperature in central England by about 1.4°C. Emission of carbon dioxide is rising in many countries, though in EU27 it is falling.

In the United Kingdom, production of public electricity and heat is responsible for 31% of total emissions of CO₂; all transport produces 23% of emissions, and car traffic 12.7% in 2005. Industry, households and services each produce about 15% of total emissions.

Emission of carbon dioxide from all car traffic was almost constant between 1993 and 2003, and is now falling. This implies that the fuel economy of the average car in service is improving faster than traffic is growing. Carbon dioxide emissions from road traffic are growing, but this growth is due to growing emissions from freight transport.

1. Managing Demand

Planning Policies

It is essential that planning policies and residential standards are reviewed to ensure they work with, rather than against, integrated transport where it can serve new developments. Sustaining integrated urban and suburban living patterns will become even more of a priority as fuel prices increase.

Reducing the need to travel will not be just an environmentalist objective, but it will become one necessitated by daily and weekly household budgeting. It will play an increasing role in choices about where to buy a house or where to seek work.

It is essential that reviews of the RDS and RTS provide for on-going strategic assessment of infrastructure and resource needs and take account of climate change, peak oil and the sustainable transport.

Policies must be strengthened to require contributions which can secure wider sustainable transport infrastructure for cyclists, pedestrians and complementary pump priming for bus service enhancements.

Demand for travel can be affected by measures that rely on persuasion and by measures that deter travel in a variety of ways. Provided attractive alternatives to the car are available, soft measures can be more effective than is appreciated by most transport planners.

The Retail Sector and Freight Transportation

Retail activity has changed over the past 20 years and retailers are continuing to adapt to the changing demands of consumers as technology advances, lifestyles change and as local and national government policies are changed and introduced. Key drivers for successful retailing are accessibility and consumer choice. Transport therefore plays a significant role either directly or indirectly in the future success of retailing and policies should reflect this.

Current trends suggest that e-shopping will become increasingly popular over the coming years, and while this may not reduce the number of trips to be made, it may change the type of trips that are made, with greater numbers of home deliveries.

In the UK, agriculture and food accounts for nearly 30% of goods transported by road and food miles rose by 15% between 1992 and 2002. In 2002, food transport accounted for 25% of all HGV vehicle kilometres in the UK. Of imported produce, 95% of the fruit and 50% of the vegetables sold in the UK is grown abroad and the amount of food being flown into the UK doubled in the 1990s. The direct environmental, social and economic costs of food transport are over £9 billion each year and are dominated by congestion.

In addition to the reliance factor of UK imported produce, the wider implications of the unsustainable transportation impact need to be addressed at local, national and global levels..

In the planning and assessment of proposed new retail and shopping outlets, which includes the establishment of Farmer's Markets, a priority should be given to the accessibility and servicing by sustainable forms of transport such as good public transport, walking and cycling links with appropriate facilities.

The introduction of effective traffic and parking management policies and improvements to public transport could improve the accessibility of town centres. If implemented effectively, travel around urban areas should be more efficient for consumers and thus potentially make the urban centres increasingly accessible. It is important to understand the value that consumers place upon time and that congestion is a major factor in influencing the time taken to access retail facilities.

Northern Ireland is almost 100% dependant on road transport for the movement of freight. Fuel consumption by road freight has increased because the total mileage by goods vehicles has increased. The fastest growth has been for light vans, followed by articulated HGVs; traffic by rigid HGVs has not increased. Fuel consumption of individual HGVs has not increased, and remains steady at about 7 or 8 miles per gallon.

Freight distribution is a wholly commercial activity. The cost of fuel in 2008 was about 30% of the cost of freight operations, so anything that can be done at a reasonable price to reduce the amount of fuel used will be done for commercial reasons.

The total mileage by vans has increased because of the steady increase in the economic activities served by vans - courier services, mail and online shopping, visits by service engineers and tradesmen of all kinds. About a quarter of the total tonnage of UK domestic road freight are goods travelling to or from ports as imports or exports. Empty running of HGVs for particular commodities has reduced slightly, particularly for the movement of manufactured goods and petrol, but the changes are small.

Reducing the distances that goods are moved would require major changes in the supply chains and manufacturing processes that are served by road freight. This is not impossible, although supply chains, distribution arrangements and depot locations have been optimised, and the disincentives to change them are great.

- Improved operation management leading to the better utilisation of goods vehicles can reduce empty and part-loaded running.
- While pilot projects in the food distribution industry in GB have shown that long-distance road freight can be transferred to rail for the trunk stage of a journey, the restricted rail network in Ireland limits the opportunities although we recommend that opportunities should be kept under review.

2. Changing Behaviour

Travel Behaviour and Effectiveness of Smarter Choices

Since the realisation that the philosophy of 'predict and provide', to keep pace with traffic growth, was not sustainable, a healthy awareness by transport professionals has emerged to consider alternative strategies and apply innovative measures to manage demand. The need to change travel choice behaviour to achieve sustainable objectives and project the existence of convenient, affordable and healthier acceptable alternative options is a priority. The provision of such options, timely information about travel opportunities, better marketing, advertising and good implementation initiatives have long been advocated by transport professionals. It is therefore considered appropriate for transport professionals to take the initiative, where possible, to engage with society to establish and promote such communication schemes.

While personal travel planning projects have demonstrated effective outcomes based upon area-wide approaches, there is a long-term opportunity to support this work by building upon existing networks and communication channels. Appropriate opportunities to target people would include during life-changing moments, when individuals may be most likely to deliberate about travel behaviour and break established habits. These could include when moving house or school, applying for a new job, obtaining an over-60 public transport pass and changes in public transport provision.

Travel plans should be developed to deal with different types of situations including school, hospital, residential and commercial business travel plans to mitigate the impact of new developments on local traffic and infrastructure to improve accessibility. Such schemes are considered essential particularly for new developments and implemented using the guidance provided by DfT.

Accessibility and Social Equity

The Promotion of Walking and Cycling Journeys

Walking and cycling have strong contributions to make in creating sustainable places, increasing accessibility, enhancing neighbourhood cohesion, improving individual fitness and well-being, and reducing the environmental impact of transport.

Survey findings found that around a third of people would walk and cycle more if the facilities on offer were improved. Hence, improvements of facilities that would encourage walkers and cyclists, such as safe walking routes, better maintained footpaths, off road cycle lanes and the provision of better bicycle parking facilities might encourage more people to cycle and walk.

Measures to promote and develop walking and cycling should take high priority for investment in the urban transport hierarchy. Walking and cycling can result in significant savings in relation to health, pollution and congestion and strongly contributes to creating sustainable places, increasing accessibility and enhancing neighbourhood cohesion.

Better use of Existing Networks

To facilitate and achieve better use of existing networks has been a particular objective since the realisation that the philosophy of 'predict and provide' for traffic growth was unsustainable.

The agenda must now extend from reducing congestion to the complementary and real need to secure greater benefits to reduce the impact of climate change. Innovative measures must be

pursued with consideration of Traffic Demand Measures first, ahead of hard infrastructure solutions.

Better use of existing transport networks can also be achieved by the promotion of publicity campaigns to affect more efficient use of motorways by targeting driver behaviour for improvements in lane discipline.

Public Transport Quality, Accessibility and Integration

It is accepted that public transport cannot be a substitute for many journeys – particularly those in less built-up and rural areas with diverse origins and destinations. As pressure increases for more sustainable transport, whether this arises from reduced availability and increasing cost of fossil fuels or from policies such as carbon rationing to limit climate change, then public transport will have an increasingly crucial role to play. This is particularly important in delivering accessibility in many of our communities. We should therefore be striving for a high volume, high quality public transport network that meets the needs of discerning customers, if we are to meet the challenges of future mobility.

The quality and quantity of public transport can be genuinely enhanced with greater innovation, thought and challenge. Public transport should therefore sit at the heart of local transport policy and practice.

If more people are to be persuaded to travel by public transport from choice, it is essential that the quality of service, the provision of information, ease and simplicity of use will need to outweigh the quality and comfort standards supplied by car manufacturers.

Treating people with dignity and respect is a key aspect of a fair and just society and it is important that transport operators treat their staff well, in terms of recruitment, training and promotion. It will also be an advantage if transport staff treat passengers with respect and similarly help and expect passengers to show similar courtesy.

Road User Charging and Parking Demand Management

Road User Charging is not a new concept but the delivery of such an approach remains controversial at both the local and national level. Charging schemes have the ability to influence choices of travel, aiming to reduce demand on the existing highway network, and improving the environment. It can also provide valuable revenue for the promotion and development of alternative modes. If they are to be successful, action needs to be taken towards promoting the positive aspects of schemes, counteracting the opinions generated through negative press coverage.

Car parking demand management measures have the possibility to significantly influence modal choice, but care needs to be given in particular to the migration of congestion to other areas. As with road user charging, parking control measures can also provide revenue support for improving access to public transport. It is therefore also considered important to ensure that these positive aspects of schemes are promoted to gain acceptance from travellers.

Road user charging has an important role to play in an integrated and equitable transport network with particular reference to urban areas. However, the arguments to promote such schemes need to be well prepared and that the benefits in terms of reduced congestion, CO₂ emissions, and improved public transport services are clearly demonstratable.

3. Technology and Safety

Vehicle Efficiency and Alternative Fuels

The fuel economy of cars has improved by about 24% since 1997, and there is no reason this improvement for cars will not continue. The fuel consumption of the car fleet, including 4 x 4s and MPVs, is reported to have only improved by 6% since 1993, although this is inconsistent with the slight fall in the total fuel used by cars since 1993, despite a 15% increase in car traffic. One reason for the relatively small reported improvement is the fashion for using

large, heavy, bluff four-wheel drive vehicles on normal roads, as these have poor fuel consumption.

The fuel consumption of goods vehicles is being reduced, but the scope for savings is less than for cars.

Alternative electric propulsion is in an early stage, mainly because of the need for development of better batteries or fuel cells. Road transport must ultimately move to electric propulsion, but this will only reduce carbon emissions when electricity generation becomes much less carbon intensive.

The benefits of alternative fuels, other than hydrogen, which is in a very early stage of development, are marginal, with only small reductions in carbon emissions and possible adverse impacts on land-use and food production. However, even if the first generation of bio-fuels are not sustainable and probably release as much or more carbon over their life-cycle as conventional fuels, the second-generation fuels are expected to achieve a significant improvement in their life-cycle carbon emissions and result in a net benefit.

Driver training has been shown to achieve a 10% reduction in fuel consumption (SAFED, a one-day course on Safe and Fuel Efficient Driving has been shown to produce a typical reduction in fuel consumption of 10%).

Alternative electric propulsion is in an early development stage, mainly because of the need for development of better batteries or fuel cells, but should be considered for urban area use. Road transport must ultimately move to electric propulsion but this will only reduce carbon emissions when electricity generation becomes much less carbon intensive.

The description of Bio-fuels as a single category is over-simplistic. Some bio-fuels offer real savings in carbon emissions over the complete fuel cycle with few adverse environmental effects. Others offer little or no saving in carbon emissions and have large effects on land use and food production. It is necessary to assess the benefits of different bio-fuels separately and promote those that are truly sustainable.

Changes required in Engineering Design Standards and Material Specification

The response to the impact of severe meteorological events must be high on the agenda for engineers and highway professionals, but they must also address the wider causes of climate change.

The need to reduce the demand on natural resources where possible and particularly that of finite stocks of fossil fuels must also be seen as an important objective. Such uses of asphalt,

bitumen and tar binders in pavement construction represent important materials for specification review. This includes both the search for alternative suitable materials and the maintenance of progress in the use of recycling in pavement construction. Industry has been well aware of the need to address whole-life costing.

The key issues of higher temperatures and drought with associated events of flooding, wind and storm requires a review of infrastructure design approaches to safety, durability, and sustainability in order to prepare for these forecast changes and resultant 'severe' conditions projected for the UK.

Considerations should include the early identification of high-risk infrastructure with particular reference to public safety. Highway and transport authorities need to consider such severe events and their impact on road pavements, permanent ways, bridges, culvert, embankments and earth retaining structures.

Design criteria for future infrastructure developments should consider how to withstand such forecast severe events. This would include the use of sub-pavement reservoirs below car parks, storm overflow culverts below estate road networks and using urban roads as shallow canals in flood risk areas.

The implications for drainage systems and design assessments indicate a clear need to audit current facilities against such event forecasts. Although current Environment Agency guidance suggests an allowance for Climate Change of 20% contingency, the possibility of 30% should also be considered.

The impact of climate change, with global warming on pavement design and materials specification is also an essential consideration. This includes the higher expected temperatures and its effect on asphalt and concrete layer performance and higher moisture content due to increase in water table level and higher density storm events.

Asphalt mix modification such as aggregate grading, voids content and binder content can be considered to optimise the design for whole pavement life. For example, in France, cold, hot, wet and dry climatic conditions are considered according to project location. Materials specifications and practice exist in other parts of the world that can inform materials choices for the future conditions expected for the UK.

Safety

While this Inquiry is related to Climate Change we believe that regard must not be lost for the safety of those using the transport network and all proposals that affect transport performance must ensure that publicity and education programmes continue to promote safer driving techniques and emphasise the reasons for it

4. Administration and Finance

The current economic outlook with uncertain housing market conditions, lack of liquidity, fuel and commodity price inflation suggests that a prudent approach to budget and medium term financial planning is necessary. In view of the trends being identified in global warming and climate change and the irreversible damage that will occur if insufficient or inappropriate action is taken, bold decisions are required on investment in policies and measures that will sustainably address and slow down or reverse trends.

Fiscal Instruments on Road Transport

Although the increasing cost of fuel tends to increase the perception that the costs of motoring have increased significantly, the reality is somewhat different. Should fuel costs stabilise, it is likely that any short-term behaviour change will lose momentum. It is considered that a direct tax measure on purchase or on circulation would have a much stronger and longer-lasting influence.

In assessing the application of motoring taxation, the evidence indicates that in real terms the cost of motoring has fallen significantly over the last 20 years. It is well behind the overall increase in the cost of living over the same period and it could be argued that there is an obvious opportunity to mitigate the environmental impact of motoring through fiscal instruments. However, based on recent experience, there is also a clear responsibility for transport professional advisers and decision makers, to use all the available evidence, to effect better understanding, need and acceptance of such action.

This is particularly important at a time when society is beginning to assess the global impact of 'climate change', with growing road usage, congestion and casualties from road collisions already being seen as unsustainable.

In future, fiscal instruments will need to cover a range of national, local and sector-specific measures to promote fuel economy and innovative clean fuels. These measures are currently progressing but in order to achieve maximum benefits, their progress should be accelerated. Such action is currently gathering pace but progress needs to be stronger.

Additional measures, which will complement integrated transport policies, should consider the introduction of locally targeted fiscal measures including Workplace Parking Levies, Business Improvement Districts or changing the basis of calculating Domestic and Business rates. These could be weighted to fiscally favour accessible locations and so counterbalance potential effects of road user charge in such places.

It may also be beneficial to promote and achieve sustainable travel benefits through the introduction of tax exemptions and reforms, favouring accessible locations that reduce travel demands and using more environmentally friendly travel modes. Some measures have already attracted very limited tax concessions using Travel Plans, but much more could be achieved in adopting this approach.

5. Alternative energy sources

As global fossil fuel sources become further depleted the need to replace them with sustainable sources becomes more urgent. Electricity has been a base energy source for many decades but in NI has been largely dependant on fossil fuels although the interconnector to GB means that some of NI's electricity consumption is met by nuclear generation. It may be years before NI's road based transport can be refocused on an electric based or other sustainable fuel system. The use of fossil fuels for much of our energy demand must be replaced by development of alternative and sustainable fuel sources.

NI, with extensive rural countryside, long coastline and situation on the edge of the Atlantic Ocean, is well placed to develop alternative power sources. Generation from wind and water as well as managed cultivation of crops for bio fuels or as fuel for power generation plants must be facilitated by sensitive but clear planning policies and economic support packages.

As waste disposal is also a major transportation and environmental problem for Ireland generally, careful consideration must be given to establishing strategic power and heat generation plants fuelled by waste.

6. Conclusions

Highways and transportation professionals recognise that their industry has an impact on the environment, on society and on the performance of the economy and seek to minimise and mitigate the negative impacts while maximising the positive impacts.

The IHT believes that it is essential for Ireland, both North and South, to become more self sufficient in energy as an economic and climate change priority.

Freight movement, on which much of our economy depends, is totally road based within NI. If transport impacts on the environment and climate are to be minimised there needs to be an ongoing investment in both transport infrastructure and transport technology to ensure efficient and sustainable movement of goods and people.

Most importantly there is need for behavioural change. The climate change message needs to be clearly communicated to the public and in particular the a general public duty to adapt and mitigate the impact of their desire to travel. Many areas including energy and water saving, waste recycling, and and promotion of alternative modes of transport all should be part of the behaviour change agenda. Leadership and commitment from business and political leaders is required. Potentially unpopular decisions will have to be taken if unsustainable trends are to be reversed.

The investment to date in transport must now be underpinned by the RDS and RTS reviews to ensure continued and sustainable economic benefit. IHT supports the investment in Public transport set out in the BMTP and reinforced by the DRD Minister's public announcements. A high quality integrated public transport system for the Belfast urban area will offer an alternative to car travel and, with the help of investment in park and ride sites and demand management measures ,encourage the public to use public transport and so reduce CO2 emissions.

Road user charging/pricing has potential to contribute to a reduction in CO2 emissions and must be fully reinvestigated. Money raised should be "ring fenced" for investment in public transport. 60% of people in the GB prefer Road User Charging to car tax. (ICE) Pricing at "point of use" tackles congestion and CO2 emissions (IHT)

Failure to maintain our road infrastructure to serviceable standards will be a significant issue in terms of sustainability. Poor road conditions slows traffic, creates unsafe conditions and damages vehicles, all of which increases costs on the economy. Reconstruction of our roads following failure, as opposed to resurfacing requires more materials, fuel etc and could have a significant detrimental impact on our environment.

Greater priority needs to be given to development of sustainable renewable energy sources in Ireland. Development of wind energy sites which is an established source, is essential and will require strategic planning and bold decisions.

IHT Northern Ireland Branch March 2009

NI Climate Change Impacts Partnership



Climate Change: What will YOU do?

Northern Ireland Climate
Change Impacts
Partnership

Report of a survey of NI people, politicians and
key decision makers
prepared by Patricia Mackey
Sustainable Northern Ireland
January 2009

**“There is still time
to avoid the
worst impact of
climate change
if we take strong
action now”**

Sir Nicholas Stern
STERN REVIEW: The Economics of Climate Change HM Treasury
United Kingdom
30 October 2006

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The survey was carried out for the Northern Ireland Climate Change Impacts Partnership (NICCIP) by Sustainable Northern Ireland in March and April 2008.

The Northern Ireland Climate Change Impacts Partnership (NICCIP) is a partnership consisting of representatives from central and local government, the business community, the voluntary sector and professional organisations.

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Executive Summary

Climate change is one of the most significant issues facing the world. Recent scientific research from the IPCC provides evidence that we need to act immediately if we are to limit its impacts at both global and local scales.

This report is based on survey returns from more than 400 members of the public, 28 MLAs, 26 district councils and 29 central government departments and agencies in Northern Ireland.

The survey's results reveal a high degree of consensus among each of the sectors surveyed that climate change is having an impact in Northern Ireland, that modifying our behaviour can make a difference and that people are willing to make changes to their lifestyles, especially if encouraged to do so by strong government leadership.

The results from the survey suggest that people do accept their responsibility for doing more, but that stronger leadership and detailed guidance from government is needed. The public, MLAs, central government and district councils are all prepared to play their part but more effective co-ordination of initiatives is required.

Key findings from the survey:

The survey yielded a number of useful findings that can be used to determine policy, priorities and actions to help reduce the severity of the impact of climate change on Northern Ireland.

Knowledge about climate change

- ❑ 81% of the public, 22 out of 28 MLAs and 51 out of 55 of key decision makers responding to the survey feel they are either completely or well informed about climate change.
- ❑ 99% of the public and 27 out of 28 MLAs agree the Earth's climate is changing.

Climate change and Northern Ireland

- ❑ 62% of the public state that changes to the climate have already had an impact on them. 20 out of 27 MLAs think that the changing climate has had an impact on their constituents.
- ❑ There is consensus that climate change will have an increasing impact on Northern Ireland over the next 5, 25 and 50 years.

Cause of climate change

- ❑ 92% of the public, 25 out of 27 MLAs and 54 out of 55 key decision makers think that people are at least partially responsible for climate change.
- ❑ Destruction of rainforests is ranked as the most significant contribution to climate change by all four survey groups. Other issues to rank highly are the manufacturing industry, power stations and transportation. Agriculture is ranked the lowest of all sectors by those surveyed.

Responsibility for climate change

- ❑ Over 90% of each group responding to the survey think industry will have a prominent impact on helping to reduce climate change.
- ❑ 26 out of 28 MLAs surveyed think the NI Assembly could have a positive impact on reducing the impact of climate change but only 68% of the public and 40 out of 55 key decision makers who responded to the survey agreed.
- ❑ 25 out of 26 district council respondents think they have an important role in reducing climate change. 18 out of 29 central government departments, 24 out of 28 MLAs and 75% of the public think that councils have an important role to play.

Willingness to make changes to lifestyle and behaviour

- ❑ 87% of public respondents think that making changes to their lifestyle will help reduce climate change.
- ❑ 18 out of 24 MLAs stated they thought their constituents would be willing to make lifestyle changes. 89% of public respondents said they would be willing to make lifestyle changes.
- ❑ 48 out of 55 key decision makers (district councils and central government departments) state that higher priority assigned to other issues is their main barrier to dealing with climate change.

Messages needed to take action

- ❑ Every group surveyed agreed that a less polluted atmosphere and benefits to public health were important messages that could be used to encourage people to take action to reduce climate change.

Actions already taking place

- ❑ The most commonly cited action people feel they are undertaking which contributes to reducing climate change is recycling and switching off lights.

Additional actions to consider

- ❑ 80% of the public surveyed stated they would be prepared to install renewable energy technology if it helped reduce the impacts of climate change.
- ❑ 24 out of 28 MLAs stated that the amount of energy generated from renewable sources should be increased to mitigate against climate change.

The important next steps

- ❑ 23 out of 28 MLAs would support the introduction of Climate Change Impact Assessments for all relevant government departments. 26 think that ensuring all new homes are built to meet robust energy standards would have an important impact on climate change.
- ❑ MLAs and key decision makers who responded to the survey are in agreement that energy efficiency and increasing the supply from renewable energy sources are important initiatives to mitigate against climate change.
- ❑ 24 out of 55 key decision makers think managing the impacts of climate change on their organisation's own buildings and estates is a top adaptation priority.

Introduction

Over the past 18 months climate change has enjoyed an increased profile in the media via advertising, reporting of scientific studies and local and global events. It is now more common for advertisers to use lower carbon emissions as a selling point. This, coupled with other environmental activities such as household multiple bin systems, has likely had a major impact on the behaviour and attitudes of the public as well as Northern Ireland's key decision makers.



These changes have been driven by the research and forecasts of the Intergovernmental Panel on Climate Change (IPCC) which has established consensus among scientists, governments and economists that climate change is happening and that we must do something now to reduce the inevitable consequences.

Everyone seems keen to display their green credentials. Marks & Spencer's 'Plan A' is pushing other retailers into action, HSBC is attempting to rebrand itself as a 'green' bank, Al Gore won an Oscar for his film promoting action to address global warming, and Arnold Schwarzenegger is pushing some radical environmental legislation within California setting the standard for other American.

Two reports^{1, 2} published in 2007 focused on gathering information covering what people think about climate change. Due to the increased attention the issue has received since then, it is timely to gather additional information to see how attitudes have moved on and to identify what the public, the politicians and other key decision makers are willing to do to ensure Northern Ireland plays its part effectively.



This report details the findings of four surveys which were undertaken during March and April 2008. The purpose of these surveys was to progress the debate and action on climate change to ascertain a suitable role for Northern Ireland. While each of the surveys gathered information on its target audience's opinion on climate change, it is the additional information on what messages will help change behaviour, what lifestyle changes people would be willing to make, what information people need in order to make informed decisions, and what measures the politicians would endorse and how key decision makers are addressing their responsibility that is of greatest potential importance.

¹ Ipsos Mori "Tipping Point or Turning Point" 2007

² WWF "Climate Change: What Northern Ireland really thinks: August 2007"

Methodology

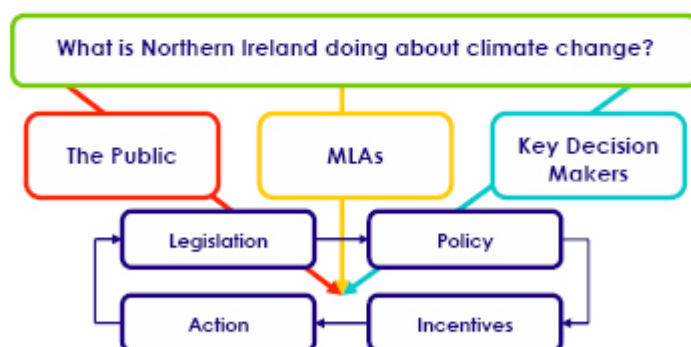
The four surveys were designed to gather information on:

- What respondents think about climate change,
- Who needs to act to reduce climate change, and
- What different groups are prepared to do to help reduce climate change.

The survey was designed by Sustainable Northern Ireland in consultation with NICOP and its members. In March 2008, 4000 households selected at random by NISRA across Northern Ireland were posted a copy of the survey. To try to make the responses as reflective as possible of the demographic make-up of Northern Ireland, the survey requested that it should be completed by the person in the household over the age of 16 whose forename came first alphabetically.

The responses received from the public reflected the national demographic splits in NI between male and female, income, house type and location. The only variance was with age: the younger age groups were not adequately represented to be reflective of the percentage of people in NI between the ages of 16 and 24. This meant these results had to be weighted to enable their projection to a NI level.

MLAs and key decision-makers from central and local government were also surveyed. These surveys varied to reflect the type of action and responsibility the individuals or organisations could take to help reduce climate change. For example, while the public survey asked about what initiatives respondents undertake or would be prepared to undertake to help reduce climate change, MLAs were asked about the political initiatives or decisions they would support to mitigate against and adapt to climate change. Decision-makers were asked their organisation's views on climate change, how prepared they are for its impacts and what they see as their role.



All responses were analysed using Microsoft Excel database. Additional analysis was undertaken by NISRA including weighting of results and cross analysis of responses.

The Public's Opinion

Section ONE

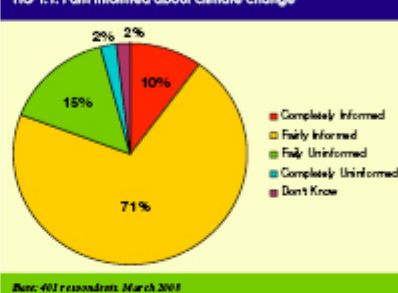
Section one of this report contains the opinions and attitudes towards climate change expressed by the public in March 2008. The data have been handled so as to enable extrapolation to make statements representative of all of the people of Northern Ireland.

What do you know about climate change?

When asked whether or not they had heard of climate change prior to taking part in the survey, 98% of respondents responded positively.

There is no difference between men and women, although there is a slight variance between younger and older generations, with 93% of those under 35 being aware of climate change compared to 98% of those aged 35 and over. There is no observed difference between urban and rural respondents or between respondents with high or low incomes.

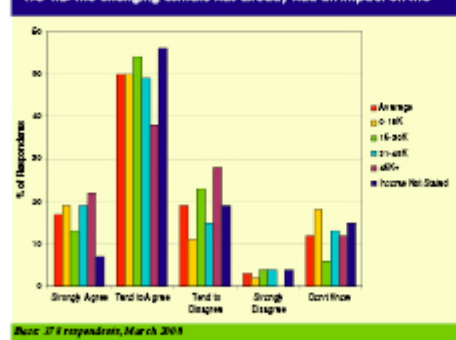
FIG 1.1: I am informed about climate change



81% of respondents feel they are at least fairly informed about climate change. Only 2% feel they are completely uninformed (fig. 1.1).

What is happening to the climate in Northern Ireland?

FIG 1.2: The changing climate has already had an impact on me



62% of respondents feel that changes to the climate have already had an impact on them (fig. 1.2). There is little correlation between average household income and agreement that noticeable climate changes have already occurred in NI.

99% of respondents feel the Earth's climate is changing. This is an increase of 19% from a similar UK government survey conducted in 2007³.

³ Survey of Public Attitudes and Behaviours Towards the Environment, DEFRA (2007)

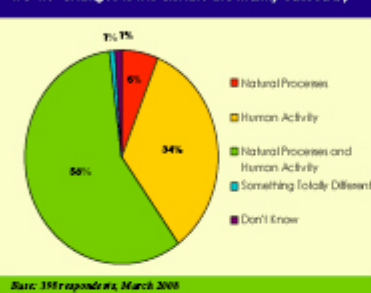
Climate Change | What will YOU do?

94% of people surveyed feel that Northern Ireland's climate is changing. Of those who feel the Earth's climate is changing, 4% do not believe the same for Northern Ireland. Women are more likely than men to believe that Northern Ireland's climate is changing, 97% compared to 92%.

57% of respondents feel that climate change is more of a global issue than one for Northern Ireland, but 40% disagreed with this. Men are more likely to think that climate change is more of a global issue (64%) compared to women (50%).

What are the causes of climate change?

FIG 1.3: Changes to the climate are mainly caused by



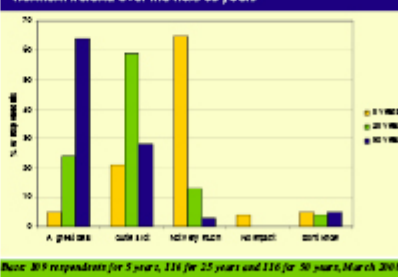
When asked what they feel is the main cause of climate change, 92% of respondents identified some level of human impact as being directly responsible for changes to the climate (fig. 1.3). This figure is higher than received for a similar question asked during a WWF survey⁴ in August 2007 where 87% of people surveyed agreed that human activity is damaging the earth. Women are more likely to believe that human activity is at least partially responsible for climate change than men, 95% compared to 89%. Only 6% of respondents feel climate change is solely caused by natural processes

89% of those who feel humans are at least partly responsible for climate change feel that by making changes to their lifestyle they would help reduce the effects of climate change.

What impact will climate change have in Northern Ireland?

In the next five years, more than two-thirds of respondents (69%) feel there would be little or no impact on Northern Ireland from climate change (fig. 1.4). In 25 years time, 59% think there will be quite a lot of impact on Northern Ireland from climate change (24% said there will be a great deal of impact), and in 50 years time, just under two-thirds of respondents (64%) feel there will be a great deal of impact on NI from changes to the climate.

FIG 1.4: Climate change will have an increasing impact on Northern Ireland over the next 50 years

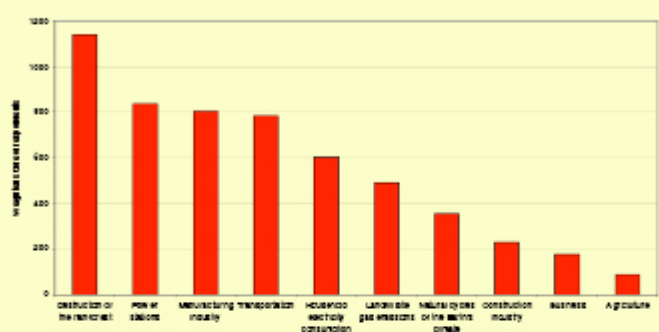


⁴ WWF "Climate Change: What Northern Ireland really thinks: August 2007"

Who needs to act?

Respondents were asked to put in rank order the five most significant factors that they feel contribute to climate change (fig. 1.5). The most frequently quoted contributor to climate change is destruction of the rainforests (31% of number one responses). The manufacturing industry and transportation are the next most commonly quoted contributors.

FIG 1.5 Destruction of the rainforests is the greatest contributor to climate change



Respondents were asked to rank the factors 1-5 depending on which one they thought contributed most significantly to climate change. These scores were then weighted to provide an accurate comparison across each factor.

In terms of being ranked in the top five, the three most frequently quoted contributors are: destruction of the rainforests (83%), transportation (72%) and power stations (72%). Agriculture and business are the least frequently quoted contributors within people's top five, with 10% and 19% respectively.

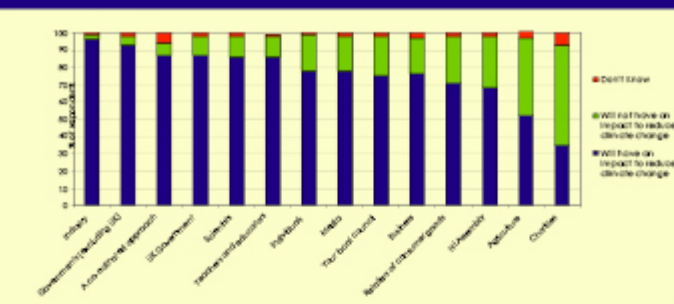
By applying a simple weighting mechanism (No.1 rank = 5 points, No. 2 rank = 4 points etc), the results change slightly. The three highest ranked contributors are: destruction of the rainforests, manufacturing industry and power stations. The lowest scorings remain the same.

When the respondents were asked to state how much impact they feel certain sectors could have in helping to reduce climate change it is interesting to note that industry is identified as being the sector most likely to make a difference, with 93% of respondents believing this (fig 1.6). This is followed by world governments, the UK Government and a co-ordinated approach, with 93%, 87% and 87% of respondents thinking they will have a positive impact respectively. Perhaps surprisingly, retailers of consumer goods do not rate highly despite all the efforts they have made in recent years such as reducing plastic bags and extensive marketing campaigns on their efforts to reduce their carbon footprints.

The charity sector is not seen as able to have as large an impact as many of the other sectors. Perhaps this is evidence that people still view charities primarily as fund raisers. In reality it is often the developmental charities such as Tear Fund and Oxfam that are making the biggest difference to people affected by climate change.

The agriculture sector is again thought to have little effect on reducing climate change, probably as it is also seen as an insignificant contributor.

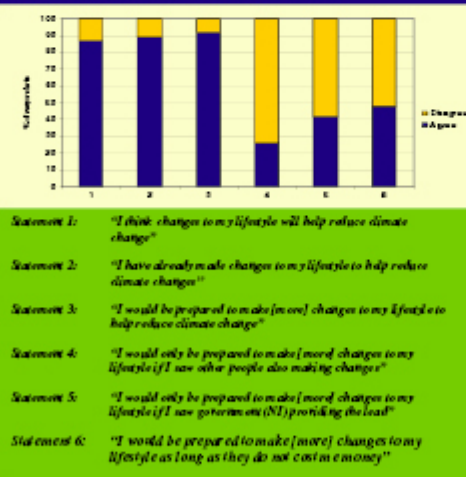
FIG 1.6: Industry and government can make the most difference



While the chart above demonstrates that respondents feel certain sectors will not be able to have much impact to reduce climate change themselves there is overwhelming consensus that a co-ordinated approach is necessary. Each of the sectors mentioned is seen as having a role to play whether it is through legislation, incentives, regulation, research, reviewing practices, educating, setting an example or effective communication and lobbying.

Are people willing to make lifestyle changes?

FIG 1.7: Changing my lifestyle can make a difference



Respondents were asked to state if they agreed or disagreed with a series of questions relating to changes to their lifestyle to help reduce climate change (fig. 1.7). Respondents largely agreed that making changes to their lifestyle will help reduce climate change (87%).

Almost nine out of ten respondents (89%) state that they have already made changes to their lifestyle to help reduce climate change. Women perform better than men in this regard, 94% compared to 83%.

92% of respondents state they are willing to make changes to their lifestyle in order to help reduce climate change. People who stated they have already made changes to their lifestyle are keen to make more changes (95%), whilst of the 11% of respondents who have not yet made any changes 71% are still not prepared to do anything.

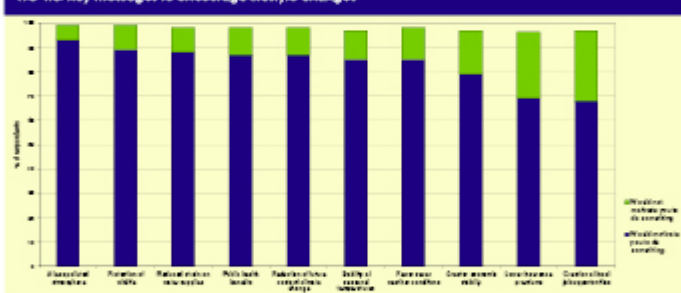
Respondents are generally happy to make changes to their lifestyle regardless of what they see others doing, with only 26% saying they will only be willing to do more if they see others doing the same. However, respondents are more evenly split when it comes to taking their lead from government and regarding the cost, with 42% and 48% agreeing that they will only do more if they see the NI Assembly doing more, or if it is cheaper (respectively). Nearly half (49%) of those who state they have not already made lifestyle changes want to see more action by the NI Assembly before they will consider doing anything themselves.

It is important to note that of the 92% of people who think that climate change has been caused by some form of human activity, 89% think that changes to their lifestyle will make a difference.

What messages are most effective?

The four messages that come out as the most popular motivations for individuals to do something to reduce climate change are: a less polluted atmosphere (93%); protection of wildlife (89%), reduced strain on water supplies (88%), public health benefits (88%) and reducing the future costs of climate change (87%) (fig. 1.8).

FIG 1.8: Key messages to encourage lifestyle changes



Creating local job opportunities and reducing insurance premiums are the least effective motivations for encouraging people to combat climate change, with 29% and 27% of respondents stating that these issues have little or no impact on their environmental motivations. However, all the messages are supported by over two-thirds of respondents.

What are people doing?

Almost nine out of ten respondents say that they already recycle as much as possible (88%) and switch off lights (88%); 83% of respondents claim that they do both (fig. 1.9). Other actions that are being carried out by at least 70% of respondents are; turning appliances off at the plug (78%), turning down the thermostat (75%), reusing bottles and containers (73%), installing low energy light bulbs (70%), and installing loft insulation (70%).

Half of the respondents state they recycle as much as possible, reduce the amount of waste they produce and reuse bottles and containers. 61% of respondents have done at least one of the following; bought a car with a smaller engine, changed to a more fuel efficient car or made fewer car journeys.

What else are people prepared to do?

The most popular action that people are prepared to do is to install a renewable energy source in their home (80%) (fig. 1.9). More than half of those who responded say they are prepared to do the following; sign up to an eco- energy tariff (75%), change to a more fuel efficient car (66%), replace broken appliances with more energy efficient ones (55%), reduce the number of electrical appliances (54%), and buy food with less packaging (54%).

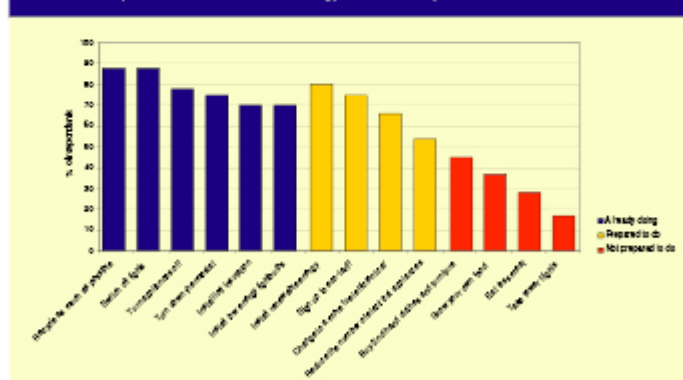
What will people not do?

Respondents are least prepared to buy second hand clothes and furniture (45%) (fig. 1.9). More than one in three respondents are not prepared to grow their own food (37%), while 28% of respondents are not prepared to eat less meat and only 17% are prepared to fly less.

When asked about the possible reasons why people may not take action against climate change, respondents feel the cost and the inconvenience may put people off more than any other reasons (88% and 86% respectively). Feeling that taking action is not their responsibility or is too time consuming are the next most frequently quoted reasons for why people may not be willing to take action (also 82% and 81% respectively).

Perhaps most worryingly is the fact that 81% of respondents feel that people do not take action because they are not interested in climate change.

FIG 1.9: I do recycle, I will install renewable energy, but I won't buy 2nd hand clothes or furniture



The MLA's Opinions

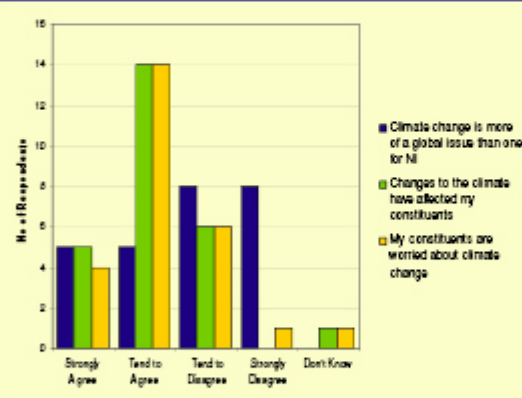
The attitudes and behaviour of our elected representatives were also surveyed. This was both in terms of what they believe on an individual basis and on how these beliefs translate into action within their political remit. Some of the questions asked are identical with those asked of the general public.

Out of 104 MLAs we received 28 responses. The data returned did include responses from all parties though we are unable to compare results across political parties. The low response rate also means it is not possible to make comparisons between MLAs and the public. In some cases we have indicated what the public thought about a particular issue that MLAs also were questioned on but these statements should not be viewed as statistically valid.

How well informed are our elected representatives?

22 out of 28 MLAs who responded feel fairly informed about climate change. None of the respondents feels completely informed or completely uninformed, while 6 feel fairly uninformed.

FIG 2.1: Climate change is an issue for Northern Ireland's MLAs



27 MLAs responding feel the Earth's climate is changing and that this is reflected in Northern Ireland's changing climate. The results received from the general public stated that many of those who feel that Northern Ireland's climate is changing think that climate change is more of a global issue than one for Northern Ireland (fig. 2.1).

20 MLAs who responded think that changes in the climate have affected their constituents (fig. 2.1). 67% of the public who responded say they have actually experienced climate change. 19 MLAs expressed the opinion that their constituents are worried about climate change (fig. 2.1).

Of the possible causes for climate change only one MLA thinks climate change is a natural phenomenon and that people have no impact on it. One stated they don't know what causes it, while the remainder believe climate change is caused by human activity (9 MLAs) or a combination of human activity and natural processes (16 MLAs).

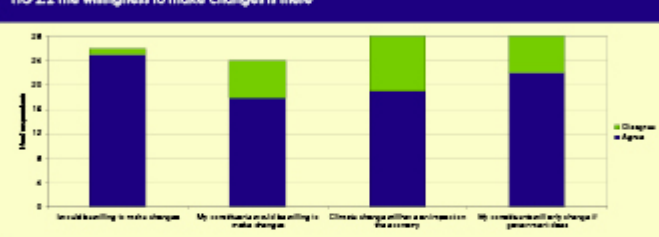
What impact will climate change have on Northern Ireland?

MLAs who responded expressed an opinion that climate change will have an increasing impact over the next 50 years. 9 think climate change is going to have either a great deal or quite a lot of impact over the next five years, compared to 24 in 25 years rising to 26 out of 28 in 50 years.

Of the 28 MLAs who responded, 24 think they are more likely to make lifestyle changes than they believe their constituents are, with 25 stating they are prepared to make changes but only 18 thinking their constituents will be willing to make changes (fig.2.2). The results from the public survey show that 86% of the population in Northern Ireland are willing to make lifestyle changes to help reduce the impacts of climate change.

22 MLAs think that their constituents will only be willing to make changes to their lifestyles if they see government in Northern Ireland taking the lead (fig. 2.2). The public survey responses indicated that 43% of the public would have to see government taking action before they will make changes.

RG 2.2 The willingness to make changes is there



19 MLAs think that climate change will have an impact on economic growth in Northern Ireland (fig. 2.2). As economic prosperity is one of two cross cutting themes in the Programme for Government, this indicates that MLAs think climate change must be a significant consideration for most of their decisions.

What is causing climate change?

MLAs who responded believe that the most significant factor contributing to global warming is the destruction of the rainforest; 10 respondents ranked it first. In fact, the 10 respondents who think that climate change is more of a global issue than a Northern Irish one cite destruction of the rainforests as the main contributing factor to climate change. This was followed by power stations, manufacturing industry and transportation. If a weighting is applied to the factors (those ranked 1 = 5, those ranked 2 = 4 etc.) then the order of significance changes. Power stations become the highest ranking factor (83 weighted response), followed by destruction of the rainforest (82 weighted response) and in third place household electricity consumption (54 weighted response).

Who can make a difference?

The MLAs feel the Northern Ireland Assembly can have the same impact as the UK Government; 26 respondents feel that both governments could either have a great deal or quite a lot of impact on climate change. This is slightly lower than the impact they think global governments can have (27 MLAs) but makes sense when examined

with other responses, such as the main contributor to climate change being seen as destruction of the rainforests and climate change being more of a global issue.

The MLAs who responded do not think that the charitable sector can have much impact on climate change. Also, like the public, the responses submitted by MLAs indicate strong support for a co-ordinated approach to reducing climate change. 24 MLAs responding think a co-ordinated approach to climate change will have either a great deal or quite a lot of impact.

What are the top three priorities for action?

MLAs were asked to state their top three priorities for action to mitigate against climate change. Their top priority is to increase the level of renewable energy (24 MLAs). This links well to the 78% of the population who are willing to install renewable energy sources and signifies a significant area for action in Northern Ireland.

Joint second are the priorities to lower the fuel consumption of vehicles and develop policies to cut carbon emissions (16 out of 28 MLAs), while third is support for increasing energy efficiency (15 MLAs). Greener procurement (0 MLAs), efficient use of materials in building projects (1 MLA) and awareness raising and education (5 MLAs) do not come across as high priority activities, but only three choices were allowed for each person. MLA's choices reflect the nature of their position to dictate policy and provide strategic leadership.

MLAs were also asked to state their top three priorities to adapt to the inevitable impacts of climate change. Interestingly the top adaptation priority is to manage the natural environment and biodiversity (19 out of 28 MLAs), followed by updating policies to take account of climate change (17 MLAs) and managing flood risks (10 MLAs). Low on their list of priorities are managing the impacts on service delivery (1 MLA) and managing the impacts on their own buildings and estates (2 MLAs). Again only three choices were allowed and MLA results reflect their areas of responsibility.

The lower priority given to managing the impacts on public health (6 out of 28 MLAs) does not tie in with the responses received from MLAs asking them to indicate how much of an impact various sectors can have on reducing climate change. 27 MLAs indicated that climate change will have either a great deal or quite a lot of impact on public health in Northern Ireland.

What will make us want to act?

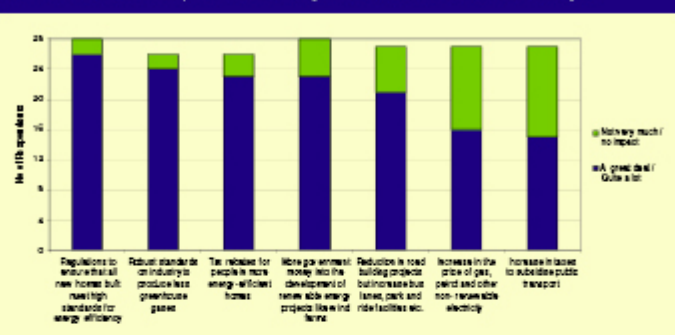
A less polluted atmosphere and protection of wildlife have 100% support from MLAs. Of the potential benefits which can result from reducing changes to the Earth's climate, these are thought to provide the greatest incentive to ensure decisions taken by MLAs, for their constituents, will not exacerbate climate change. Factors least likely to make MLAs consider the impacts on climate change in their decision making process are lower insurance premiums (14 out of 28 MLAs), although this is still a high percentage of respondents who would be encouraged to take action.

MLAs responding to the survey feel that the development of regulations to ensure that all new homes meet high standards for energy efficiency (26 out of 28 MLAs) and the introduction of robust standards on industry so they are forced to produce fewer greenhouse gases (24 MLAs) are seen as the two initiatives that will have the greatest impact on reducing climate change (fig. 2.3). Also popular with the MLAs who responded was the introduction of tax rebates for people who live in more energy efficient homes (23 MLAs) and more government money in the development of renewable energy projects like wind farms (23 MLAs). A reduction in road building programmes, with increases in bus lanes, and park and ride facilities, is also thought

to be a positive development with 21 out of 28 respondents thinking it will have a positive impact.

The initiatives thought to have the least impact are increasing taxes to subsidise public transport (12 out of 28 MLAs thinking it would have not very much or no impact) and increasing the price of gas, petrol and other non-renewable electricity sources (11 MLAs thinking it would not have an impact). However, even here nearly 50% of respondents still think they are a good idea.

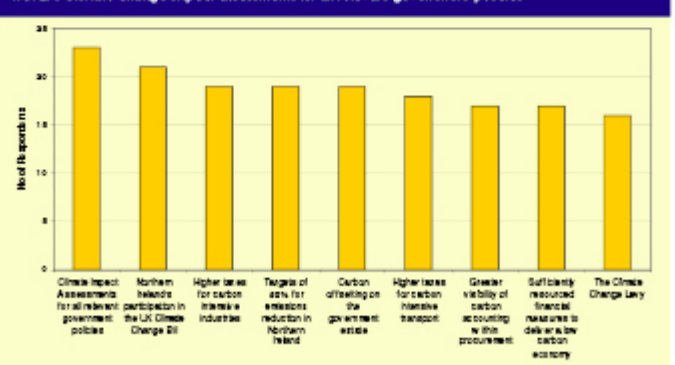
FIG 2.3: How much of an impact will the following initiatives have to reduce climate change?



Using their 'role' what incentives/initiatives would MLAs support?

MLAs were asked if they supported a prescribed list of measures that would ensure Northern Ireland can play its role in reducing climate change (fig. 2.4). Of the measures suggested the most popular are 'Climate Impact Assessments' for all relevant government policies (23 out of 28 MLAs) and Northern Ireland's participation in the UK Climate Change Bill (21 MLAs).

FIG 2.4: Climate change impact assessments for all relevant government policies



The measures with the lowest level of support from the respondents are a Climate Change Levy (only 16 respondents supporting this); greater visibility of carbon accounting within procurement (17 MLAs) and sufficiently resourced financial measures to deliver a low carbon economy (17 MLAs). However, these measures were still supported by most respondents.

RG 2.5: How many signed the 'No Day Named Motion' on climate change?



22 respondents state they supported the climate change 'No Day Named Motion', 2 said they have not while 4 did not answer (fig. 2.5). This does not match the recorded figures of just over 50% of MLAs that have signed the NDNM. Perhaps this is evidence of who within the Assembly completed and returned the survey.

⁵ A 'No Day Named Motion' is the term given to an Assembly debate for which no date has been fixed yet. MLAs are invited to sign to motion to demonstrate their support.

Decision Maker's Opinions

The third and fourth groups surveyed contain some of Northern Ireland's key decision makers. Officers in central government departments and their local government (district council) counterparts were asked a series of questions to identify their position on climate change and ascertain what work, if any, they have initiated to mitigate and adapt to future events.

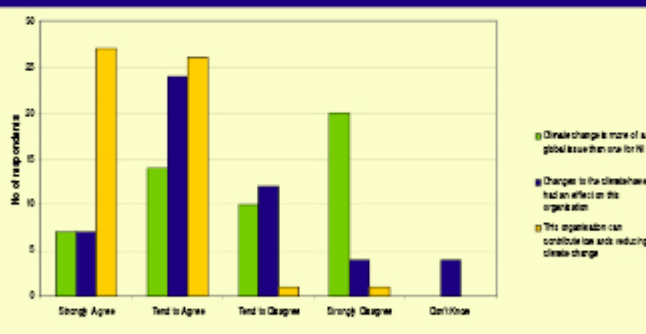
A total of 55 responses were received from decision makers, 29 from central government departments and 26 from district councils (responses were received from 22 different councils). These results have been amalgamated to give an overall opinion on how decision makers are dealing with climate change. Due to the small number of responses it is not possible to make direct comparisons between central government and district councils respondents, although in some cases statements have been made regarding the answers provided by each decision maker group.

How informed are decision makers?

51 out of 55 respondents feel either completely or fairly informed about climate change. 4 feel fairly uninformed while no respondents think they are completely uninformed or selected 'do not know'. Central government respondents feel slightly better informed than district council respondents; 28 out of 29 respondents from central government organisations feel either fairly or completely informed; 23 out of 26 district council respondents felt the same.

21 out of 55 respondents feel climate change is more of a global issue than one for Northern Ireland (fig. 3.1) and 30 think it is just as important an issue in NI as elsewhere, while four did not supply a response.

FIG 3.1: Do you agree with the statements?



17 out of 24 council respondents feel that changes to the climate have already had an effect on the organisation whereas 14 out of 27 respondents from central government feel the same. Both groups of respondents feel their organisation can contribute towards reducing climate change; 53 out of the 55 decision makers who responded either tend to agree or strongly agreed (fig. 3.1).

Of the possible causes of climate change, all but 1 respondent think humans have some impact on climate change either by themselves or alongside natural processes.

The responses received from decision makers indicate a high level of understanding and consideration of the issues that their organisations are giving to climate change. 36 of the 55 respondents feel they have a good understanding of the issues and are developing a Strategy. 19 said they have a vague understanding and are aware of key issues only. No respondent states they do not understand climate change or they are sceptical and that climate change does not need to be a consideration for their organisation.

What are organisations doing to address climate change?

FIG 3.2: Does your organisation have a Climate Change Strategy or Policy?

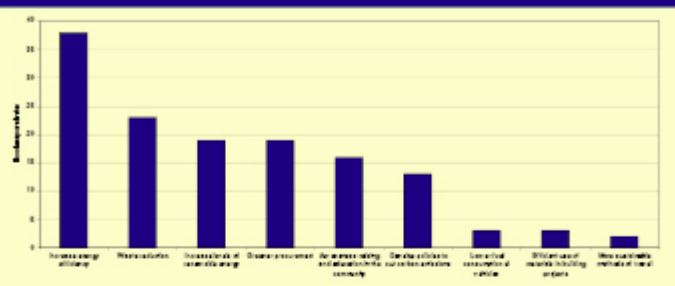


Only 10 respondents state their organisation has no plans to produce a climate change strategy or policy. 6 out of 29 central government respondents either have a published Climate Change Strategy or have one in development (fig. 3.2). Only 2 out of 26 district council respondents have a Strategy.

34 out of 55 respondents feel the main driver for their organisation's Climate Change Strategy (or similar – either completed, in development or planned) is leadership from senior management. This is often followed by a formal declaration or similar commitment (30 respondents) and integration with the organisation's Strategic Plan (25 respondents).

The organisations with completed plans, ones in development or ones planned were asked some specific questions about the plans and what they contained. Responses received show that buildings, services and vehicles are included in the plans more in terms of mitigation than adaptation. These are areas where decision makers are seeing that they may have a significant role to play in trying to reduce the effects of climate change on both their organisation and on Northern Ireland.

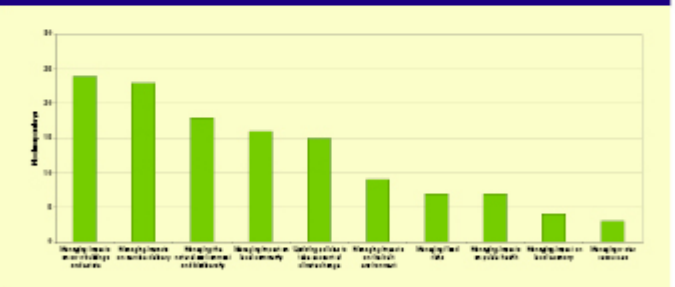
FIG. 3.3: Mitigation priorities of decision makers



Decision makers were asked to state their top three priorities to mitigate against climate change (fig. 3.3). Responses showed these to be: increasing energy efficiency (38 out of 55 respondents), waste reduction (23 respondents), increase levels of renewable energy (19 respondents) and greener procurement (19 respondents).

Decision makers listed their top three priorities to adapt to climate change predominantly as managing the impacts on the organisation's own buildings and estate (24 out of 55 respondents), managing the impacts on service delivery (23 respondents), and managing the impacts on the natural environment and biodiversity (18 respondents) (fig. 3.4).

FIG. 3.4: Adaptation priorities of decision makers



When decision makers were asked to put in rank order the factors they feel are most significantly contributing to climate change, power stations (15 out of 55 respondents) received the highest percentage of number one rankings. This is followed by household energy consumption (13 respondents) and transportation (11 respondents). If a weighted ranking is applied to the results this order of impact does not change.

Who can make a difference?

World governments (excluding the UK) and industry are identified as the sectors likely to have the greatest impact on reducing climate change. 53 out of 55 respondents state they can either have a great deal or quite a lot of impact. Respondents also rate the impact the UK government can have quite highly, with 51 stating they can have an impact. This compares with 40 respondents who feel the NI Assembly can have an impact. 43 respondents feel that district councils can have either a great deal or quite a lot of impact. This figure varied greatly between the two sectors of government; while 25 out of 26 district council respondents feel their organisation could make a great deal or quite a lot of impact, only 18 out of 29 central government respondents feel district councils will be able to make a difference.

What will make a difference?

The top three initiatives respondents feel can successfully reduce climate change are development of regulations to ensure that new homes are built to meet high standards for energy efficiency (53 out of 55 respondents), introduction of robust standards on industry so they are forced to produce fewer greenhouse gases (52 respondents) and more government money spent on the development of renewable energy projects (48 respondents).

The initiatives respondents feel will have least impact focus around transportation. 31 out of 55 respondents feel increasing taxes to subsidise public transport will have little or no impact to reduce climate change. 26 respondents feel increasing the price of gas, petrol and other non-renewable energy sources will have little impact along with 25 who feel similarly about reducing road building projects.

What is stopping organisations take action?

Of the factors limiting a decision makers' organisation from actively working to help reduce climate change, other issues taking higher priority (48 out of 55 respondents) is most frequently cited as an issue (fig.3.5). This is followed by insufficient staff / staff time (40 respondents) and lack of funding (38 respondents).

FIG 3.5: Why is climate change not a priority?



Central government respondents indicate a difficulty in embedding climate change actions into other strategies and plans; 16 out of 29 respondents feel this is a difficulty. While district councils felt the perceived lack of leadership from central government (22 out of 26 respondents) was a difficulty. Respondents also cite lack of leadership from within their organisations as being a problem.

Conclusions

Section FOUR

What did respondents think about climate change?

The data generated from each of the sectors surveyed demonstrates that there is consensus within Northern Ireland that climate change is happening and that people feel relatively well informed about it.

While many respondents (the public, MLAs and organisations) view climate change as more of a global issue than one for Northern Ireland, over two-thirds of the public respondents feel that they have already felt the effects of changes to the climate.

Much work is needed to demonstrate the significance of climate change to Northern Ireland – both in terms of our impact on climate change and the impact of climate change on us. The most efficient way to do this will be to tap into and publicise the experiences of the two-thirds of the population who state they have already felt the impacts, either on a personal level or via their organisations.

The significance of climate change to Northern Ireland – both in terms of our impact on climate change and the impact climate change will have on us – needs to be highlighted

Most respondents to each of the surveys felt that people have contributed to climatic change, either alone or in combination with natural processes. This indicates that resources should focus on demonstrating what the public, MLAs and decision makers can do to help reduce climate change. The impacts people in Northern Ireland have in a global capacity also need to be a focus as there is a danger that because they view climate change largely as a global issue it is easy for people to also view the solution as global.

Our impact on the destruction of the rainforests needs to be made clear, especially the role we play, through our purchasing decisions, and how we can help reduce this and ultimately climate change.

When people were asked about the global significance of climate change, most respondents cited destruction of the rainforests as the main contributing factor to climate change. The links between the destruction of the rainforests and our culpability is not evident in the survey results with many still viewing climate change as more of a global issue than one for Northern Ireland.

The energy emitted from 'alien (little green men) space craft' was thought to play a role in raising global temperatures by one member of the public. With that exception, most groups surveyed were in agreement that people, through our actions, have in some way contributed to climate change.

What level of impact is climate change going to have?

The majority of respondents in each group surveyed think climate change will have a notable impact within the next five years, and that this will increase in significance in 25 and 50 years. An increase in the notable effects of climate change will perhaps mean difficult times ahead for NI and that both the impacts and consequences of climate change can not be ignored.

Climate change will increase in the significance of its impacts over the next 5, 25 and 50 years

How do respondents think we can make a difference?

The results from the survey help reinforce the different roles and responsibilities each sector has, particularly the difference between MLAs and key decision makers within the civil service and local government. This was particularly evident when MLAs and key decision makers were asked to select their three priorities for mitigation and adaptation. MLAs tended to prioritise policies and the economy while decision makers prioritised more practical issues such as managing the impact of climate change on service delivery and in their estates.

Everyone has a role

MLAs need to set policy and lead by example

Decision makers need to provide the infrastructure and demonstrate commitment to a low carbon economy

The public, who do rate their ability to make a difference as high, need to make changes to their lifestyles

The survey demonstrates that the majority of people (the public, MLAs and key decision makers) are willing to act. It is important that we implement a strategy that takes account of the willingness of each of the groups to make changes to their lifestyles and work practices. Each group of respondents also rates their own ability to make a difference as relatively high.

Respondents displayed a high level of confidence in the ability of all sectors to play a useful role. District councils stood out as the most confident in the ability of others to play a useful role. In particular they were confident in industry, businesses and were the strongest supports of the agricultural sector to help reduce the magnitude of climate change.

The success of Northern Ireland effectively contributing to mitigating against and adapting to climate change will depend on what happens next. This survey demonstrates everyone is willing to act.

The will is there but it is essential that good communication, capacity building and practical drivers are used to help everyone participate.

Recommendations

The results of this survey were presented to members of NICCIP, key decision makers and other stakeholders at the launch of NICCIP in November 2008. The discussions generated during a number of workshops held as part of the event have helped formulate the primary recommendations arising from the survey. The recommendations will also help NICCIP formulate its plan of what it needs to do.

These workshops identified five common themes that have been developed as headline recommendations with specific actions being left to NICCIP's future action plan.

1. Planning

Long-term strategic planning should include policies, targets, commitment and action in relation to both adaptation and mitigation. This should link climate change with sustainable economic policy and involve all structures of government.

2. Co-ordination

Climate change requires a co-ordinated approach and partnerships need to be used effectively to ensure the message is clearly communicated, actions are undertaken and impact is measured. This means co-ordination of what different stakeholders are doing, inclusion of all stakeholders within any action and fragmentation of approach needs to be overcome.

3. Measurement

Quantitative and qualitative measurements of climate change impacts and actions need to be established including measures of public opinion as well as measures of the impacts which actions and policies are having on carbon emissions. The impacts and attitudes to climate change of the business sector should be included along side the sectors contained within this survey.

4. Communication

Targeted and sector specific communication mechanisms must be put in place to engage with all sectors in Northern Ireland. This requires specific communication and information dissemination to the public, MLAs, central government, local government and businesses to promote and encourage action to mitigate and adapt to climate change. It also includes promotion of what impacts actions (both positive and negative) in NI are having on a global and local scale. The use jargon should be kept to a minimum and messages should be clear, concise and consistent.

5. Action

Support packages and guidance documentation should be written to help make it easy for the public, MLAs, decision makers and other key stakeholders to make changes to help reduce Northern Ireland's contribution to climate change. Identification of the types of action which will encourage the public, MLAs, decision makers and businesses to get involved is necessary.

The Recommendations formulated from the results of this survey are vital to ensure Northern Ireland's success at effectively addressing the changing climate.

NICCIP is supported by the following organisations; DOE, DARD, SNIFFER, NILGA, DHSSPS, SDC (OFMdFM), NI WATER, Local Government, NIEL, UFU, CBI, NICVA, Fed of Small Businesses and UKCIP

This Survey was carried out by Sustainable Northern Ireland on behalf of NICCIP
Sustainable Northern Ireland
89 Loopland Drive
BELFAST
BT6 9DW

www.sustainableni.org
info@sustainableni.org
Phone: 028 9050 7850



INQUIRY INTO CLIMATE CHANGE

Evidence from
Sustainable Northern Ireland



89 Loopland Drive
BELFAST
BT6 9DW

T: 028 9050 7850
E: patricia@sustainableni.org

"There is still time to avoid the worst impact of climate change if we take strong action now"

*Sir Nicholas Stern
STERN Review: The Economics of Climate Change HM Treasury, UK
30th October 2006*

SUMMARY POINTS

- There is a large *distortion* between the (early) costs associated with addressing climate change and the (late) benefits in reducing emissions
- The Assembly should categorically state its support for an *international climate change agreement* that limits global warming to no more than 2°C above pre-industrial temperatures.
- The Executive and Assembly should urgently make commitments to *introduce a NI Climate Change Act* with legally binding regional targets to reduce our CO₂ emissions by 80% from 1990 levels by 2050.
- The Executive should set an "intermediate" *target for emissions in 2020*, a series of legally binding *five year "carbon budgets"* and an *annual carbon reduction target* at an average of at least 3% per annum.
- The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of *Northern Ireland-specific budgets and action plans* and monitoring performance against these.
- The Assembly should ensure that *all plans, programmes and policies are assessed to determine their contribution to, or impact on, achieving carbon budgets.*

- *Each government department should investigate the opportunities and obstacles to carbon reductions within their competency areas and develop and deliver an action plan to decrease the emissions in line with targets.*
- *Long-term holistic planning, setting specific NI carbon budgets and action plans, and using Climate Impact Assessments should provide a framework for adaptation resources.*
- *Actions to reduce energy consumption and emission of GHGs need to be sector specific, realistic, cost effective, measurable, time bound and proportionate.*
- *The new Sustainable Development Strategy Implementation Plan needs to include the same targets that have been signed up to by Northern Ireland.*
- *Northern Ireland needs a Minister with joint responsibility for Sustainable Development and Climate Change.*

INTRODUCTION

Sustainable Northern Ireland (SNI) is a charity established in 1997 to assist district councils, the community and voluntary sector, central government departments and non-departmental public bodies in understanding and moving towards sustainable development. SNI is a member of the Climate Change Coalition (NI) and Northern Ireland Environment Link (NIEL) and supports the comments they have submitted, but would like to further highlight some of their comments and make additional comments of our own.

SNI welcomes the opportunity to submit evidence to the Environment Committee's inquiry into climate change. Climate change is an integral element of Sustainable Development and was included as a priority area in the previous Sustainable Development Strategy (it is assumed it will also be a key feature of the revised Strategy) along with actions and targets. Climate change must be a fundamental part of any Sustainable Development Plan, and it is important that central government provides the lead that can then be replicated by the entire public sector, as well as being filtered out to influence the private sector through example and via procurement and contract requirements.

Northern Ireland has committed itself to the UK Climate Change Bill but without agreement on specific actions this has the potential to be meaningless. Northern Ireland must agree legally binding targets as well as identifying specific roles and responsibilities for each sector – the NI Assembly, central government, local government, business and communities. *Northern Ireland needs its own Climate Change Act with legally binding targets.*

SNI's comments are based primarily on the importance of addressing climate change within a long-term sustainability complex and include data from a recent survey (enclosed) undertaken by SNI on behalf of

the Northern Ireland Climate Change Impact Partnership (NICCIP). This survey showed that *92% of public respondents were willing to make changes to their lifestyles to help reduce the impacts of climate change, especially if they were provided with clear leadership from the NI Assembly.*

RESPONSE TO THE TERMS OF REFERENCE

1. To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

Global temperature depends not on the current flow of emissions but on the cumulative amount of greenhouse gases (GHGs) in the atmosphere, with emissions taking decades to have their full effect. This means that little can be done to stop the increase in temperatures and the likely impacts of climate change over the next decade. While we need to put in place measures that will allow us to adapt to the inevitable impacts of climate change within this decade, we must also use resources to mitigate against the additional long-term impacts of further GHG emissions for subsequent decades. *There is a large distortion between the (early) costs associated with addressing climate change and the (late) benefits in reducing emissions¹.*

Northern Ireland will not be able to tackle climate change alone. Given the global nature of climate change, it cannot be tackled by any individual country. At the same time it is important that we play a fair and proportionate role in line with our commitments to the UK Climate Change Act. The Assembly should be committed to playing its part in the international process and work in partnership with the UK government, the other devolved administrations and the Republic of Ireland government in developing and implementing a suitable response. *The Assembly should categorically state its support for an international climate change agreement that limits global warming to no more than 2°C above pre-industrial temperatures.*

Northern Ireland is a small country with our impact on climate change estimated at approximately 3% of UK GHG emissions. But small size of country or low amount of emissions cannot be an excuse for inaction. Northern Ireland needs to identify its 'share' based on the amount of carbon savings that should be made through its devolved policies to match savings from all developed policies in the UKCCP² on a per capita basis. This approach would provide clarification of Northern Ireland's climate change reduction commitments. It would also provide a method of benchmarking the effectiveness of the Executive's policies at delivering carbon savings against all policies across the UK, ROI and the rest of the world. *The Executive and Assembly should urgently make commitments to introduce a NI Climate Change Act with legally binding regional targets to reduce our CO₂ emissions by 80% from 1990 levels by 2050.*

¹ Jones et al, 2007, "Climate Change: Economic Impact and Policy Responses," in *World Economic Outlook*, October (Washington: International Monetary Fund), Appendix 1.1

² UK Climate Change Programme – first published in 2000 and subsequently reviewed and updated

The Northern Ireland Sustainable Development Strategy, published in May 2006, committed Northern Ireland to a reduction of 25% in GHG emissions and 30% CO₂ emissions below 1990 levels by 2025. This Strategy is now being rewritten and all targets may be removed from it. But this is not the only place that NI has committed to reducing GHG emissions. The UK has a domestic goal of reducing emissions of carbon dioxide to 20% below 1990 levels by 2010. The UK Climate Change Act has now set legally binding targets for the UK to reduce greenhouse gas emissions by at least 80% by 2050, and CO₂ emissions by at least 26% by 2020, all set against a 1990 baseline. It also requires the Government to set five year carbon budgets, in order to set out a trajectory for emissions reductions to 2050. The first three budgets will cover the periods 2008-12, 2013-17 and 2018-2022, and must be set by 1st June 2009. *The Executive should set an "intermediate" target for emissions in 2020, a series of legally binding five year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.*

Northern Ireland needs to develop a considered long-term response to climate change. If the UK and NI are to achieve an 80% reduction in carbon emissions by 2050 we will require a significant change in lifestyle and an imaginative approach to ensure these changes are recognised as opportunities rather than perceived as burdens. *The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland-specific budgets and action plans and monitoring performance against these.*

A 2008 survey³ of attitudes to climate change conducted by SNI for NICCIP included MLAs. The results of this survey showed that, of the MLAs who responded, two of the incentives they supported were climate change impact assessments for all relevant government policies and Northern Ireland's participation in the UK Climate Change Bill. *The Assembly should ensure that all plans, programmes and policies are assessed to determine their contribution to, or impact on, achieving carbon budgets.*

Adaptation is intrinsically linked to mitigation, and it is essential that both be addressed as a matter of urgency. *The Northern Ireland Assembly should put in place cross-departmental policies and measures which will allow people, infrastructure, biodiversity and natural systems to adapt to changing climatic conditions.*

An adaptation strategy to detail how human infrastructure and natural systems will be managed to help them adapt to a range of climate change scenarios should be developed. It is particularly important that climate change impacts are a strong consideration in all decisions relating to nature conservation as new ways of looking at designated sites (e.g. buffer zones, corridors, low intensity networks and landscape scale actions) will be required for wildlife to adapt to changing climatic conditions.

³ 'Climate Change: What will you do?' Northern Ireland Climate Change Impacts Partnership (NICCIP) written by Sustainable Northern Ireland, January 2009

2. To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector, etc.).

Climate change will have direct impacts in Northern Ireland. The impacts are already being felt and well thought-out planning for each sector will ensure they are better prepared to both adapt to the consequences of climate change and help to effectively mitigate against the long-term impacts.

Many sectors, in spite of a lack of leadership from Government, have already started taking steps to reduce their energy consumption and environmental footprint. It would be a reasonable comment that many sectors are in fact demonstrating more holistic and long-term strategic thinking than NI's decision makers. If the Executive continues to procrastinate over climate change rather than taking strong and decisive action it is going to weaken its reputation as a serious political body which follows behind the business sector rather than leading. *Business leaders desire a firm and fair legislative framework to provide the basis for their actions.*

Each sector must be considered separately. A blanket approach to policies and actions is unlikely to have the necessary impact. Action to help reduce climate change will have wider benefits and these need to be factored into a sector-specific route map. For example, micro-generation of energy will have wider self-sufficiency benefits and provide lower energy costs in the long term, as well as ensuring greater security of supply.

Each government department should investigate the opportunities and obstacles to carbon reductions within their competency areas and develop and deliver an action plan to decrease the emissions in line with targets. Some departments will have larger scope for action than others and climate change will have different impacts and consequences for each department.

There may be a level of uncertainty over the exact impacts of climate change on each specific sector but no sector will remain unaffected. For example, in agriculture climate change may in the short-term provide some benefits to northern hemisphere crop production by increasing yields. But this is likely to only be in the first 2°C of climate change and does not take into account that extreme weather conditions (which we are already starting to experience) could reduce or eliminate any gain. This scenario also does not take into account the negative impacts of increased ozone at ground level, increased variability of temperature and precipitation and increases in levels of weeds, pests and diseases.

Improved energy efficiency and rapid deployment of renewable energy are mentioned by the Carbon Trust, Stern, WWF, RSPB, etc as key areas to target early in the decarbonisation plans. Energy efficiency is a mechanism in which all sectors and departments can have a significant

role. Stronger legislation and enforcement from the Assembly in this area will help cut Northern Ireland's CO₂ emissions in line with targets set out in the UK Climate Change Act.

- Approximately 500,000 homes in Northern Ireland have either no loft insulation or have insulation below the recommended levels of 270mm while some 70,000 homes would benefit from cavity wall insulation. *The Assembly should set annual targets to upgrade the existing housing stock to recommended insulation levels: all new homes should be zero carbon by 2016.*
- *The Assembly should set a Strategic Energy Framework target of sourcing 15% of all our energy (electricity, transport and heat) from renewable sources by 2020 (this is the target set for the UK in the EU Climate and Energy Package) will act as the driving forces towards a low carbon society. Government will have to provide additional support such as:*
 - Ensuring that renewables are included in the design requirements for new public buildings;
 - Providing funding packages for smaller scale technologies (such as extending the Environment and Renewable Energy Fund);
 - Requiring energy companies to generate an increased percentage of their energy from renewable sources (by increasing the NIRO; the obligation in the rest of the UK is significantly higher);
 - Guaranteeing good long term prices for units of energy generated from renewable sources to encourage greater uptake of microgeneration schemes (provisions to implement a system of feed-in tariffs for small renewable energy producers by 2010 are included in the UK Energy Bill, which was given Royal Assent on 26 November 2008); and/or,
 - Introducing mandatory micro-generation, including community heating schemes. It is estimated that by 2050 micro-generation could supply 30-40% of the UK's electricity needs.

Transport was responsible for around 30% of Northern Ireland's CO₂ emissions in 2004, highlighting the need for tailored transport solutions in Northern Ireland. At the moment highway measures have been allocated 80% of the transport spend. Only by increasing the share of the budget for other transport modes (walking, cycling and public transport) will significant strides be taken towards ending this reliance. *The Assembly must increase the budget spent on creating a better public transport infrastructure for Northern Ireland. Consideration must be given to a government subsidised scheme to make non car related transport a viable alternative.*

The survey SNI undertook regarding public attitudes to climate change³ found that 92% of public respondents felt that people are at least partially responsible for climate change, 87% thought that making changes to their lifestyle will help reduce climate change and 92% of respondents stated they were willing to make changes in order to help reduce climate change.

This survey demonstrates that *the public are willing to act now to help reduce climate change and do accept some responsibility. It is important to remember in any plans developed that public acceptance and action are important prerequisites to successful implementation.* Action must include government departments, non-departmental public bodies and other stakeholders.

3. To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

Taking decisive action on climate change presents a win-win scenario. The economic costs of climate change mitigation are relatively well understood, as are the sectors and industries most likely to be affected by any mitigation policies and measures. By contrast, the economic costs of climate change impacts are not well understood – nor is how these balance with the cost of adaptation. It is essential that the economic assessment of climate change impacts are framed in the context of all the potential costs and benefits associated with climate change and our response to the situation. Once the net benefits are better understood then decisions can be made about the most appropriate combination of mitigation and adaptation measures needed in Northern Ireland. Lack of understanding on all the issues should not be used as an excuse for inaction.

Climate change and measures to respond to it have potentially significant macroeconomic effects. Government should see investment in a low carbon future as a way to stimulate the local economy. For evidence of this the Committee should look at the number of jobs created as a result of the Environment and Renewable Energy Fund (EREF) in NI. The renewable energy sector in Germany supports 170,000 people currently and it is anticipated that a further 130,000 new jobs will be created by 2020 as a result of the German government's support and promotion of renewable energy.

While action to help mitigate against and adapt to climate change may cost 1% of GDP in 2020 the cost of inaction will be much more. The SNIFFER report⁴ on the impacts of climate change on NI identified a number of direct effects, mostly negative, on human health, the economy, natural habitats and water resources. Warmer temperatures will encourage the spread of diseases and insects not currently experienced within NI. These impacts all have associated costs which will be greater than the cost of mitigation and adaptation measures.

⁴ SNIFFER "Implications of climate change for NI: Informing strategy development, 2002

Invest NI's *Maximising Business Opportunities from Sustainable Energy* recommends that Northern Ireland should focus its sustainable energy efforts on four technology areas:

- **Integrated Building Technologies** (as buildings account for around 40% of all energy usage in most countries)
- **Offshore Energy** (including wind, tidal and wave – GB backing for 7000 offshore wind turbines to generate 33GW of power at an estimated cost of £64 billion. RII has formally committed 2000 MW of offshore wind turbine generation at a cost of €4 billion over the next 5 years. £36 million spent in the UK on Marine Current Turbine research in the last 5 years (50% of the world total). £50 million spent on wave power research in the UK (90% of the world total))
- **Bioenergy** (including anaerobic digestion (AD) and biofuels from waste and sustainable sources. A DARD report estimates Northern Ireland has an AD potential of 292 MW heat + 146 MW electricity; DOE indicated 747,000 tonnes of biodegradable municipal waste was collected in 2004. A RII study indicates the potential for 1590 MW heat + 530 MW electricity in the Republic of Ireland)
- **Energy Storage** (to help smooth out fluctuations in demand, intermittent supply, and quality of supply. This developing technology is seen as being a significant factor once renewables exceed 10% of the grid supply). The current annual £21 billion global energy storage market is set to grow by 55% to £33 billion by 2012.

4. To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change/CO₂ emissions (Akin to Regulatory Impact Assessment/Rural Proofing).

Northern Ireland needs to look to the other devolved administrations for models and assessments that are already being used. It is also important that existing policies are reviewed to identify their impacts on climate change and CO₂ emissions. Assessments should be based on net GHG impact – so those that will help reduce emissions are automatically viewed more favourably than those that will increase them. *Long-term holistic planning, setting specific NI carbon budgets and action plans, and using Climate Impact Assessments should provide a framework for adaptation resources.*

5. To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

The target for reducing GHG emissions is already set and committed to by NI. We have committed to reducing our GHG emissions by 20% below 1990 levels by 2010⁵, 80% by 2050,

⁵ UK Domestic agreement a result of the Kyoto Protocol

and carbon dioxide emissions by at least 26% by 2020, all set against a 1990 baseline⁶. These are therefore the targets we should maintain and aim for and include in a Northern Ireland Climate Change Act. There is potential for assigning variable and specific targets to different sectors in order to ensure they contribute their fair share (or that this is at least included in determining who should play what part).

Actions to reduce energy consumption and emission of GHGs need to be sector specific, realistic, cost effective, measurable, time bound and proportionate. The new Sustainable Development Strategy Implementation Plan needs to include the same targets that have been signed up to by Northern Ireland. To ensure we deliver an immediate and sustained decline in NI's GHG emissions the Executive should set an 'intermediate' target for emissions in 2020, a series of legally binding five year 'carbon budgets' and an annual carbon reduction target at an average of at least 3% per annum.

The Plan needs to identify how these targets are to be met, who is responsible for measuring compliance and the percentage reductions that can be applied to each sector. The Plan also must have full accountability and scrutiny where non-compliance can have budgetary repercussions for failing departments.

6. To make recommendations on a public service agreement for the DoE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

The DOE Climate Change Unit, along with NICCIP, needs to develop a detailed analysis of how NI is adding to human induced climate change, including a breakdown of sectors, but also an analysis of different policies, levies, and carbon trading impacts to give a net GHG figure. Every department in the Executive is part of the problem and therefore must be part of the solution. The additional problem we have in NI is that with a power sharing executive there is little co-operation between departments and there is no one individual to hold departments to account for not playing their fair share. *For NI to have any impact on climate change the Executive must put in place a mandatory reduction target for each of the government departments (for their relevant sector, i.e. agriculture, business, homes, education, health, etc.) which is audited and monitored by the DOE CCU and the Committee for Climate Change and where non-compliance can have an impact on future budget allocations. Monies for each of the departments to undertake carbon reduction activities within their sector must be ring fenced.*

A public service agreement should be drafted for the DOE Climate Change Unit's role to help all government departments develop climate change Strategies that are linked to the agreed reduction targets for that sector. The legal responsibility to deliver targets set in a Northern

⁶ UK Climate Change Act

Ireland Climate Change Act and through the carbon budgets should fall collectively on the Executive. *Specific responsibilities to deliver targets set in the Climate Change Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department.*

7. To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Bill.

Northern Ireland should have its own primary legislation in relation to climate change rather than considering what secondary legislation raising powers within the UK Climate Change Act would contribute to NI's commitment. This would better enable the Northern Ireland Assembly to set its own budgets in relation to climate change and include tax raising powers to incentivise all sectors to actively contribute. This will also enable secondary legislation to be introduced to set 5-year carbon budgets and annual carbon targets (3% annual emissions reductions is a minimum) for the region. Secondary legislation under a Northern Ireland Act should be used to impose public sector duties to deliver targets and to set sectoral targets for emissions reductions.

Northern Ireland needs its own Climate Change Act with a legally binding regional target to reduce our CO₂ emissions by 80% from 1990 levels by 2050. The Executive must also set an 'intermediate' target for emissions in 2020, a series of legally binding five year 'carbon budgets' and an annual carbon reduction target at an average of 3% per annum.

8. To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

Sustainable Northern Ireland's experience of Assembly scrutiny committees is that they essentially have limited power to enact change. All power seems to lie with the Minister. Obviously in NI this creates a major problem as the Minister with responsibility for Climate Change does not believe any action to reduce atmospheric GHGs is necessary. In the UK there is a Minister dedicated to climate change. SNI has long called for a dedicated Minister for Sustainable Development. We now believe that *a Minister with joint responsibility for Sustainable Development and Climate Change would make sense* as both are cross-cutting inter-related issues for all departments so would require the same level of accountability, scrutiny and power.

Climate change is such a large, complex and pressing issue that it is imperative that when the Committee on Climate Change reports to the Executive and the Assembly that these reports are responded to and acted upon.

9. To produce a report on the findings and recommendations of the inquiry by September 2009.

Sustainable Northern Ireland is concerned that no action on climate change is going to be undertaken before September 2009 and that the length of time it takes to write legislation and implement change may make it too late for NI to play its fair share without large additional costs.

Even before the report is written and made public the Environment Committee must recommend that the Executive and Assembly urgently make commitments to introduce a Northern Ireland Climate Change Act with legally binding regional targets to reduce our CO₂ emissions by 80% from 1990 levels by 2050.

Thank you for giving us the opportunity to submit written evidence. We would be happy to meet the Committee to provide additional oral evidence. We will be following the actions the Environment Committee, the Assembly and the Executive take with great interest.



Patricia Mackey
Sustainable Development Officer
Sustainable Northern Ireland
89 Loopland Drive
BELFAST
P: 028 9050 7850
E: patricia@sustainableni.org
W: www.sustainableni.org

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Evidence to the Environment Committee Inquiry into Climate Change - NICVA

As the umbrella representative organisation for the voluntary and community sector in Northern Ireland, the Northern Ireland Council for Voluntary Action (NICVA) has over 1,000 members. Full members, of which there are 914, are independent voluntary and community organisations. NICVA also has 87 subscribers to NICVA services. These include all District Councils in Northern Ireland and some statutory bodies which have an interest in or relationship with the voluntary and community sector.

NICVA is an independent body with charitable status and is a company limited by guarantee. The organisation is owned by its members who elect the board of trustees or Executive Committee. NICVA offers comprehensive advice to member organisations on charity law, funding, finance, personnel and policy matters. With a dedicated communications team, NICVA works to ensure the sector is represented at every level, and that the voice of the sector is facilitated through the media and into the corridors of power.

NICVA works in partnership with other organisations on the issue of climate change, being a member of the NI Climate Change Coalition and the NI Climate Change Impacts Partnership. We note that in 2008 a survey conducted by Sustainable Northern Ireland found that, "92% of respondents were willing to make changes to their lifestyles, especially if encouraged to do so by strong government leadership." We call upon the Committee, the Executive and the rest of the Assembly to provide this leadership.

1.0 Initial commitments for Northern Ireland

The Assembly has accepted that the provisions of the UK Climate Act will be extended to Northern Ireland. However, the UK Act does not set specific emission reduction targets for the devolved administrations. Northern Ireland's initial commitments should include local, legally binding targets for reducing carbon dioxide emissions by 80% from 1990 levels by 2050, in keeping with the UK legislation. These targets should be contained in a Northern Ireland Act and the Assembly and Executive should clearly state support for an international climate change agreement to limit global warming to no more than 2° Celsius above pre-industrial temperatures, as the scientific consensus recommends.

1.1 The Assembly and Executive should be considering both mitigation (reducing carbon emissions and the slowing of the rate of climate change) and adaptation (preparing for the effects of the changes already happening and those confidently predicted by the available science). Work done on behalf of DOE by the Scotland and Northern Ireland Forum for Environmental Research in 2007 has identified a number of adaptation responses which Northern Ireland should be preparing. These are in the areas of biodiversity and habitats, agriculture, forestry, fisheries, water resources, coastal and flood risk management, buildings, construction and planning, business, insurance, transport, energy and health. All public sector procurement, especially the Strategic Investment Strategy should have robust adaptation components built in.

1.2 The Assembly and Executive must ensure that short-term adaptation actions do not run contrary to longer-term mitigation goals.

2.0 Necessary actions and a route map

In order to reach the long-term targets, intermediary benchmarking targets should be set. In keeping with the existing target in the Programme for Government, the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding five year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum. Immediate action is required; it is not sufficient to set long-term targets and act at the last minute as this implies more damaging carbon emissions in the short term and only exacerbates the overall problem. Current estimates are that emissions should peak no later than 2015. A short-term route map could be provided by the action plans to accompany the Sustainable Development Strategy. These plans should be focused on achieving the targets set out in a Northern Ireland Bill. The Committee on Climate Change should be involved in setting benchmarks and targets for Northern Ireland.

3.0 Costs

The Stern Review calculated that the dangers of unchecked climate change would be equivalent to at least 5% of GDP each year possibly rising to 20% of GDP or more. By contrast, the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year.

3.1 There are also potential benefits to the NI economy in embracing green jobs and technologies, especially in an economic downturn. As NICVA highlighted in its response to the last Programme for Government, the renewables sector in Germany supports 170,000 people and existing German government support measures promoting renewable energy could create 130,000 new jobs by 2020. The Carbon Trust estimates that more than 70,000 jobs could be created in the UK by investing in and developing offshore wind technology and Action Renewables estimate that almost 6,000 short term and 400 long term jobs could be sustained in Northern Ireland, exclusively by developing renewable energy within the region.

4.0 A Public Service Agreement for the Climate Change Unit

The Climate Change Unit in DOE should act as a centre of expertise across government. Its function should be to provide information and support to the other departments to help deliver the targets set in a Northern Ireland Climate Change Act and in the carbon budgets.

5.0 Secondary legislation

The Northern Ireland Executive should introduce its own primary legislation in the form of a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. Secondary legislation might usefully include a tax on plastic bags as has been introduced in other jurisdictions.

6.0 More effective scrutiny

The Environment Committee should work jointly with other committees to ensure effective scrutiny on climate change actions across all Departments. This scrutiny role could be enhanced by ensuring that the Committee on Climate Change reports to the Executive and the Assembly and that the Executive response to the reports is made in the Assembly.

For further information please contact Frances McCandless, Director of Policy
frances.mccandless@nicva.org

NILGA FINAL response to the NI

Assembly Inquiry into climate change



Introduction

NILGA, the Northern Ireland Local Government Association, is the representative body for district councils in Northern Ireland. NILGA represents and promotes the interests of local authorities and is supported by all the main political parties. Climate change is a key issue for local government due to the huge impact it can have on local communities, the economy and sustainability. NILGA is pleased to be able to have an opportunity to comment on the Assembly Environment Committee Inquiry into Climate Change and we trust that our comments will be taken into account when developing an assembly position on the matter. For further information

regarding this response, please contact Karen Smyth, Head of Policy at NILGA on (028) 9079 8972 or at k.smyth@nilga.org

Summary

Local government work on issues relating to climate change is ongoing. From our experiences and the work that has already taken place, particularly on a local government declaration on climate change, we would summarise our views as follows:

- The proposed Declaration on Climate Change to be signed by Councils has not proceeded, due to a lack of support from government, and due to a lack of resources to implement such a document within local government.
- There is an urgent need for a ministerial champion to be appointed to take the climate change issue forward working within either a climate change interdepartmental working group or a sustainable development working group.
- In the current economic crisis savings could be made throughout the population and in particular by those suffering fuel poverty, if there was a clear and coherent strategy to address this issue.
- A budget should be set aside to develop a communication strategy on climate change and sustainable development to ensure that the general public understands the issues and the necessity to take action.

Background and Targets

NILGA is aware that in January 2007, as part of an integrated climate change and energy policy, the European Commission set out proposals and options for an ambitious global agreement in its Communication "Limiting Global Climate Change to 2 degrees Celsius: The way ahead for 2020 and beyond". EU leaders endorsed this vision in March 2007. They committed the EU to cutting its greenhouse gas emissions by 30% of 1990 levels by 2020 provided other developed countries commit to making comparable reductions under a global agreement. To start transforming Europe into a highly energy-efficient, low-carbon economy, they committed to cutting emissions by at least 20% independently of what other countries decide to do.

The 30% carbon dioxide reduction target is mirrored by the UK Climate Change Bill which aims to introduce UK targets to reduce carbon dioxide emissions by at least 60 per cent by 2050 and 26-32 per cent by 2020, against a 1990 baseline. The Republic of Ireland Climate Change Strategy 2007-2012 states that under the Kyoto Protocol, the Republic of Ireland must limit the growth in emissions to 13% above the 1990 levels in the 2008- 2012 period. The strategy recognises, however, that the EU has adopted a much more challenging reduction target for 2020 and while Ireland's precise contribution within this new framework has yet to be agreed, it will require a reduction to below its 1990 emission levels.

It is the NILGA view that the targets for Northern Ireland should be proportional and appropriately related to the EU targets.

Nilga Work on Climate Change

NILGA has been at the forefront of local government work on climate change, both at a national and regional level. We ensured that councils in Northern Ireland communicated with the Local Government Climate Change Commission, whose work culminated in the production of the report "A Climate of Change" available at <http://www.lga.gov.uk/lga/aio/20631>.

NILGA has also been a key player in the Northern Ireland Climate Change Impacts Partnership, chaired by Douglas McIlldoon, from whom you will have received a separate response. As part of our work within NICCIP, NILGA has drafted a local government declaration on climate change (attached – Appendix A) which is similar to the Nottingham, Scottish and Welsh declarations, giving suggested aims, objectives and targets for local government up to 2025. This declaration is designed to be signed jointly by the Minister for Environment and the Mayors/Chairs of the 26 district councils.

NILGA Project: Achieving Sustainable Councils

Whilst developing a climate change declaration for Northern Ireland, similar to the Nottingham declaration it became apparent that the local authorities in Northern Ireland lack the capacity, technical expertise and funding to deliver adequately on the key elements such a declaration would contain. To ensure appropriate delivery of the declaration, it was identified that a comprehensive support structure would be required, providing:

- Additional capacity
- Access to technical support
- A logical sequence of steps to enable delivery
- Resourcing to stimulate action and investment in new technologies
- Networking opportunities to enable sharing of best practice
- Mechanisms for community involvement, to stimulate change at individual level.

Representatives of the subgroup widened this discussion and contacted government and council representatives in the Republic of Ireland, who identified similar issues and needs. Given that climate change is an issue 'blind' to borders, and that many of the difficulties that are likely to be experienced in the future will be similar, North and South of the border, it was agreed that a strategic local government project on climate change should be pursued on a cross-border basis, to enable greater public sector collaboration in developing a more sustainable future for the island of Ireland.

The key need identified was to improve the resource use efficiency of local government and local community groups and in doing so, reduce the carbon footprint of local councils and the communities they serve.

It was established that no resource would be forthcoming from the Republic of Ireland, UK or Northern Ireland Assembly governments to fund this work. It was also established that some work was being done on behalf of Department of Environment, Heritage and Local Government in the Republic of Ireland that could be built upon to enable local government, North and South to work towards meeting this key need.

In addition to the pure environmental issues, during the next three years, councils in Northern Ireland will be grouping together as set out in the NI Review of Public Administration policies. Each group of councils will be required to begin to work together to develop unified policy, strategy and practice, and to take on new functions such as Planning. The vital preparation time between 2009 and 2011 allowing councils to modernise, build capacity and improve service delivery for the benefit of the citizen, was viewed by the declarations sub-group as a strategic opportunity to build sustainable development principles and working into the corporate policy and practice of the new councils. The ASC project will enable the development of a collaborative approach on climate change and sustainable development issues whilst the new Northern councils are being developed, and it will also give the eligible county councils an opportunity to

forge sustainable working relationships with the new structures in the North, which will be vitally important for ongoing cross-border working.

NILGA has been unsuccessful in obtaining funding via INTERREG for this work, but the project identified provides a viable methodology for taking climate change and carbon reduction work forward within councils and communities in Northern Ireland. Our suggested project was estimated to cost almost £4m over 3 years. A summary of the proposed project is attached (Appendix B).

Other Examples of Local Government Best Practice

Two examples of how local government can be effective in tackling issues such as climate change and sustainability at a local level are:

1. The STEM Project – This project involved 9 councils and the Southern Group Environmental Health Committee working together to identify and address environmental issues, both within the councils and in businesses in each of the council areas. Each council and 284 businesses implemented an Environmental Management system, and over 10,000 employees were trained on environmental issues during the course of the project. The project was included in the Sustainable Development Strategy for Northern Ireland as an example of Best Practice and has won many awards in recognition of its success.

2. The Community Eco- Challenge Project - By helping community organisations measure and take action to reduce their ecological footprint, this project brought the issue of sustainability to the home. Having identified the benefits of this approach the Assembly Environment Committee have arranged a visit on the 12th March to see how it is operating on the ground.

Mitigation and Adaptation

NILGA is of the view that although it is completely necessary to mitigate against climate change, and has proposed the ASC project to assist in doing so; for local government and other public service delivery organisations, the main challenges will be seen to involve adaptation. NILGA would therefore particularly endorse the NICCIP comments to the Environment Committee on adaptation. Government needs to plan for change and to ensure that the citizens of Northern Ireland are adequately protected in the face of the challenges we face as a result of climate change. NILGA would recommend that the Environment Committee examine the valuable work of the UK Climate Impacts Programme in this area, and make recommendations to the Assembly to take this work into account when planning any future development.

It is vital that adaptation measures are also built into the programme for government, and that adequate resources are provided for this work. At present NILGA is of the view that emergency management, and particularly that done by local government, is under-resourced. The emergency management role of local government will grow after the reform of local government and it will be key to protecting public safety to resource this role properly.

A Climate Change Strategy for Northern Ireland

The Assembly departments will need to ensure that any future development can withstand the challenges climate change will bring, and will need to protect existing development. This will impact on each and every government department and it will be necessary to develop and implement a strategy to ensure that all policy brought forward by government is 'proofed' for climate change, mitigation and adaptation.

It has been the experience of local government that the Sustainable Development Strategy has not delivered. There has been little implementation, with sustainable development issues frequently put in the 'too hard' box. Local government is still waiting on adequate and appropriate guidance as to how it should implement the statutory duty introduced within that strategy. There is no point introducing a strategy that will not be implemented, and it will be critical to the success of any NI Climate Change Strategy to ensure that all stakeholders are aware of their responsibilities and enabled to perform these.

A review of all existing government strategies needs to take place to ensure that climate change is taken into account. For example, there is no mention of climate change in the existing waste management strategy, even though the targets expressed within it are a direct result of EU climate change policy, and the *raison d'être* of landfill diversion is the reduction of greenhouse gases.

Working across Departments

It is the experience of NILGA that government finds working on cross-cutting strategies particularly challenging. This has been amply demonstrated by the waste strategy and the sustainable development strategy. To ensure the success of such strategies, it is vital to have cross-governmental ministerial oversight. There must be ministerial pressure to perform, and an appropriate level of buy-in from officers.

We have witnessed the resolution of particularly difficult issues (such as PPS14) through joined-up Ministerial working and although this is encouraging, for issues on which there is less pressure from the electorate in an environment where constitutional politics usually takes precedence, it has been the case that implementation of particularly complex issues (such as sustainable development) have fallen by the wayside.

It will be extremely difficult to take any work on climate change forward without a ministerial 'champion'.

Funding

As evidenced by the work NILGA has done on preparing the ASC project, local government is seeking innovative ways of obtaining funding for work on climate change. It is our experience that those councils who have started along the road of monitoring energy use and reducing their carbon footprint have quickly saved large amounts of money, enabling them to pay for the officers they have employed (e.g. Ballymena Borough Council).

It is likely that with a regional governmental approach to climate change, after the quick wins that will initially be experienced, a resource will need to be made available, that is strategically targeted to those areas we need to do most work on.

Adequate and appropriate research must be done on how NI can reduce its carbon footprint and what needs to be done to implement any climate change strategy. There is a need to prioritise work, and to support our universities to develop new technologies. There is a huge economic development opportunity linked to work on renewable and sustainable technology, and no reason why NI cannot become a world leader in this area.

Sources of Information

The following sources of information were used when researching the ASC project and the Committee may find them useful.

EU Climate Change Policy

In January 2007, as part of an integrated climate change and energy policy, the European Commission set out proposals and options for an ambitious global agreement in its Communication "Limiting Global Climate Change to 2 degrees Celsius: The way ahead for 2020 and beyond"

EU leaders endorsed this vision in March 2007. They committed the EU to cutting its greenhouse gas emissions by 30% of 1990 levels by 2020 provided other developed countries commit to making comparable reductions under a global agreement. And to start transforming Europe into a highly energy-efficient, low-carbon economy, they committed to cutting emissions by at least 20% independently of what other countries decide to do.

In line with the Strategic EU Energy Review, the EU will ensure a significant reduction of greenhouse gas emissions in the EU by 2020 by:

- Improving the EU's energy efficiency by 20 % by 2020.
- Increasing the share of renewable energy to 20 % by 2020.

The need to improve resource use efficiency in all sectors of society is identified by the EC Thematic Strategy on the Sustainable Use of Natural Resources.

(available at <http://ec.europa.eu/environment/natres/>) which sets as its key objective 'to reduce the negative environmental impacts generated by the use of natural resources in a growing economy'.

Scotland and Northern Ireland Forum for Environmental Research

"Review of Climate Change Mitigation Tools for Local Authorities", available at: <http://www.sniffer.org.uk/>

The report highlighted a number of ways in which policy makers and local authorities could strengthen the development of tools to address climate change. In particular there is a need for:

Tools which clearly explain how they can help local authorities deliver specific climate change commitments;

Consistent standards and verification of local authorities used to inform local emissions' baselines;

Strengthened tools and support for local authorities' 'climate change-proofing' of strategies, plans and programmes;

More 'hand-holding' support for local authorities who are embarking on developing climate change strategies and action plans; and using tools to do so;

Opportunities and mechanisms for local authorities to share their experience in developing responses to climate change and using tools.

Sustainable Development Commission

"I will if you will - Towards sustainable consumption", available at:

<http://www.sd-commission.org.uk/publications.php>

The report stresses the need for collective action across all sectors if society is to move towards a more sustainable future. The NILGA ASC project will not focus solely on one group or collection of organisations. Through working with local councils to reduce the carbon footprint of the councils and with community groups, greater reductions in climate change impacts in the participating areas will be delivered compared to if a single area or sector was targeted.

The report stresses that 'four areas of our lives generate four-fifths of our overall impact on the environment around us: how we run our homes; the food we eat; how we get around; and how we travel on our holidays' (page 2). The carbon footprinting exercise involving local community groups will discover the areas of activity that contribute most significantly to the carbon footprints of local people in the participating areas and participants will be provided with the skills to affect behavioural changes in their own lifestyles in accordance with the outcome of the carbon footprinting.

"An Independent Review of Sustainable Development in the English Regions", available at: <http://www.sd-commission.org.uk/pages/localgovt.html>

This study emphasised that the English regions have a crucial part to play in advancing sustainable development in England as important policies are developed, decisions taken, and resources deployed in the regions. The document asserts regions should have an important role in helping to deliver the four shared priorities for UK Sustainable Development strategy:

- Sustainable Consumption and Production
- Climate Change and Energy
- Natural Resource Protection and Environmental Enhancement
- Sustainable Communities.

The study found the lack of consistent leadership at the regional level to be a major obstacle to the delivery of sustainable development in the English regions. In most regions no single body is acting as the lead advocate for delivering sustainable development principles and priorities. The ASC project will help overcome this obstacle in Northern Ireland and the 6 Republic of Ireland border councils, enabling NILGA to work as lead partner, providing leadership and facilitating the delivery of sustainable development principles throughout local councils and local community groups.

"Inspiring a Sustainable Local Future", available at: <http://www.sd-commission.org.uk/publications.php?id=364>

This report highlights a number of common barriers to effectively implementing sustainable development at a local government level. The barriers identified in the report are shown below, along with the ways in which the NILGA ASC project will overcome these barriers.

World Wildlife Fund

"The Right Climate for Change", available at:

<http://www.wwflearning.org.uk/localmatters/resources/climate-for-change,1348,AR.html>

The report highlights that transition towards a low-carbon economy requires a fundamental change in the way climate change is tackled at a local level. This change not only requires local government to minimise the impact of their service delivery on climate change but also to encourage behavioural change amongst local communities. The report highlights that the average UK local authority produces at least 30,000 tonnes of carbon dioxide per year, whilst the average council area has a carbon footprint of over 1.5 million tonnes. The ASC project will offer local councils the opportunity to fulfil their responsibility to 'get their own house in order' by providing support, training and resources to reduce the size of the council carbon footprint. The project will also undertake work with local communities to affect behaviour change and reduce the carbon footprints of communities living within the council area.

HM Treasury

"Stern Review on the economics of climate change", available at

[http://www.hm-](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_Report.cfm)

[treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_Report.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_Report.cfm)

The 2006 Stern Report highlights the economic consequences of failing to reduce the climate change impacts of our current behaviour. The review estimates the costs of climate change will be equivalent to losing 5% of global GDP each year, now and forever. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more. The worst impacts of climate change can be substantially reduced if annual emissions of greenhouse gases can be brought down to more than 80% below current levels. The ASC project will develop an evidence base of the climate change impacts of local government resource consumption, indicating where improvements in resource consumption can be made whilst maintaining optimum service delivery to all citizens.

NI Office of the First and Deputy First Minister

"First Steps Towards Sustainability; A Sustainable Development Strategy for Northern Ireland", available at: <http://www.ofmdfmi.gov.uk/sustain-develop.pdf>

In aiming to improve the efficiency of resource consumption in Northern Ireland and progress towards an environmentally sustainable future, the Northern Ireland Sustainable Development strategy sets the following objectives:

- Northern Ireland to become 85% resource efficient by 2025:
- Stabilise the Northern Ireland Ecological Footprint by 2015 and reduce it thereafter
- Reduce greenhouse gas emissions by 25% below 1990 levels by 2025
- From 2007 reduce consumption of electricity in Northern Ireland by 1% annually until 2012
- Beyond 2025, 40 % of all electricity consumed in Northern Ireland to come from indigenous renewable sources – 25% non wind.

Delivery of the ASC project's objectives will contribute to meeting each of these targets for Northern Ireland.

ROI Department of the Environment, Heritage and Local Government

"National climate change strategy 2007-2012", available at:
<http://www.environ.ie/en/publicationsdocuments/filedownload,1861,en.pdf>

Ireland, as a member state of the EU, is committed to the Kyoto Protocol and must therefore limit the growth in missions to 13% above the 1990 levels in the 2008-2012 period. Whilst Ireland's precise contribution within this new framework has yet to be agreed, it is likely to require a reduction to below the 1990 levels.

The purpose of this Strategy is twofold:

1. To show clearly the measures by which Ireland will meet its 2008-2012 commitment; and
2. To show how these measures position Ireland for the post-2012 period, and to identify the areas in which further measures are being researched and developed to enable them to meet the 2020 commitment.

The Strategy shows, sector by sector, that the range of existing and additional measures which have already been developed, will reduce Ireland's greenhouse gas emissions by over 17 million tonnes (Mt) of CO₂ equivalent in the period 2008-2012.

Sectors identified and explored in detail in this report are as follows:

1. Energy Supply
2. Transport
3. Residential
4. Industry, Commercial and Services
5. Agriculture, Land-use and Forestry
6. Waste
7. Public Sector

Local authorities are specifically mentioned in this Strategy as they can have a significant influence over emissions in their local areas, both directly through reducing emissions from their own energy use and procurement activities, in raising awareness and stimulating action in local communities, and indirectly through the exercise of their housing planning and other statutory functions.

LGA Commission on Climate Change report

A Climate of Change: Final report of the LGA Climate Change Commission

<http://www.lga.gov.uk/lga/publications/publication-display.do?id=20630>

Two key recommendations made in the LGA report which have impacted upon the structure of the ASC Project are as follows:

1. By December 2008, all councils should have signed the Nottingham Declaration and published a climate change strategy and action plan. These plans should include measurable and quantifiable milestones at 2010, 2015 and 2020.
2. All councils must undertake a climate change impact assessment of all major policy, planning and investment decisions, screening decisions to ensure that they are systematically lowering carbon emissions and ensuring that all decisions are resilient to climate change.

The ASC project requirements for councils to sign the Climate Change Declaration and develop a carbon reduction action plan are guided by these recommendations.

Welsh, Scottish and Nottingham Declarations

The Welsh Declaration on Climate Change and Energy Efficiency recognises that local authorities need to play their full part at local level, leading and delivering the Welsh response to climate change within the UK Climate Change Programme.

The declaration welcomes the opportunity for local authorities to lead the response at local level by helping encourage local residents and businesses to reduce their energy costs, reduce transport congestion, and improve the local environment and to deal with fuel poverty within communities.

Additionally, the declaration allows local authorities to make a public declaration, in line with agreed targets, to:

- Deliver a significant reduction in greenhouse gas emissions;
- Improve energy efficiency in greenhouse gas emissions; and
- Increase the use of 'green' energy from renewable sources.

The Welsh Climate Change Declaration is available at:

<http://www.wlga.gov.uk/english/meeting-documents/a-welsh-declaration-on-climate-change/>

Scotland's Climate Change Declaration is similar to the Welsh Declaration on Climate Change and is signed by each Council Leader and Chief Executive, committing to actions such as encouraging and working with others in the local community to take action to adapt to the impact of climate change, to reduce their own greenhouse gas emissions and make public their commitment to action.

The Scottish Climate Change Declaration is available at:

<http://www.sustainable-scotland.net/climatechange/>

The Nottingham Declaration also recognises the crucial role local authorities have to meet national targets for reducing emissions and adapting to climate change. By signing this Declaration, councils can show their commitment to this important issue by pledging to actively tackle climate change. So far, over 200 local authorities have signed the Declaration.

The Nottingham Climate Change Declaration is available at:
<http://www.energysavingtrust.org.uk/housingbuildings/localauthorities/NottinghamDeclaration>

Fuel Poverty

The UK Warm Homes and Energy Conservation Act 2000 placed a statutory duty on the Westminster Government to eradicate fuel poverty by 2016. This Act was adopted by the NI Assembly and Eradicating Fuel Poverty: A Strategy for Northern Ireland was produced in 2004. This strategy proposes to eliminate fuel poverty for vulnerable households by 2010 and for all households by 2016. Northern Ireland has a very high rate of fuel poverty compared with the rest of the UK and the ASC project aim of improving resource use within local community groups in Northern Ireland will contribute to lowering rates of fuel poverty in Northern Ireland.

In the Republic of Ireland, no government department adopts specific lead responsibility for coordinating actions to tackle fuel poverty. Despite the absence of an over-riding fuel poverty strategy or dedicated government unit, the fuel poverty issue is considered within a number of government documents:

- The Energy Policy Framework 2007-2010 commits to 'systematically address fuel poverty in an era of increased fuel prices'. The National Action Plan for Social Inclusion 2007-2016 is named the main instrument of delivery.
- The National Action Plan for Social Inclusion 2007-2016 emphasises proposed developments by the Department of Social and Family Affairs in respect of social welfare payments and increases in budget allocation to local authorities to improve heating in rented dwellings. Funding for the Warmer Homes Scheme and to support fuel poverty research through the work of Sustainable Energy is also proposed.

NILGA Interreg IVA Climate Change Bid Summary



NILGA has developed a Local Government Climate Change project proposal which was submitted for funding under the Interreg IVA project. The following information has been adapted from the application, however, this is a work in progress and some detail may be subject to change. We are expecting a decision on the bid in late February 2009.

Project Summary

The Achieving Sustainable Councils (ASC) project will engage the 26 district councils in Northern Ireland and 6 county councils in the Republic of Ireland in a proactive programme to improve the environmental sustainability of council services and their communities with the aim of contributing to the national and international climate change objectives and global sustainability. Councils will identify the climate change impacts of council activity and develop action plans to target for improvement the areas that will most readily enhance environmental sustainability, contributing to the long term goal of achieving carbon neutral local government in Ireland. Local communities will be engaged in capacity building and practical projects to provide citizens with the necessary resources knowledge and skills to enable behavioural change that will reduce the climate change impacts of citizens' lifestyles.

General Objectives

A joint development committee will be formed to oversee delivery of the project and ensure the input of key agencies, statutory bodies, participating councils and project funders.

As lead partner, NILGA will recruit a project manager and 12 project officers to implement the project.

Council Focused Objectives

Councils will be invited to join the project through a marketing programme highlighting the benefits of participating and the commitment required during participation. Deadlines will be given for inclusion within the project to enable delivery within the funding deadlines.

Participating councils will be required to sign up to the Local Government Declaration on Climate Change. Supporting the declaration will commit local government to work with regional and central government, to contribute at a local level, to the delivery of the National Climate Change Programmes and participate in local, regional and cross-border networks for support and sharing of best practice. This is aimed at ensuring top level management and elected member commitment to the projects aims and objectives. The declaration will also require the identification of an in-house project champion from each Council and the development of an internal delivery sub-committee chaired by a nominated elected member. At this stage the Council will be asked to adopt a climate change approach to community development functions.

The 26 district councils in Northern Ireland will participate in accordance with the Review of Public Administration Boundary groupings. Therefore the 26 district councils will form 11 groups. These 11 groupings will work collaboratively with the 6 County Councils in the Republic of Ireland towards achieving the project aim of reducing the carbon footprint of local government in Ireland.

Project officers will establish a working partnership with an in-house project champion for each of the council groupings.

Project officers will conduct baseline studies for the individual councils in each of the groupings to determine the carbon footprint of each local council and the climate change impacts caused by the delivery of council services. The baseline studies will examine:

- Electricity consumption
- Transport (including air travel)
- Fuel consumption including heating oil and gas
- Energy efficiency of council property
- Waste Quantity and disposal
- Water Usage

Each council grouping will be required to develop an action plan to target for improvement the areas of activity identified by the carbon footprint analysis where enhancements in energy efficiency will most readily lead to a reduction in the size of the council's carbon footprint. Prioritisation of options for carbon reduction will be based on project scale, carbon reduction potential, cost/payback, potential for direct control, PR potential and demonstration value.

Financial resources of £20,000 will be provided to each council to be used undertake carbon minimization activities for council activities and service delivery.

Additional projects will be run, one in each of the following areas:

- Electricity consumption
- Transport
- Fuel consumption including heating oil and gas
- Energy efficiency of council property
- Waste Quantity and disposal
- Water Usage

Calls for innovative projects in each of the above areas will be tendered by NILGA and the council groupings will be encouraged to develop project proposals and submit applications for additional resources to deliver these projects. £500,000 will be ring-fenced for resourcing innovative projects in these areas.

The project will rely heavily on opportunities to network and share best practice. Regional cluster meetings for the participating council groupings will be held quarterly and a multi-council conference on climate change and local solutions to address global problems will be held during the lifespan of the project.

Each council grouping will be required to evaluate the programme delivery and communicate a state of the environment report and progress against the action plan for each council to elected members, council committees, officers and other councils.

Community Focused Objectives

Project officers will provide training for Community Development departments across Councils, educating officers on issues relating to climate change and the opportunities for community development to address these.

A review will be undertaken identifying opportunities within existing community development plans, proposed action plans, priority areas and community networks within the area which may be engaged in programmes aimed at improving the sustainability of the wider Borough.

Community Groups will be invited to join the project through a marketing programme highlighting the benefits of participating and the commitment required during participation. Deadlines will be given for inclusion within the project to enable delivery within the funding deadlines.

Project officers will hold an event in each council grouping area for community representatives. Representatives will be given a demonstration of the carbon foot-printing tool and the benefits of assessing the community carbon footprint in order to identify key areas for improving the efficiency of energy and resource use will be communicated to participants.

Project officers will conduct the carbon foot-printing analysis for participating community groups. Groups will be assisted in developing actions to reduce the size of their community carbon footprint based on the outcome of the footprint analysis. Community groups will receive training on how they may reduce the climate change impact generated by everyday activities. Issues examined will include:

- Transport (including air travel)
- Electricity use
- Fuel use for heating
- Energy efficiency of housing
- Food consumption
- Waste production
- Purchasing

Community groups will have access to financial resources of £15,000 per council area through the project to seed fund activity programmes and stimulate change.

To facilitate sharing of experiences and best practice, regional cluster meetings for the participating community groups will be held quarterly and a multi-council conference on climate change and local solutions to address global problems will be held during the lifespan of the project.

Each community Group participating will be required to evaluate, with assistance from project officers, the effectiveness of the actions taken to reduce the size of the community's carbon footprint. The reports produced will be presented to the respective local councils.

The Draft Northern Ireland Local Government Declaration on Climate Change

We acknowledge that:

- Evidence shows that climate change is occurring.
- Climate change has begun to and will continue to have far-reaching effects on people and places, economy, society and environment in Northern Ireland and the planet as a whole.

We welcome the:

- Social, economic and environmental benefits which come from combating climate change.
- Emission reduction targets agreed by central government and the programme for delivering change, as set out in the UK Climate Change Programme.
- Opportunity for local government to lead the response at a local level, encouraging and helping local residents, local businesses and other organisations - to reduce their energy consumption, to adapt to the impacts of climate change, to improve the local environment and to help deal with fuel poverty in our communities.
- Endorsement of this declaration by the Northern Ireland Executive.

We commit our Council from this date to:

- Work with regional and central government, to contribute at a local level, to reduce greenhouse gas emissions by 25% below 1990 levels by 2025 as outlined in the Programme for Government for Northern Ireland.
- Participate in local, regional, cross-border and European networks for support and sharing of best practice.
- Within the next three years develop action plans with our partners and local communities to progressively address the causes and the impacts of climate change, according to our local priorities, securing maximum benefit for our communities.
- Publicly declare, within appropriate plans and strategies, the commitment to achieve a significant reduction of greenhouse gas emissions from our own authority's operations, especially energy sourcing and use, travel and transport, waste production and disposal and the purchasing of goods and services.
- Assess the risk associated with climate change and the implications for our services and our communities of climate change impacts and adapt accordingly.
- To educate promote and encourage all sectors in our local community to take the opportunity to adapt to the impacts of climate change, to reduce their own greenhouse gas emissions and to make public their commitment to action.
- Monitor the progress of our plans against the actions needed and publish the result.

Council acknowledges the increasing impact that climate change will have on our community during the 21st century and commits to tackling the causes and effects of a changing climate on our council area.

NIIRTA Submission to the Northern Ireland Assembly Environment Committee on their enquiry into Climate Change February 2009

The Northern Ireland Independent Retail Trade Association has over a 1000 members from the independent retail grocery and food sector in Northern Ireland who generate in excess of £1 billion turnover every year and employ over 20,000 staff.

We very much welcome the opportunity to submit evidence on this subject.

Northern Ireland is a small business economy with 98% of all business classified as 'small'. The independent retail sector is the biggest sub-sector of that economy and plays a crucial role as the backbone of the private sector. In addition, NIIRTA is also a socially responsible organisation who through its members strives for a sustainable future in terms of social, ethical and environmental factors.

Climate change is the greatest environmental challenge facing the world today (Blair, 2006). It is widely accepted that emissions of greenhouse gases, like carbon dioxide and methane, from human activities are causing global warming and a change in the earth's weather patterns. The main human influence on global climate is emissions of the key greenhouse gases - carbon dioxide (CO₂), methane and nitrous oxide. At present, just over 7 billion tonnes of CO₂ is emitted globally each year through business and consumer use of fossil fuel (DEFRA, 2009).

The commitment of business and the public sector to tackling climate change is growing in the UK (DEFRA, 2009). For example, recent research from the Friends of the Earth has highlighted the fact that independent retailers and local shops are extremely energy efficient and strive to minimise their impact on the environment (FOE, 2007).

Therefore, NIIRTA is committed in helping the UK Government and the NI Executive achieve its targets to climate change through 5 main proposals which are:

1. Publish PPS5
2. Promote local town centre shops therefore reduce car usage for shopping
3. Promote SMEs who are sourcing food locally and reducing food miles
4. Food miles should be labelled
5. Reduce packaging

1. Publish PPS5

The publication of PPS5 has many environmentally friendly benefits. The actual shops in which independent retailers trade out of have usually a small square footage as they are generally town centre locations (Independent, 2006). Owing to this, research has highlighted that independent retailers emit less carbon dioxide than larger multiple owned outlets (FOE, 2005). For example, the average greengrocer emits on average three times less carbon dioxide per square foot compared to a large multiple retailer (FOE, 2005).

Moreover, Sheffield University found that large superstores are the most energy inefficient buildings in the retail industrial sector (BBC, 2007). Therefore it can be argued that to help tackle climate change local government must revise the planning laws within Northern Ireland, as the devastation caused from out of town retailing cannot be underestimated.

2. Promote local town centre shops therefore reduce car usage for shopping

Recent work for DEFRA suggests that car use for food shopping results in costs to society of more than £3.5 billion per year, from traffic emissions, noise, accidents and congestion (DEFRA, 2005) and cars are responsible for 20 per cent of the UK's CO₂ emissions from food transport.

On the other hand, Friends of the Earth (2007) have highlighted that the average independent retail store is more likely to be visited on foot by its customers, therefore reducing car usage and in turn carbon emissions. As a result of this, it is important that Government encourages consumers to use town centre shops as this will enviably reduce car usage for shopping.

Furthermore, it must be considered that 26% of households in Northern Ireland don't have access to a car (DRDNI, 2007) hence, public transport is an important element of shopping in Northern Ireland and Government must help ensure that it meets the needs of consumers.

3. Promote SMEs who are sourcing food locally and reducing food miles

Agriculture, processing, storage of products and the way consumer's shop all have to be factored into the bigger carbon emissions picture. Most importantly, the UK is still generating higher levels of carbon dioxide emissions from transporting foodstuffs than any of the other European countries, (European Commission, 1999).

The term 'Food Miles' has been created to describe this phenomenon which refers to the distance food travels from field to plate (BBC, 2004). To paint a picture of the amount of food miles generated in the UK, it is appropriate to highlight that half the vegetables and 95 per cent of the fruit eaten in the UK comes from beyond our country (BBC, 2008). Food transport is responsible for 25 per cent of the miles travelled on UK roads (Sustainable Food, 2008).

Furthermore, Young (2004) stated that local produce generates much less carbon emissions than produce from foreign countries (e.g. food from Mexico emits 5,278 kg of CO₂ compared with only 17 kg if the food is sourced locally).

Therefore, it is imperative that local government must look at the issue of food miles within the bigger picture of climate change. It is clear that local retailers in Northern Ireland play their part in reducing food miles and sourcing food locally however, Government must encourage all retailers in Northern Ireland to follow the example of local independent retailers and source more products locally, not just food but all aspects of retail.

4. Food miles should be labelled

From the aforementioned points, another recommendation for government is to label food with the amount of food miles travelled to help consumers make an informed decision on their food. Moreover, it will also encourage retailers to source locally to meet the demands of consumers.

5. Reduce packaging

Furthermore, local retailers significantly reduce their carbon footprint by the way they pack their produce. Packaging makes up nearly a quarter of household waste, and 70 per cent of it is food related (INCPEN, 2001). In contrast, buying fruit and vegetables from independent shops can produce an estimated 75% less waste in terms of packaging and food waste (Soil Association, 2003).

For instance a independent grocery retailer's fresh produce is often sold loose therefore cutting down on the amount of packaging used. In addition, research has emphasised that a higher proportion of their packaging is recyclable (LGA). Government must ensure that all retailers in Northern Ireland follow the same example set by independent retailers and cut down on packaging and plastic bags to ensure an environmentally friendly retail landscape.

Conclusion

From the aforementioned points, it is clear that independent retailers in Northern Ireland are significantly contributing to the fight against climate change. However, there is no debate that more needs to be done from all dimensions of society.

Therefore it is vital that PPS5 be produced immediately to stop the influx of out of town retailing so that shops are located in town centres thus becoming more environmentally friendly.

Finally, Government must think strategically about climate change. Independent retailers must be commended for their contribution to ecologically aware practices and used as an example of good practice across the board.

Glyn Roberts
Chief Executive
Northern Ireland Independent Retail Trade Association
261-263 Ormeau Road
Belfast BT7 3GG

Tel: 028 90220004
Mob: 07515 710517
Email: glyn.roberts@niirta.com
www.niirta.com

Northern Ireland Electricity

WGD/jes.

Mr Alex McGarel
Clerk to the Committee for the Environment
Northern Ireland Assembly
Environment Committee Office (Room 245)
Parliament Buildings
Stormont
BELFAST
BT4 3XX.

20 February 2009.

Dear Alex

Northern Ireland Assembly Environment Committee Inquiry into Climate Change

NIE welcomes this opportunity to participate in the Committee's "Inquiry into Climate Change".

As the owner of the electricity network (the transmission and distribution system) and the operator of the distribution system in Northern Ireland, NIE is aware that its activities are very relevant to the debate on climate change.

Regarding the Inquiry's terms of reference, we consider that they will need to ensure that a fully interlinked approach is taken, both within the energy sector itself and across each sector of the Northern Ireland economy.

In regard to the electricity sector, the Committee should ensure that it involves all key stakeholders, including the generators and suppliers of electricity in Northern Ireland. Also, it will be important to obtain the views of the Utility Regulator having regard to its role in sustainable development (the subject of a public consultation in 2008).

NIE's transmission and distribution business impacts on each of the sectors that are mentioned in the Committee's terms of reference. For example the development of a new housing site will require detailed guidance from the Planning Service, and will have both long and short term impacts on energy requirements, construction and subsequent maintenance, transport, land use, and waste management. It is not surprising, given the many issues that arise, that conflicting requirements emerge frequently. Therefore, it is critical that statutory tools are established,

through bodies such as the Planning Service, which ensure that these conflicting requirements can be resolved satisfactorily.

We would appreciate any guidance that could be provided by the Department at this stage on the preliminary approach that will be employed in addressing the issues outlined in the terms of reference for this inquiry.

Yours sincerely

Gareth Hughes

Environment Officer, Northern Ireland Electricity plc

L 090220 Inquiry into Climate Change (NIA)

Northern Ireland Environmental Link



Environment Committee

Inquiry into Climate Change

Comments by

Northern Ireland Environment Link

20 February 2009

Northern Ireland Environment Link (NIEL) is the networking and forum body for non-statutory organisations concerned with the environment of Northern Ireland. Its 53 Full Members represent over 90,000 individuals, 262 subsidiary groups, have an annual turnover of £70 million and manage over 314,000 acres of land. Members are involved in environmental issues of all types and at all levels from the local community to the global environment.

These comments are agreed by Members, but some members may be providing independent comments as well. If you would like to discuss these comments we would be delighted to do so.

Prof Sue Christie, Director

Northern Ireland Environment Link

89 Loopland Drive

Belfast, BT6 9DW

P: 028 9045 5770

E: Sue@nienvironmentlink.org

W: www.nienvironmentlink.org

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1. Summary Points

1.1 NIEL believes that written submissions should be considered as initial thoughts which can be added to and developed throughout the inquiry. NIEL requests the opportunity to speak directly with the Committee and would also be happy to facilitate a meeting/seminar involving NIEL members and the Committee.

1.2 The Northern Ireland Assembly should categorically state its support for an international climate change agreement to limit global warming to no more than 2° Celsius above pre-industrial temperatures.

1.3 The UK Act does not set specific, legally binding emissions reduction targets for the devolved administrations. The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act setting a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050.

1.4 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas the Executive should set an "intermediate" target for emissions in 2020 (42% below 1990 levels), a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

1.5 The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting and monitoring of Northern Ireland specific budgets and action plans.

1.6 The energy (efficiency and renewable) and transport sectors should be targeted for initial emissions reductions.

1.7 All plans, programmes and policies should be assessed to determine their contribution to or impact on achieving carbon budgets.

1.8 Each government department should investigate the opportunities and obstacles to carbon reductions within their competency areas and develop departmental and sectoral action plans to achieve reduction targets.

1.9 The Public Sector procurement budget should be used as a tool to deliver significant emissions reductions.

1.10 Government should invest in emissions reductions and low carbon infrastructure now; the Stern Review concludes this is the economically prudent path to follow.

1.11 The legal responsibility to deliver the targets set in a Northern Ireland Climate Change Act, and through the carbon budgets, should fall collectively on the Executive.

1.12 Specific responsibilities to deliver the targets set in the Climate Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department.

1.13 The Environment Committee should share responsibility for scrutinising progress towards achieving the targets in the Act and within budgets with all other departments.

2. Introduction

2.1 Northern Ireland Environment Link is a member of the Climate Change Coalition Northern Ireland (CCC NI). NIEL supports the CCC NI submission.

2.2 NIEL welcomes the Environment Committee's decision to conduct an Inquiry into Climate Change. Climate change is an issue that must be addressed urgently at the local, regional, national and international levels.

2.3 The Committee is right to focus its Inquiry at identifying how Northern Ireland can play its part in tackling climate change. The scientific and economic rationales for addressing human impact on climate change is well established and widely accepted.

2.4 The Intergovernmental Panel on Climate Change (IPCC), a group containing over 2500 scientists, reported in 2007 that 'warming of the climate is unequivocal' and that 'most of the observed increase in temperature is very likely (90%) due to human activity'. The findings of the IPCC are also supported by the Academies of Science of the 11 largest countries in the world, including the Royal Society of London.

2.5 The Stern Review calculated that the dangers of unabated climate change would be equivalent to at least 5% of GDP each year. However, when more recent scientific evidence is included in the models, the Review estimates that the dangers could be equivalent to 20% of GDP or more. In contrast, the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year. The central message is that reducing emissions today will make us better off in the future: one model predicts benefits of up to \$2.5 trillion each year if the world shifts to a low carbon path.

2.6 The people of Northern Ireland are asking for leadership from the Assembly. A survey conducted in 2008 by Sustainable Northern Ireland for the Northern Ireland Climate Change Impacts Programme revealed that, "92% of respondents were willing to make changes to their lifestyles, especially if encouraged to do so by strong government leadership." The Committee should provide this leadership.

2.7 There is a great deal of expertise on climate change available in Northern Ireland and many groups are willing to play their part in facilitating moves towards a low carbon economy. The Committee should engage widely and openly.

2.8 The call for submissions allowed interested parties only a short response time. NIEL understands the urgency for action and commend the Committee in its efforts to publish its findings quickly. Therefore, NIEL believes that written submissions should be considered as initial thoughts which can be added to and developed throughout the inquiry.

2.9 NIEL would welcome the opportunity to make an oral presentation to the Committee Inquiry.

3. Submission of Evidence

3.1. To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

3.1.1 Climate change must be addressed urgently at the local, regional, national and international levels.

3.1.2 The Assembly should ensure that its voice is heard at the national and international level. It should categorically state its support for an international climate change agreement to limit global warming to no more than 2° Celsius above pre-industrial temperatures (most scientists accept that 'dangerous climate change' is much more likely above this temperature increase).

3.1.3 To limit global temperature rise to no more than 2°C the IPCC suggests that atmospheric carbon dioxide levels should be limited to a maximum of 450 parts per million.

3.1.4 As carbon dioxide persists in the atmosphere for many years, the determinant of the severity of climate change is total cumulative emissions by 2050. The Tyndall Centre has estimated that global carbon emissions need to peak by 2015 and then decrease by up to 6.5% each year if atmospheric CO₂ levels are to stabilise at 450ppm.

3.1.5 Industrialised countries have an historical responsibility for causing climate change and as a matter of fairness and justice should bear the leading responsibility for tackling the problem, both by reducing their emissions and by assisting developing countries to adapt to the changes that are already occurring.

3.1.6 Professor James Hansen, Director of NASA's Goddard Institute, has calculated that the UK has contributed the most greenhouse gas emissions to the atmosphere of any country in the world when historical emissions are totalled.

3.1.7 The Committee on Climate Change recommended, and the UK Government has accepted that a reduction of 80% by 2050 - based on 1990 emissions levels - would be an "appropriate" UK contribution to global aims to cut emissions by 50%.

3.1.8 The Assembly has accepted that the provisions of the UK Climate Act will be extended to Northern Ireland. However, the UK Act does not set specific emission reduction targets for the devolved administrations.

3.1.9 Northern Ireland's per capita emissions of 12.83 tonnes per annum compares badly with the UK average of 10.48 tonnes, the global average of 4 tonnes and the global fair share of 1.65 tonnes.

3.1.10 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

3.1.11 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum. Combining indicative annual milestones with the legal framework of the budget periods should offer flexibility without compromising longer term targets.

3.1.12 The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting and monitoring of Northern Ireland specific budgets and action plans. The Committee on Climate Change's reports on progress and action plans should be delivered to the Assembly and responded to by the Executive.

3.1.13 The Committee on Climate Change should help ensure co-ordination of emissions reduction efforts across the UK. Carbon emissions in Northern Ireland and the Republic of Ireland are closely interlinked. Therefore, provisions to enable joint achievement of emissions reduction goals should be made.

3.1.14 All plans, programmes and policies should be assessed (Climate Impact Assessments) to determine their contribution to or impact on achieving carbon budgets.

3.1.15 Adaptation is intrinsically linked to mitigation, and it is essential that both be addressed as a matter of urgency. The Northern Ireland Assembly should introduce cross-departmental policies and measures which will allow people, infrastructure, biodiversity and natural systems to adapt to changing climatic conditions.

3.1.16 An adaptation strategy to detail how human infrastructure and natural systems will be managed to help them adapt to a range of climate change scenarios should be developed. It is particularly important that climate change impacts are a strong consideration in all decisions relating to nature conservation and archaeological sites. New ways of looking at designated sites (e.g. buffer zones, corridors, low intensity networks and landscape scale actions) will be required for wildlife to adapt to changing climatic conditions. Archaeological sites which may be affected by the impacts of climate change should be assessed and managed accordingly.

3.2. To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

3.2.1 The Committee on Climate Change's statutory duty to Northern Ireland includes:

To provide advice on the sectors of the economy in which there are particular opportunities for contributions to be made towards meeting the budgets through reductions in emissions.

3.2.2 The Committee on Climate Change's first report was released in December 2008. It includes an analysis of what opportunities exist for making emission reductions in Northern Ireland. It states Northern Ireland could contribute emissions reductions of over 2MtCO₂e (Million tonnes of carbon dioxide equivalent) per year in 2020:

- Emissions from buildings and industry could be reduced by up to 1 MTCO₂ in 2020 by using energy more efficiently;
- More efficient vehicles and new transport fuels could deliver reductions of up to 1 MTCO₂ in 2020;
- Emissions from agriculture, land use and forestry and waste management sectors could be reduced by up to 0.5 MtCO₂e in 2020.

3.2.3 The actions outlined above do not go far enough to keep Northern Ireland on target to achieve an 80% emissions reduction target. The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans.

3.2.4 Each government department should investigate the opportunities for and obstacles to carbon reductions within their areas of responsibility.

3.2.5 The Public Sector procurement budget should be used as a tool to deliver significant emissions reductions.

3.2.6 Improved energy efficiency and rapid deployment of renewable energy are mentioned by the Carbon Trust, Stern, WWF, RSPB, etc as key areas to target early in the decarbonisation plans.

3.2.7 Approximately 500,000 homes in Northern Ireland have either no loft insulation or have insulation below the recommended levels of 270mm while some 70,000 homes would benefit from cavity wall insulation. The Assembly should set annual targets to upgrade the existing housing stock to recommended insulation levels: all new homes should be zero carbon by 2016.

3.2.8 A Strategic Energy Framework target of sourcing 15% of all our energy (electricity, transport and heat) from renewable sources by 2020 (this is the target set for the UK in the EU Climate and Energy Package) will act as the driving forces towards a low carbon society.

3.2.9 To achieve the energy target it is estimated over 40% of electricity would have to be produced from renewable sources and renewable sources would also have to provide a significant source (5-10%) of energy for heating purposes. It is estimated that by 2050 micro-generation could supply 30-40% of the UK's electricity needs. Government will have to provide additional support to renewable technologies to achieve the 15% target. This may include:

- investing in large scale projects, facilitating large projects (NIEL welcomes the recent announcement to undertake a Strategic Environmental Assessment of offshore energy generation in Northern Ireland);
- ensuring that renewables are included in the design requirements for all new public buildings;
- providing funding packages for smaller scale technologies (such as extending the Environment and Renewable Energy Fund);
- requiring energy companies to generate an increased percentage of their energy from renewable sources (by increasing the NIRO; the obligation in the rest of the UK is significantly higher);
- by guaranteeing good long term prices for units of energy generated from renewable sources to encourage greater uptake of microgeneration schemes (provisions to implement a system of feed-in tariffs for small renewable energy producers by 2010 are included in the UK Energy Bill, which was given Royal Assent on 26 November 2008); and/or,
- introduce mandatory micro-generation, including community heating schemes.

3.2.10 Transport was responsible for around 30% of Northern Ireland's CO2 emissions in 2004, highlighting the need for tailored transport solutions in Northern Ireland. At the moment highway measures have been allocated 80% of the transport spend. Only by increasing the share of the budget for other transport modes (walking, cycling and public transport) will significant strides be taken towards ending this reliance.

3.2.11 Spatial and land-use planners have a key role to play in delivering a low-carbon economy and a resilient environment and society. Planners should only make decisions after they have

considered how the development will contribute to mitigation efforts and whether the site and design is appropriate given the predicted impacts of climate change in Northern Ireland.

3.3. To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

3.3.1 The Stern Review calculated that the dangers of unabated climate change would be equivalent to at least 5% of GDP each year. However, when more recent scientific evidence is included in the models, the Review estimates that the dangers could be equivalent to 20% of GDP or more. In contrast, the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year. The central message is that reducing emissions today will make us better off in the future: one model predicts benefits of up to \$2.5 trillion each year if the world shifts to a low carbon path.

3.3.2 The significant emissions reductions proposed for the UK in the Committee on Climate Change's first report can be achieved without harming the economy and at a cost less than 1% of GDP in 2020. In other words, an economy that might grow by 30% in the period to 2020 would instead grow by 29%. The Committee on Climate Change advises that this is a price worth paying, given the long-term costs of inaction on climate change.

3.3.3 The All Island Grid Study suggested that 42% of power generation could come from renewable sources in 2020 without a debilitating increase in cost (7%) compared to continuing with our current energy mix. The cost differential will lessen as fossil fuel prices increase.

3.3.4 The renewable sector in Germany supports 170,000 people and existing German government support measures promoting renewable energy could create 130,000 new jobs by 2020 according to the German environment ministry.

3.3.5 The Prime Minister stated that the overall added value of the low carbon energy sector by 2050 could be as high as \$3 trillion per year worldwide and that it could employ more than 25 million people.

3.3.6 The Carbon Trust estimates that more than 70,000 jobs could be created in the UK by investing in and developing offshore wind technology.

3.3.7 Government should see investment in a low carbon future as a way to stimulate the local economy (as President Obama has in the USA). The move to renewable fuels may help develop industries that will provide economic opportunities and jobs. Given the huge potential that exists around our shores for wind power there are sound economic and environmental reasons for ensuring that a significant proportion of these jobs are developed in Northern Ireland.

3.3.8 Action Renewables estimate that almost 6,000 short term and 400 long term jobs could be sustained in Northern Ireland, exclusively by developing renewable energy within the region.

3.3.9 Invest NI's Maximising Business Opportunities from Sustainable Energy recommends that Northern Ireland should focus its sustainable energy efforts on four technology areas:

- Integrated Building Technologies (as buildings account for around 40% of all energy usage in most countries)
- Offshore Energy (including wind, tidal and wave – GB backing for 7000 offshore wind turbines to generate 33GW of power at an estimated cost of £64 billion. RoI has formally committed 2000 MW of offshore wind turbine generation at a cost of €4 billion over the next 5 years. £36 million spent in the UK on Marine Current Turbine research in the last

5 years [50% of the world total]. £50 million spent on wave power research in the UK [90% of the world total])

- Bioenergy (including anaerobic digestion [AD] and biofuels from waste and sustainable sources. A DARD report estimates Northern Ireland has an AD potential of 292 MW heat + 146 MW electricity; DOE indicated 747,000 tonnes of biodegradable municipal waste was collected in 2004. A Republic of Ireland study indicates the potential for 1590 MW heat + 530 MW electricity in the Republic of Ireland)
- Energy Storage (to help smooth out fluctuations in demand, intermittent supply, and quality of supply. This developing technology is seen as being a significant factor once renewables exceed 10% of the grid supply). The current annual £21 billion global energy storage market is set to grow by 55% to £33 billion by 2012.

3.3.10 NIEL believes that there are strong moral imperatives for Northern Ireland to contribute its fair share of global emissions cuts in order to combat global climate change. Hundreds of millions of people across the globe could lose their lives and livelihoods, up to a third of land-based species may become extinct, immense political instability will occur as people migrate to avoid droughts and floods and compete for scarce resources, and great economic damage will be caused by increasingly extreme weather.

3.3.11 Climate change is one of the biggest threats to development: it could undo decades of progress in fighting poverty and compromise the achievement of the Millennium Development Goals (MDGs) which aim to reduce poverty and promote sustainable development by 2015.

3.3.12 The SNIFFER report on the impacts of climate change on Northern Ireland identified a number of direct effects, mostly negative, on human health, the economy, natural habitats and water resources, for example, the extent of flood risk to existing settlements remains unquantified compared with the situation in Great Britain.

3.3.13 Northern Ireland's Chief Medical Officer Michael McBride has said,

"Current predictions on climate change suggest greater long-term impacts on health than any current public health priority. To preserve health in a changing climate, we need to modify and strengthen the systems we have to adapt to the likely future impacts of global warming. We must tackle this issue on all fronts, reducing our contribution to the problem and responding to the effects of climate change is a shared international responsibility."

3.4. To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO₂ emissions. (Akin to Regulatory Impact Assessments/Rural Proofing)

3.4.1 NIEL believes that long term plans, supported by a strong legislative framework, are the best way to promote efficiency and innovation in policy and technology design and thus the best mechanism to minimise costs.

3.4.2 The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans: sharing this resource with the rest of the UK should help minimise costs.

3.4.3 All plans, programmes and policies should be assessed using Climate Impact Assessments to determine their contribution to or impact on achieving carbon budgets. The process should be akin to equality screening and should be initiated at the start of policy design to maximise outcomes and minimise costs.

3.5. To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

3.5.1 The key climate targets that the SD Strategy should deliver are those identified in a Northern Ireland Climate Act, carbon budgets and annual targets.

3.5.2 The SD Strategy should also help deliver the recommendations on how to achieve emissions reductions put forward by the Committee on Climate Change.

3.5.3 The SD Strategy could play an important role in helping to inform and empower individuals to take action to tackle climate change.

3.6. To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

3.6.1 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change.

3.6.2 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an "intermediate" target for emissions in 2020, a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

3.6.3 The legal responsibility to deliver the targets set in a Northern Ireland Climate Change Act, and through the carbon budgets, should fall collectively on the Executive.

3.6.4 Specific responsibilities to deliver the targets set in the Climate Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department. Departments should prepare action plans on how they intend to deliver their reduction targets.

3.6.5 Sharing responsibility to meet targets across the Executive and departments is the only way to ensure that all parts of government play their part in delivering the targets.

3.6.6 A public service agreement should be drafted for the Department of the Environment which would include a commitment to provide information and support to the other departments to help deliver the targets set in a Northern Ireland Climate Change Act and in the carbon budgets.

3.7. To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Bill.

3.7.1 NIEL believes that the secondary legislation in the UK Bill should not be the basis of Northern Ireland's climate change regulation. Instead, Northern Ireland should introduce its own primary legislation.

3.7.2 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050.

3.7.3 The introduction of primary legislation in Northern Ireland will enable secondary legislation to be introduced to set 5-year carbon budgets and annual carbon targets (3% annual emissions reductions is a minimum) for the region.

3.7.4 Secondary legislation under a Northern Ireland Act should be used to impose public sector duties to deliver targets and to set sectoral targets for emissions reductions.

3.7.5 The role of the Committee on Climate Change should also be set and amended via secondary legislation.

3.7.6 The UK Act enables targets to be reviewed and amended but the 2020 and 2050 targets should only be amended based on the best available scientific advice.

3.8. To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

3.8.1 The Environment Committee should scrutinise progress towards achieving the targets in the Act and within budgets. The Minister should be asked to explain progress and outline plans to achieve the targets to the Committee

3.8.2 The ability of the Committees and the Assembly as a whole to scrutinise progress will be greatly enhanced by ensuring the Committee on Climate Change report to the Executive and the Assembly and that the Executive respond to their reports in the Assembly.

3.9. To produce a report on the findings and recommendations of the inquiry by September 2009.

3.9.1 The longer Northern Ireland delays significant and decisive action on climate change, the larger the task will become. Stern has concluded that early action makes economic sense. The greatest opportunities for job creation and market share in emerging technologies will also be delivered by responding early to the challenges we know we face. Therefore, the Committee should use its influence to encourage action now. Waiting until September to recommend that Northern Ireland should act on climate change, is only delaying the inevitable.

3.9.2 New multinational climate agreements being developed by the United Nations (the post Kyoto climate agreement should be finalised in Copenhagen in December 2009) and the European Union (the Energy and Climate Package was endorsed by the European Parliament in December 2008) will require the United Kingdom and ultimately Northern Ireland to significantly reduce emissions. Attempts to delay action on climate change will only make achieving the new responsibilities more difficult and costly.

Queen's University Belfast Climate Change Working Group

An inter-disciplinary collaborative group working between the QUESTOR Centre and the Centre for Sustainability and Environmental Governance

Comments to the Department of the Environment in Northern Ireland (DoENI), as per their request, concerning the Review of the UK Climate Change Programme Consultation Paper, with particular emphasis on the role of Devolved Administrations

Submitted on: 25 February 2005

Co-ordinator and Correspondent for the Working Group:

Dr. John Barry, Acting Director of the Institute of Governance, Public Policy and Social Research and Co-Director, Centre for Sustainability and Environmental Governance, Queen's University Belfast, 63 University Road, Belfast, BT 7 1PA, Northern Ireland Office: 0044 (0) 2890 972549 / Direct: 0044 (0) 2890 972546 / Fax: 0044 (0) 2890 972551 Email: j.barry@qub.ac.uk / Web: www.governance.qub.ac.uk

Members of the Working Group:

Dr John Barry (Institute of Governance, Public Policy and Social Research; and Centre for Sustainability and Environmental Governance); Dr William Beattie (Electrical and Electronic Engineering; Electric Power and Energy Systems; SNIFFER); Dr Nicholas L Betts (School of Geography; SNIFFER); Dr Sumon Bhaumik (School of Management and Economics); Mr Thomas Crawford (School of Geography); Dr Vivienne Crawford (School of Medicine; SNIFFER); Ms Katharine N Farrell (Institute of Governance, Public Policy and Social Research); Dr David Favis-Mortlock (School of Geography, SNIFFER); Mrs Claire Griffin (The QUESTOR Centre); Dr David Hughes (School of Civil Engineering; SNIFFER); Professor Bob Kalin (Professor in Environmental Engineering, School of Civil Engineering; SNIFFER); Dr Jim McAdam (School of Agriculture and Food Science; SNIFFER); Professor Ian Montgomery (Biology and Biochemistry; SNIFFER); Professor Julian Orford (School of Geography; SNIFFER); Dr Paula J. Reimer (School of Archaeology and Palaeoecology); Dr Dai Roberts (Biology and Biochemistry; SNIFFER); Mr Suresh Rohilla (School of Geography); Dr Alastair Ruffell (School of Geography; SNIFFER); Professor Bernie J Smith (School of Geography; SNIFFER); Dr Jude Stephens (Gibson Institute for Land, Food and the Environment; SNIFFER); Mr John Stewart (School of Computer Science); Dr Roy Tomlinson (School of Geography; SNIFFER); Professor Sharon Turner (School of Law); Mr Christopher Tweed (School of Architecture; SNIFFER); Professor Brian Whalley (School of Geography; SNIFFER)

General Comments on the Consultation Document

1. It is the general consensus of the Working Group that most of the questions raised in this consultation document are addressed in their most current form in the SNIFFER report of 2002, prepared by an interdisciplinary team of QUB researchers, in collaboration with researchers in Scotland and Wales (electronic copies of the full report can be found at: <http://boris.qub.ac.uk/sniffer/index.html> / you will find the report as a pdf, choose the link marked 'Final report') were highly relevant). The objectives of this study were to investigate — in broad terms — the likely impacts of climate change on the environment, economy, and natural resources of Northern Ireland; and to assess levels of awareness of climate change, to consider the possibilities of adapting to climate change and to assess policies for mitigating emission of greenhouse gases. Publications were reviewed and organisations and individuals (stakeholders) from the public and private sectors were interviewed. The scenarios of climate change published in 1998 for the UK Climate Impacts Programme were the primary source of information on possible future climates. These were used to guide discussion with stakeholders. The purpose of the SNIFFER research was to provide a baseline reference on the Northern Ireland situation and to identify data gaps and requirements for further research. While some further research has taken place (mainly with regard to building codes) the QUB CC-WG is disappointed to report that most of the identified data gaps remain.

2. The overwhelming view of the Climate Change Working Group is that there is a data deficiency in Northern Ireland on the points of interest to the DoENI and that the relevant data deficiencies are well documented in the SNIFFER report (see comment 1 above). We do not have the sufficient Northern Ireland data to provide comments on many of the questions specified

throughout the consultation document. The Working Group recommends to the DoENI that if they wish to have information on the status of these indicators and/or to measure the intensities of the Climate Change related pollution and impacts, then the DoENI should fund the research that is required to compile these data.

3. Research on Climate Change cannot take place within a single department. It is a highly complex and problem with aspects requiring the attention of research from a broad range of departments, where combining and collaborating across different viewpoint, can create substantial challenges to researcher. The SNIFFER research was conducted with great enthusiasm by a broad inter-disciplinary group of researchers and serves as an excellent example of successful inter-disciplinary research on a research problem that could not possibly be addressed within any one discipline. However, there remain points of conflict between different perspectives on the Climate Change problem, even within the Working Group (in the comments below you there are points of ambiguity, reflecting ongoing debates within the CC-WG). It is the view of the QUB CC-WG that similar follow-up inter-disciplinary research will require targeted financial support for cross-departmental co-operation if it is to produce competitive research and results. The CC-WG also note that this research, which would ideally take place in co-operation with the Devolved Northern Ireland Administration, is an excellent opportunity for the University to further extend its Industrial Collaboration research activities.

Comments on Devolved Administration Questions 52 and 53

Q52: What more can devolved administrations contribute to UK climate change objectives?

The relationship between sustainable development and environmental governance is crucial in the case of achieving reduction of CO₂ emissions and the shift to a low carbon economy. The devolved administrations should be devising new, novel and bespoke policies and strategies to ensure environmental governance is a driver for innovation and for meeting targets. Devolved administrations could be encouraged or mandated to develop and disseminate 'good practice' in devising policies aimed at both a) reducing CO₂ emissions and b) developing an economic case for the opportunities in the transition to a low carbon technology. Here, the Scottish executive has much to offer by way of examples and Wales to a lesser extent.

The devolved administrations ought to be encouraged to experiment and try out novel ways of working with various stakeholders, the public etc. to develop carbon reducing policies. In particular, given the small scale of Northern Ireland as a region of the UK, government here in NI should be able to communicate and relate to the public and other stakeholders, business in particular. For example: NI also is unique in the size of its public sector, which while financially/fiscally unsustainable (as heralded in the forthcoming Review of Public Administration), does offer the advantage of giving the public sector here an opportunity to take a lead on devising policy, procurement strategies in energy, building, goods and services. Innovative procurement policies could create markets for renewable energy and other carbon reducing economic opportunities (local food supplies to local hospitals and schools for example).

In terms of mediating impacts, devolved administrations should seek to make a positive contribution, as some of the potential changes could be very regional: for example, in NI it is predicted that there will be a clear east / west split in terms of the impact on agriculture. Farming is more important here than in Great Britain, therefore, by taking region specific actions, the NI devolved administration can make a greater ameliorative impact here than might be required elsewhere in the UK.

However, apart from delivering on emission targets, supporting innovation and best practice in the region and identifying any impacts unique to the region and what might be done by way of mitigation, devolved administrations can do little with respect to national and more importantly global issues. If world/national government fails to assess the scale of the problem correctly and to do anything constructive, no region acting in isolation will have any effect.

To the extent that all parts of the European Union (EU) will have to adhere to European norms and all parts of the UK will have to adhere to terms agreed by treaty, devolution per se does not add new targets and obligations. However, if compliance mechanisms are soft (meaning that the regulations are adopted through best practice rather than being required by law), regions that are economically backward (by EU standards) will be able to bargain for more time and flexibility in achieving compliance with the norms. Under these conditions, devolution endows NI with institutions able to lobby on behalf of the special needs and circumstances of local farmers, businesses etc. This could improve the quality of NI implementation and so in this respect, making the case for special conditions of NI is one more thing that devolved administrations can contribute.

The devolved administrations could fund research specific to the NI region to fill data gaps relating to the special NI situation and could support the targeting of UK level funding toward this research, which is highly region specific and therefore not necessarily supported by other funding resources.

~ One case in point example of data gaps and the need for further research...

For the last 10 years, Dr R Tomlinson and Mrs M Cruickshank (RT & MC) have contributed to the programme of the Global Atmosphere Division of DEFRA, based at the Centre for Ecology and Hydrology, Edinburgh, which provides annual estimates of changes in carbon (C) stocks due to Land Use, Land-use Change and Forestry (LULUCF) for the United Kingdom. RT & MC have submitted the estimates for NI see, e.g.:

<http://www.edinburgh.ceh.ac.uk/ukcarbon/reports.htm>. However, these estimates have limitations; in particular relating changes in soil C stocks (Mt C) to changes in land use. There is insufficient local data on soil C density (t C/ha) under different cover types, and of the rate of change of soil C density consequent on land use change. There is a need for field studies of paired soil samples under different land cover types, and ideally for paired samples with a known history of land use.

Current estimates of soil C stocks in NI, suggest that c50% is held by peat and peaty soils, but those estimates (Cruickshank et al. 1998) are based on available data on extents of peats of different depths; these data are insufficient. There is a requirement for more field investigation of the extent of peats of different depths. The estimates are also based on peat C densities derived from studies in GB; there is a requirement for local data on peat C densities, given the apparent importance of peat as a C store in NI and the extent and nature of peatlands in NI. Such local data should include the effect of changes in land cover on peat; for example reclamation for agriculture or planting to forests.

Estimates for changes in biomass C stocks due to LULUCF similarly are limited by a lack of local data on biomass C densities, including models for forest C densities as well as for agricultural land cover types and peat cover types.

In summary, best estimates of soil and biomass C stocks and changes have been made for NI, but there is an urgent need for the devolved administration to support research that will yield local data that can be used in the estimates - with a view to suggesting land use practices and

changes that might provide sinks for atmospheric C in Northern Ireland and mitigate against our annual losses of C to the atmosphere.

Reference: M M Cruickshank, R W Tomlinson, P M Devine and R Milne. Carbon in the vegetation and soils of Northern Ireland. Biology and Environment: Proc. Roy. Irish Academy 98B, 9-21 (1998).

Q53: Should the devolved administrations have their own targets for measuring progress in delivering greenhouse gas emissions reductions and, if so, what form should these take?

Yes, devolved administrations should have targets that take into account national and global objectives. Conditions in NI are sufficiently different from other regions of the UK that local targets can be expected to improve implementation and reduce negative side-effects.

For progress to be made on reducing greenhouse gas emissions ambitious but realistic targets need to be set for devolved regions. For example, a recent report from the National Environmental Technology Centre (NETCEN) for DEFRA gives the greenhouse gas emission trends for England, Scotland, Wales and Northern Ireland. It stated that Northern Ireland's overall emissions of greenhouse gases, those responsible for global warming, were 1.9 per cent higher in 2002 than in 1990. This compares to an 18 per cent decrease in England, a 5.6 per cent decrease in Scotland and an 8.6 per cent decrease in Wales in the same period. Similarly, our Carbon Dioxide (CO₂) emissions (N.B. CO₂ accounts for more than 80 per cent of the emissions that contribute to climate change) were 3.0 per cent higher in 2002 than in 1990. This compares with an overall UK decrease of 8.7 per cent with reductions of 10.8 per cent in England, 5.9 per cent in Wales and 3.2 per cent in Scotland.

According to the NETCEN report, road transport accounted for 31 per cent of Northern Ireland's CO₂ emissions in 2002, overtaking energy production as the single largest contributor. This contrasts sharply with the rest of the UK, where energy production is the largest single source of CO₂ emissions. Northern Ireland's over reliance on private transport and our poor public transport infrastructure shoulder a large part of the blame for our disappointing record.

In order to monitor progress toward local targets NI would need to compile region specific data and these data would help measure regional progress and also could be used to communicate with the public and various stakeholders.

This being said, it should also be noted that recent modelling data and scientific publications suggest that we are well past the niceties of pandering to regional or indeed national sensitivities in taking action. The level of inaction nationally and internationally is extremely alarming, whilst the level of inactivity regionally is only to be expected.

Devolved administrations targets:

- can be more ambitious than the national government would have. For example, on the agricultural front, specific policies can enhance Carbon uptake and stabilisation. Forestry planting targets should be made available;
- might have a common currency e.g. Carbon emissions and might reflect environmental and socio-economic criteria unique to the region;
- could take a form similar to 'eco-footprinting' / mass balance that is identifying the 'CO₂ footprint' of Northern Ireland as a region of the UK or as part of the Island of Ireland (given that from the point of view of EU environmental directives, the Island as a whole

is treated as one 'eco-region'). Some work on this has already been done both in the SNIFFER report (2001) and 'Northern Limits' (2003). One of the advantages of the eco-footprinting method is its usefulness as part of a communication/consultation strategy, which is of course one of the main issues in addressing reducing CO2 emissions;

- could take the form of local procurement strategies, complementing programs aimed at creating innovation and advancing state-of-the art best practice in the region

Dissenting Opinion:

If NI has to adhere to pan-European norms, why would regional government have its own targets? Would not any NI government's role be to monitor how adherence to the norms would affect other aspects of the NI population, e.g., how profitability of the businesses is affected, how the transportation system is affected etc.

Queen's University Belfast



Queen's University Belfast submission to the Northern Ireland Assembly's Environment Committee Inquiry into Climate Change

Co-ordinated and compiled by Dr. John Barry, Assistant Director, Institute for a Sustainable World^[1]

Introduction

The scientific case for the significance of anthropogenic emissions in climate change is now proven beyond doubt. There is no scientific debate about the reality or anthropogenic climate change –with the Intergovernmental Panel on Climate Change presenting the most authoritative science on the matter. What debate there is should be about how we as societies and a species adapt to inevitable climate change while also at the same time seek to mitigate the causes of that change. If CO2 and methane emissions are not curbed and radically reduced, global temperatures will continue to rise faster than at any time in world history. Even if we take effective action now, global temperatures will continue to rise for many decades. The effect of global warming seems to be such that global warming is accelerated e.g. loss of rainforest, melting of permafrost, and decline in area of ice cap, acidification of seawater. Climatic change involves other challenges including a greater frequency of severe weather conditions and more extremes. These factors influence many areas of human endeavour and interest from our food supply to shelter, from health to wealth creation. Climate change interacts with many other environmental challenges e.g. habitat loss, invasive species, eutrophication, such as to exacerbate their impacts locally, nationally and throughout the world.

One cannot separate climate change policy from energy policy in general and the 'managed retreat' from fossil fuel based heating, transport and electricity production. Climate change must therefore be explicitly and consistently linked to low-carbon energy proposals and strategies.

The point at which science delivered incontrovertible evidence of climatic change and its impact was in the late 1990s. Sceptics tend to have vested interests or are self publicists and lack any credibility in the wider scientific community. Their arguments usually relate to time scales far in excess of the rate of change recorded over the last 30 years. Governments and people have done little of any importance in addressing the problem since the 1990s. They are now distracted by economic issues at least for the short term. Globally, environmental problems will increase during this period.

As scientists we are used to being cautious and not extrapolating our results. As people we do think about the future. The scales are human - 10s of years or a few 100s. The future looks bleak. Governments seem incapable of grasping the magnitude of the challenge and the short period we have left to offset the worst of the impacts of climate change. We have reached and gone beyond the 'tipping' point and our only hope of avoiding the worst impacts of climatic change is to reduce greenhouse gases in the face of rising temperatures in the hope that the 'tipping' point can be passed. We know we can get ever hotter. We don't know if this can be reversed. The 21st century looks like an increasingly unpleasant world with the failure of global and regional political structures, resource wars and major human catastrophes.

Northern Ireland is a small part of a medium sized but highly developed, democratic country in world terms and together with the Republic of Ireland is an island ecological entity. We should expect to be involved in taking a lead in combating climatic change and adapting to the challenges ahead. We must contribute to meeting and exceeding all targets for carbon reduction and getting involved in adaptation measures. It cannot be an issue that we leave to others. Similarly it is an issue that people cannot leave to their governments. A politician who does not accept his or her responsibility to deal with the most significant of problems facing all people is a like a health minister denying the existence of lung cancer and the influence of cigarette smoking.

Science has delivered the answer to the initial questions about whether the global climate is changing and what are the root causes of this change. Science also provided the solutions but delays in taking action and the speed of change are such that we are no longer sure these will work, or work in the most effective manner. Hence, the emphasis now is on a technological fix. This may prove an 'opportunity' even here in Northern Ireland. However, there is not a single technological fix that is affordable, risk free and environmentally sustainable and doubt even more it is an opportunity for Northern Ireland. Rapid changes in our approach to food production, energy generation, transport, built environment and so on could overall make a difference and would offer sustainable employment within Northern Ireland. Climate change is not only as Lord Stern pointed out, 'the greatest market failure in history' but also one that provides the opportunity for economies to decarbonise and for those willing to lead to take 'first mover advantage' in investing now in renewable, low-carbon technologies and sectors, and encouraging the uptake of low carbon lifestyles so as to be 'fit for purpose' for the inevitable transition to a low-carbon future in a climate changed world.

1. Summary Points

1. The Northern Ireland Environment Committee, Executive and Assembly should categorically state its support for an international climate change agreement to limit global warming to no more than 2° Celsius above pre-industrial temperatures.

2. The UK Act does not set specific, legally binding emissions reduction targets for the devolved administrations. The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act setting a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050, in line with the UK Climate Change Act and targets agreed by the Scottish Executive and the Irish government.

3. To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas the Executive should set an "intermediate" target for emissions in 2020 (42% below 1990 levels), a series of legally binding 5 year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.
4. The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting and monitoring of Northern Ireland specific budgets and action plans.
5. Serious consideration should be given to creating a new Department of Climate Change and Energy following the UK government's lead, amalgamating elements from the DETI, DoE and DRD.
6. The energy (efficiency and renewable), housing and transport sectors should be targeted for initial emissions reductions.
7. All plans, programmes and policies should be assessed to determine their contribution to or impact on achieving demanding carbon budgets.
8. Each government department should investigate the opportunities and obstacles to carbon reductions within their competency areas and develop departmental and sectoral action plans to achieve reduction targets.
9. The Public Sector procurement budget should be used as a tool to deliver significant emissions reductions as well as support emerging markets for low-carbon energy technologies and encourage low-carbon lifestyle changes.
10. As far as possible solutions to climate change should also be linked to the decarbonisation of the economy, the managed transition to a low carbon economy and the creation of a new green economy with employment, investment and wealth creation opportunities.
11. Government should invest in emissions reductions and low carbon infrastructure now; the Stern Review concludes this is the economically prudent path to follow.
12. The legal responsibility to deliver the targets set in a Northern Ireland Climate Change Act, and through carbon budgets, should fall collectively on the Executive.
13. Specific responsibilities to deliver the targets set in the Climate Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department.
14. The Environment Committee should share responsibility for scrutinising progress towards achieving the targets in the Act and within budgets with all other departments.
15. There is an opportunity for the Committee to consider political innovations in terms of mobilising citizens in Northern Ireland not only to 'do their bit' in adopting less carbon-intensive lifestyles but also by exploring innovative forms of 'sustainability citizenship' to mobilise and enthuse communities and citizens to take part in decarbonising the NI economy.
16. There is a pressing need for the Assembly and Executive to demonstrate leadership on this issue, to help prepare Northern Ireland citizens for the inevitable transition to a low carbon future.

Inquiry's Terms of Reference

1. To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

1.1 The Assembly should categorically state its support for an international climate change agreement to limit global warming to no more than 2° Celsius above pre-industrial temperatures because most scientists accept that 'dangerous climate change' is much more likely above this temperature increase.

1.2 To limit global temperature rise to no more than 2°C the IPCC suggests that atmospheric carbon dioxide concentrations should be limited to a maximum of 450 parts per million.

1.3 The Assembly has accepted that the provisions of the UK Climate Act will be extended to Northern Ireland. However, the UK Act does not set specific emission reduction targets for the devolved administrations.

1.4 Northern Ireland's per capita emissions of 12.83 tonnes per annum compares badly with the UK average of 10.48 tonnes, the global average of 4 tonnes and the global fair share of 1.65 tonnes. Northern Ireland has a higher Carbon Footprint than Scotland and Wales, and only the South-East region of England is higher and NI is the only region in the UK in which CO₂ emissions are increasing.

1.5 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid 'dangerous climate change'.

1.6 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an 'intermediate' target for emissions in 2020, a series of legally binding 5 year 'carbon budgets' and an annual carbon reduction target at an average of at least 3% per annum. Combining indicative annual milestones with the legal framework of the budget periods should offer flexibility without compromising longer term targets.

1.7 The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting and monitoring of Northern Ireland specific budgets and action plans. The Committee on Climate Change's reports on progress and action plans should be delivered to the Assembly and responded to by the Executive.

1.8 The Committee on Climate Change should help ensure co-ordination of emissions reduction efforts across the UK. Carbon emissions in Northern Ireland and the Republic of Ireland are closely interlinked and provision should be made to enable joint achievement of emissions reduction goals.

1.9 Adaptation is intrinsically linked to mitigation, and it is essential that both be addressed as a matter of urgency. The Northern Ireland Assembly should introduce cross-departmental policies and measures which will allow people, infrastructure, biodiversity and natural systems to adapt to changing climatic conditions.

1.10 An adaptation strategy to detail how human infrastructure and natural systems will be managed to help them adapt to a range of climate change scenarios should be developed. It is particularly important that climate change impacts are a strong consideration in all decisions relating to nature conservation and archaeological sites. New ways of looking at designated sites (e.g. buffer zones, corridors, low intensity networks and landscape scale actions) will be required

for wildlife to adapt to changing climatic conditions. Archaeological sites which may be affected by the impacts of climate change should be assessed and managed accordingly.

2. To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

2.1 The Committee on Climate Change's statutory duty to Northern Ireland includes:

To provide advice on the sectors of the economy in which there are particular opportunities for contributions to be made towards meeting the budgets through reductions in emissions.

2.2 The Committee on Climate Change's first report was released in December 2008. It includes an analysis of the opportunities that exist for making emission reductions in Northern Ireland. It states, "Northern Ireland could contribute emissions reductions of over 2MtCO₂e (Million tonnes of carbon dioxide equivalent) per year in 2020:

- Emissions from buildings and industry could be reduced by up to 1 MTCO₂ in 2020 by using energy more efficiently;
- More efficient vehicles and new transport fuels could deliver reductions of up to 1 MTCO₂ in 2020;
- Emissions from agriculture, land use and forestry and waste management sectors could be reduced by up to 0.5 MtCO₂e in 2020."

2.3 The actions outlined above are not adequate to keep Northern Ireland on target to achieve an 80% emissions reduction target. The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans.

2.4 Each government department should investigate the opportunities for carbon reductions within their areas of responsibility.

2.5 The government can lead by example by introducing systems and efficiencies which they would like the public and industry to follow, including greater use of public transport and other non-car based transportation or the use and encouragement of new technologies such as video-conferencing to reduce travel or working at home initiatives.

2.6 The Public Sector procurement budget should be used as a tool to deliver significant emissions reductions.

2.7 Approximately 500,000 homes in Northern Ireland have either no loft insulation or have insulation below the recommended levels of 270mm while some 70,000 homes would benefit from cavity wall insulation. The Assembly should set annual targets to upgrade the existing housing stock to recommended insulation levels. All new homes should be zero carbon by 2016.

2.8 A Strategic Energy Framework target of sourcing 15% of all our energy (electricity, transport and heat) from renewable sources by 2020 (the target set for the UK in the EU Climate and Energy Package) will act as the driving forces towards a low carbon society.

2.9 To achieve the energy target it is estimated over 40% of electricity would have to be produced from renewable sources and renewable sources would also have to provide a significant source (5-10%) of energy for heating purposes. It is estimated that by 2050 micro-

generation could supply 30-40% of the UK's electricity needs. Government will have to provide additional support to renewable technologies to achieve the 15% target. This may include:

- investing in large scale projects;
- ensuring that renewables are included in the design requirements for all new public buildings;
- providing funding packages for smaller scale technologies such as extending the Environment and Renewable Energy Fund;
- requiring energy companies to generate an increased percentage of their energy from renewable sources by increasing the NIRO - the obligation in the rest of the UK is significantly higher;
- by guaranteeing good long term prices for units of energy generated from renewable sources to encourage greater uptake of microgeneration schemes (provisions to implement a system of feed-in tariffs for small renewable energy producers by 2010 are included in the UK Energy Bill, which was given Royal Assent on 26 November 2008); and/or,
- introducing mandatory micro-generation, including district heating schemes.

2.10 Transport was responsible for around 30% of Northern Ireland's CO₂ emissions in 2004, highlighting the need for tailored transport solutions in Northern Ireland. At present, highway measures have been allocated 80% of the transport spend. Only by increasing the share of the budget for other transport modes (walking, cycling and public transport) will significant strides be taken towards ending this reliance.

2.11 Spatial and land-use planners have a key role to play in delivering a low-carbon economy and a resilient environment and society. Planners should make decisions only after they have considered how the development will contribute to mitigation efforts and whether the site and design are appropriate given the predicted impacts of climate change in Northern Ireland.

2.12 Support for local start up businesses to provide the services needed for larger and deeper engagement with the energy question. For example more grants to homeowners for PV systems and other renewable energy technologies, and more support for companies to install these. Support for the training needed for installation personnel and maintenance personnel.

2.13 Medium to long term initiatives to the universities and industry to develop next generation solutions, appropriate to the infrastructure, economic strategy and climate in NI.

3. To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

3.1 The Stern Review calculated that the dangers of unabated climate change would be equivalent to at least 5% of GDP each year. However, when more recent scientific evidence is included in the models, the Review estimates that the dangers could be equivalent to 20% of GDP or more. In contrast, the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year. The central message is that reducing emissions today will make us better off in the future. One model predicts benefits of up to \$2.5 trillion each year if the world shifts to a low carbon path.

3.1.1 Lord Stern in a recent London School of Economics report has stipulated that government needs to commit to at least a 20% investment of any fiscal stimulus packages to decarbonise the

economy and support the green/environmental goods and services sector, especially supporting renewable energy innovation and mass market penetration.

3.2 The significant emissions reductions proposed for the UK in the Committee on Climate Change's first report can be achieved without harming the economy and at a cost less than 1% of GDP in 2020. In other words, an economy that might grow by 30% in the period to 2020 would instead grow by 29%. The Committee on Climate Change advises that this is a price worth paying, given the long-term costs of inaction on climate change.

3.3 The All Island Grid Study suggested that 42% of power generation could come from renewable sources in 2020 without a debilitating increase in cost (7%) compared to continuing with our current energy mix. The cost differential will lessen as fossil fuel prices increase.

3.4 The renewable sector in Germany supports 170,000 people and existing German government support measures promoting renewable energy could create 130,000 new jobs by 2020 according to the German environment ministry.

3.5 The Prime Minister stated that the overall added value of the low carbon energy sector by 2050 could be as high as \$3 trillion per year worldwide and that it could employ more than 25 million people.

3.6 The Carbon Trust estimates that more than 70,000 jobs could be created in the UK by investing in and developing offshore wind technology, while the Prime Minister stated that 160,000 jobs will be created in the UK in the renewable energy sector over the next decade and 20,000 in the energy efficiency sector alone.

3.7 Government should see investment in a low carbon future as a way to stimulate the local economy (as President Obama has in the USA). The move to renewable fuels may help develop industries that will provide economic opportunities and jobs. Given the huge potential that exists around our shores for wind power there are sound economic and environmental reasons for ensuring that a significant proportion of these jobs are developed in Northern Ireland.

3.8 Action Renewables estimate that almost 6,000 short term and 400 long term jobs could be sustained in Northern Ireland, exclusively by developing renewable energy within the region.

3.9 Invest NI's Maximising Business Opportunities from Sustainable Energy recommends that Northern Ireland should focus its sustainable energy efforts on four technology areas:

- Integrated Building Technologies (as buildings account for around 40% of all energy usage in most countries)
- Offshore Energy (including wind, tidal and wave – GB backing for 7000 offshore wind turbines to generate 33GW of power at an estimated cost of £64 billion. RoI has formally committed 2000 MW of offshore wind turbine generation at a cost of €4 billion over the next 5 years. £36 million spent in the UK on Marine Current Turbine research in the last 5 years [50% of the world total]. £50 million spent on wave power research in the UK [90% of the world total])
- Bioenergy (including anaerobic digestion [AD] and biofuels from waste and sustainable sources. A DARD report estimates Northern Ireland has an AD potential of 292 MW heat + 146 MW electricity; DOE indicated 747,000 tonnes of biodegradable municipal waste was collected in 2004. A Republic of Ireland study indicates the potential for 1590 MW heat + 530 MW electricity in the Republic of Ireland)

- Energy Storage (to help smooth out fluctuations in demand, intermittent supply, and quality of supply. This developing technology is seen as being a significant factor once renewables exceed 10% of the grid supply). The current annual £21 billion global energy storage market is set to grow by 55% to £33 billion by 2012.

3.10 Climate change is one of the biggest threats to development: it could undo decades of progress in fighting poverty and compromise the achievement of the Millennium Development Goals (MDGs) which aim to reduce poverty and promote sustainable development by 2015.

3.11 The SNIFFER report on the impacts of climate change on Northern Ireland identified a number of direct effects, mostly negative, on human health, the economy, natural habitats and water resources, for example, the extent of flood risk to existing settlements remains unquantified compared with the situation in Great Britain.

3.12 The SNIFFER report identified some of adaptation mechanisms and changes needed in key sectors – transport (reducing Northern Ireland's dependence on car-based mobility), housing (insulating our extremely energy inefficient housing stock), and electricity (our vulnerability to foreign sources of fossil fuel, especially natural gas).

3.13 In the transport sector urgent action is need to encourage a 'modal shift' away from car-based mobility towards other forms of mobility. The rough base-line is that 80% of journeys in NI is car-based according to a 2006 DRD Roads Service Northern Ireland Travel Survey 2003-2005. Achieving the modal shift targets in the Regional Transportation Strategy would make significant carbon savings.

3.14 Northern Ireland's Chief Medical Officer Michael McBride has said,

"Current predictions on climate change suggest greater long-term impacts on health than any current public health priority. To preserve health in a changing climate, we need to modify and strengthen the systems we have to adapt to the likely future impacts of global warming. We must tackle this issue on all fronts, reducing our contribution to the problem and responding to the effects of climate change is a shared international responsibility."

3.15 As the OECD's Ministerial Environment Policy Committee it late last year: "Removing subsidies to carbon-intensive technologies, pricing pollution and creating a "level playing field" is also important to enable low carbon alternatives to compete fairly in the market, and to find ways of helping these technologies to move quickly into the market-place". Removing these perverse subsidies could provide the necessary incentive as well as potential sources of funding to provide the investment for a strategy towards a low-carbon, green economy in NI.

3.16 Results from the 2008 Northern Limits: Footpaths to Sustainability report, approximately 80% of the Carbon Footprint of Northern Ireland residents relate to three policy areas: namely housing, transport and energy.

3.17 In the agriculture/agri-food sector lower carbon footprint production methods based on less use of chemical fertilisers will also deliver win-wins by reducing diffuse agricultural pollution contributing to compliance with the Nitrates Directive and reduction of eutrophication pressure as required under the Water Framework Directive.

3.18 The universities and some companies have capability to carry out costing, but it must be whole life costs and must be based on clearly agreed system boundaries. These are very easy to fudge depending on the point of view taken – costs can be pushed from one sector to another giving a false impression. Although some previous studies have identified costs these are often

aggregated over a large system, for example UK or EU and not necessarily what is needed for the NI region.

4. To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO2 emissions. (Akin to Regulatory Impact Assessments/Rural Proofing)

4.1 The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland specific budgets and action plans. Sharing this resource with the rest of the UK would help minimise costs.

4.2 All plans, programmes and policies should be assessed using Climate Impact Assessments to determine their contribution to or impact on achieving carbon budgets. The process should be akin to equality screening and should be initiated at the start of policy design to maximise outcomes and minimise costs.

4.3 All plans, strategies and policies should be assessed also using 'materials flow analysis' methodology as employed and demonstrated in Northern Limits: Footpaths to Sustainability research project which looked at sustainability policy scenarios for Northern Ireland. Key here is the use of assessment tools, decision-making and scenario-building policy tools which use physical and not just monetary evaluations and metrics.

4.4. As the Northern Limits report put it

Northern Ireland needs a fit-for-purpose environmental-socio-economic framework for policy development underpinned by a robust evidence base to enable the management of the transition to a low carbon economy. To achieve this resource and carbon accounting needs to be fully integrated with 'traditional' economic planning. Northern Ireland needs a framework which allows the forecasts for investment and economic development to be integrated with a backcasting process which sets out how this economic development can be decoupled from increasing resource use and carbon emissions. Namely, an integrated economic and environmental accounting framework which allows budget forecasts for investment to be made in conjunction with year-on-year carbon reduction budgets.

5. To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

What is needed are:

1. A definition of the northern Ireland energy system to a detailed level
2. Models accurately reflecting the behaviour of elements.
3. A roadmap of technology developments needed
4. A roadmap of the business developments needed to fulfill the new energy efficient economy.
5. A targeted and generous system of incentives to encourage developments

We need to do this like the Republic of Ireland did with its road building programmes. Investment at a fundamental level and an open system of opportunities. If the government can

put the business 'road network' in place then business will use it, and bring the new technology to people at a more cost effective level and uptake will improve.

5.1 The key climate targets that the SD Strategy should deliver are those identified in a Northern Ireland Climate Act, carbon budgets and annual targets. The targets are annual 3% reduction in CO₂ and 80% reduction by 2050. However, demanding intermediate targets with implementation strategies and regular monitoring against progress updates are needed for 5 year periods 2015, 2020, 2025 etc.

5.2 The SD Strategy and Implementation Plan should also help deliver the recommendations on how to achieve emissions reductions put forward by the Committee on Climate Change.

5.3 The SD Strategy and Implementation Plan could play an important role in helping to inform and empower individuals to take action to tackle climate change.

5.4 The Northern Ireland Vision Study found that a step change in improving the building regulations from 2012 to demand zero emission buildings will achieve most of the required reduction in the Carbon Footprint, demolition rates of older and energy-inefficient buildings will have to increase or more householders will need to be motivated and incentivised to use renewable energy from before 2012.

6. To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

6.1 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050. This is the minimum requirement that will be necessary to play our part in the global attempt to avoid dangerous climate change. However, we also require transparent and achievable interim targets set at 5 year intervals.

6.2 To ensure we achieve an immediate and sustained decline in Northern Ireland's greenhouse gas emissions the Executive should set an 'intermediate' target for emissions in 2015, a series of legally binding 5 year 'carbon budgets' and an annual carbon reduction target at an average of at least 3% per annum.

6.3 The legal responsibility to deliver the targets set in a Northern Ireland Climate Change Act, and through the carbon budgets, should fall collectively on the Executive.

6.4 Specific responsibilities to deliver the targets set in the Climate Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department. Departments should prepare action plans on how they intend to deliver their reduction targets.

6.5 Sharing responsibility to meet targets across the Executive and departments is the only way to ensure that all parts of government play their part in delivering the targets.

6.6 A public service agreement should be drafted for the Department of the Environment which would include a commitment to provide information and support to the other departments to help deliver the targets set in a Northern Ireland Climate Change Act and in the carbon budgets.

6.7 The second Programme for Government should explicitly put climate change, the decarbonising of the economy and sustainable development at its heart and have an implementation and investment strategy to achieve those objectives.

7. To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Bill.

7.1 The Executive and Assembly should urgently make commitments to introduce a Northern Ireland Climate Change Act with a legally binding regional target to reduce our carbon dioxide emissions by 80% from 1990 levels by 2050.

7.2 The introduction of primary legislation in Northern Ireland will enable secondary legislation to be introduced to set 5-year carbon budgets and annual carbon targets (3% annual emissions reductions is a minimum) for the region.

7.3 Secondary legislation under a Northern Ireland Act should be used to impose public sector duties to deliver targets and to set sectoral targets for emissions reductions.

7.4 The role of the Committee on Climate Change should also be set and amended via secondary legislation.

7.5 The UK Act enables targets to be reviewed and amended but the 2020 and 2050 targets should only be amended based on the best available scientific advice.

7.6 The Assembly should introduce secondary legislation where appropriate to enable carbon reduction targets to be met through requiring and enabling post-RPA Local Councils to contribute.

8. To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

8.1 The Environment Committee should scrutinise progress towards achieving the targets in the Act and within budgets. The Minister should be asked to explain progress and outline plans to achieve the targets to the Committee

8.2 The ability of the Committees and the Assembly as a whole to scrutinise progress will be greatly enhanced by ensuring the Committee on Climate Change report to the Executive and the Assembly and that the Executive respond to their reports in the Assembly.

9. To produce a report on the findings and recommendations of the inquiry by September 2009.

9.1 The longer Northern Ireland delays significant and decisive action on climate change, the larger the task will become. Stern has concluded that early action makes economic sense. The greatest opportunities for job creation and market share in emerging technologies will also be delivered by responding early to the challenges we know we face. Therefore, the Committee should use its influence to encourage action now. Waiting until September to recommend that Northern Ireland should act on climate change, is only delaying the inevitable.

9.2 New multinational climate agreements being developed by the United Nations (the post Kyoto climate agreement should be finalised in Copenhagen in December 2009) and the European Union (the Energy and Climate Package was endorsed by the European Parliament in December 2008) will require the United Kingdom and ultimately Northern Ireland to significantly reduce emissions. Attempts to delay action on climate change will only make achieving the new responsibilities more difficult and costly.

9.3 The Committee's Inquiry should be used as an opportunity to consolidate, integrate and where appropriate update existing climate change research on Northern Ireland. The 2005 Carbon Trust Northern Ireland Vision Study, for example, examined the prospects for reducing carbon emissions in five key sectors of the Northern Ireland economy and developed a set of scenarios and a model of Northern Ireland's energy balance. The main conclusion of this work was that it was possible to realise a 60% reduction in Northern Ireland carbon emissions by 2050, if early action was taken to:

- Ensure that all sectors of the economy adopt a sustainable approach to energy use.
- Encourage the development of low carbon lifestyles.
- Support the development of low carbon technologies, products and services.
- Invest in energy efficiency and renewable energy programmes.

Other Carbon Trust research in NI has demonstrated that a maximum of 15% reduction in CO₂ emissions from housing can be achieved through behavioural change such as turning down the thermostat by 1°C and ensuring that appliances are not left on stand-by. Other research demonstrates that adopting a less carbon-intensive food diet (eating less red meat Dr Rajendra Pachauri, chair of the IPCC has recommended, or eating at home more and adopting a more vegetarian-based diet as the Northern Limits research found). These behavioural changes strategy should be linked to the point above about linking CO₂ reduction strategies to mobilising and empowering 'sustainability citizens'.

UK-wide research such as the UK Foresight Programme Scenarios should also be used by the Committee to inform its deliberations.

Concluding Comments

If progress is to be made in moving towards achieving significant CO₂ emissions reduction and the transition to a low carbon economy and low carbon lifestyle then it is vital to know what the relative impact of production and consumption activities are. In the same way that all actions to reduce footprints are not equal, such as replacing incandescent light bulbs compared to travelling less, the impact of consumption activities are not equal. Transport and domestic energy use have the highest impact per pound spent.

The Committee should also take the 'rebound effect' of any putative policy initiatives into account. Rebound effects occur because efficiency improvements make certain activities cheaper compared to others but can undermine the overall strategy of meeting CO₂ targets. If financial benefits gained from lower fuel bills as a result of reducing energy consumption are then spent on high impact activities such as holidays then the CO₂ reduction benefits will be lost.

In Northern Ireland, tackling climate change requires 'buy in' from all major stakeholders – businesses, trades unions, the Northern Ireland Assembly, Executive and civil society. But such is the scale of the 'triple crunch' – economic, climate and energy insecurity – that we are facing; it is conceivable that such a coalition could be created and Government should be leading not following on this issue. In Northern Ireland tackling climate change and decarbonising our

economy offers a way to harness the abundant renewable energy sources we have, link universities and energy companies, provide skills and training for the creation of a new and growing 'green collar' economy. To reduce carbon dramatically will require skills ranging from energy analysis, design and production of hi-tech renewable alternatives, large-scale engineering projects such as combined heat and power and offshore wind, through to work in making every building 'energy tight', and fitting more efficient energy systems in homes, offices and factories.

The scale of the challenges we face cannot be underestimated but then neither can the potential benefits. The most timely and targeted measures include those that promote smart energy-efficient public buildings and homes, and switching to cleaner types of transport, such as light-rail systems in cities such as Belfast.

However, tackling climate change in Northern Ireland or elsewhere should not simply be about spending public money. It is important that fiscal measures that are not explicitly 'green' do not make achieving climate change goals more difficult by subsidising greenhouse gas emissions or 'locking in' high-carbon infrastructure for decades to come. Hence, dealing with climate change should also include removing subsidies and other fiscal or financial incentives from forms of near-term infrastructural investment or technological innovation which maintains the unsustainable and therefore ultimately uneconomic 'business as usual' high-carbon energy economy.

Governments around the world are spending hundreds of billions attempting to stabilise the global economy. Tackling climate change, using Stern's recent analysis, requires that at least 20% of the stimulus packages that are now being developed should be targeted towards, not maintaining and sustaining the old economy of the twentieth century, but investing in the new economy of the twenty-first century. Northern Ireland is uniquely placed, not least in terms of its abundant renewable (especially wind and marine) energy resources, and with political, business, union and environmental leadership and partnership become a 'green economy' leader.

Scottish Finance Minister John Swinney laid out the Scottish government's aim of seizing at least a 10th of the estimated 160,000 renewable energy jobs that will be generated in the UK over the next 10 years. Across the UK the potential for new jobs in home energy efficiency is 20,000. There will also be new jobs in managing the risks associated with climate change. For example, additional public investment in new flood defences will generate new jobs. Unfortunately, at present, we here in Northern Ireland do not see the same determination and leadership we see in Scotland from our own executive. Without such leadership Northern Ireland runs the risk of losing out from the job and investment potential of the transition to a low-carbon, renewable energy economy.

[1] Correspondence details: Dr. John Barry, 21 University Square, Queen's University Belfast, email: j.barry@qub.ac.uk, tel: 02890972546

Royal Institute of Chartered Surveyors

9 -11 Corporation Square
BELFAST
BT1 3AJ

Tel: 028 9032 2877
Fax : 028 9023 3465
Email : noneill@rics.org
www.rics.org/ni

27 February 2009

Mr Patsy McGlone MLA
Chairman
Northern Ireland Assembly Environment Committee
Room 245
Parliament Buildings
Stormont Estate
Belfast BT4 3XX

(e) doecommittee@niassembly.gov.uk

Dear Mr McGlone,

RE: RICS Northern Ireland submission to the Northern Ireland Assembly Environment Committee Inquiry into Climate Change

The Royal Institution of Chartered Surveyors (RICS) Northern Ireland is the principal body representing professionals employed in the land, property and construction sectors and represents some 3,000 members. Our members practice in land, property and construction markets and are employed in private practice, in central, regional and local government, in public agencies, in academic institutions, in business organisations and in non-governmental organisations.

As part of its Royal Charter, the Institution has a commitment to provide advice to the government of the day and, in doing so, has an obligation to bear in mind the public interest as well as the development of the profession. RICS Northern Ireland is therefore in a unique position to provide a balanced, apolitical perspective on issues of importance to the land, property and construction sectors.

The Royal Institution of Chartered Surveyors is pleased to have the opportunity to provide this submission regarding the Committee's inquiry into climate change. Tackling climate change is an integral part of the RICS sustainability framework that will also address energy, waste and water. The Institution takes a serious approach to the policy arena of the environment, climate change and sustainability. It established a Sustainability Commission in 2005 and set 'a low carbon built environment' as a policy priority in 2007.

Background

"Climate change is widely accepted by the scientific community as a major environmental threat and is likely to result in alterations to the current situation in Northern Ireland. Predictions show increases to both annual rainfall and average temperatures, with a principal area of concern being resultant changes to species and habitats."^[1]

Reports on climate change have indicated that:

- the world has warmed up by about 0.7°C in the last 100 years and man made emissions of carbon dioxide are the principal cause;
- global temperature rises of up to 4°C are predicted for the next 100 years if emissions continue at their present rate with knock-on effects on extreme events such as storms, sea level rise and rainfall. The impact on ecosystems could be devastating;

- the UK's buildings are responsible for almost 50% of the UK's energy consumption and carbon emissions^[2]; and
- Northern Ireland has a larger ecological footprint when compared to England Scotland and Wales. If the rest of the world lived as Northern Ireland's population does, it would take three planets to support us.

Executive Action

RICS Northern Ireland would like to acknowledge the actions taken by the Northern Ireland Executive which will help improve energy efficiency and reduce greenhouse gas emissions, such as:

- the introduction of the Code for Sustainable Homes (from 1 April 2008) which was applied to all new social houses to make them more energy efficient and environmentally friendly both in construction and occupation. The Code meant that a house built after 1 April 2008 will be 25% more energy efficient than one built two years before this date;
- the introduction of Energy Performance Certificates (EPC) will ensure that people are aware of the efficiency grade of their property and guide people towards cost effective improvements;
- the recent announcement that from 2010 'green' rebates will be introduced for homeowners who bring their homes up to modern standards of insulation; and
- the announcement of the creation of an eco-village in Omagh.

While it is welcome that these initiatives have been introduced much more work is required to deliver cultural and attitudinal change necessary to meet targets that will help mitigate against the worst effects of climate change.

Initial Commitments

As a minimum, urgent action must be taken if the Executive's target of reducing greenhouse gas emissions by 25% below 1990 levels by 2025 is to be reached. However RICS believe that the Executive should be taking action to meet the more ambitious target set out in the UK Climate Change Act which sets out a UK Carbon account in 2050 at least 80% less than the 1990 baseline.

Necessary Actions

According to the Northern Ireland Environment Agency the main driving forces and pressures in Northern Ireland with respect to both local air and contribution to greenhouse gases are transport, energy production, agriculture, industrial processes and residential development. RICS Northern Ireland has focused on transport, energy production and the built environment in this submission to the Environment Committee.

Energy

A two track approach must be adopted with a focus on reducing energy demand alongside improvements in energy efficiency (see section on building stock).

Northern Ireland is precariously dependent on imported fossil fuel which comprises 94%^[3] of power generation. RICS Northern Ireland concurs with the Department of Enterprise, Trade and Investment's assessment that the primary focus of energy policy will be to tackle the threat of

climate change as well as addressing concern around security of supply and economic development. Increasing sources of renewable energy will help meet these goals. Northern Ireland has a rich resource of wind power; there are currently 19 wind farms across Northern Ireland which equates to approximately 6% of our energy consumption. EU targets demand that by 2012 at least 12% of all electricity consumption comes from renewable sources. The European Commission Renewables Directive places an onus on us to develop renewable technologies as well as ensure that targets relate to the energy mix rather than just electricity.

A recent report "Turning Tides" by the Sustainable Development Commission states that energy contained in the tides around Rathlin Island could produce over 10% of the electricity needs of Northern Ireland. The Northern Ireland Executive needs to explore the viability of options for renewable energy. To ensure a meaningful reduction in green house gas emissions a cross-departmental approach must be adopted by Government for example ensuring greater compatibility between energy and planning policies.

Transport

The Northern Ireland road surface transport system is almost entirely dependent on fossil fuel, global reserves of which are depleting at a faster rate than the discovery of replacement. RICS Northern Ireland acknowledges that while roads play an important role in social cohesion a significant amount more than is currently envisaged needs to be spent on public transport.

Whilst increasing numbers of people are using public transport in Northern Ireland, figures show that car use is the dominant mode of transport. In the period 2005-2007 car travel accounted for over four fifths (81%) of the total distance travelled in Northern Ireland^[4]. Since 1990 emissions from road transport in Northern Ireland have risen by 34.7%.^[5] Emissions from cars have reduced in recent years due to the development of 'cleaner' cars, however, carbon dioxide emissions from road transport in Northern Ireland accounted for nearly 1/3 of carbon dioxide emissions in 2005, and road transport is also the largest combustion related source of nitrous oxide.

RICS Northern Ireland considers there to be a need for greater investment in the rail network. The introduction of new rolling stock has contributed to increased use by passengers. The weekly average rail passenger journeys have increased by 12% since the third quarter of 2007, during the same period weekly average rail passenger receipts rose by 14%.^[6] Northern Ireland Railways (NIR), unlike England, Scotland and Wales does not carry freight transport. There is potential to tap into the investment from the private sector, if NIR were to adopt a policy of allowing freight to be transported on its lines. We need to move to more sustainable forms of transport, encouraging people to become less reliant on their cars through investment in public transport, links to developments and development of workplace travel plans.

Building Stock (Residential & Commercial)

- Buildings contribute 44% of carbon emissions. Of this figure non-domestic buildings constitute 18% and domestic 26%.
- 63% of all energy consumed in the UK is used in the built environment.
- The largest proportion of energy consumed in the built environment is in the domestic sector, where consumption has increased by 15% since 1990 and 27% since 1970.

The RICS and its members are strongly committed to the delivery of a sustainable property sector where the use of resources, particularly energy, is minimised throughout the life of the building, from concept to disposal. Significant cost and energy savings are possible using low

cost technologies and management and behavioural change techniques that already exist. The British Government is currently consulting on the Heat and Energy Savings Strategy which contains policies aimed at reducing annual emissions by up to 44 million tonnes of CO² in 2020 – the equivalent of a 30% reduction in emissions from households compared to 2006. RICS Northern Ireland urges the Northern Ireland Executive to explore the proposals contained in this strategy and adopt examples of best practice to reduce energy loss from buildings.

To date the focus of Government policy has been on two key areas: measures to improve domestic energy efficiency, through grants for insulation; and micro-generation equipment and new buildings, through the Code for Sustainable Homes and stronger building regulations. While these are welcome steps, a significant impact can be made on carbon emissions from ensuring improvements are made to existing commercial buildings.

Building regulations can ensure environmental standards in new building, provided there is proper compliance, but the current focus is too biased towards new build and public funded stock and not majority owned existing stock. It is imperative that building regulations will reflect the highest possible European standards.

New build homes are typically more energy efficient than older properties: carbon emissions from a typical pre 1914 home are in the region of 8 tonnes of CO² per year compared to 4 tonnes from a home built after 1995. In light of the vast number of existing properties, improving the energy efficiency of these homes must be a priority.

The adoption of best practice within the construction sector and the exchange of information to enable owners and developers to improve the environmental performance of their buildings offer the better way to meet the challenges of climate change.

Costs

“No-one can predict the consequences of climate change with complete certainty; but we know enough to understand the risks. Mitigation – taking strong action to reduce emissions – must be viewed as an investment, a cost incurred now and in the coming few decades to avoid the risks of very severe consequences in the future. If these investments are made wisely, the costs will be manageable, and there will be a wide range of opportunities for growth and development along the way.”^[7]

BCIS (is the Building Cost Information Service of the RICS) published the Greener Homes Price Guide in July 2008. The book is aimed at getting people to organise and budget for energy efficiency and reducing their carbon footprint. The guide also contains information on payback periods on the installation of energy efficient measures. RICS Northern Ireland will forward a copy of this book by post to the Committee for information.

Conclusion

It is clear that transport, energy production and energy loss from buildings significantly increase levels of greenhouse gases that contribute to global warming. Urgent action must be taken to address these issues if we are to assuage the consequences of climate change.

RICS Northern Ireland would welcome the opportunity to provide oral evidence to the Committee should Members require further information on any of the issues raised.

Yours sincerely

Nuala O'Neill

Public Policy Executive

- [1] Department of the Environment, State of the Environment Report, April 2008
- [2] Department of Communities and Local Government (DCLG) website 2009
- [3] Department for Enterprise, Trade and Investment – Northern Ireland Strategic Energy Framework Pre-consultation Scoping Paper
- [4] Northern Ireland Statistics and Research Agency (NISRA), 2005-2007 Travel Study
- [5] Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990-2005 AEA/EDO5452200/Draft Final
- [6] Northern Ireland Road and Rail Transport Statistics July- September 2008, Department for Regional Development
- [7] Stern Review: The Economics of Climate Change

Royal Town Planning Institute



Planning to Live with Climate Change

Refreshing the New Vision for Planning: 2009-2014

Consultation Report February 2009

This draft Consultation Report on "Planning to Live with Climate Change" has been prepared by the RTPI Planning Policy & Practice Committee in discussion with the Executive Board in late 2008 and early 2009, as the basis for consultation with the RTPI General Assembly and the wider membership in spring 2009. It has been developed from an Interim Report on Refreshing the New Vision for Planning that was prepared by the RTPI New Vision Task Group in late 2007 and early 2008 and then restructured and supplemented with further material by the Planning Policy & Practice Committee and General Assembly debate on the development of the 21st Century Professional in mid-to-late 2008.

Planning Policy and Practice @ Rtpi: 2009

Planning to Live with Climate Change

Draft Consultation Report : January 2009

Summary Challenge, Options and Action Plan

- 1 Introduction Spatial planning and climate change
- 2 The Challenge Global sustainable development
- 3 Options for the Future 3.1 Climate change
3.2 Sustainable development
3.3 Spatial planning
3.4 Value-driven planning
3.5 Action-orientated planning
- 4 Action Plan 4.1 Realign the responsibilities for planning
4.2 Improve the capabilities of planning
4.3 The 21st Century professional
4.4 The role of the RTPI
- 5 Conclusion Putting climate change at the heart of sustainable development
- 6 Get Involved How to contribute your views

Planning to Live with Climate Change

Consultation Report: February 2009

Summary: Planning to Live with Climate Change

Human civilization is entering a new era. Most social and economic decisions throughout our history have been taken with little concern for the use of finite natural resources. We have now reached a point when we must provide for the needs of future generations as well as our own present needs. We must change the way we use natural resources both globally and locally to become truly sustainable and to avoid threatening the survival of humankind and other world ecosystems. Traditional growth and development models now need to be reconsidered at every level to ensure sustainable development. Sound analysis demonstrates that urgent action is needed to tackle climate change and can secure economic as well as social and environmental benefits.

This review of The New Vision for Planning suggests how everyone engaged in spatial planning should adapt their professional approach to plan for living with climate change, to advise and work in partnership with others and to campaign for fundamental change to shape a sustainable new future for humankind. It points the way ahead for the Royal Town Planning Institute (RTPI) in extending a culture change in our approach to sustainable development, both nationally and internationally.

The Challenge

Climate change threatens our survival. Recent studies have shown that we have about 5 to 7 years - the timescale of this document - to change our ways before accelerating trends in environmental degradation lead to irreversible and chaotic change that could challenge the very basis of our way of life and ability to plan. Global warming would hit us at home as well as abroad. Consequential economic change threatens our security both locally and globally. Environmental and economic changes threaten the well-being of communities, families and individuals. Social changes on a global scale will unavoidably lead to increasing deprivation amongst poorer communities and increasing social and economic polarity worldwide.

Options for the Future

"Planning to Live with Climate Change" introduces the challenges of climate change to our vision for planning as an over-arching priority. It revisits the key issues of sustainable development, spatial planning, value-driven planning and action-orientated planning at the heart of the RTPI's original "New Vision for Planning". It then develops the original agenda for change into an Action Plan that seeks to realign the responsibilities for planning, improve the capabilities of planning, focus on the role of the 21st Century professional and identify the actions that the RTPI must take to tackle what is emerging as a new world order. This document challenges you, the spatial planner, to propose individual and collective actions that you can take over the period 2009 – 2014 that will make a difference and asks how the RTPI and its partners should contribute towards effective delivery.

Climate change

Conventional approaches to planning for sustainable development have tended to balance a range of competing considerations, in ways that sometimes assume they are of equivalent weight. Our need to respond to climate change suggests that these approaches cannot continue. Where there is a challenge to the survival of human civilisations and/or ecosystems, measures to mitigate climate change should have priority over the balance that is conventionally sought between economic, social and environmental factors in planning for the specific needs and circumstances of a particular area. The challenge to survival might, for example, be defined in relation to international and national targets for reducing the carbon and related greenhouse gas emissions that drive global warming.

Sustainable development

The 'New Vision for Planning' called for clear planning frameworks to engage people and integrate action to achieve sustainable development. The 'UK Sustainable Development Strategy' has focused on living within environmental limits, ensuring a strong, healthy and just society, achieving a sustainable economy, promoting good governance and using sound science responsibly to achieve sustainable development. Spatial planning aims to balance economic, social and environmental issues and link them with integrated transport systems, community governance and new technology. Whilst government priorities may change over the lifetime of this document, these objectives are likely to endure.

Spatial planning

The new vision proposed that planning should be spatial, sustainable, integrated and inclusive. The RTPI's 2007 report 'Effective Practice in Spatial Planning' found an evolving understanding of spatial planning that involves "place shaping and delivery at the local and regional levels". Spatial planning should aim to enable a vision for the future of regions and places that is based on evidence, local distinctiveness and community derived objectives and translate this vision into a set of policies, priorities, programmes and land allocations together with the resources to deliver them.

Value-driven planning

The RTPI Education Commission aimed to develop education, skills and life-long learning to raise standards of professional competence. There is now a need to extend the continuing culture change in planning to promote change in the management of governments, councils, companies and agencies that are involved in spatial planning. There is an increasing clash of values about

the social, economic and environmental issues raised by development and their spatial implications, particularly as between the challenge posed by climate change and the challenges posed by economic growth and social polarity.

Action-orientated planning

The Agenda for Action in the New Vision should be extended to promote sustainable development, to tackle climate change and to secure global survival. The RTPI should establish itself as the voice on spatial planning and become a "campaigning profession". It should strengthen its commitment to community engagement, particularly through Planning Aid, and its programme of consultation across a wide range of public, private and voluntary partners. It should also consolidate its position as the primary professional and academic accreditation body for a wide range of practitioners.

Action Plan

The role of partners

The Action Plan for "Planning to Live with Climate Change" is built on the New Vision for Planning and is focussed on professional leadership, vision and delivery to promote fundamental shifts in practice in response to local and global change. The RTPI is uniquely placed to support civic leadership and establish professional competence, technical capabilities and inclusive processes.

Key shifts in the practice of spatial planning amongst all the partners involved in promoting sustainable development should include:

- Realigning the responsibilities for planning. This should resolve conflicts within sustainable development and realign the powers and responsibilities of the professionals, governments, community organisations, public sector agencies, the private sector developers and operators and the local and global companies involved in spatial planning. Action is required to undertake planning at the right scale and to secure a new accountability for central agencies so that decisions are taken at the lowest possible level consistent with good outcomes. Action is also required to align the agenda of the private sector with the agenda of the public sector so that investment decisions can be effectively integrated to achieve commonly agreed objectives.
- Improving the capabilities of planning. This should address the increasing complexity of urban and rural development at all levels and the need to realign the responsibilities for planning. The RTPI has a lead role to influence government and to support individual planners in developing their own competencies in spatial planning. Action is required to promote research and to manage knowledge for spatial planning at all levels. Action is also required to advance effective practice in spatial planning to work with associated professions and practitioners by consolidating the on-going shift from "blueprint" regulatory models towards more flexible "outcome focused" models of spatial planning.
- Fostering the 21st Century professional. This should encourage professionals in spatial planning to be multi-disciplinary, globally responsible, socially ethical and, above all, progressively campaigning. The RTPI should become a campaigning profession and support planners in extending the current "culture change" in planning. It will need to approach this leadership role at both the strategic and the operational levels with public, private and voluntary sectors and with companies, local communities and individual people. Planners are good at managing change, at finding synergy amidst competing

demands and at synthesising complex situations into integrated policies and programmes of action.

The role of the RTPI

The RTPI will need to translate the Action Plan for "Planning to Live with Climate Change" into its

Corporate Plan and annual Business Plan to complement the actions that will be required by professional planners, central and local government, public and voluntary sector agencies and the private sector. It will need to adapt its organisation and operation to promote spatial planning and engage its members and partners in tackling global economic, social and environmental issues. It will also need to engage the commitment of its members and partners to deliver practical action.

The RTPI should set its own action plan to achieve its wider objectives including:

- Action to promote international planning to facilitate the major contribution that spatial planning can make to address issues that are essential to the survival of civilisations and ecosystems such as climate change, economic stability and urban and rural poverty.
- Action to achieve planning at the right scale to advocate decision-making at the appropriate level for each decision which may be at the international, national, regional, subregional or local level of spatial planning.
- Action to secure a new accountability for central agencies to counter the increasing responsibility which is being given to non-elected agencies and to private service monopolies that combine to separate communities from decision-making processes.
- Action to align the agenda of the private sector to encourage companies to align their agendas to wider economic social, environmental goals as part of their commitments to sustainability and corporate responsibility.
- Action to strengthen checks and balances within the voluntary sector to ensure that the expertise and values of voluntary sector interest groups are not undermined and to strengthen and promote the role and value of Planning Aid.
- Action to re-empower local governance to support policies to strengthen effective spatial planning and to secure accountability and long-term commitment to each particular locality.
- Action to re-engage local communities to advocate the importance of planning local communities as a key means of re-energising local democracy.
- Action to adapt and improve the skills and ethics of spatial planning to face the challenges of climate change and sustainable development in exercising the RTPI's role as the custodian and developer of initial professional training, life long learning, skills and professional standards.

Conclusion

The RTPI must promote a debate about the fundamental shift that is needed to put climate change at the heart of sustainable development. "Planning to Live with Climate Change" advocates a "climate change priority" to change the conventional approach to planning for sustainable development where there is a challenge to the survival of civilisations and/or ecosystems. Measures to mitigate climate change should have priority over the conventional balance between economic, social and environmental factors in planning for a particular area

where it is essential to achieve targets to reduce greenhouse gas emissions that threaten global survival.

The Action Plan for "Planning to Live with Climate Change" advocates a new focus on professional leadership, vision and delivery to promote change in response to the challenge of climate change and the threat to global survival. It is built on a review of the original proposals for realigning the responsibilities for planning and improving the capabilities of planners in the New Vision for Planning. It develops fresh ideas about the new professionalism that will be needed to tackle climate change and promote spatial planning. It identifies the action the RTPI must take to achieve them but, above all, it challenges the spatial planning profession to consider it must act to deliver critically important change to tackle the challenge of climate change.

Planning to Live with Climate Change

Consultation Report: February 2009

1 Introduction

1. Human civilization is entering a new era. Most of the key social and economic decisions throughout human history have been taken with little concern about the rate at which natural resources are consumed. But we have now reached a point when responsible decision-making must ensure that we provide for our current needs as well as ensuring our long term ability to provide for the needs of future generations. We must make radical changes to the way we use natural resources globally and locally if we are to avoid becoming increasingly unsustainable and to avoid threatening the survival of human civilisations and ecosystems across the globe. The traditional processes of growth and development now need to be reconsidered at every level to make way for truly sustainable development.

2. The planning profession has the opportunity and the responsibility at this turning point in world change and development to take the lead in tackling climate change through sustainable development both nationally and internationally. Planners have and can further develop the skills and experience to work creatively with associated professions and practitioners to find synergy and synthesis amidst the many complicated issues in sustainable development and to suggest realistic visions and workable solutions for future sustainable development. They also have the skills and experience to work with the local communities involved to secure commitment to shared proposals for change.

3. Spatial planning is well-placed to diagnose emerging needs and to help local and global communities to agree responsible visions for the future and deliver the necessary actions to realise them. This review of The New Vision for Planning suggests how everyone engaged in spatial planning should adapt their professional approach to plan for living with climate change, to advise and work in partnership with others and to campaign for fundamental change to shape a sustainable new future for humankind. It points the way ahead for the Royal Town Planning Institute (RTPI) in leading a culture change in our

approach to sustainable development, both nationally and internationally.

2 The Challenge

4. Climate change threatens our survival both locally and globally. The Stern Report^[1] and other studies^[2] suggest that we have about 5 to 7 years - the timescale of the action plan proposed in

this document - to change our ways before the rapidly rising trends in major natural environmental changes become too major or chaotic to allow them to be managed or reversed with the means we currently have at our disposal. Current human civilisation has emerged in an era characterised by relative stability in climate systems, in which the predictability of our physical environment and our access to resources has liberated humanity to plan, construct and develop the many complex urban societies that now encompass the majority of the human population.

5. The risks of global warming include widespread flooding and coastal inundation for many of the world's leading cities, significant changes to the climatic stability and productivity of key staple food and resource producing regions and increases in the frequency, damages and cost of extreme weather events. These changes are likely to escalate the costs of world water, food and energy supplies and the more significant and less predictable they become, the greater is the likelihood of desperate shortages that could lead to rapid increases in world poverty, mass migration and warfare to settle competing claims for scarce vital resources. These threats will hit us at home as well as abroad.

6. Economic change threatens our security both locally and globally. The economic crisis that swept the world in 2008 has shown us how unstable our wealth and security had become. Whatever the individual causes of this crisis, we have witnessed a rapid loss of confidence and a downturn in economic activity in the construction, finance, business and retail sectors, which has then undermined demand in the manufacturing sector and prompted a widespread rise in unemployment.

7. These environmental and economic changes threaten the well-being of communities, families and individuals both locally and globally. Social changes appear likely to lead to increasing deprivation amongst poorer communities whilst having relatively less impact on wealthier communities and increasing social polarity. The risks are that increasing poverty in the developing world combined with rapid urbanisation and inadequate infrastructure provision will challenge the environmental and economic resources of many countries and prompt conflict. The developed world too faces similar challenges in different terms that could nonetheless create profound social distress.

8. So is this just scare-mongering or a harsh reality that most of us find difficult to take seriously? Even if the reality is far less than worst-case fears, we know that these environmental, economic and social issues could ultimately threaten our basic needs, our prosperity, our peace and security and, ultimately, the survival of human civilisations and natural ecosystems. Surely, there is now good reason to adopt the "precautionary principle". We need sustainable development to secure survival.

3 Options for the Future

9. This fundamental review of the RTPI's New Vision for Planning attempts to grapple with the challenges of climate change, adverse economic change, social polarity and disruption to civilisations and ecosystems. It introduces the challenge of climate change at the outset and revisits the key issues of sustainable development, spatial planning, value-driven planning and action-orientated planning that were at the heart of the original New Vision for Planning when it was first published in 2002. It then develops the original agenda for change into an Action Plan that seeks to realign the responsibilities for planning, improve the capabilities of planning, focus on the role of the 21st Century professional and identify the tasks that the RTPI itself should be taking to tackle the issues of what is emerging as a new world order at every level. It challenges spatial planners acting individually or through the various organs of the RTPI to identify what can be done.

10. "The New Vision for Planning: An Agenda for Action" was launched in 2002 and provided a stimulus for wide-ranging reforms in the scope and culture of planning including the statutory adoption of "spatial planning", including the introduction of the Scottish National Spatial Planning Framework, the Wales Spatial Plan, the Planning and Compulsory Purchase Act 2004 in England and Wales and the renewal of the RTPI itself. The original version of the New Vision promoted four key defining themes that planning should be spatial, integrative, inclusive and sustainable. Two further themes argued that planning to be value driven and action orientated. A wider approach to spatial planning replaced the traditional approach to land use planning and expanded the role and reach of the profession.

3.1 Climate change

11. Climate change must now be recognised as a key driver in sustainable development. Indeed, a "climate change priority" is needed to change the conventional approach to planning for sustainable development. Where there is a challenge to the survival of civilisations and ecosystems, measures to mitigate climate change should have priority over the balance that is usually sought between economic, social and environmental factors in planning for the specific needs and circumstances of a particular area. The challenge to survival might, for example, be defined in relation to international and national targets for reducing the carbon and related greenhouse gas emissions that drive global warming and threaten survival.

12. The RTPI must promote national and international debate about a fundamental "paradigm shift" in thinking and action that is needed to put climate change and the survival of civilisations and ecosystems at the heart of sustainable development, spatial planning and project delivery. It must review our scientific understanding of global warming, assess the potential social and economic consequences and develop the role of spatial planning in mitigating and managing the impact of climate change. The original New Vision for Planning called for effective and creative planning to secure the sustainable development of communities and nations but it did not identify climate change as a priority issue. This is now the primary task of refreshing the New Vision.

13. Climate change is now recognised as a global issue driven by energy use, land use change and other human activities, leading to changes to the atmosphere and increases in carbon dioxide and related greenhouse gas emissions. The Stern report suggested that global greenhouse gas emissions should be reduced by 2% per year by 2015 – only 7 years from now – if a potentially catastrophic increase in global temperatures of more than 20C is to be avoided. The recent Hadley Centre Report for the UK Meteorological Office^[3] seems to suggest that it will be necessary to cut global carbon emissions by 3% per annum from 2010 to avoid a global temperatures rise of more than 20C which is widely recognised as the level of significant risk of the worst effects of sea level rise and drought.

14. The RTPI must take a clear and bold position to promote a positive and realistic response to the challenges of climate change on behalf of the planning profession and advocate it through debate with government, related professions and the general public. The initial focus should be on how to facilitate the movement towards more sustainable energy generation and use and on how to develop more sustainable forms of communities which are based on lower energy and de-carbonised systems of movement. The UK government has set a target of an 80% cut in carbon emissions by 2050 and set up a Department of Climate Change and Energy to coordinate action to tackle climate change, energy policy and the move towards a low carbon economy. The RTPI should continue to engage the resources of the planning profession at the national, regional and local levels.

3.2 Sustainable development

15. The New Vision for Planning called for clear planning frameworks to integrate action and engage people across key sectors, locations and scales to achieve sustainable development. Spatial planning aims to balance the key economic, social and environmental elements of sustainable development in each area according to its particular needs and circumstances, link them with integrated transport systems and set them into the wider context of governance and technology. The UK Sustainable Development Strategy focused on the principles of living within environmental limits, ensuring a strong, healthy and just society, achieving a sustainable economy, promoting good governance and using sound science responsibly to achieve sustainable development.

16. One of the key recommendations of the New Vision for Planning was that Regional Economic Strategies should be integrated with Regional Spatial Strategies. The principle of integrating spatial planning and economic development has now been accepted in England through the Sub National Review (SNR). The Scottish National Planning Framework and the Wales Spatial Plan embody a similar approach, but more can yet be done. It will be important to ensure that this integration does not result in the marginalisation of social and environmental issues as mere derivatives of an economic agenda. The RTPI will continue to press for a truly joint policy framework for the preparation of Integrated Regional Strategies and national spatial plans and planning frameworks. It will continue to press for the development of truly spatial National Policy Statements for infrastructures under the Planning Act 2008. Above all, it will continue to highlight the need for integration at the scale of the UK and the European region.

17. The social consequences of environmental degradation and economic decline must be given greater priority and local communities must be engaged more effectively in planning for sustainable development. Community development policies and programmes need to be more closely integrated with other plans and programmes at the regional and local levels at the formative stage to achieve sustainable development. The post 2008 economic downturn and the threats of climate change are likely to intensify the problems of deprivation and the need for regeneration in the areas that are still recovering from the economic recession of the early 1990s as well as generating new problems and opportunities as a new round of economic restructuring in sectors such as finance becomes apparent.

18. The original New Vision for Planning highlighted the need to shift the focus on the environment to positive action to complement negative planning controls and to realise the economic and social potential of restoring lost habitats and removing inherited blight. The concept of "green infrastructure" is now accepted as part of planning but it is not yet widely applied in practice. The need for resourcing and evaluating environmental projects still needs to be addressed, for example, by reviewing the way that discounting practices in effect devalue and write-off the long term benefits of sustainable approaches to development. The need to tackle the challenges of climate change must now be brought up to the top of the agenda.

19. Transport provision has become a universal challenge that threatens the quality of life in many local communities in addition to adding to unnecessary greenhouse gas emissions. This challenge cannot be solved by new high-tech integrated transport systems alone. New development must be better related to transport infrastructure and access requirements must be a critical determinant in locating new development. A systematic approach is now needed to manage demand for travel to help achieve sustainable transport as part of sustainable development. Demand management in transport will need to be complemented by similar policies to manage demand in the use of energy and other natural resources that are non-renewable and where uncontrolled rises in demand lead to increased greenhouse gas emissions that are not effectively managed using current price signals.

3.3 Spatial planning

20. The New Vision for Planning proposed in 2002 that planning should be spatial, sustainable, integrated and inclusive. The report of the RTPI's Effective Practice in Spatial Planning project, "Shaping and Delivering Tomorrow's Places: Effective Practice in Spatial Planning", found in 2007 an evolving understanding of spatial planning that involves "place shaping and delivery at the local and regional levels". It suggested that spatial planning should aim to enable a vision for the future of regions and places that is based on evidence, local distinctiveness and community derived objectives and translate this vision into a set of policies, priorities, programmes and land allocations together with the public sector resources to deliver them. It should then create a framework for private investment and regeneration that promotes economic, environmental and social well being and coordinate and deliver the public sector components of the vision with other agencies and processes.

21. Spatial planning is now built into the heart of the RTPI charter, into government legislation, policies and planning practice. It is the 'core business' of the planning profession. Essential elements include new practice in local government linked with Sustainable Community Strategies, Local Area Agreements and other agency plans using a common evidence base shared amongst partners and the public through emerging Multi Area Agreements in England or national spatial plans and frameworks in Wales and Scotland. Spatial planning needs better integration between strategies, policies and resources at the regional, subregional and local levels to achieve effective resource coordination. Development management must play a key role and more training for planners, including an MBA and courses on project and programme management, will be needed to provide new skills.

22. The original New Vision for Planning argued that the integration of economic, social and environmental issues should be at the heart of a sustainable approach to development both in the long and in the short term. This review of the New Vision has identified a widening gap between the rhetoric of "sustainable planning" and the reality of plans and policies that are branded "sustainable" but perhaps only really succeed in balancing two rather than three of the economic, social and environmental aspects of development in a particular area. For example, the tension between short term economic objectives and long term environmental aims may be reinforced by tension between the implications of economic and social change.

23. The original New Vision for Planning explained how planning seeks to integrate all aspects of the development of communities and localities but that the corporate decisions which determine the location of new developments are already taken as matters of principle before the local community, politicians and 'planners' are involved. This review of the New Vision has focussed on the need to address the increasing fragmentation of the institutional roles and capabilities to deliver programmes and projects. The Sub National Review in England proposed a closer integration between spatial planning and economic development at the regional, subregional and local levels. It could broaden the scope of spatial planning and strengthen the mechanisms for delivery again drawing on similar approaches in Scotland and Wales.

24. The original New Vision for Planning also explained how society is becoming increasingly interactive and flexible in travel, relationships and communications whilst local community identity and engagement in development plans is fragmented by cultural differences and social exclusion. All members of society must be able to take part in spatial planning if it is to be truly inclusive. The process of planning is concerned with balancing the costs and benefits of alternative decisions for different interests and the achievement of net community benefit. There is a growing democratic deficit as social fragmentation and institutional structures distance decisions and decision-makers from local people. The RTPI has therefore worked with government and others to extend the role of Planning Aid in supporting individuals and communities to find a more effective voice in place shaping and spatial planning for their areas.

3.4 Value-driven planning

25. The RTPI appointed an Education Commission alongside its work on the original New Vision to develop the foundation of education, skills and life-long learning that is vital to maintaining and raising standards of professional competence. This review of the New Vision has identified a need to extend the continuing culture change for planners which it instigated to promote a culture change in the management of the governments, councils, companies and agencies that are also involved in spatial planning. There is a need to shift governments away from preoccupations with quantitatively measuring the inputs and outputs of planning processes to qualitatively assessing the outcomes of planning activity. Despite the cynicism that can prevail, planning makes a major contribution to the well-being of society.

26. There is an increasing clash of values about the social, economic and environmental issues of development and their spatial implications. The most significant conflict will be between the challenge of climate change and the challenges of economic growth and social polarity. If we fail to join forces across the globe to counter the effects of climate change, we will face an "ultimate market failure" as a result of rapid, compound and adverse environmental, economic and social changes which could amount to global catastrophe. We have a moral responsibility to continue to put the short-term in the context of the long-term, to point out the potential for market and other single dimensional policy failures, to promote integrated and spatial policy development and project evaluation and to shape all our research, education and skills programmes in the context of long-term needs and requirements.

27. The RTPI promotes spatial planning at the national and international levels and so it needs to address the needs and responsibilities of the planning profession in the UK and abroad. This means that the UK planning profession must tackle climate change, economic change and social change in a global context as well as a UK context if it is to meet its global responsibilities. Similarly, it must look at future trends and their possible implications as a basis for action in both the short term and the long term, nationally and internationally. The way that the planning profession approaches spatial planning in the UK must recognise the challenges for spatial planning at an international level and adopt approaches to spatial planning that can enable planners abroad to work in complementary ways to address common issues and achieve common goals.

3.5 Action-orientated planning

28. This review of the New Vision for Planning has revisited the original Agenda for Action to see where priorities should be reassessed and where proposals for action need to be extended or adjusted. It has identified a primary need for the RTPI to promote the need for sustainable development to tackle the challenge of climate change and the threat to the survival of civilisations and ecosystems on a global scale. The RTPI should establish itself further as the recognised voice of spatial planning and it should become a "campaigning profession". It should also audit the effectiveness of current national policy objectives, broaden the scope of spatial planning across all aspects of sustainable development, adopt a new urban agenda for urban expansion, urban centres and suburban regeneration and improve the integration of rural planning with the management of natural systems and natural resources.

29. The RTPI should improve its national and international standing and build both local and global networks to disseminate good practice in spatial planning, to influence governments and international agencies, to strengthen professional inputs on international issues and to engage in joint action with associated professions to direct attention and resources to the challenge of climate change. It should strengthen its commitment to community engagement, particularly through Planning Aid, and its programme of consultation across a wide range of public, private and voluntary partners to improve effective practice in spatial planning. It should also consider conducting specific campaigns to promote spatial planning and to advocate action to address the challenges of climate change.

30. The RTPI should establish its position as the primary professional and academic accreditation body become for a wide range of practitioners across the expanding spectrum of spatial planning. In particular, it should maintain the impetus of the Education Commission to raise the quality of planning education, to encourage the development of new planning courses, to review the current membership structure, to develop a careers advisory service, to support young planners, to extend the scope of continuing professional development, to review the ethical context of planning practice and to create a programme of external fund raising for RTPI activities.

4 Action Plan

31. The Action Plan for "Planning to Live with Climate Change" has been developed from the New Vision for Planning. It has been built on a review of the original proposals for realigning the responsibilities for planning and improving the capabilities of planners. It has gone further in developing fresh ideas about the new professionalism that will be needed to tackle climate change and to promote spatial planning in the 21st Century and in identifying the action that the RTPI itself will need to take. The Action Plan is still being developed. It will need to be changed to respond to issues raised in consultation. The consultation process will include a challenge to individuals and groups of spatial planners to identify the actions that they can take themselves, with their employers or with the RTPI. It will have to be aligned to the RTPI Corporate and Business Plans.

32. A new focus on professional leadership, vision and delivery to promote and guide change is now required which is unlikely to be provided by governments with their shorter term perspective and their administrative and financial constraints. The RTPI is uniquely placed to provide the renewed leadership that is needed to support civic vision and leadership and to establish effective professional competences, technical capabilities and inclusive processes that can tackle the challenges of the future.

33. The primary role of planning in the 21st Century will be to provide professional leadership to governments, local government, business and communities in responding to the challenges of climate change by identifying and promoting vision at the strategic level and delivery at the operational level. The action to realign the powers and responsibilities of planning and to improve the professional and technical capabilities of planning will all contribute to defining the 21st Century professional.

4.1 Realign the responsibilities for planning

34. The key shift that is needed to address the conflicts and contradictions of sustainable development is to realign the powers and responsibilities of the professionals, governments, community organisations, public sector agencies, private sector developers and operators and local and global companies that are involved in various ways in spatial planning.

35. Action is required to undertake planning at the right scale and to secure a new accountability for central agencies so that decisions are taken at the lowest possible level (the principle of subsidiarity) and so that decisions, resources and action are coordinated centrally and delivered locally. Action is also required to align the agenda of the private sector with the agenda of the public sector so that investment decisions can be effectively integrated to achieve commonly agreed objectives.

36. It will be necessary to strengthen the checks and balances in the voluntary sector by ensuring that its expertise and resources are fully utilised whilst also ensuring that its objectives complement and support the aspirations of local communities. It will also be important to re-

empower the governance structures of local authorities and to re-engage with local communities to ensure that spatial planning embodies sufficient democratic accountability and community support.

37. Professionalism is being revolutionised by the dramatic expansion of freely available information on the internet, the fundamental shifts in the roles of national, regional and local government and the increasing devolution of responsibilities for public sector action to various public and semi-public agencies. Professionals in spatial planning are also finding themselves increasingly involved in working with professionals and practitioners in associated disciplines in economic and social development, transport and infrastructure provision, building design and environmental conservation.

38. Last but not least, planners are becoming increasingly aware of and involved in spatial planning issues at an international level. Action is needed by the RTPI and other professions to develop new approaches to professional responsibility in global issues such as climate change, economic restructuring, social polarity, natural resource conservation and world poverty. This will necessitate working alongside government and business to ensure complementary action on common problems to think globally and act locally. The RTPI's involvement with UN Habitat, the World Urban Forum, the Global Planners Network (GPN), the European Spatial Planning Observatory Network (ESPON) and the Commonwealth Association of Planners (CAP) is already demonstrating a lead on these issues.

4.2 Improve the capabilities of planning

39. An effective response to the increasing complexity of urban and rural development at all levels requires a significant improvement in the capabilities of planning as well as a progressive realignment in the responsibilities for planning. The RTPI has a lead role to identify what capabilities and skills are required, to influence governments and also to support individual planners in developing their own competencies in spatial planning.

40. Action is required across the planning profession to promote research and to manage knowledge on the expanding scope of spatial planning at all levels. Research and knowledge management should aim to support the formulation of shared development strategies that meet the needs and characteristics of particular areas and the priorities and preferences of local authorities, local people and local businesses. This will necessitate action to build the capacity of local communities to engage effectively in spatial planning for their areas and to generate social capital amongst the various public, private and voluntary partners and stakeholders in the area to work together towards commonly agreed aims.

41. Action is also required to advance effective practice in spatial planning to work with associated professions and practitioners by consolidating the on-going shift from "blueprint" regulatory models towards more flexible "outcome focused" or "performancebased" models of spatial planning. It will also be important to continue raising professional standards in spatial planning by developing a long-term educational programme to meet the future needs of a broader profession and its associate practitioners in an internationally globalising society.

42. The RTPI must develop understandings of professional ethics amongst its members and the members of associated professions by ensuring that all voices are heard in debates about ethical issues and that the different value systems of the various partners and stakeholders involved in spatial planning are reconciled within a shared approach to common problems. It will also be important to improve the performance of spatial planning by focussing on the outcomes of planning policies and programmes rather than the inputs and outputs of planning interventions.

43. Finally, the RTPI must mobilise for action by translating this Action Plan into the specific tasks and projects that will need to be incorporated into its Corporate Plan and annual Business Plan to direct the necessary resources to agreed priorities for delivery. This will mean involving the membership in considering the priorities and resources for action between the competing interests of member services and the wider responsibilities of the profession in helping to address international as well as national, regional and local issues. The various organs of the RTPI such as the General Assembly, the Regions and Nations and the Networks and Associations will need to be engaged in the delivery of the Action Plan as well as monitoring the effectiveness of its results.

4.3 The 21st Century professional

44. The 21st Century professional in planning will need to be multi-disciplinary, globally responsible, socially ethical and, above all, progressively campaigning. Planners should say what is needed to achieve sustainable development and effective responses to climate change without fear or favour. These shifts in professionalism will be the hallmarks of all the professionals who become engaged in the ever-widening scope of spatial planning. Equally, the RTPI will need to lead the change in professionalism by becoming a campaigning profession and by supporting planners in broadening the current process of "culture change" in planning. It will need to approach this leadership role at both the strategic and the operational levels of spatial planning by the public, private and voluntary sectors and by companies, local communities and individual people who become engaged in planning and the development process.

45. The multi-disciplinary professional will need to understand and work with associated professionals and practitioners who are also involved in spatial planning. There is a multiplicity of different values systems in spatial planning not only for planners themselves but for all the other professionals and practitioners involved. We must all consider "how can we live together ? – how can we recognise common destinies, respect each other's views and work together to secure the survival of civilisations and ecosystems ?" The key challenges for the multi-disciplinary professional in spatial planning will be to provide leadership and to share ownership in solutions to the problems and opportunities of climate change, economic recession and social polarity across the world.

46. The globally responsible professional will need to understand and act upon the complex relationships between the needs and circumstances of their own areas and the wider national and international context of climate change, economic restructuring, social polarity and global survival. But planners are good at managing change, at finding synergy amidst competing demands and at synthesising complex situations into integrated policies and programmes of action. The RTPI is determined to extend its international agenda to encourage and support the practice of spatial planning across the world to tackle these major changes.

47. The socially ethical professional must remember that the role of the planner is to find the right balance between the economic, social and environmental needs of an area in the wider public interest and also within the wider global interest which now includes the challenge of climate change. The planning profession must continue the current "culture change" in developing spatial planning and place shaping within new development and particularly within existing development. In an ever more dynamic world, planners must also commit themselves to their Continuing Professional Development (CPD) and help to extend the knowledge and skills of associated professions and practitioners in spatial planning.

48. The progressively campaigning professional must take up the cause of promoting truly sustainable development to help address the challenge of climate change, economic restructuring and social polarity across the world and to help secure global survival. The RTPI must now move away from its current "value-free" stance on planning issues to become a

"campaigning profession" that is ready and able to strengthen spatial planning at all levels and advocate a new professionalism that is based on much broader values both nationally and internationally.

4.4 The role of the RTPI

49. The RTPI will need to translate the Action Plan for "Planning to Live with Climate Change" into the action it must take forward itself through its Corporate Plan and annual Business Plan to complement the actions that will be required by professional planners, central and local government, public and voluntary sector agencies and the private sector. It will need to take hard decisions to adapt its organisation and methods to promote spatial planning and engage its members and partners in delivering a programme of action to tackle global economic, social and environmental issues.

50. The RTPI will need to engage the commitment required from its members and partners to deliver practical action to tackle climate change and safeguard the survival of civilisations and ecosystems in developed and developing countries. It must not be afraid to stand up to people who oppose change and it must promote and celebrate progress in national and international sustainable development. It will also need to develop its broad coalition with governments, business and other professions world-wide to deliver the programme of action for international sustainable development. It must demonstrate that it is taking the lead in delivering on climate change, economic adversity and social polarity to earn respect from other partners before exhorting them to take complementary action.

51. The original New Vision for Planning set out the RTPI's Manifesto for Action which incorporated key objectives for sustainable development to resolve the competing interests of economic development, social inclusion, environmental conservation and integrated transport. It focused on the processes of change within urban and rural communities at the local, national and international scales. It advocated shifts in the roles and responsibilities of central government, central agencies, the private sector, the voluntary sector, local governance and local communities and it emphasised the need to secure professionalism in providing planning advice.

52. In taking this forward to form a new Action Plan, the RTPI must recognise that:

- Current arrangements for planning locally and globally are not capable of taking effective decisions, particularly in linking plan making to plan delivery and further 'statutory' change is needed.
- Despite assertions about 'evidence-based' policy, our technical resources and capabilities are inadequate, particularly in addressing the urgent challenges presented by climate change.
- Planning decisions are increasingly challenged by investors in development and by people who become alienated by the effects of development.

53. An effective response to these challenges will require a new focus on professional leadership, vision and delivery to promote and guide change which is unlikely to be provided by governments with their shorter term and administrative constraints. The RTPI is uniquely placed in view of its mandate and its experience to provide renewed leadership in setting out the Action Plan that is required to support civic vision and leadership and to create effective professional competences, technical capabilities and inclusive processes to tackle the challenges that now face the 21st century professional.

54. Action is required to promote international planning, where we will draw out the major contribution that spatial planning can make to address issues that are essential to the survival of global civilization and ecosystems such as climate change, economic stability and urban and rural poverty reduction. This means that the RTPI will:

- Support the Global Planners Network (GPN) and other groups of spatial planners across the world to develop and share policy and practice.
- Stand for and advocate the proposition that spatial planning enables communities to develop equitable visions for their sustainable futures in partnership with other professional bodies for planning.
- Support the identification of the global planning capacity that is necessary to deliver sustainable strategies.
- Develop and promote a 'tool kit' of policy and practice tools and techniques to support climate change adaptation.
- Undertake research and work in partnership with governments and research bodies to support these actions.
- Ensure that the professional learning outcomes of spatial planning education respond to the critical nature of climate change in driving change in policy and practice.
- Influence planning curricula in tertiary education to this end via the Association of European Schools of Planning (AESOP), Council of Head of Planning Schools (CHOPS) and education partnerships.
- Develop international benchmarking around training and curriculum development in spatial planning.
- Influence overseas policy and practice in spatial planning through the accreditation of overseas professional training providers.
- Generate debate and disseminate advances in policy and practice through the Planning Education and Research Network (PERN).

55. Action is required to achieve planning at the right scale where we will advocate

- decision-making at the appropriate level for each decision which may be at the
- international, national, regional, subregional or local level. This means that the RTPI will:
- Engage in political and policy dialogue to ensure the best means of delivering spatial planning objectives through plan-making and plan-implementation.
- Continue to campaign for the development of national planning frameworks, drawing on its United Kingdom Spatial Planning Framework research stream and from experience in Scotland, Wales, Northern Ireland, the Republic of Ireland and other jurisdictions.
- Lead and support the development and integration of locationally specific national policy statements under the Planning Act 2008.
- Lead and support the development of marine spatial planning.
- Lead and support the development of integrated regional planning in England.
- Lead and support the ongoing development of regional and sub-regional partnerships and plans for sustainable futures.

56. Action is required to secure a new accountability for central agencies where we will counter the increasing responsibility which is being given to non-elected agencies and private service

monopolies that has reinforced the separation of communities from the decision-making process. This means that the RTPI will:

- Advocate formal and informal accountability and engagement mechanisms under which stakeholders can positively and efficiently engage with central and unelected bodies' policies and programmes.
- Work in partnership and seek to influence the agendas of key government departments and agencies, in UK and devolved administrations.
- Seek better means of integrating agency programmes to ensure effective community engagement and support and the best balance of community benefit at the regional, sub-regional and local level.

57. Action is required to align the agenda of the private sector where we will encourage entities to align their agendas to wider social, environmental and sustainable economic goals as part of their commitments to corporate responsibility. This means that the RTPI will:

- Develop and promote tools and techniques to support private sector planners in practice, delivering climate change adaptation and sustainable development outcomes.
- Work in partnership with and seek to influence private sector peak bodies pursuing climate change adaptation and sustainable development outcomes (including UK Green Building Council, UK Business Council for Sustainable Energy, CBI, BWEA)

58. Action is required to strengthen checks and balances in the voluntary sector, where we will ensure that the expertise and values of voluntary sector interest groups are not undermined and particularly seek to strengthen and promote the role and value of Planning Aid. This means that the RTPI will:

- Advocate and support the deployment of positive community engagement in spatial planning.
- Develop and promote tools and techniques to support practice, delivering climate change adaptation and sustainable development outcomes.
- Work in partnership with and seek to influence broader built environment professional bodies including CIC, ICE, RIBA, RICS, Landscape Institute, IHBC, CIH, CIOEH.
- Work in partnership with and seek to influence voluntary sector environment and conservation bodies including RSPB, CPRE, National Trust, Greenpeace and Friends of the Earth.
- Ensure that Planning Aid is recognised as a key source of spatial planning advice in the voluntary sector, underpinned by the voluntary effort of spatial planners.

59. Action is required to re-empower local governance where we will support policies to strengthen effective spatial planning as a critical element in its accountability and its long-term commitment to and identification with a particular locality. This means that the RTPI will:

- Develop messages emerging from the Effective Practice in Spatial Planning research stream.
- Develop messages emerging from the Outcome Indicators research stream, supporting local government to identify and communicate the positive benefits of planning.
- Work in partnership with government improvement and development agencies and local government representative bodies to this end.

- Work with government departments with responsibility for local government to support the message that spatial planning empowers local governance and is key to achieving the vision of local, sub-regional and regional partnerships (for example through Sustainable Community Strategies, Local and Multi Area Agreements).
- Advocate and support the development of infrastructure plans and programmes at the local level.
- Develop a competency framework for spatial planning in local government to assist in staff and service development.
- Further develop and promote Planning Aid as a key conduit between local government and hard-to-reach communities and individuals to ensure that their views are considered in plan making and development management decision making.

60. Action is required to re-engage local communities where we will advocate the importance of planning 'ones own community' as a key means of re-energising local democracy. This means that the RTPI will:

- Work with governments at all tiers and through Planning Aid to advocate meaningful mechanisms of community engagement in plan making and development management decision making.
- Support Planning Aid and the development of Community Planning practice as a positive means to enable communities to develop a vision for their own future and convey that vision into local government.
- Better enable Planning Aid to work with communities to develop local understanding of and responses to climate change and to promote sustainable development outcomes.
- Develop local political understandings of the role and potentials of spatial planning through the work of the Politicians in Planning Association (PIPA).
- Empower citizens to understand and use planning and community engagement in planning as a tool, by developing planning components of civics education, particularly in the 14-19 curriculum, in partnership with governments and secondary education providers.

61. Underpinning all of these actions, action is required to adapt and improve the skills and ethics of spatial planning to face the challenges of climate change and sustainable development. It is the RTPI's role as the custodian and developer of initial professional training, life long learning, skills and professional standards for spatial planning to improve the skills and ethics of spatial planning at all spatial scales and in partnership with all relevant stakeholders. This means that the RTPI will:

- Undertake relevant research directly and through partnerships and foster research driven by others to inform the development of planning policy and practice.
- Ensure the effective integration of skills across different components of governments and local government.
- Influence the Homes and Communities Academy (formerly ASC), PAS, IDeA, Sector Skills Councils and equivalent bodies throughout the UK to ensure that built environment sector professionals share the skills necessary to respond to climate change and deliver sustainable development.
- Continuously monitor and develop tertiary education curricula through education partnerships.

- Continuously monitor and develop the requirements of the Assessment of Professional Competence (APC).
- Review personal development plans and continuing professional development (CPD) logs to diagnose the need for additional training.
- Introduce special CPD requirements for training in climate change which is appropriate to individual planners' practice requirements.
- Provide greater direction on climate change and sustainable development to conference and training providers and the organisers of regional CPD programmes .
- Provide clearer and simpler access to practice advice and guidance on climate change and sustainable development in partnership with governments and with education, training and skills providers,
- Promote the use of the RTPI's Planners in the Workplace (PiWP) and Learning Partners initiatives to support workplace learning and skills development through individual employees' and employers' commitments.

5 Conclusion

62. The RTPI's work in refreshing the New Vision for Planning began with a wake-up call to the planning profession to respond to the urgent challenge of climate change, economic slowdown and the increase in social polarity both nationally and internationally. It drew attention to the threat to the survival of civilisations and ecosystems if we continue to use non-renewable natural resources and to generate greenhouse gas emissions at the present rate. It went on to highlight the imperative to adopt truly sustainable development within the next 5 to 7 years to avoid an irreversible move into chaotic and inherently unmanageable adverse change that would be hard to predict with any certainty.

63. Planners have and can develop the skills and experience to work with associated professions and practitioners to find synergy and synthesis amidst the many complicated issues in sustainable development and to suggest realistic visions and workable solutions for future development. Spatial planning is well-placed to diagnose emerging needs and to help local and global communities to agree responsible visions for the future and deliver the necessary actions to realise them. The challenge of climate change must now direct the practice of spatial planning advocated in the New Vision for Planning.

64. The RTPI must now promote a debate about the "paradigm shift" that is needed to put climate change at the heart of sustainable development. "Planning to Live with Climate Change" advocates "climate change priority" over the conventional approach to planning for sustainable development where there is a challenge to the survival of human civilisations or natural ecosystems. Measures to mitigate climate change should have priority over the usual local balance between economic, social and environmental factors in planning for a particular area where it is essential to achieve national and international targets for reducing the greenhouse gas emissions that drive global warming and threaten survival.

65. The Action Plan for "Planning to Live with Climate Change" advocates a new focus on professional leadership, vision and delivery to promote and guide change to respond to the challenge of climate change and the threat to global survival. It is built on a review of the original proposals for realigning the responsibilities for planning and improving the capabilities of planners that were put forward in the New Vision for Planning. It develops fresh ideas about the new professionalism that will be needed to tackle climate change and to promote spatial planning in the 21st Century and it identifies the action that the RTPI itself will need to take to initiate change.

6 Get Involved

66. Now is your chance to get involved. If you are an RTPI member or a member of an RTPI network or association, tell us how you would like to see this vision for planning to live with climate change developed further. To find out what the current New Vision says and to contribute to its further development, go to:

<http://www.rtpi.org.uk/item/296/23/5/3>

You will be asked to participate in our professional challenge, to shape how planning should respond to climate change to deliver a more sustainable world, by proposing actions that you, your organisation and the RTPI can take.

You can feed back your response in two ways:

- Nations, Regions, Networks, Associations and Planning Aid are being asked to consider this document in a process that will feed into a debate in the RTPI General Assembly on 22 April 2009. Encourage the part of the RTPI that you normally associate with to take part in this debate and please help the process by encouraging your GA representatives to participate in the debate and providing them with your ideas by 14 April 2009. You can do this directly, or responses can be sent via the RTPI offices at Botolph Lane, London, using the click link on the RTPI website.
- You can also contribute as an individual if you wish, also by 14 April 2009. Responses should be sent via the click link on the RTPI website.

67. Following the General Assembly debate, a Consultation Report will be made available on the website to RTPI members. The Executive Team and the Executive Board will work together to take the issues raised in the consultation process in preparing a final version of the Consultation Report. A Communications Plan will also be prepared to guide the dissemination and follow-up action on Planning to Live with Climate Change.

68. Views are sought on the key changes to the New Vision that are proposed in the Draft Consultation Report but not on the foundations of the New Vision itself which the Executive Board and the Policy and Practice Committee consider remain sound.

69. Views are sought on the key ideas in the Draft Consultation Report but not on the language or style of its drafting. Once the content of Planning to Live with Climate Change is settled, the presentation of its messages will be adjusted to the needs of various different audiences.

70. Views are also sought on specific questions raised in debates by The Policy and Practice Committee on the preparation of the Draft Consultation Report.

1. Action Challenges

1.1 What over-arching priorities should be set for the development of action by the RTPI executive across policy, practice and partnerships and education and life-long learning?

1.2 What specific priority actions can your nation, chapter, region, association or network undertake?

1.3 What RTPI staff, volunteer and financial resources might you need to carry out your actions?

1.4 What external partnerships or bids for external resources might you need to carry out your actions?

1.5 What changes can you make to your day to day work as a planning professional to help deliver the priorities and objectives in the Draft Consultation Report?

2. Evidence

2.1 What additional evidence should be reported on to support Planning to Live with Climate Change and develop members and stakeholders' understanding?

2.2 How should this evidence be presented?

3. Nations, Regions, Networks and Planning Aid

3.1 What changes will help to ensure that Planning to Live with Climate Change is seen as generally applicable by spatial planners, whilst also specifically applicable within the policy contexts of the nations of the UK and Ireland?

3.2 What specific changes are needed to ensure that the document is applicable to Scottish Chapters and English Regions?

3.3 What specific changes that could be recommended on the particular specialist expertise or professional affiliations of the Networks and Associations?

3.4 What specific changes could be recommended to improve the application of Planning to Live with Climate Change to planners working with communities through Planning Aid?

4. External Audiences

4.1 Which audiences outside the RTPi should be targeted when Planning to Live with Climate Change has been finalised?

4.2 . Which particular priority audiences should be specifically targeted?

4.3 What key messages should be communicated to these priority audiences?

4.4 How should the document and its messages be presented to these priority audiences and what dissemination styles and methods should be used to engage them?

[1] Stern Report on the Economics of Climate Change 2006: http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

[2] Inter-Governmental Panel on Climate Change (IPCC) Fourth Assessment Report 2007: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf

[3] Hadley Centre Report on Climate Change to the UK Meteorological Office, September 2008

Royal Town Planning Institute

Planning to Live with Climate Change

Refreshing the New Vision for Planning: 2009-2014

Consultation Report: February 2009

Human civilization is entering a new era. Most social and economic decisions throughout our history have been taken with little concern for the use of finite natural resources. We have now reached a point when we must provide for the needs of future generations as well as our own present needs. We must change the way we use natural resources both globally and locally to become truly sustainable and to avoid threatening the survival of humankind and other world ecosystems. Traditional growth and development models now need to be reconsidered at every level to ensure sustainable development. Sound analysis demonstrates that urgent action is needed to tackle climate change and can secure economic as well as social and environmental benefits.

This review of The New Vision for Planning suggests how everyone engaged in spatial planning should adapt their professional approach to plan for living with climate change, to advise and work in partnership with others and to campaign for fundamental change to shape a sustainable new future for humankind. It points the way ahead for the Royal Town Planning Institute (RTPI) in extending a culture change in our approach to sustainable development, both nationally and internationally.

The Challenge

Climate change threatens our survival. Recent studies have shown that we have about 5 to 7 years - the timescale of this document - to change our ways before accelerating trends in environmental degradation lead to irreversible and chaotic change that could challenge the very basis of our way of life and ability to plan. Global warming would hit us at home as well as abroad. Consequential economic change threatens our security both locally and globally. Environmental and economic changes threaten the well-being of communities, families and individuals. Social changes on a global scale will unavoidably lead to increasing deprivation amongst poorer communities and increasing social and economic polarity worldwide.

Options for the Future

"Planning to Live with Climate Change" introduces the challenges of climate change to our vision for planning as an over-arching priority. It revisits the key issues of sustainable development, spatial planning, value-driven planning and action-orientated planning at the heart of the RTPI's original "New Vision for Planning". It then develops the original agenda for change into an Action Plan that seeks to realign the responsibilities for planning, improve the capabilities of planning, focus on the role of the 21st Century professional and identify the actions that the RTPI must take to tackle what is emerging as a new world order. This document challenges you, the spatial planner, to propose individual and collective actions that you can take over the period 2009 – 2014 that will make a difference and asks how the RTPI and its partners should contribute towards effective delivery.

Climate change

Conventional approaches to planning for sustainable development have tended to balance a range of competing considerations, in ways that sometimes assume they are of equivalent weight. Our need to respond to climate change suggests that these approaches cannot continue. Where there is a challenge to the survival of human civilisations and/or ecosystems, measures to mitigate climate change should have priority over the balance that is conventionally sought between economic, social and environmental factors in planning for the specific needs and circumstances of a particular area. The challenge to survival might, for example, be defined in relation to international and national targets for reducing the carbon and related greenhouse gas emissions that drive global warming.

Sustainable development

The 'New Vision for Planning' called for clear planning frameworks to engage people and integrate action to achieve sustainable development. The 'UK Sustainable Development Strategy' has focused on living within environmental limits, ensuring a strong, healthy and just society, achieving a sustainable economy, promoting good governance and using sound science responsibly to achieve sustainable development. Spatial planning aims to balance economic, social and environmental issues and link them with integrated transport systems, community governance and new technology. Whilst government priorities may change over the lifetime of this document, these objectives are likely to endure.

Spatial planning

The new vision proposed that planning should be spatial, sustainable, integrated and inclusive. The RTPI's 2007 report 'Effective Practice in Spatial Planning' found an evolving understanding of spatial planning that involves "place shaping and delivery at the local and regional levels". Spatial planning should aim to enable a vision for the future of regions and places that is based on evidence, local distinctiveness and community derived objectives and translate this vision into a set of policies, priorities, programmes and land allocations together with the resources to deliver them.

Value-driven planning

The RTPI Education Commission aimed to develop education, skills and life-long learning to raise standards of professional competence. There is now a need to extend the continuing culture change in planning to promote change in the management of governments, councils, companies and agencies that are involved in spatial planning. There is an increasing clash of values about the social, economic and environmental issues raised by development and their spatial implications, particularly as between the challenge posed by climate change and the challenges posed by economic growth and social polarity.

Action-orientated planning

The Agenda for Action in the New Vision should be extended to promote sustainable development, to tackle climate change and to secure global survival. The RTPI should establish itself as the voice on spatial planning and become a "campaigning profession". It should strengthen its commitment to community engagement, particularly through Planning Aid, and its programme of consultation across a wide range of public, private and voluntary partners. It should also consolidate its position as the primary professional and academic accreditation body for a wide range of practitioners.

Action Plan

The role of partners

The Action Plan for "Planning to Live with Climate Change" is built on the New Vision for Planning and is focussed on professional leadership, vision and delivery to promote fundamental shifts in practice in response to local and global change. The RTPI is uniquely placed to support civic leadership and establish professional competence, technical capabilities and inclusive processes.

Key shifts in the practice of spatial planning amongst all the partners involved in promoting sustainable development should include:

- Realigning the responsibilities for planning. This should resolve conflicts within sustainable development and realign the powers and responsibilities of the professionals, governments, community organisations, public sector agencies, the private sector developers and operators and the local and global companies involved in spatial planning. Action is required to undertake planning at the right scale and to secure a new accountability for central agencies so that decisions are taken at the lowest possible level consistent with good outcomes. Action is also required to align the agenda of the private sector with the agenda of the public sector so that investment decisions can be effectively integrated to achieve commonly agreed objectives.
- Improving the capabilities of planning. This should address the increasing complexity of urban and rural development at all levels and the need to realign the responsibilities for planning. The RTPI has a lead role to influence government and to support individual planners in developing their own competencies in spatial planning. Action is required to promote research and to manage knowledge for spatial planning at all levels. Action is also required to advance effective practice in spatial planning to work with associated professions and practitioners by consolidating the on-going shift from "blueprint" regulatory models towards more flexible "outcome focused" models of spatial planning.
- Fostering the 21st Century professional. This should encourage professionals in spatial planning to be multi-disciplinary, globally responsible, socially ethical and, above all, progressively campaigning. The RTPI should become a campaigning profession and support planners in extending the current "culture change" in planning. It will need to approach this leadership role at both the strategic and the operational levels with public, private and voluntary sectors and with companies, local communities and individual people. Planners are good at managing change, at finding synergy amidst competing demands and at synthesising complex situations into integrated policies and programmes of action.

The role of the RTPI

The RTPI will need to translate the Action Plan for "Planning to Live with Climate Change" into its Corporate Plan and annual Business Plan to complement the actions that will be required by professional planners, central and local government, public and voluntary sector agencies and the private sector. It will need to adapt its organisation and operation to promote spatial planning and engage its members and partners in tackling global economic, social and environmental issues. It will also need to engage the commitment of its members and partners to deliver practical action.

The RTPI should set its own action plan to achieve its wider objectives including:

- Action to promote international planning to facilitate the major contribution that spatial planning can make to address issues that are essential to the survival of civilisations and ecosystems such as climate change, economic stability and urban and rural poverty.
- Action to achieve planning at the right scale to advocate decision-making at the appropriate level for each decision which may be at the international, national, regional, subregional or local level of spatial planning.
- Action to secure a new accountability for central agencies to counter the increasing responsibility which is being given to non elected agencies and to private service monopolies that combine to separate communities from decision-making processes.
- Action to align the agenda of the private sector to encourage companies to align their agendas to wider economic social, environmental goals as part of their commitments to sustainability and corporate responsibility.
- Action to strengthen checks and balances within the voluntary sector to ensure that the expertise and values of voluntary sector interest groups are not undermined and to strengthen and promote the role and value of Planning Aid.
- Action to re empower local governance to support policies to strengthen effective spatial planning and to secure accountability and long-term commitment to each particular locality.
- Action to re engage local communities to advocate the importance of planning local communities as a key means of re-energising local democracy.
- Action to adapt and improve the skills and ethics of spatial planning to face the challenges of climate change and sustainable development in exercising the RTPI's role as the custodian and developer of initial professional training, life long learning, skills and professional standards.

Conclusion

The RTPI must promote a debate about the fundamental shift that is needed to put climate change at the heart of sustainable development. "Planning to Live with Climate Change" advocates a "climate change priority" to change the conventional approach to planning for sustainable development where there is a challenge to the survival of civilisations and/or ecosystems. Measures to mitigate climate change should have priority over the conventional balance between economic, social and environmental factors in planning for a particular area where it is essential to achieve targets to reduce greenhouse gas emissions that threaten global survival.

The Action Plan for "Planning to Live with Climate Change" advocates a new focus on professional leadership, vision and delivery to promote change in response to the challenge of climate change and the threat to global survival. It is built on a review of the original proposals for realigning the responsibilities for planning and improving the capabilities of planners in the New Vision for Planning. It develops fresh ideas about the new professionalism that will be needed to tackle climate change and promote spatial planning. It identifies the action the RTPI must take to achieve them but, above all, it challenges the spatial planning profession to consider it must act to deliver critically important change to tackle the challenge of climate change.

RSPB



80°

Challenge
Delivering a low-carbon UK

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Keeping human-induced average temperature rises to less than 2°C above pre-industrial levels – the UK and EU goal – will require the UK to reduce its carbon dioxide emissions by at least 80% by 2050. Taking into account the latest climate science, the current UK target of a 60% reduction is inadequate if Britain is to play its part in avoiding dangerous climate change.

Summary

4 In this work, the Institute of Public Policy Research (ippr), WWF and the Royal Society for the Protection of Birds (RSPB) set out to investigate whether a target of 80% can be achieved in the UK by domestic efforts alone and what the costs of doing so would be. We employed two approaches – the MARKAL-MACRO model, used by the government for the 2007 Energy White Paper, and a model developed by Professor Dennis Anderson at Imperial College, employed for the Stern Review on the economics of climate change.

We followed the same assumptions and approaches used by government, but added some constraints that we consider environmentally essential. Unlike the government, we included emissions from international aviation, with a multiplier to allow for non-carbon dioxide effects, in our targets and models. This clearly made our approach much more challenging – however, we believe it is indefensible to exclude this large and rapidly growing source of emissions from UK targets. We examined the implications of excluding new nuclear electricity generation and placed limits both on the use of biofuels and wind.

The key conclusion is that it is feasible to reduce the UK's emissions by 80% by 2050, and at costs that are not prohibitive. Both models identified pathways towards an 80% reduction that involved rapid decarbonisation of the electricity sector, achieved by major investments in wind power and other renewables, and a significant role for carbon capture and storage. Emissions from the production of heat would be reduced through a major programme of energy efficiency and potentially a move to the use of low-carbon electricity for heating. Surface transport emissions would be dealt with by major improvements in vehicle efficiency and, for cars, a move towards use of advanced biofuels derived from sustainable sources.

We must stress that the results presented here do not necessarily represent our preferred pathway to decarbonisation. This report represents only a few of many possible scenarios – including those that could include more rapid uptake of marine renewables, far

higher levels of distributed energy and energy efficiency, and the achievement of energy security goals. Indeed, cost-minimisation models of the kind used here inevitably exclude some solutions that might be preferable on environmental or social grounds.

Despite these caveats, it is clear from the modelling results that it would be feasible to adopt and achieve a UK emissions reduction target of at least 80% by 2050 from 1990 levels, and to do so without new nuclear power. There are also some clear general recommendations for policies to help achieve this goal:

- A much more aggressive focus on energy efficiency should be pursued across all sectors of the economy.
- An ambitious implementation programme for renewable energy must be pursued. The government should focus on delivering, rather than weakening, the EU target for renewable energy to meet 20% of primary energy by 2020.
- Government should review current policy planning tools and the current framework for energy regulation to ensure that the benefits of decentralised power generation are recognised and achieved.
- Carbon capture and storage (CCS) could play an important role. There is an urgent need to demonstrate the viability of this technology in large-scale electricity generation, and to develop a clear framework for regulation and treatment of liabilities. Certainly we cannot afford to build and run new unabated coal-fired power stations without some form of guarantee that CCS works effectively.

- Urgent action is needed to constrain significantly the forecast growth in aviation. Without such action, it will be difficult or impossible for the UK to achieve reductions in emissions consistent with avoiding a dangerous level of climate change.
- The government should apply its own sustainable development principles to the selection of climate mitigation measures in the future. This will ensure that these measures deliver best value in economic, social and environmental terms. Such an approach would, for example, ensure that biofuels were only deployed at volumes that did not pose a significant risk to the environment or food production.

The estimated cost of meeting the 80% target, including our share of international aviation emissions, ranges between approximately 2% and 3% of GDP in 2050; though energy efficiency could markedly reduce these costs, to approximately 1.5% to 2% of GDP.

These estimates represent an upper limit on costs; and while the sums involved are large, the impact on growth of the whole economy over time is relatively minor. The economy would almost triple in size by 2050, even with an 80% cut in emissions. GDP would reach the same level as it does in 2050 under business-as-usual one and a half years later, in the spring of 2052. Costs would be significantly lower if barriers to energy efficiency are addressed successfully. The costs of achieving the 80% target are also dwarfed by the costs of unmitigated climate change. Decarbonising the UK economy by 80% would cost between one half and one tenth as much as doing nothing, based on Stern's estimate that climate change damage costs would reduce global GDP by between 5% and 20%.

A more comprehensive presentation of this study can be found in ippr's companion report 2050 Vision.



Introduction

- 6 Can the UK reduce its carbon emissions by 80% from 1990 levels by 2050, and if so at what cost? There is a substantial amount of analysis suggesting that the impacts of human-induced climate change will become increasingly dangerous if the average global surface temperature exceeds 2°C above pre-industrial levels. While 2°C is not in itself a safe limit, and will result in significant harm to both people and wildlife, it has been widely accepted as a critical threshold, and adopted as the overall aim of the EU.



For the UK to make a fair contribution to a global emission reduction effort consistent with staying within a 2°C limit, emissions would have to be reduced by at least 80% by 2050 from 1990 levels, and possibly by 95% or more.²

While the scientific imperative is clear, there are major concerns that achieving such deep emissions cuts could be difficult (or even impossible), costly and damaging to the economy. The UK government's position is that a 60% reduction in carbon dioxide emissions by 2050 should be adopted in the Climate Change Bill currently before Parliament – although the Prime Minister recently stated his intention to ask the new

Climate Change Committee to review the adequacy of this target.

WWF, the Institute for Public Policy Research (ippr) and the Royal Society for the Protection of Birds (RSPB) have commissioned modelling work to explore the feasibility and costs of an 80% carbon emissions reduction for the UK economy. This approach explores the case in which this reduction is achieved entirely through domestic action, with no contribution from credits purchased from abroad. It effectively establishes an upper bound on technological feasibility and costs.

Our target is considerably more ambitious than that proposed by the

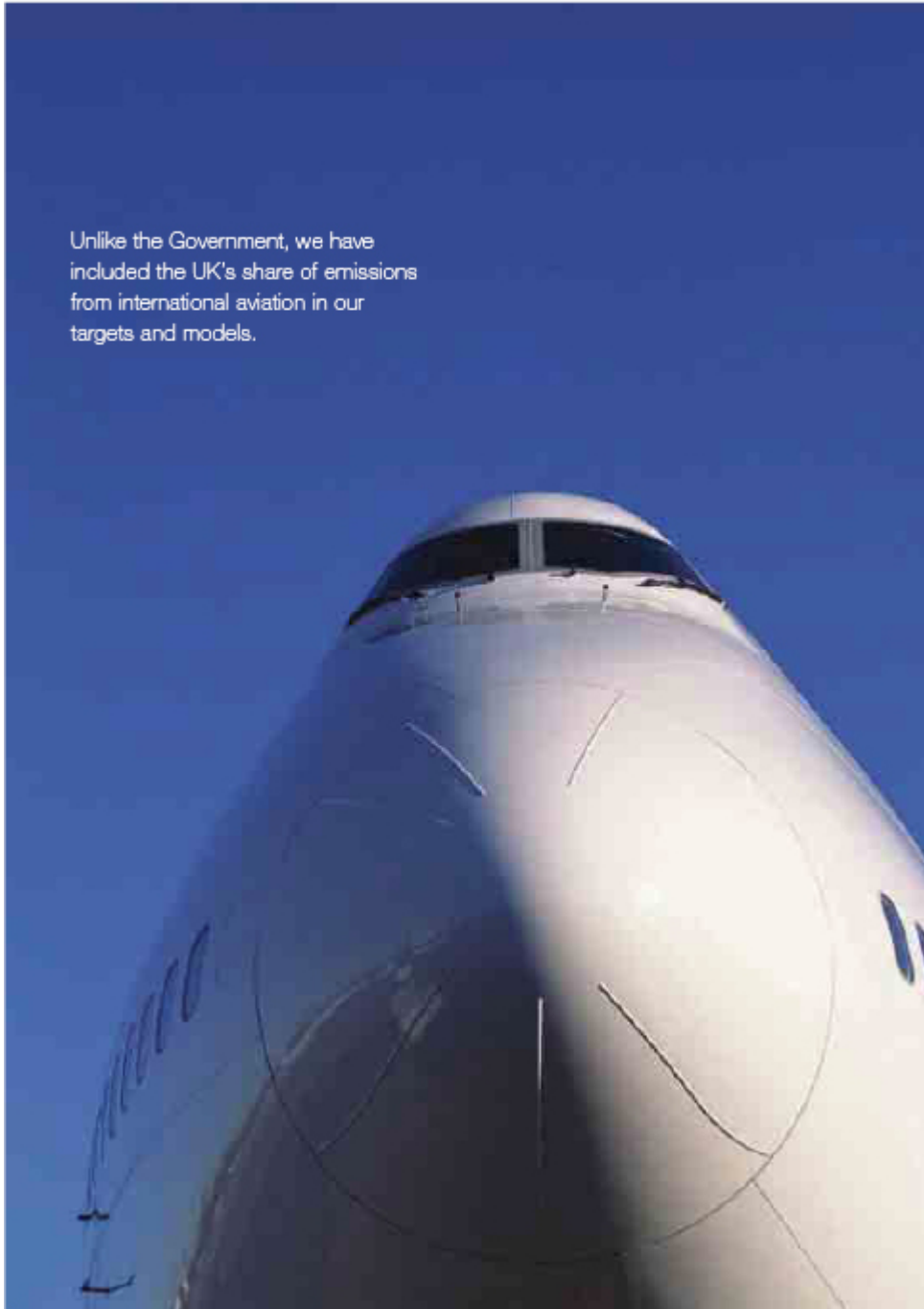
government – not least because we have included the UK's share of emissions from international aviation. Because these emissions are growing so rapidly, carbon emissions from land-based sources will need to fall by perhaps 90-95%.

We employed two authoritative approaches: the MARKALMACRO model, used by the government for the 2007 Energy White Paper, and a model developed by Professor Dennis Anderson of Imperial College for the Stern Review.

With few exceptions, we employed the same underlying assumptions as the government and the Stern Review, such as economic growth rates. However, our study differs from the official approach to UK modelling in three ways: we included emissions from international aviation, we looked at electricity generation without new nuclear power, and we imposed constraints on the extent to which both biofuels and wind generation could be used.

The modelling results show that it is technologically feasible for the UK to attain a target of 80% emissions reductions by 2050, without major reductions in mobility and while meeting national demand for energy services. They also show that the costs of doing so, while greater than those required for reaching a 60% reduction, are still of the same order of magnitude, and significantly lower than the costs of doing nothing.

Unlike the Government, we have included the UK's share of emissions from international aviation in our targets and models.



The relationship between temperature rise and emissions

8

The objective of reducing the UK's carbon dioxide emissions by 60% by 2050 from 1990 levels was proposed by the Royal Commission on Environmental Pollution in 2000, and was based on an assessment of what the UK needed to do to make a fair contribution to staying below 2°C warming. The government adopted the 60% goal in the 2003 Energy White Paper.

Since then, however, developments in climate modelling have allowed more precise estimates of the relationship between different atmospheric concentrations of greenhouse gases (and hence global emission reduction pathways) and temperature increases.

A recent review of these studies showed that to stand a reasonable chance (better than 50:50) of staying below two degrees, it will be necessary for concentrations of global greenhouse gas emissions to stabilise at below 450 parts per million carbon dioxide equivalent (ppm CO₂e) and probably nearer 400ppm (Meinhausen 2006¹).

However, given that the atmospheric concentration of greenhouse gases is already near 430ppm CO₂e, greenhouse gas concentrations will have to first peak and then decline (e.g. Meinhausen 2006¹, Baer with Mastrandrea 2006², European Commission 2007³, Höhne et al 2007⁴). Because the climate system takes a long time to adjust to rises in greenhouse gas emissions, as long as the peak in emissions is brief enough, temperature increase should not exceed 2°C.

These studies imply that global greenhouse gas emissions will have to fall by at least 50% from 1990 levels by 2050 if we are to have a better than 50% chance of staying below 2°C. To reduce the chance of exceeding 2°C to less than 25%, more radical cuts in global emissions would be required, of the order of 70–80% (Baer with Mastrandrea 2006²).

To work out the implications at the national level, it is necessary to determine what the UK's 'fair share' of global reductions should be. There are various ways of doing this, including different versions of contraction and convergence, the 'trijtych' system that takes national

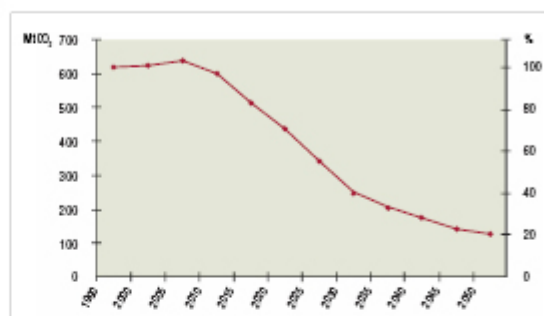


Figure 1. CO₂ emissions reductions targets for the UK

factors into account, used by the EU for its burden sharing agreement, and other formulations.

A recent review by Höhne et al (2007) for the UK government, based on a goal of stabilisation at 450ppm CO₂e, suggests that the UK should be aiming to reduce greenhouse gas emissions by 35–45% by 2020 and by 60–65% by 2050, from 1990 levels. This is in the same range as Baer and Mastrandrea (2006), who estimate that to be consistent with a low-to-medium risk (i.e. <25%) of exceeding 2°C, and under a contraction and convergence burden sharing model, the UK would have to reduce carbon dioxide emissions by between 59% and 64% from 1990 levels by 2050. It is worth noting that the review by Höhne et al (2007) concluded that even to stabilise at 550ppm CO₂e – corresponding to a likely warming in excess of 3°C – the UK's emissions would need to fall by 70–90% by 2050.

An 60% emissions reduction by 2050 from 1990 levels is therefore probably the least that the UK needs to achieve in order to make a fair contribution to a global effort to avoid dangerous climate change. In this study we have adopted this limit, with interim targets of 30% reduction by 2020 and 60% by 2030 (see Figure 1), but it should be noted that to have a lower risk of exceeding 2°C, further reductions would be needed.

In principle, some of the UK's emissions reductions could be achieved through international emissions trading and the purchase of emission reduction credits from other countries. However, it is unwise at this stage to place too much reliance on this mechanism or assume ready access to large volumes of relatively cheap credits. Although it is hoped that a robust global trading system will emerge, at present there are real concerns over the credibility of the emerging carbon markets and the Clean Development Mechanism in particular. For these reasons, in this study we assumed that emission reductions of 60% by 2050 would be achieved entirely through domestic action. This tests the upper bounds of both feasibility and cost.

This emissions trajectory can also be expressed in terms of five-year carbon budgets, in line with the Climate Change Bill proposals, from 2008 to 2028:

Output period	Five year budget (GtCO ₂)
2008–12	2.99
2013–17	2.58
2018–22	2.17
2023–27	1.71

The 2°C imperative

Since the industrial revolution, the world has warmed by some 0.75°C – and we are already seeing significant impacts on the world's poorest people and on biodiversity. This year's reports by the Intergovernmental Panel on Climate Change make clear that this warming is "very likely" to be a result of human activities. The IPCC concluded that without strong efforts to reduce global emissions, this century will see a probable further rise in temperature of 1.8–4°C – with a possible increase of as much as 6.4°C.³

In 1996, the EU adopted an objective to stabilise global temperatures at 2°C above the pre-industrial average. It has repeatedly reaffirmed this goal, most recently in the context of this year's G8 summit in Germany. Prime Minister Gordon Brown has also stated his support for the 2°C objective.

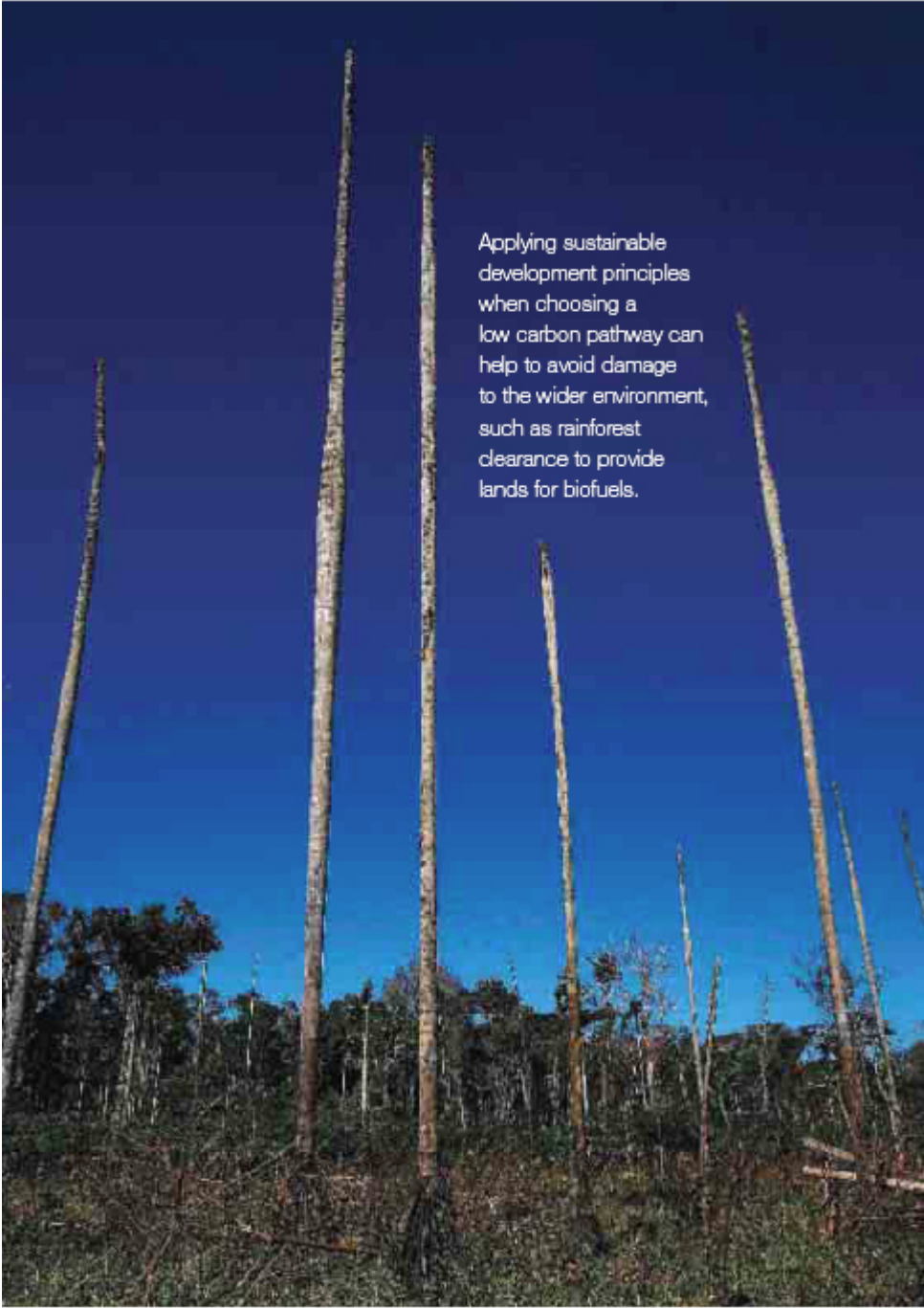
Even if warming is restricted to 2°C, the world is committed to very significant impacts to both human society and biodiversity. The IPCC concluded that at warming of just over 2°C above pre-industrial levels, some 20–30% of species face a high risk of extinction. If the rise in temperature ranges between 2–3°C, an additional 1–2 billion people will face increased water scarcity and many millions face increased risk of hunger and displacement by sea level rise and extreme weather events. We are already fueling the prospect of an Arctic that is free of summer sea ice by mid-century.

Moreover, above 2°C warming we face severe risks of crossing irreversible 'tipping points' and triggering feedbacks that will further accelerate climate change.⁴ These impacts include the collapse of the West Antarctic Ice Sheet and irreversible melting of the

Greenland ice-sheet, which would lead respectively to eventual sea level rises of 4–6 metres and 6–7 metres. Above 2°C, the world's soils and vegetation are expected to cease being net sinks for carbon and turn into net sources – fuelling further warming. Warming above 2°C is likely to wipe out most of the world's coral reefs and could trigger drying out and die-back of the Amazon rainforest.

Some leading scientists believe that even warming of 2°C is too much. James Hansen, Director of the NASA Goddard Institute for Space Studies, argues that global warming of more than 1°C this century "will constitute 'dangerous' climate change as judged from likely effects on sea level and extermination of species'.⁵





Applying sustainable development principles when choosing a low carbon pathway can help to avoid damage to the wider environment, such as rainforest clearance to provide lands for biofuels.

Environmental safeguards and modelling assumptions

THE MODELLING APPROACH

This report is based on two energy-economy modelling approaches: the MARKALMACRO model, used by the government for the 2007 Energy White Paper; and a model developed by Professor Dennis Anderson of Imperial College for the Stern Review.

Before describing the modelling approaches and results, it is important to spell out the nature of the exercise. The approaches used here are not forecasting models. They are not used to try to predict the future energy system of the UK in 50 years' time. Instead they offer ways of exploring the trade-offs between different energy systems pathways, as well as the cost, energy supply and emissions implications of these different pathways.

Both the approaches here are bottom-up models that base scenarios and cost estimates on data about individual technologies. They are transparent and open on assumptions about costs.

However, these models also have their limitations. For example, they represent the electricity system in an aggregated way. Decentralised energy may well have a greater role to play than the models suggest, but further more detailed work is needed to quantify this. Nor are energy security issues factored into the operation of the models.

More broadly, in both models it is assumed in a straightforward way that investment will flow into those technologies with the lowest cost. Investment decisions in the real world are more complex, where expected revenues and potential risks play a major role (Gross et al 2007¹²). These models should not be taken literally as a strict prediction, but rather as an indication of long-term potential patterns based on our current knowledge of technologies and costs.

Because of these limitations, and because the models seek least-cost rather than best-value options, there would be serious risks in relying on them too heavily to guide choices in climate and energy policy. A more rounded way of assessing available mitigation options might be to apply the government's sustainable development principles to

any package of mitigation policies¹³ under consideration. This would help to ensure that climate mitigation solutions maximise benefits for other policy objectives and minimise undesirable trade-offs.

In the MARKALMACRO modelling, we used, with a few exceptions, the same assumptions about technologies and costs as those made by the government. Likewise, with the Anderson model, we followed the same approach as the Stern Review, although technology cost estimates are different because they relate to the UK, rather than average global costs.

However, for both studies, some additional common changes to approach and assumptions were made: including international aviation; imposing some constraints on biofuels and wind for environmental reasons; and excluding nuclear new build.

INCLUDING INTERNATIONAL AVIATION EMISSIONS

The first difference from the government's approach was to include emissions from international aviation. Emissions from aviation already make a significant contribution to the UK's carbon dioxide emissions: their share was 6.3% in 2005, of which 0.4% was from domestic and 5.9% from international flights.¹⁴ They are rising much more rapidly than other sources of emissions and are forecast to continue to grow considerably if unconstrained. According to the Department for Transport (DfT), under current policies by 2030 the sector's emissions are set to reach nearly four times their 1990 level.

Aviation also has a greater net impact on climate change than is implied by its carbon dioxide emissions alone, due to the behaviour of other exhaust gases at altitude and the warming effect of aircraft-induced contrails and cirrus clouds. The Intergovernmental Panel on Climate Change (IPCC) has estimated that aviation's total impact on the climate is between two and four times that of its carbon dioxide emissions alone. Although some uncertainty remains as to the exact quantification of these effects, the precautionary principle states that this

should not be used as a justification for ignoring them. Accordingly, in this report we have followed the practice of the Treasury in applying a multiplier of 2.5 to aviation's carbon emissions.¹⁵

The government includes only domestic aviation in its emission reduction targets and the modelling work for the Energy White Paper, because emissions from international aviation are not covered by the Kyoto Protocol. Nonetheless, it recognises that they should be included and is committed to resolving the political issues that led to their exclusion from Kyoto. Since our study is driven not by politics but by the scientific imperative to limit greenhouse gas emissions, we considered that it was essential to include international aviation emissions in our work.

However, we also constrained emissions from aviation so that they should not exceed the forecast level in 2010, to reflect the likely inclusion of aviation in the EU emission trading scheme from that date. This approach to capping the sector's emissions does not constrain aviation growth *per se* – rather it implies that any increase in passenger kilometres flown must be matched by corresponding efficiency improvements through better technology or flight management. This is clearly ambitious, given current growth rates – but from a broader perspective aviation could be seen to be receiving favourable treatment as all other sectors of the economy will need to make very steep cuts in emissions.

We believe that it is justifiable to treat aviation as a unique case, because of its extremely rapid growth and because of the lack of readily available technological solutions. Including international aviation emissions with a multiplier in our modelling was particularly challenging. With an 80% reduction by 2050, the models suggest that a large proportion of all remaining UK emissions would be from aviation. Even with our constraints on future growth in aviation emissions, the rest of the UK economy is required to reduce its carbon emissions from a 1990 baseline by more than 40% by 2020 and by some 65% by 2050.



The ptarmigan could find its climate space disappear from the UK as conditions on mountaintops become less suitable in a changing climate.

ENVIRONMENTAL SAFEGUARDS

Environmental organisations recognise the need to tackle climate change as an overriding imperative and are fully signed up to the need to achieve 80% emissions reductions cuts. However, there are concerns that certain choices for mitigating climate change may be damaging in their broader sustainability impacts, particularly to wildlife. Such examples include badly sited wind farms that have damaged important bird of prey populations in Spain and Norway, and biofuel supplies that have accelerated the rate of deforestation in the tropics.

Because of this, one of the issues we wished to explore in deploying these models was whether or not we can still achieve an 80% reduction target with indicative environmental safeguards. We did this by constraining the amount of biofuels and wind generation (the latter also being limited by intermittency constraints in one of the models). Though this by no means takes account of all sustainability issues across different technologies, by applying those constraints here, we could limit the potential wider impacts of two significant technologies while investigating whether achieving an 80% cut in emissions would still be technologically and economically feasible.

Sustainable biomass

There are a number of concerns about the sustainability of biomass and biofuel production, especially if the fuel is imported in large amounts without adequate accreditation to ensure it meets environmental safeguards and offsets

significant net CO₂ savings throughout its life cycle. We therefore capped the UK's use of bioenergy at a level that we considered would not lead to significant adverse effects, such as further rainforest destruction for palm oil or soya production.

WWF International recently reviewed the evidence on biomass, and estimated that biomass with an energy content of between 110 and 250 exajoules (EJ) could sustainably be produced annually by 2050, at a global level (WWF International 2007¹¹). In our study, we introduced a conservative constraint on the UK's share of that global supply of biomass based on equal per capita use, with total biomass imports limited to 1.1EJ per annum in 2050, growing linearly from zero in 2000.

Wind power

Research commissioned by the Scottish Executive has examined potential onshore wind capacity if developments avoid sensitive wildlife, landscape and military areas.¹² It concluded that even with these constraints the onshore wind capacity is more than Scotland's entire projected electricity consumption in 2020. Offshore wind has even greater potential, but it is recognised that delivering the full benefits of this form of renewable energy would require significant changes to the transmission system.

The limit on wind power to 25% of capacity on the grid employed in the MARKAL-MACRO model to reflect intermittency constraints (see below) also limits damage to wildlife but in this respect is probably conservative.¹³ If the intermittency issue can be resolved in an economic way, levels of wind employed without damage to the wider environment

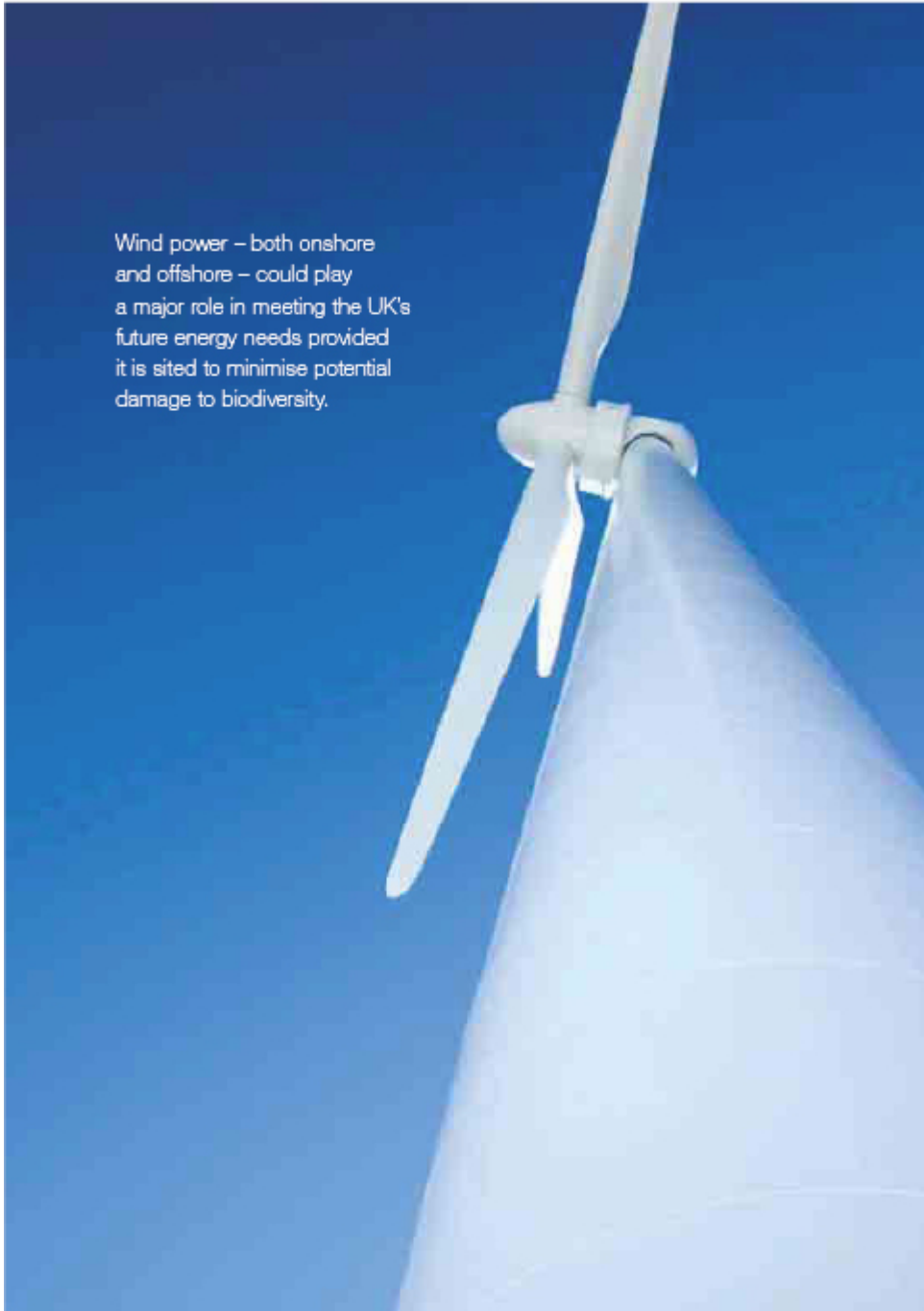
could be significantly greater. These models do not deal with spatial data but a strategic planning approach would be the best method of ensuring the maximum deployment of wind without wider environmental damage.

EXCLUDING NUCLEAR NEW BUILD

One relatively low carbon option for electricity generation is nuclear power, and the government includes it in its forecasts. However, in the past nuclear power has proved costly and the problem of the long-term disposal of nuclear waste remains unsolved and is a large ongoing liability. Nuclear power also poses concerns about security. Other countries will look to the example of the UK, so new nuclear build here will encourage others to do likewise. But the widespread adoption of nuclear power potentially exacerbates the threat of proliferation that accompanies nuclear energy programmes (US National Security Task Force on Energy 2006)¹⁴.

For these reasons we decided to model the feasibility of reaching an 80% target without new nuclear generation. New nuclear was excluded from the MARKAL-MACRO modelling. In both models, excluding new nuclear build does not affect the technological feasibility of attaining an 80% reduction by 2050. The Anderson model was run with and without new nuclear, allowing cost comparisons. Excluding nuclear does raise costs in the middle part of the period, but by 2050 the difference is only 0.1% of GDP.

Wind power – both onshore and offshore – could play a major role in meeting the UK's future energy needs provided it is sited to minimise potential damage to biodiversity.



The models

14 Both the approaches used for this study combine estimates of the costs of energy technologies with simple economic growth models. One model, known as MARKAL-MACRO, is supported by the International Energy Agency (IEA), and used by around 100 teams in over 30 countries (Strachan et al 2006). In the UK, the lead organisation running the model is the Policy Studies Institute (PSI). The Department for Trade and Industry (DTI) (now the Department for Business, Enterprise and Regulatory Reform, DBERR) commissioned MARKAL modelling work from the PSI as input into the 2007 Energy White Paper. The other model was developed at the Imperial College Centre for Energy Policy and Technology by Professor Dennis Anderson²⁰ for estimating the global costs of mitigating climate change for the Stern Review.

MARKAL-MACRO

MARKAL stands for MARKet

Allocation, since it mimics a market by always choosing the combination of technologies with the lowest cost. MARKAL makes estimates of future costs based on extensive literature review, peer review and stakeholder workshops. The MARKAL model can be linked to a simple economic growth model, which allows carbon prices to feed back to energy demands.

The combined MARKAL-MACRO model gives estimates of future GDP, as well as the costs of carbon abatement in terms of a proportion of GDP.

The model includes assumptions about the growth in demand for energy in the baseline or business-as-usual case (i.e. without any carbon abatement). In our study, the PSI used the same set of assumptions as were used for the 2007 Energy White Paper analysis (Strachan et al 2007²¹). This includes the effects of all existing policy measures, and central DTI and DfT projections for energy use in the domestic, industrial, and surface transport sectors.

The MARKAL-MACRO model has both strengths and weaknesses. While its assumptions on data, technology pathways and constraints are transparent, not all factors can be captured fully. By optimising costs, in effect it represents a perfect energy market, and neglects barriers and other non-economic criteria

that affect decisions. As a closed national economy model, it does not produce estimates of costs due to loss of international competitiveness, and as a result the cost estimates it produces may be over-optimistic. On the other hand, it also does not include any potential gains from exports of low carbon technologies.

In both the models used, much of the decarbonisation, especially initially, comes from the electricity generation sector. This implies a very large amount of investment in wind in the case of MARKAL, to levels far beyond 40% of demand. This matters because wind, like some other renewables, is an intermittent source of power. At low levels of penetration in the power system (<10%), this intermittency does not matter much. However, higher levels (>20%) of wind and some other renewables can mean higher costs, because of the need for reinforcement of the transmission and distribution system, and also balancing and/or storage costs.

The MARKAL model is not well designed to deal with such high levels of wind in the system. To overcome this problem, a requirement for energy storage was applied to intermittent renewable sources above 25% of total generating capacity.²² In effect, this made wind and other intermittent renewables more expensive beyond this point.

THE ANDERSON MODEL

Anderson's model was originally used to estimate the global costs of reducing global greenhouse gas emissions by 25% from current levels by 2050, consistent with stabilisation at atmospheric concentrations of 500ppm CO₂. Here the model was applied to the costs to the UK of a much deeper 60% reduction in the UK's carbon emissions.

Anderson begins with estimates of the costs of different energy technologies in 2015, 2025 and 2050, in the electricity, heat and transport sectors. For many emerging technologies, such as coal with carbon capture and storage or hydrogen fuel cell vehicles, where there is uncertainty about what costs will be, the model assumes a range of possible costs with each cost within that range assigned a probability.

The model then makes assumptions about future oil prices, future economic growth, growth in the demand for energy, and likely market shares for different technologies. Again, these are not known for certain, so they are also expressed as ranges of possible values, with average values based on historical experience.

In Anderson's original base case, projected future aviation growth reflects historical experience. For this study, a version of the model with zero elasticity of demand for aviation fuel from 2010 onwards was used, to introduce the constraint on aviation emissions discussed above.

From these variables, the average cost of abating a tonne of carbon at the different dates is calculated. Multiplied by the emissions reduction requirements given in our emission abatement curve (Figure 1), this gives the total cost of abatement.

Since these cost estimates are drawn from the underlying assumptions about future technology costs, energy demand, oil prices etc., they are themselves expressed as ranges, with an average and a probability distribution. Only the averages are reported here.

Results

SECTORS AND TECHNOLOGIES

Both models show that deep reductions in emissions from the UK of 80% by 2050 from 1990 levels are technologically possible. However, they also point to the scale of the challenge of developing policies to bring forward rapid investments in energy efficiency, low carbon electricity and transport.

The models show a considerable degree of consistency in estimating the extent to which different sectors will decarbonise and which technologies will develop, given that they use different approaches. Anderson's model gives a wider range

of technologies than MARKAL-MACRO, as would be expected from two models based on reasonable probabilities and least costs respectively.

Both models foresee abatement of emissions in the electricity sector as playing a central role, with emissions declining to almost zero, in spite of a large increase in the use of electricity after 2030 (Figures 2.1 and 2.2). This partly reflects the fact that a range of low and zero carbon technologies in this sector are already reaching maturity, and so emission reduction costs are lower than in other sectors.

The household sector also

decarbonises substantially (completely in the MARKAL-MACRO model), with zero carbon electricity replacing natural gas as the energy source for space and water heating.

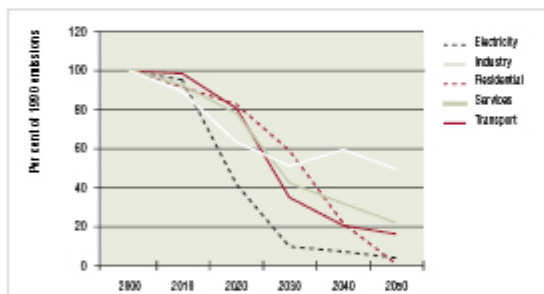


Figure 2.1 – Carbon abatement by sector, MARKAL-MACRO model

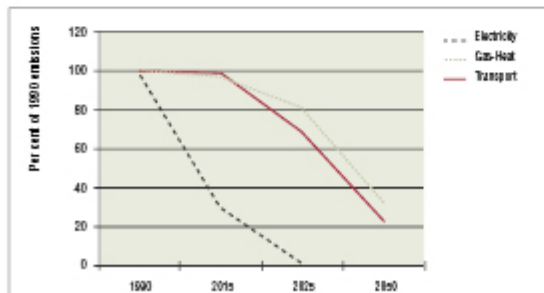


Figure 2.2 – Carbon abatement by sector, Anderson model



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Electricity

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While the Anderson model gives a role to micro-generation technologies, such as solar and domestic combined heat and power (dCHP), the main result of both models is that decarbonisation in the electricity sector is dominated by wind power and carbon capture and storage (Figures 3 and 4). In the MARKAL model these two technologies account for three-quarters of electricity generation by 2050.

Because transport plays virtually no role in decarbonisation before 2025 in Anderson's model, the electricity sector requires particularly rapid investment in low-carbon technologies. In illustrative scenarios, based on average market shares, our calculations, based on Anderson's model are that of the order of 70 terawatt hours (TWh) of electricity will have to be generated from wind by 2015, mainly off-shore, requiring about 20 gigawatts (GW) of installed capacity. By comparison, the London Array has a planned capacity of 1 GW, and current plans for Round 2 of offshore wind-farm consents are in the range of 5.4-7.2 GW. However, the British Wind Energy Association (BWEA) considers that 20 GW of offshore wind alone is achievable by 2020, within the current policy context (BWEA 2006¹⁹).

Because the transport sector starts to decarbonise earlier in the MARKAL-MACRO model, the early emphasis placed on renewables is somewhat less. Wind generation by 2020 is modelled at 30 TWh, requiring some 6 GW of capacity, in line with the government's current expectations of Round 2 of offshore wind farm development (5.4-7.2 GW). Only around 10% of electricity generation is modelled to come from renewables by 2020, also within the government's current goal.

However, there is a very sharp subsequent increase in wind capacity after 2020, rising to 82 TWh in 2030, requiring some 33 GW, and eventually to 110 TWh in 2050. By 2050, other renewables are also beginning to enter into the generation mix, with marine and various biomass and waste technologies growing in importance.

The current government aspiration for renewables is that they should be 20% of electricity generation by 2020, and the EU-wide target is to produce 20% of energy from renewables (with the UK possibly having to take on a more ambitious goal within that EU-wide figure). Thus the mid-term scenario derived from the Anderson model for renewable electricity generation shown here is far more demanding than current policy, and presents a serious medium-term challenge. A policy framework for rapid expansion of renewables would have to be adopted very soon for this scenario to be feasible in terms of new investments. By contrast, the MARKAL-MACRO scenario is within the ambitions of existing UK renewable electricity targets for 2020.

However, in March 2007, EU Heads of State signed up to a binding target for renewables to meet 20% of Europe's primary energy needs by 2020. This target will clearly require a much more rapid growth in renewables for electricity supply than implied by current UK targets. Although we applied a 25% threshold on intermittent renewables in running the MARKAL-MACRO model,

evidence suggests that a greater volume of wind generation could be achieved without significant environmental impact if appropriate strategic planning was undertaken now. In meeting the EU target, sustainable development principles should be applied to policy choices – including the implications of environmental limits for onshore and offshore wind – to ensure that they maximise benefits and minimise risks across a range of policy objectives.

Figure 3. Relative contributions to carbon abatement in the electricity sector by 2050, Anderson model

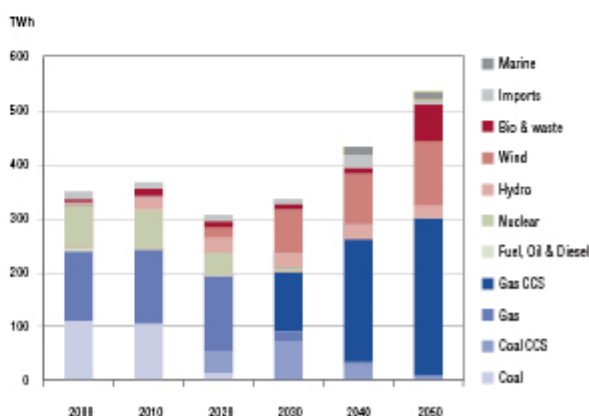
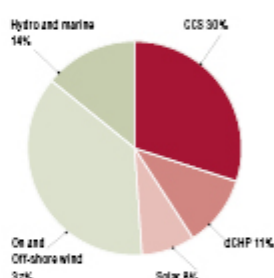


Figure 4. Electricity generation mix to 2050, MARKAL-MACRO model

The other main technology in the decarbonisation of electricity in these models is carbon capture and storage (CCS) applied to fossil fuels (see box). Our calculations, based on Anderson's model, are that by 2025, CCS plant would have to be generating over 100 TWh of electricity, or around 25% of estimated demand. This would be roughly equivalent to 15 GW of generation capacity, or some 30 medium-sized 500 MW power stations. Currently, there are plans for only one 'full-scale' demonstration plant, probably of 500 MW-1 GW, to be operational in the early years of the next decade. Getting on track for this particular scenario would therefore require a rapid deployment of the technology on a very large scale immediately after a successful demonstration.

The MARKAL-MACRO model scenario also involves the development of major CCS capacity over time. By 2020, the model requires 43 TWh of generation from 5.4 GW of coal and gas-fired plant with CCS (equivalent to 11 medium-sized 500 MW power stations). By 2050 this grows to 301 TWh, mostly from gas-fired plant with CCS.

These installation rates are ambitious, but appear to be achievable and consistent with reported carbon storage capacity in depleted North Sea oil and gas fields. A recent study concluded that with adequate political support it would be possible for CCS to reduce emissions from UK electricity generation by 45% by 2020, covering some 9-13 GW of installed capacity¹⁴.

As noted above, neither approach models decentralised electricity generation well. In the MARKAL-MACRO model it plays virtually no part. Micro-renewable heat technologies (such as solar thermal or ground source heat pumps) do not enter the picture either. This is because, despite coming down in price over the period, they remain more expensive than heating through centralised electricity. This reflects the strict cost-optimisation aspect of the MARKAL model.

Carbon capture and storage

It is clear that to achieve the ambitious emissions reduction scenarios required to avoid dangerous climate change, a rapid transition away from fossil fuels will be essential. However, the need for rapid and deep cuts in emissions means that there may well be a role for carbon capture and storage (CCS) as a bridging technology – provided that it does not distract effort away from more sustainable approaches such as energy efficiency and renewables.

CCS entails the removal of carbon dioxide from

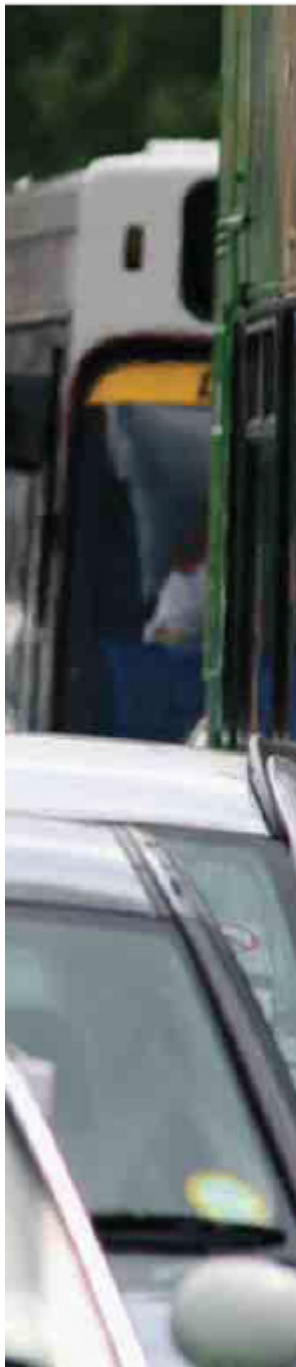
fossil fuels before or after combustion. The captured CO₂ can then be injected into geological structures, such as depleted oil and gas wells under the North Sea or deep saline aquifers. Although CCS is new, its components are not. However, there are significant challenges to demonstrate that carbon capture can operate effectively on a large-scale integrated power plant, and that storage can be carried out in a safe and well-regulated manner.

In 2005, a major review by the Intergovernmental

Panel on Climate Change concluded that CCS could contribute perhaps 15-35% of the overall global efforts to reduce emissions this century, provided that technical, economic and regulatory barriers could be addressed (IPCC 2005¹⁵). In March 2007, the EU stated its intention to have 10 CCS demonstration projects running by 2015 – and in the 2007 Energy White Paper the government announced a competition to build the world's first full-scale CCS power plant in the UK.







Transport

Surface transport also sees very deep emissions reductions, albeit more slowly than in the electricity sector.

In the Anderson model, the transport sector starts significant decarbonisation only after 2015. First and second generation biofuels play some role, in both surface transport and in aviation. In aviation, they make up a third of fuel used by 2050. However, hydrogen²⁴ also plays a substantial role in surface transport, making up almost 20% of energy used by 2050.

In the MARKALMACRO model, road transport also sees a major restructuring, with a move to much greater efficiency in engines in cars, and the introduction of hybrids in vans and buses. Biodiesel use (especially second-generation biodiesel²⁵) begins to take off from 2010 across all vehicle classes, and by 2030 conventional diesel has been largely phased out (Figure 5).

However, there are limits to the use of first-generation biofuels in cars, with biodiesel and methanol peaking in 2050 at around 4.5 Mtoe (million tonnes of oil equivalent), or around 17% of current car fuel use. But by 2030 'Fischer-Tropsch' diesel, a second generation biofuel produced from solid biomass, is already emerging as the most important fuel in the mix for

cars. By 2050, 70% of fuel used in cars is F-T diesel.

The heavy goods vehicle fleet converts to hydrogen (mainly from electrolysis from zero carbon electricity) by 2030. Rail switches over entirely from diesel (which currently accounts for 80% of energy use in rail) to electricity. Despite more efficient vehicles, overall energy use in transport increases, meaning that mobility across the economy continues to rise.

Air transport is the least transformed sector, with the least low carbon fuel substitution (none at all in the MARKALMACRO model), meaning that kerosene jet fuel continues to be used. However, a combination of increased fuel efficiency and the deep decarbonisation in other sectors means that a modest expansion of air travel (30% over current levels in the MARKALMACRO model) is still possible.

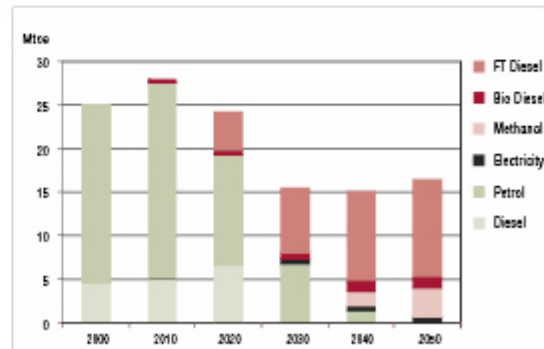


Figure 5. Fuel use in cars, MARKAL-MACRO model

Total costs

In terms of overall costs of decarbonisation (see Box) in 2050, the two models give results in the range of 2% and 3% of GDP.

In the Anderson model, the estimate of total costs of decarbonisation by 2050 is around 2.1% of GDP (the most likely value within a probability distribution ranging from under 1% to around 3%). With growth modelled as 2% per year until 2025, and then falling to 1.5%, GDP in 2050 is expected to be £2,650 billion at 2005 prices. Thus in absolute terms the costs of meeting the target will be in the region of £55 billion a year by 2050.

In the MARKAL-MACRO model, total costs in the central scenario rise to around 2.8% in 2050. Estimated GDP by 2050 in 2005 prices is £2,600 billion, so the absolute costs of achieving the 80% reduction trajectory start low, but rise to around £30 billion by 2030 and almost £80 billion by 2050.

Under both models, costs fall very significantly (by more than 20% under MARKAL-MACRO) if barriers to the uptake of energy efficiency measures are addressed successfully (see the alternative scenarios discussion in Annex I of this document).

The two models show different distributions of costs over time. Under the MARKAL-MACRO model, costs rise steadily from around 0.5% of GDP in 2020 to 1.6% in 2030 and then to around 2.8% in 2050 (Figure 6). In the Anderson model, costs peak at 2.25% of GDP in 2025 and then fall to 2.1% in 2050 (Figure 7). The difference arises because Anderson has a wider range of higher cost low carbon technologies than the MARKAL-MACRO model, and these are expensive to deploy widely in the middle of the period.

These cost estimates need to be set in context. The size of the UK economy is assumed to increase to roughly 2.5 times its present size by 2050, and the net impact on that growth of the costs discussed here are small (Figures 8 and 9). A UK economy meeting an 80% carbon emissions reduction target would reach the same GDP in 2050 as a business-as-usual UK economy would in 2050.

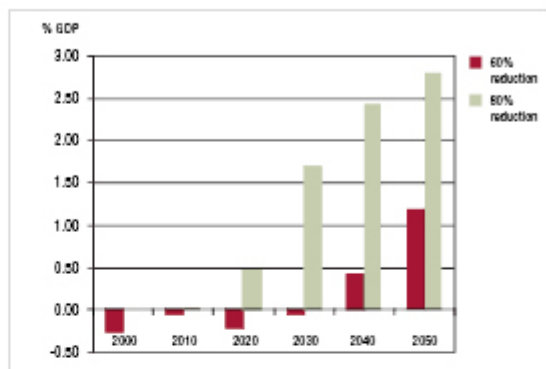


Figure 6. Total costs of abatement, MARKAL-MACRO model

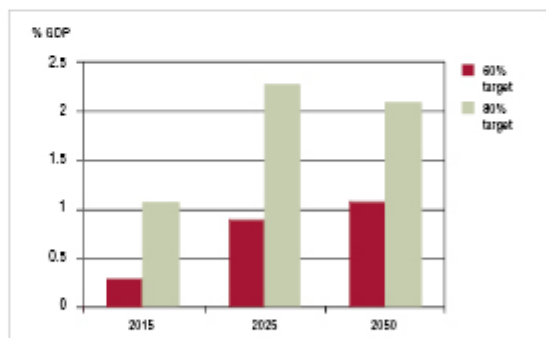


Figure 7. Total costs of abatement, Anderson model

Note: the costs of achieving the 80% and 60% targets indicated in Figures 6 and 7 are not directly comparable with the government's 60% objective, because we included international aviation emissions whereas the government did not.

The costs of doing nothing should also be remembered. The Stern Review put the damage costs of unabated climate change at a much higher range – between 5% and 20% of global GDP.

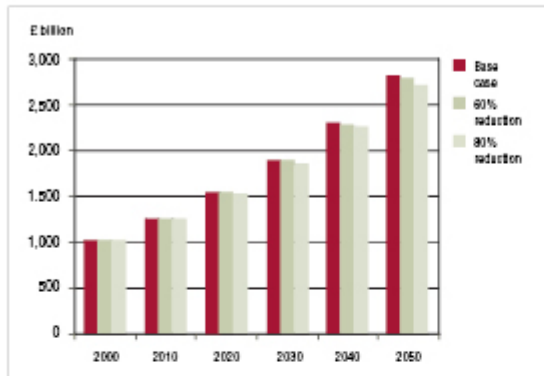


Figure 8. GDP growth with and without abatement, MARKAL-MACRO model

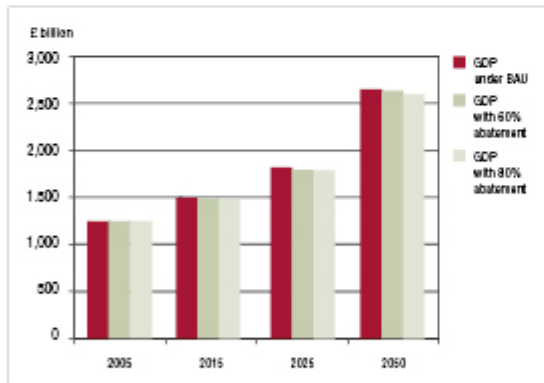


Figure 9. GDP growth with and without abatement, Anderson model

Note: the costs of achieving the 80% and 60% targets indicated in Figures 8 and 9 are not directly comparable with the government's 60% objective, because we included international aviation emissions whereas the government did not.

Treatment of costs

There are two ways of understanding the costs of decarbonising the UK economy. One is simply the additional costs of low carbon technologies over the costs of our current fossil fuel technologies. The Anderson model produces this type of cost estimate, expressed as a percentage of GDP.

The other approach is to look also at the knock-on effects on the wider economy. Bringing in higher cost low carbon technologies means that households and businesses pay more for electricity, heat and transport.

As a result, they have less to spend in other areas, and in particular end up spending less on investment. While there is increased investment in low carbon technologies in the energy and transport sectors, the net impact across the economy as a whole is to lower investment and therefore to lower economic growth. At this level, the costs of decarbonisation can be seen as growth forgone. In other words, economic growth is lower than it would be if fossil fuels had continued to be used. This is the approach taken in the MARKAL-MACRO model, which adjusts technology costs for these wider economic interactions.

However, these cost figures should not be taken too literally, but rather in a relative sense. This is because the estimates leave out factors that would lower overall costs – such as the export of low carbon technologies – and other factors that would increase costs, such as the assumption that there are no policy mistakes.

The costs of moving to a low carbon economy would not fall on everyone equally. Some groups may need special support in adapting. One would be low-income households in hard-to-heat homes, or living in areas with poor public transport. A high cost of carbon would hit them particularly hard, requiring compensation in the short term, and extra help to lower their carbon footprints over time. A second group would be energy-intensive industries open to international competition, where the danger is that production and jobs would be lost to other countries not decarbonising so deeply. Aluminium, iron and steel would be most at risk (Sato et al 2005¹⁹). Again, the long-term solution is to shift to lower carbon production methods (decarbonising electricity supply will help), but short-term adjustment help may be necessary.

Cost of carbon – marginal costs

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As might be expected in a highly carbon-constrained world, the marginal cost of carbon – i.e. the cost of reducing the last tonne of carbon, or the implicit carbon price – is significant by 2050 in both models (Table 1). Costs rise over time in both models, although to a significantly higher level in the case of MARKAL and with a small fall in 2060 in Anderson, reflecting the peak in overall GDP costs in 2050 as described above.²²

These marginal costs are considerably higher than those associated with attaining a 60% target without including aviation emissions, which for the DTI MARKALMACRO model for the Energy White Paper are in the range £65–176/tCO₂. Costs in this study are higher principally because the carbon constraint is tighter, and because emissions from international aviation are included. According to the Anderson model, this latter factor increases costs by 0.4% of GDP in 2050 (see Table 5 below).

These marginal costs appear high compared to the current price of carbon in the EU ETS. However, the more appropriate comparison is with the implied price of carbon in mechanisms designed to promote investment in the newer and more expensive low carbon technologies. In the case of the Renewables Obligation, for example, the effective price of carbon to consumers is currently over £100/tCO₂ (Ofgem 2009²³). The Renewable

Transport Fuel Obligation will introduce an effective price of carbon of £60–123/tCO₂ for biofuels, depending on the crop and transformation pathway. Incentives for emerging technologies in the rest of Europe, the US and Japan are of similar magnitudes (Anderson 2007²⁴).

Our modelled costs should also be seen in the context of recent fossil fuel prices. High oil and gas prices have a similar effect on the economy as a carbon tax or carbon price would have, working both through the transport sector and via electricity. Table 2 shows the carbon cost equivalent of oil prices at various levels, in relation to a base case of the average 2003 oil price (\$26.3/bbl). For most of 2006, the Brent spot price was well over \$70/bbl, and peaked near \$80/bbl, and has recently again reached this level. This is around the equivalent of average costs estimated in Anderson's model.

ALTERNATIVE SCENARIOS

The two models explored different alternative scenarios (Tables 3 and 4) – see Annex for details of specifications.

The MARKALMACRO sensitivity runs explored the cost implications of more rapid cost reductions in renewable technologies, accelerated energy efficiency and high fossil fuel prices. The Anderson model also explored accelerated energy efficiency, but then looked at the implications of new

nuclear build. The original base case for the Anderson model also did not constrain aviation emissions, so this can also be compared with the constrained emissions scenario.

All of the MARKALMACRO alternative scenarios lead to lower costs of decarbonisation. This is especially the case for accelerated energy efficiency, which reduces costs in 2050 to 2.04% of GDP, compared to 2.61% for the base case.

Accelerated energy efficiency also significantly decreases costs in the Anderson model. This confirms that policies focused on overcoming non-cost barriers to energy efficiency are key to the cost-effective delivery of emissions targets. Improvements in energy efficiency greatly reduce the onus placed on low carbon energy supply technologies to reduce emissions, as many other studies have found. This is reflected in the cost estimates for the Anderson model, where better energy efficiency cuts the costs of an 80% emissions reduction trajectory by between a half and third (impacts on the 60% reduction scenario are less dramatic). However, the figures here come with the health warning that they reflect only differences in the costs of supplying energy. Carrying out energy efficiency improvements also has a cost, which has not been estimated here.

energy price

Table 1. Marginal costs of abatement in MARKAL and Anderson models

	MARKAL MACRO marginal cost (£/tCO ₂)	ANDERSON marginal cost (£/tCO ₂)
2020	45	62
2050	177	123
2060	175	114

Table 3. Costs of 80% carbon emissions reduction with different assumptions (% GDP), MARKALMACRO model

	2020	2050	2060	2068
Central scenario	0.45	1.70	2.43	2.61
With accelerated technological change	0.45	1.60	2.35	2.58
With higher fossil fuel prices	0.45	1.54	2.27	2.54
With accelerated technological change	-0.07	0.93	1.63	2.04

Oil price (\$ per barrel Brent spot)	Equivalent carbon (£/tCO ₂)
35	19
40	23
60	35
80	50
100	123

Table 2. Oil price and carbon price equivalence

Source:
Starr et al
(2004:257)

Table 4. Costs of 80% emissions reductions with different assumptions (% GDP), Anderson model

	2015	2025	2050
Central scenario	1.05	2.25	2.07
With accelerated energy efficiency	0.69	1.25	1.38
With new nuclear build	0.65	2.02	1.95
With unconstrained aviation emissions	1.23	2.95	2.47



Conclusions

- 24 Given recent climate science, and a range of burden sharing models, the current UK target of a 60% emissions reduction by 2050 is inconsistent with attaining the UK and EU goal of keeping mean global surface temperature rise to less than 2°C above pre-industrial levels. A target of 80% or more is required.

Authoritative modelling approaches (one used by the UK government and the other by the Stern Review) suggest that it would be feasible, although challenging, to adopt and achieve a UK emissions reduction target of at least 80% by 2050 from 1990 levels, solely through domestic effort. This result emerges even with the inclusion of international aviation emissions, with constraints on first generation biofuels and wind, and excluding new nuclear power. The costs of attaining an 80% target, with our added constraints, would be roughly 2 and 3 times those of attaining a 60% target without aviation emissions, but these costs would still be, at most, half the costs of adapting to climate change and perhaps nearer one

tenth. Costs could be further reduced by implementing aggressive policies to improve energy efficiency.

While an 80% target is technologically feasible and affordable, achieving it would require an immediate and radical shift in the pace and scale of investments in low carbon technologies – probably initially in the electricity sector. The models point to the need for a rapid increase in the deployment of renewable energy technologies, and also for urgent action to demonstrate the effectiveness of carbon capture and storage as an economically and environmentally acceptable abatement option. It is also clear from the modelling that in the absence of new technological

solutions, emissions reductions compatible with the government's international climate change goals cannot be achieved without significant constraints on the growth in aviation.

All models have their limitations, and we would emphasise that these modelling results do not represent a blueprint for a low-carbon economy – other technologies and societal choices may be equally, or more, valid. Better energy futures might well include far higher levels of distributed energy and energy efficiency, which our work shows has significant cost benefits. But these results show that, according to the best models we have available to us, the UK could in principle attain a target of 80% by 2050 through domestic action alone – and that it can do so without damaging the wider environment, and at costs that are significantly lower than the costs of doing nothing.





Annex – Additional modelling

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ACCELERATION OF TECHNOLOGICAL CHANGE

New technologies – whether mobile phones or low carbon technologies such as offshore wind or fuel cells – tend to be expensive at first, but their costs come down over time. This is because of economies of scale in manufacturing, but also because manufacturers and developers learn how to cut costs over time, and as more and more units are sold. Technologies are said to have a 'learning curve', showing how costs come down as the technology is used increasingly widely (in electricity, for example, in installed capacity measured in MW or GW). The learning rate indicates how far costs come down with a doubling in the use of the technology. For example, International Energy Agency (IEA) estimates learning rates to be 18% for wind, 20–35% for photovoltaics, and 15% for electricity from biomass (Anderson et al 2001)²¹. The MARKAL MACRO model normally uses learning rates taken from a review of estimates (McDonald, A., and L. Schnatz-Holzer 2002). As in the analysis for the Energy White Paper, expected future deployments of technologies were taken from the European Commission's World Energy Technology Outlook - 2050, but for the central model run a conservative set of estimates were used. In the additional re-run, the full estimates were substituted. These latter projections may be more realistic, as a substantial global effort on climate mitigation can be expected to drive the pace of technological development and hence cost savings.

Applying these higher estimates of rates of deployment to a range of renewables in the power sector (hydro, energy from waste, biomass, solar, wave, tidal, onshore wind, offshore wind, and micro-wind) to the same learning curves accelerates cost reductions for these technologies by 2050. For some technologies the reductions are considerable (e.g. 20–27% for wind and marine, 25–43% for biomass and waste, and 51% for solar).

Accelerating technological change on the supply side in this way does reduce overall costs, but not by a large amount,

bringing down the total cost from 2.8 to 2.0% of GDP by 2050. However, it should be noted that accelerated learning in this scenario has been applied only to a limited range of renewable energy technologies in the electricity sector. Accelerated learning in other sectors that have higher marginal costs, such as transport or carbon capture and storage, might be expected to have a greater effect on total costs.

ACCELERATED ENERGY EFFICIENCY

In the Anderson model, how fast energy efficiency improves over time is dealt with through the elasticities of demand for energy. If we assume a high rate of efficiency improvements, this is represented through a low elasticity. In our central scenario for the Anderson model, estimates of future elasticities of demand are based on past trends. However, Anderson explored an alternative set of assumptions about efficiency improvements across the economy as a whole, based on a set of engineering studies (Anderson 2007). These assumptions are still quite conservative – other studies point to the possibility of yet lower demand elasticities.

The MARKAL model accounts for energy efficiency in a different way from the Anderson model. Instead of rolling all energy efficiency measures into a single elasticity of demand variable, the MARKAL model includes a large number of separate energy efficiency technologies.

Many of these have very low (or even negative) lifetime costs, and an unconstrained cost optimisation model would normally choose them first. However, a number of barriers in reality prevent people and organisations from investing in energy efficiency measures. To reflect this, the model chooses only those energy efficiency measures that pass the hurdle of having a positive net present value with a discount rate of 25%. This is a much higher rate than that (10%) used more widely for investments in the model. The accelerated energy efficiency scenario simply drops the hurdle rate from 25% to this default rate of 10% in order to demonstrate the impact

of focused policies to address non-cost barriers to the uptake of energy efficiency.

These changes have a large impact on costs, with savings in the early years and a cut in 2050 costs to around 2% of GDP. The lower hurdle rate not only boosts the uptake of efficient and conservation-supporting options in the end-use sectors, it also makes the existing measures cheaper. Greater energy efficiency has the biggest impact in the transport sector, where it cuts fuel use and also drives fuel substitution, because alternatively fuelled vehicles (e.g. those using hydrogen) are often more efficient.

HIGHER FOSSIL FUEL PRICES

In this study, DTI projections of fossil fuel prices were used. The baseline scenario uses the DTI's central projections (DTI 2006iv). For oil, these range from \$40–45/bbl in the next decade, rising to \$55/bbl after 2040. For gas prices, projections are around 35p/therm to 2015, rising to more than 40p/therm by 2040. Coal rises from around \$1.0/GJ to \$2.2/GJ.

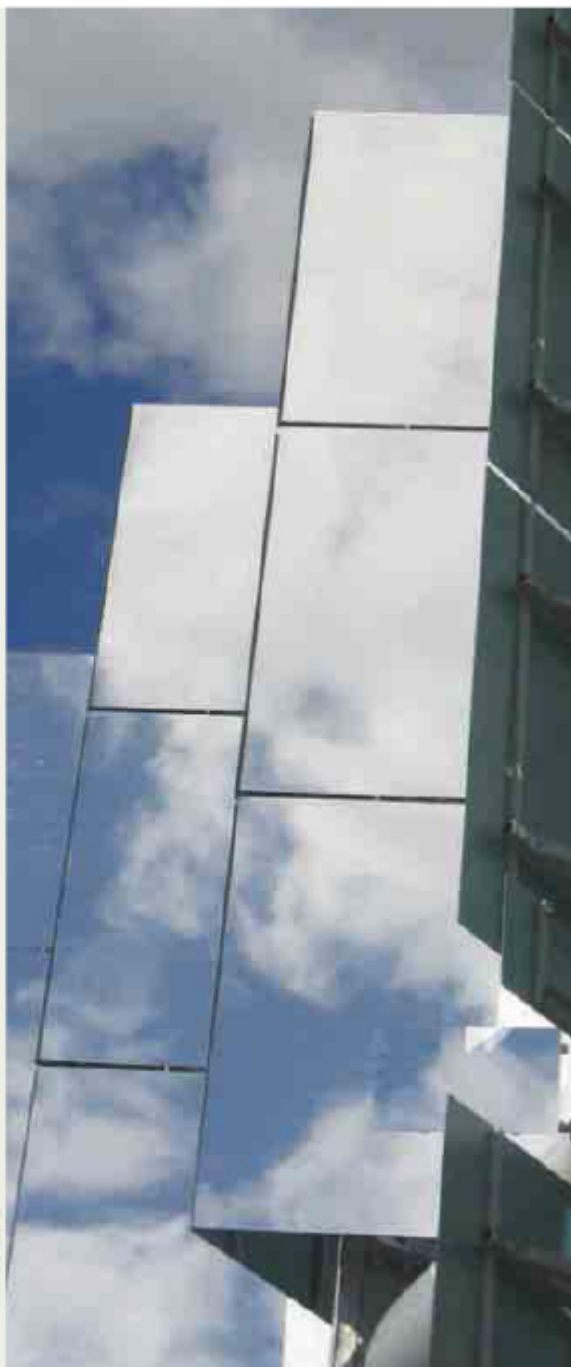
By contrast, the high price projection has oil at \$72/bbl in 2020, rising to \$82/bbl by 2050, with correspondingly higher gas and coal prices. With oil prices close to \$80/bbl in mid-2007, and with some in the oil industry predicting prices could rise to \$150 a barrel in the next 20 years²², this projection seems conservative.

Higher fuel prices drive both lower demand and greater movement into non-fossil fuel substitutes. However, the effect of higher fossil fuel prices on overall costs is not as large as one might expect. With the demanding emissions trajectory, and with constraints on nuclear and biomass, the model drives demand towards alternatives that are still quite costly.

ENDNOTES

1. In 2007, the UK signed up to a binding target for renewable to make 15% of UK electricity generation by 2020. A 2008 report from the Energy Commission of the UK and the UK's Climate Change Commission, 'Renewable Energy: A Roadmap for the Future', sets out a target for 15% of electricity generation to come from renewable sources by 2020. The target is to be achieved by 2020, with a target of 10% by 2015. The target is to be achieved by 2020, with a target of 10% by 2015.
2. The UK's Climate Change Commission, 'Renewable Energy: A Roadmap for the Future', sets out a target for 15% of electricity generation to come from renewable sources by 2020. The target is to be achieved by 2020, with a target of 10% by 2015.
3. IFC (2007), 'Renewable Energy: A Roadmap for the Future', sets out a target for 15% of electricity generation to come from renewable sources by 2020. The target is to be achieved by 2020, with a target of 10% by 2015.
4. International Energy Agency (IEA), 'World Energy Outlook 2006', sets out a target for 15% of electricity generation to come from renewable sources by 2020. The target is to be achieved by 2020, with a target of 10% by 2015.

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WWF-UK
Panda House,
Weyside Park
Godalming, Surrey
GU7 1XR
t: +44 (0)1483 426444
f: +44 (0)1483 426409
wwf.org.uk



**Institute for Public
Policy Research**
30-32 Southampton Street
London, WC2E 7RA
t: +44 (0)20 7470 6100
f: +44 (0)20 7470 6111
ippr.org



The RSPB
The Lodge, Sandy,
Bedfordshire
SG19 2DL
t: +44 (0)1767 680551
f: +44 (0)1767 682365
www.rspb.org.uk

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Learning by Design: A new way to build a better world

The RSPB believes renewable energy
can be developed in harmony with the
natural environment



Warming waters around the UK mean there are fewer sandeels for puffins and other seabirds to eat

Foreword

Mark Avery, Director of Conservation, the RSPB

A safe climate future is in our hands – but only just. The vast majority of scientists attribute the past century's upsurge in global temperature to human activity and say the possibility to limit further warming rests with us.

Greenhouse gases from human activity have sent average temperatures soaring more quickly than at any time in the last 650,000 years. We have only until 2015 to send these emissions into irreversible decline and avert dangerous climate change.

It is time for urgent action, but not for panic. Leaders the world over must take decisive, cool-headed steps to switch the global economy away from fossil fuel dependence and towards truly green, renewable sources of energy. The UK Government has already taken the laudable step of committing to 80% cuts in carbon emissions by 2050; the Scottish Government commitment is for 80% cuts in greenhouse gas emissions in the same time period.

Our Governments must, broadly, do two things to cut emissions in a secure, environmentally sustainable way. They must embark on a massive drive to reduce energy demand and increase energy efficiency; and they must send a bold signal to industry and civil society that renewable energy will be the UK's first choice for new power generation.

Many energy saving and energy efficiency measures will save money up front; others will pay back the investments by businesses and homeowners very quickly. Energy saving does no harm to wildlife or the natural environment. It's astonishing we haven't grasped this easy win sooner.

Renewable energy technologies have tremendous potential to deliver the remainder of the UK's needed emissions cuts in the next decade. They will not replace fossil fuels completely during that time. But many old fossil fuel and nuclear power plants will be decommissioned in this period.

With the right Government signals to businesses and individuals, a mix of renewables technologies – coupled with energy saving and efficiency – could make up the power generating capacity that will be lost.

Worryingly, the UK has one of the worst records in Europe on overall renewable energy use. It has so far addressed this shortfall with some disastrously ill-informed renewable energy schemes. A prime example has been enthusiasm to increase the use of liquid biofuels in transport, exposed as a huge environmental liability when scientists and non-governmental organisations publicised the greenhouse gas emissions and habitat loss caused by many of these fuels.

The RSPB passionately believes that it is possible to deploy much renewable energy in harmony, rather than in conflict with, the natural environment. We can demonstrate through our research how renewables, at the scale required to meet the climate challenge, can underpin sustainable economic growth in the next half-century. We can show how renewables can be developed across our terrestrial and marine landscapes without harming precious wildlife.

In the following pages, I hope you will be reminded of the urgency of the climate challenge facing us, and also inspired by the possibility of revolutionising the way the UK does business. We have combined our UK-wide analyses on the economic potential and broader sustainability of renewable energy with case studies to illustrate how successful renewable projects can deliver jobs, emissions cuts, and enhancement of the natural environment. The UK could become a green energy leader, rather than a laggard, in Europe and the world.

I hope you will support us and work with us to achieve our vision of a world where climate change and its impacts on people and wildlife are limited, and the UK boasts a rich environment that will sustain us all.



From <https://www.rspb.org.uk>

The RSPB is campaigning against new coal-fired power stations in the UK that do not operate carbon capture and storage technology from the start. These would be a climate disaster.

Climate change: the big picture

time is running out

There is no longer any question that climate change is having serious impacts on the human and natural world, and, without urgent action to stop it, has the potential to quickly become a global catastrophe.

The Intergovernmental Panel on Climate Change (IPCC), a collaboration of the world's pre-eminent climate scientists, has found that the evidence of a warming world is now "unequivocal". It is "very likely" that human activity has caused "most of the observed increase" in average global temperatures since the mid-20th century.¹

The proof for the IPCC's stark conclusions is in rising average air and ocean temperatures around the world, melting snow and ice at high latitudes, and rising global sea levels. Eleven of the past 12 years have been the hottest on record. More extreme weather events, a trademark of climate change, are becoming more common.

For example, the intensity of tropical cyclones (hurricanes) in the North Atlantic has increased in the past 30 years. Heavy storms are becoming more frequent over most land areas.

Meanwhile, human society continues to churn out greenhouse gases at unprecedented levels. The IPCC found that if it were not for human activity, volcanic activity and solar cycles would have made the period since the mid-1990s cooler than preceding decades.

Scientists agree that average global temperatures must be stabilised at two degrees Centigrade above pre-industrial levels if we're to keep climate change at manageable levels. Why two degrees? Average global temperatures rose by 0.6 degrees in the 20th century and the greenhouse gases already in the atmosphere mean some further warming is inevitable. We can't stop climate change from happening. Our challenge is to stop it getting even worse. Even a two degree average temperature rise masks local

variations, such as four and five degree rises at the poles, which will have huge impacts on species and habitats.

To keep below two degrees, we will most likely need to limit atmospheric concentrations of carbon dioxide (the most prevalent greenhouse gas) to between 350 and 430 parts per million. Before industrialisation, the concentration was around 280 parts per million. Now, our burning of fossil fuels has driven it up to 383 parts per million and the figure rises every year. We're already in dangerous territory.

The IPCC estimates that the global temperature will rise a further 1.8 to four degrees Centigrade this century. Global sea level is projected to rise between 18 and 59 centimetres in the same period, putting low-lying settlements at risk. Droughts will become more intense and heavy precipitation more frequent.

All this will happen before we consider the risk of irreversible events such as the potential loss of the Arctic and Greenland ice sheets, which would bring sea level rises of metres rather than centimetres, and would challenge our ability to sustain our existing civilisation in many parts of the world.

We still don't fully understand the feedback loops between the oceans, land and atmosphere that could either diminish or fuel further global warming. But we know that we must do everything possible to limit climate change and its impacts.

1. Synthesis Report: Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2007: IPCC, Geneva, Switzerland).

Northern brown argus by Mark Hambley



Scientists believe climate change is responsible for the expansion of the Northern brown argus butterfly's range in the UK in the past 30 years

Signs of change in the natural world

Climate change poses a grave threat to all life on earth. By mid-century, one third of land-based species could be on the pathway to extinction because of climate change. By the end of the century, climate change could be the greatest single cause of biodiversity loss worldwide. Fossil and pollen records show that previous rapid climate shifts have resulted in mass extinctions.

In the UK, climate change is already affecting species' life cycles: snowdrops are flowering earlier, oaks are leafing earlier, and butterflies are emerging earlier in spring.



David Shaw

Warming springs mean oaks are leafing earlier

Swallows are arriving a week earlier, on average, than they did in the 1970s. Some bird species are hatching their eggs earlier, so in some cases the insect food on which the chicks depend is no longer available at exactly the right time.

Seabirds around UK coasts show among the most worrying signs yet. Changed conditions in the North Sea have altered plankton populations. This has, in turn, reduced the numbers of sandeels – the staple diet of many seabirds such as kittiwakes, Arctic terns and guillemots. As a result, these species have suffered massive breeding failures in their colonies, especially from 2003 onwards.

Even if we succeed in limiting global temperature rise to two degrees, we can expect UK winters to become warmer and wetter, and summers hotter and drier. Birds at high latitudes, alpine species, species of small islands, seabirds and wetland species will be particularly vulnerable to these changes.

Researchers at the RSPB, Durham and Cambridge universities have modelled the future impacts of climate change on birds. They have found that the suitable climate conditions for European breeding birds will shift, on average, 550 kilometres north-east by the end of the century, under a moderate warming scenario². Such shifts in potential range raise pressing questions: will the species manage to disperse such distances across land and water? Will the right habitat be available for them to move into?

For wildlife, as for people, there is great uncertainty and huge risk to survival if climate change spins out of control. The greatest hope for preserving species diversity lies in transforming our approach to energy generation and use and keeping climate change manageable.

2. A Climate Atlas of European Breeding Birds. Brian Huntley, Roger Green, Thomas Collingham and Stephen D. Miller. 2010. Lynx Edicions.

Saving energy

time to get serious

A truly sustainable energy policy must be founded on using energy wisely, not squandering it at every turn. To do this requires all of us, as citizens, to save energy where we can – in our cars, homes and offices, by driving less, turning off lights and turning down heating. However, though we can take on a part of this task, individuals cannot act alone – we need our Governments to create the right conditions and incentives for the UK to become a lean, green economy.

Unfortunately, policy makers at UK, national and local scales have all so far failed in this most basic task. Many homes and indeed many Government buildings still pour out waste heat and light every hour of the day and night, costing millions of pounds a year and causing millions of tonnes of greenhouse gas emissions. The UK wastes vast amounts of heat from inefficient power stations – 64% of energy from conventional fossil fuel power plants is lost as heat. Meanwhile, old buildings also leak large amounts at the point of use.

The UK Government has set itself a target of reducing energy use by 25% by 2020. This is admirable, and essential – but much more will be needed if this is not to become another missed milestone. To meet this goal, we need to pledge to do everything we can to cut our energy use. And, at the same time, we should ask Government to do everything it can to put energy saving at the heart of a low-carbon future. At the very least, we must see action in these four critical areas:

- Our existing buildings must become more efficient – Governments can help deliver this through incentives for refurbishment.
- New buildings must be truly carbon zero – homes and offices must meet the highest possible standards from day one.
- The cars we drive must be the most efficient that technology can deliver – product standards and incentives for efficient vehicles should lead the way.
- Our power stations must be required to use rather than waste the heat they generate – vast quantities of heat that could be used in homes and businesses are wasted every minute of every day by old-fashioned power stations.



Shane Kim (shane@img.com)

Climate change has affected plankton distribution in the North Sea, with knock-on effects for seabirds and the seabirds that depend on them for food.

The task ahead

meeting the 80% challenge

Why energy saving and renewable energy are essential

To keep the world within a safe climate of two degrees Centigrade temperature rise above pre-industrial levels will require global cuts in emissions of at least 50% by 2050. Historically, developed countries like the UK have produced the vast bulk of the greenhouse gas emissions, which are causing today's climate pollution. Carbon dioxide is the most prevalent of these. To take account of our responsibility for these emissions, and to enable developing countries to tackle poverty as they switch to a lower-carbon development path, the onus is on industrialised countries to make the greatest cuts. The UK and other industrialised nations must cut their emissions by at least 80% by 2050.

The UK Government's adoption of the 80% target in law, in its 2008 Climate Change Act, is a vital step in the right direction, as is the proposal for a similar target in Scottish climate change laws. Now, however, we need to see

policies and actions that will set us on track to meet these long-term targets.

Many climate analysts have sought to identify cost-effective and sustainable pathways to a very low-carbon economy in 2050. The RSPB and WWF contributed to one such analysis by IPPPR¹, which used the Government's own energy models to identify practical approaches to an 80% emissions cut, which would also safeguard wildlife.

Our project confirmed the results of previous studies. Saving energy across the economy, and switching from high to low-carbon sources of electricity and heat, are the first crucial steps needed towards a safe climate future. Tackling emissions in the power sector, in particular, is essential if we are to make the rapid cuts needed from 2015 to avoid an ecological and humanitarian disaster.

1. The 80% challenge: IPPPR, 2007 and RSPB, 2007.

Avoiding dangerous climate change

Clean, low-carbon sources of energy must be deployed at unprecedented scales within the next decade, if we are to avoid dangerous climate change. Renewable energy is critical to building a low-carbon economy in the UK, which is why the RSPB supports a new European target, to ensure that 20% of our energy comes from renewable sources by 2020. In the UK, our share of this target is 15% of energy use across the economy. At present, less than 2% of our energy is renewable, so we have a huge, but exciting challenge ahead of us, to deliver this step change in renewable technology deployment, in ways that work in harmony with wildlife and the natural environment.



The worst impacts of climate change will be felt in developing countries, which have least historical responsibility for greenhouse gas emissions

Renewable energy

do we have the resources we need?

Renewable energy technologies and decentralised forms of power generation must also be at the heart of the UK's emissions reduction plans. There is no other way for us to stay on track to achieve an 80% emissions reduction by 2050.

Meeting our new EU target of 15% renewable energy by 2020 is a first, but essential, step towards this long-term goal. Yet doubts have been raised about whether this is possible if we also apply policies that protect wildlife at home and abroad.

The RSPB wanted to be certain that we could meet our renewable energy goals in ways that protected wildlife, and so, together with Greenpeace and Friends of the Earth, we sponsored a study to look at the capacity and costs of different renewable technologies in the UK.

We worked with Poyry, respected energy consultants who had already undertaken analysis of the 15% renewable energy target for the Government, to test what would happen if we applied important environmental constraints to their models.

The outcomes were heartening. If we meet the UK Government's targets for energy efficiency, we can indeed rule out expansion of the most damaging technologies – specifically liquid biofuels – and still achieve our 15% goal by 2020. Nor does any of our modelling work suggest that a large tidal barrage on the Severn is essential to delivering the renewable energy we need within this timescale.

Poyry – examining the impacts

The RSPB, WWF, and Greenpeace commissioned Poyry, the energy analysts responsible for the modelling behind the UK Government's Renewable Energy Strategy, to examine the impacts of:

- Applying sustainability constraints to certain renewable technologies.
- Varying the assumptions about capacity for some technologies.

The main conclusions were that:

- If the Government meets its own aspirations on energy efficiency, there is easily enough renewable energy capacity to meet the 15% EU renewable target whilst freezing use of liquid biofuels, and applying environmental safeguards to biomass use in the power and heat sectors.

- Because of the high costs of liquid biofuels, these scenarios are not significantly more costly than those generated by the original Poyry analysis.

- None of the scenarios suggested that meeting the target was dependent on the construction of a tidal barrage on the Severn Estuary.

In the long-term, renewable energy will need to give us even more than our 15% target in 2020. It must be at the heart of the UK's aspiration to build an ultra-low-carbon economy in the next 20 to 30 years. Only then can we reduce our overall emissions by at least 80% by 2050 and help avoid dangerous climate change. We are confident that, with the right investment in new technologies and environmental safeguards, we can achieve our vision for a green energy future.

Taking control

planning for a sustainable future

Energy saving is essential to tackling dangerous climate change. Alone, however, it will not be enough. Avoiding dangerous climate change also requires a "renewables revolution" in the developed economies of the world, including the UK. The RSPB is campaigning for a massive increase in the amount of energy we generate from renewable sources – but we also believe that this can and should be done without unnecessary and irreversible damage to our vulnerable and valuable natural environment.

We have a choice, right now, about how we build our new, low-carbon economy. We can rely on the current market structures and planning system to deliver "least cost solutions", or we can design new green infrastructure in a way that involves communities and respects nature.

We believe that a carefully planned approach to renewables will deliver more green energy, more quickly, and with less damage to wildlife, than the "laissez faire" approach we have adopted so far. Our record on renewable energy in the UK is the third worst in Europe – a scandal for a country with some of the best wind, wave and tidal resources in the world. Yet, we also have pockets of excellent practice, where developers and environmentalists work together to deliver outstanding projects.

We need to build on these partnerships if we are to become a world leader in developing and deploying renewable technologies. This means taking a sustainable approach to energy, which recognises environmental and social, as well as traditional economic costs and benefits, in decision-making. It means forging partnerships between Government, industry and communities, at UK, national, regional and local scales. It also means avoiding impacts on fragile wildlife, which is already suffering the impacts of climate change, pollution, invasive species, habitat destruction and persecution. Only by finding common ground and working together can we address the threat of climate change with the urgency it demands.



River Camo, York, England

Decision-making should balance environmental and social with traditional economic costs and benefits

Our vision

for a green energy future

The RSPB is calling for a renewable energy revolution that works for the climate, for nature, and for sustainable jobs in the UK economy. We say the UK's approach to renewable energy must be:

Urgent

We need to reduce emissions from our power sector by more than half by 2020, if we want to win the battle against dangerous climate change. Our renewable energy vision must be big enough, bold enough and fast enough to play its part.



Credit: Martin Images.com

Long-term

To achieve at least an 80% cut in greenhouse gas emissions by the 2050s, we will need a zero carbon power sector by the 2030s. This will require novel renewable solutions – such as an extended electricity grid connecting the UK and other parts of Europe. It will also require investment in technologies such as wave power, which are not yet mature, but have a critical role to play over the coming decades. We must take the action needed now, to ensure that we have the right technological solutions at our fingertips in the future.

Home-grown

The UK has an enviable renewable energy resource, and a pitifully small renewable energy industry. New green infrastructure could be the engine for economic recovery – but this means the right policies and investment now.

Outward facing

The UK is a group of islands, but it is unlikely that it will be an energy island forever. In fact, we are already connected to the continent through electricity grid networks, and these will become more extensive every year. We should plan our energy future knowing that we can import – and export – renewable energy. This outlook gives us the potential for a wholly renewable power system, rather than just a partial one.

Kind to nature

Our natural environment and the diverse species it supports are not ours to give away or damage, where there are alternatives. It belongs to our children. We must work to promote technologies and design policies that maximise benefits for, and minimise damage to, wildlife.

Considerate of scale

Regardless of technology, most renewable energy sources can be deployed at different scales. Smaller developments, which generate and use power locally, tend to have less damaging impacts on the natural environment than large, industrial-scale schemes. There is certainly a need for large-scale renewable power, but we must also support as many community-scale projects as possible.

Empowering

Fostering household and community ownership of energy is one of the easiest ways to help people to understand the connection between energy use and climate change. Powerful communities, working for a common goal, are one of our greatest assets; harnessing their efforts to deliver an energy revolution is part of the recipe for success.

Wind power

Wind energy, on and offshore, will be critical to delivering renewable energy over the next two decades, when emissions from our economy must begin to fall sharply. Its sustainability depends on location and design.

Many wind farms have no discernible effects on wildlife at all. For those that do, seldom are the effects serious enough to affect wildlife populations. It is also encouraging that some wind farms – particularly those offshore – have the potential to protect wildlife from other impacts, providing safe havens for spawning fish, for example.

However, the impact of wind farms on birds depends crucially on where the turbines are located. If wind farms are located on sensitive wildlife sites, the results can be disastrous for wildlife. There are several ways in which wind farms can have negative impacts on birds and other wildlife: disturbance, habitat loss or damage, and collision.

Birds may be displaced from their usual locations by construction noise or the presence of operating turbines and maintenance activities. Fish and marine mammals may be disturbed by the construction of offshore wind farms and the vibrations of operating turbines at sea. Different species' ability to adjust to these disturbances over time varies widely.

Wind farms can displace birds by creating a barrier to migration paths or to flights between breeding, feeding, roosting and moulting areas. When this happens, birds may have to fly further to get around the turbines, which requires more energy and so could decrease birds' strength and survival rates. There is also growing evidence that turbines may pose a problem for bats, notably through collision deaths.

Wind farms, and their associated roads, tracks, cable trenches, or buildings may physically destroy birds' feeding, breeding or roosting sites. Birds may also fly

into turbine towers or blades and be killed or injured, particularly during adverse flying conditions, such as storms, poor visibility, and low wind speeds (as some large species rely on updrafts).

All of these impacts can be avoided and managed by choosing appropriate locations and then designing wind farms so that they work in harmony with the natural environment. Poorly located projects, such as the Tarifa and Navarra wind farms in Spain, which are situated in areas important for raptor migration, have resulted in the deaths of many hundreds of raptors. By contrast, in the UK, no wind farm has yet been responsible for causing this scale of damage to wildlife, largely because of our track record in assessing risks and avoiding environmental impacts through the planning system. The RSPB hopes to help maintain this track record by providing developers with locational guidance and encouraging them to consult early with us. We have already produced such guidance for Scotland and are preparing it for England. The locational guidance shows the most sensitive areas for birds. These areas require particularly rigorous environmental impact assessment to determine whether and how renewable energy projects can be designed in a sustainable way.

The RSPB welcomes early consultation by developers to assess how wind farms can avoid harm to wildlife, and we applaud well-considered wind farm proposals, such as the one gigawatt Thames Array project, which have been designed with wildlife in mind. A good land-use planning system is critical to securing good outcomes for renewable energy and wildlife. In our view, close collaboration between Government, developers and environmentalists could see wind energy being rolled out more quickly and at a greater scale than we have achieved so far – but we cannot afford to leave this to chance. Next we set out our proposals for securing effective planning for renewable energy projects in the future.

Renewable technologies energy and wildlife

Renewable energy is essential to tackling climate change. Renewable energy projects cause little damage to wildlife when they are properly located and designed. We believe that a full assessment of the environmental impacts of renewable energy projects should be carried out to enable

developers to avoid inappropriate sites, and to design projects with minimal wildlife impacts in mind. Different technologies have the potential to affect the climate, wildlife and the natural environment in different ways, and each requires special consideration.

Lewis peatlands wind farm

The Lewis Wind Power proposal for a huge wind farm on an internationally important wildlife site was an example of how renewable energy should not be developed.

This proposal for 181 turbines (234 turbines were initially proposed) on the Isle of Lewis would have torn up invaluable peatlands with 137 pylons, 30 kilometres of overhead cable, 141 kilometres of roads, and 181 concrete bases, each up to 1,000 cubic metres. The RSPB fought hard against this proposal because it would have removed the habitat for rare and threatened bird life protected under European law: golden eagles, golden plovers, dunlins, red-throated and black-throated divers, and merlins.

We also fought a long, hard campaign against this misguided proposal because we believed that allowing a development of this scale to go ahead on a Special Protection Area for birds could put at risk the entire European network of protected wildlife sites. In April 2006, we were delighted when the Scottish Government turned down the Lewis Wind Power proposal. This sent a strong message that renewable energy developments must be delivered to reach Scotland's climate change goals, but not at any price. In its judgment, the Scottish Government recognised that the developers had failed to explore alternative locations that could meet the project objectives without large-scale damage to the natural environment.



Important habitat for dunlins would have been lost had the Lewis peatlands wind farm proposal gone ahead

Chris Greenwood / rspb.org.uk/lewis



Slavonian grebe by Sue Kennell <http://suekennell.com>

The Glendoe hydro scheme has been developed in a way that minimises disturbance to Slavonian grebes in the area

Glendoe hydro scheme: managing impacts on bird life

Glendoe electricity generating station has been developed by Scottish and Southern Energy (SSE), with a capacity to generate 100 megawatts of electricity. The scheme will be situated on the western edge of the Monadhliath Mountains, east of Fort Augustus, and involves the construction of a 35 metre high, 1,000 metre long dam across two rivers at the head of Glen Tarff and the building of the power station in a cavern deep inside Borlum Hill on the shore of Loch Ness. The RSPB initially objected to the proposal because of concerns that Slavonian grebes, and a range of other rare birds such as common scoters, golden plovers, red-throated divers and nesting golden eagles in a neighbouring European wildlife site (the Glendoe Lochans

Special Protection Area, SPA), would be disturbed by the loud noise of blasting and drilling anticipated in construction.

After long negotiations with SSE, the RSPB withdrew their original objection on the condition that the developers pursued mitigation measures to address all concerns around the SPA. The developers trialled loud noises before construction and found it did not affect species in the SPA; they also created an exclusion zone around the SPA and the eagles' eyrie, to ensure that project workers did not disturb wildlife. The project is now near completion. Wildlife monitors are satisfied that it has guarded local wildlife extremely well.

Wave power

Wave energy is an emerging technology, with the potential to supply a very significant level of renewable electricity. Theoretically, the wave power resource around the UK's coast is more than twice UK electricity consumption. The greatest potential is in the seas off western Scotland and south-west England, because of the power of Atlantic waves.

Wave power devices are designed to absorb the energy from waves and convert it to electricity. There are three main types of wave technology: buoyancy devices, fixed or semi-fixed pressure differential devices and channelling devices. The world's first commercial-scale machine to generate electricity into the grid from offshore wave energy is the Pelamis Wave Energy Converter, employed off the coast of Portugal. Other prototypes are being developed and tested all the time.

Offshore wave power devices could contribute to underwater noise that disturbs sea mammals and fish. We are investigating whether there are likely to be impacts on seabirds; it is likely that any effects will depend on bird species and location. It is important that these devices avoid, wherever possible, concentrations of feeding and breeding seabirds and other wildlife, where harm may occur. Shoreline wave devices are likely to have fewer impacts on marine species but should also be sited to avoid important bird colonies and feeding areas. Thorough environmental assessment and monitoring are needed to avoid any such problems. The RSPB encourages the development of devices that produce the least noise possible, and with moving parts that minimise oil spill risks and do not endanger wildlife.

Marine renewables – a special challenge

Our marine environment has been abused and neglected for too long – and now, on top of the impacts of pollution and over-fishing, comes the added menace of climate change. The UK's seabirds are some of the first wildlife victims of climate change impacts at sea – all the more reason to make sure that in planning renewable energy projects, we do no further damage to these fragile ecosystems and the amazing wildlife they support.

There is room for renewable energy projects and marine wildlife to live side by side. To achieve this, however, we must have good information about the marine environment, and a robust network of protected sites to safeguard the most precious and vulnerable areas of our seas. Using these tools, we will be able to guide development into places where it will not have unnecessary adverse impacts on biodiversity. We need a strong lead from Governments across the UK, to bring existing data together in one place; highlight knowledge gaps (many of which are already known, for example seabird distributions at sea); and to focus new data collection to fill those gaps. With these basics in place, we can get on with harnessing the immense power of our oceans.

The power of the Severn – Government's big decision

Proposals for a barrage across the Severn Estuary have been around for over 100 years, but the urgency of the climate change debate has brought them to the fore in recent years. The Sustainable Development Commission report concluded that a large barrage built between Cardiff and Weston would cost at least £15 billion to build, and should be a publicly-owned project. It also confirmed that a Severn Barrage would fundamentally alter the nature of the estuary and its wildlife habitats.

The estuary is particularly important for birds because its great tidal range exposes mudflats for considerable periods, offering wintering birds plentiful opportunities to feed. The Cardiff-Weston barrage would increase tidal inundation of a large area, preventing birds from having access to the mudflats. It is also likely to provide an impenetrable barrier to migrating fish.

In the light of the very considerable costs of a barrage, and the potential for it to cause large-scale and irreversible environmental damage, the RSPB has welcomed a feasibility study investigating the options for harnessing tidal power from the Severn.

However, we feel that it is vital that we answer two questions before we commit to any public investment in tidal barrage schemes. Firstly, we must determine whether this amount of taxpayers' money is best invested in a large barrage, rather than any other climate change solutions.

Secondly, we think it is vital to examine all the options available for harnessing the power of our

estuaries. Some proposals, such as the so-called tidal reef, offer potentially viable alternatives to the Cardiff-Weston barrage while largely maintaining the habitats upon which birds depend and causing less harm to migrating fish species. Energy from the estuary is not essential for meeting the renewable energy targets by 2020, but will be necessary by 2030. So, there is still time to conceive, test and develop an engineering solution that maximises energy output with minimal environmental damage and at lowest cost.

We will continue to engage actively with and contribute to studies of tidal power, and will seek to ensure that any project supported by the Government is a cost-effective part of a radical plan to tackle climate change sustainably.



Tidal power

Tidal power also has great potential to generate large quantities of renewable energy – but it carries with it huge risks to particularly sensitive environments, if not appropriately designed and located, and at an appropriate scale.



Seal by Andrew Patterson / iStockphoto.com

Tidal power schemes should be located where their noise and vibrations do not disturb marine mammals

Tidal projects could displace species, form a barrier to migration, and offer a risk of wildlife colliding with turbines, cables or anchor devices. Since marine birds prefer to forage in areas of high tidal activity, areas suitable for tidal power schemes often coincide with feeding areas for birds. Birds that pursue fish through the water, such as cormorants and divers, are particularly likely to be affected.

By removing energy from the water column, tidal power schemes can also affect the transport and deposition of sediments. The richness of sediments and all the organisms they support affects the feeding prospects for animals all the way up the food chain.

Like wind turbines, tidal energy schemes may generate noise and vibrations when they are being built and operated. This could disrupt the sonar functions of marine mammals. The substances used to construct and operate tidal energy schemes could also pose a risk, if toxic compounds in hydraulic fluids and vessel fuels enter the water, harming a wide range of marine life, including fish, birds, cetaceans and other marine mammals.

By contrast, tidal energy schemes could also benefit some birds' ability to look for food: they may provide refuges from which other human activity, such as fishing and recreation, is excluded. This could lead to new spawning grounds and nursery areas for fish and therefore better feeding areas.

The RSPB is working actively to find and support tidal power solutions for our estuaries and our seas that generate clean energy but avoid irreversible and unnecessary damage to these extraordinary ecosystems. The scale and siting of such projects are vital to their sustainability.



Dun Gormail, Lough Erne

Cut reeds from RSPB reserves could be made into pellets for use in boilers, providing a sustainable source of bioenergy

Sustainable biomass from RSPB reserves

The RSPB gathers a lot of waste biological material as a result of the nature conservation work on its reserves. We remove scrub, cut reeds and remove non-native tree species, for example. When these do not have a market, they are usually burnt or left in piles to rot down. Sometimes this takes years to happen, or we run out of room to store the waste material.

At our Arne reserve in Dorset, our focus has been on removing non-native trees to restore a vibrant heathland ecosystem. This has resulted in large amounts of "waste" timber, brush and bracken. We have been investigating

ways to make these waste materials into useful energy products. We are producing firewood for local sale and can produce wood chips for biomass boilers, although currently local demand for wood chips is low.

The RSPB is also scoping options for acquiring a mobile wood pellet-maker. This would enable us to take waste wood and reed products from reserves around the UK and create a sustainable fuel with good market prospects. Wood pellets would also be suitable for the biomass boilers that heat our own office buildings: we have such a boiler installed at RSPB Old Moor in South Yorkshire.

Bioenergy

Bioenergy has a vital role to play in moving towards a low-carbon economy, but it is also a scarce resource that needs to be produced and deployed in the most efficient and sustainable way possible. This requires an understanding of the range and capacity of different sources of bioenergy; their greenhouse gas efficiencies; the potential environmental impacts of their production and use; and the best ways to deploy them in the energy system.

Bioenergy is, in theory, "carbon neutral", as growing crops absorb carbon dioxide and then release it back into the atmosphere as they are burnt as fuel in vehicle engines, boilers, stoves or power plants. However, the full life cycle emissions of different bioenergy types can vary dramatically. Bioenergy produced from many kinds of wastes or harvested from sustainably managed woodlands is likely to deliver good greenhouse gas benefits, compared with fossil fuels. Some dedicated bioenergy crops, however, may generate significant greenhouse gas emissions from direct or indirect land clearance (that is, what land use the crops are replacing), the use of inputs such as fertilisers and pesticides, and transport.

There are also many potential end uses for bioenergy. It is far more efficient to use bioenergy to generate heat and power in dedicated boilers, for example, than to use liquid bioenergy in cars. As a result, it makes more sense for the climate if we use bioenergy supplies to power our homes and businesses than to power vehicles.

Different sources of bioenergy also create a wide range of potential impacts on the natural environment. Harvesting crops from sustainably managed woodlands or wetlands, for example, can have a positive benefit on the local environment, as well as a good impact on the climate. At the other end of the scale, the clearance of biodiversity- and carbon-rich forests and wetlands to grow crops for liquid biofuel production is little short of environmental madness.

Policies for a sustainable bioenergy sector

Bioenergy is a crucial component of our green energy future. However, its expansion also carries significant risks to the environment and to sustainable development if it happens at the expense of natural carbon stores, wildlife habitats or food production. Governments in the UK must ensure that the emerging bioenergy sectors deliver the greatest greenhouse gas savings, with minimum damaging impacts. We believe that this can be achieved by acting now, on a simple, three point plan:

- Policy incentives and targets based on greenhouse gas savings and sustainability of production, not volumes. Tackling climate change must be the primary goal of bioenergy policies. This means cutting down on the emissions generated during bioenergy production – for example, by avoiding damaging land-use change and curbing polluting fertiliser and pesticide inputs. We should also use scarce bioenergy resources as efficiently as we can, for example in combined heat and power systems.
- Robust sustainability standards for all bioenergy supplies. Compulsory legal standards, established early in the life of the UK's bioenergy industry, would increase investor and consumer confidence.
- Guidance on the location and scale of bioenergy crop production in the UK. Expansion of bioenergy crops in the UK risks displacement of important habitats, such as wetlands and heathlands. Standards applied to bioenergy suppliers will go some way to reducing these risks, but additional action will be needed, for example by ensuring that Environmental Impact Assessment rules are followed with care, and that grants for planting bioenergy crops are dependent on appropriate location. Sustainable land-use planning at local and regional levels will be needed, to ensure that the location and scale of bioenergy production does not harm wildlife.

Domestic solar power

Domestic solar power takes two forms. The first is solar photovoltaic (PV) systems: energy systems that directly convert energy harnessed from the sun into electricity. These are suitable for use in both urban and rural locations and are adaptable to almost any building that has sufficient exposure to light. PV comes in an increasingly wide range of roofing and building materials and as a modular technology there are no limitations on the size of system that can be installed.

Solar water heating systems use heat from the sun to work alongside a conventional water heater. The technology is well developed and can provide almost all of a domestic property's hot water during the summer months and about 50% year round. The average domestic system reduces carbon dioxide emissions by around 400 kilograms per year, depending on the type of fuel replaced.

Microgeneration technologies such as domestic solar power can be deployed widely with minimal impacts on biodiversity, while having the potential to contribute significantly to reductions in greenhouse gas emissions.

It is important that these measures receive Government and industry support as part of a range of technologies needed to address climate change. For example, the RSPB is calling for the introduction of a "feed-in tariff" in the UK that would reward small-scale producers of renewable energy for selling their excess power back to the electricity grid.

Easing the cost of and access to these technologies for consumers, and creating the right financial rewards, will help drive demand and build new markets in the UK for domestic solar power.



Solar panels by Andy Hay / iStockphoto.com

Industrial solar power



In some countries, larger scale roll-out of solar farms has meant covering large land areas with solar panels. This can take two forms: the first is covering a large area of land with photovoltaic panels and harvesting the energy generated. The second is called Concentrated Solar Power, where mirrors are used to concentrate sunlight to create heat. This latter technology has the potential to generate large amounts of usable energy at low cost in sunny areas. The heat may be used to raise steam to drive turbines and generators in the conventional way or it may drive Stirling engines with generators. "Concentrating photovoltaic" (CPV) uses mirrors to concentrate sunlight on to special heat-resistant PV panels that convert the concentrated sunlight into electricity. The first

commercially operating Concentrated Solar Power plants have been built in Spain. There are plans for much greater development of this technology.

Industrial-scale solar plant developments can have a greater direct impact on biodiversity than domestic-scale systems, depending on where such projects are located. Land deemed suitable for these may be marginal in an agricultural context but could nevertheless be important for wildlife. In order to minimise these risks, developers should seek to avoid protected and sensitive sites, manage surrounding land for the benefit of wildlife, and limit the ecological disturbance created by associated buildings and technical appliances.

Identifying sensitive areas for wind farm development

Research by the Institute for European Environmental Policy (IEEP) for the RSPB shows that approaching onshore wind development with robust spatial planning can help deliver renewable energy and safeguard nature. There are good examples of such approaches in the UK and beyond. We also recognise that there could be pitfalls to such approaches, if initial mapping efforts slow project development and alienate investors. Different spatial approaches yield important lessons on how to balance wildlife protection with the urgency of tackling climate change.

The RSPB and Scottish Natural Heritage have produced a 'sensitivity map' showing those areas in Scotland where wind farms would pose a high- to medium-risk for important bird populations. We hope the map will minimise the conflict between wind farms and vulnerable bird populations by alerting decision-makers and developers to the most sensitive sites. Scotland has very ambitious renewable energy targets – with a goal for 50% of electricity from renewables by 2020. In this context, planning strategically for the siting of wind farms and other renewable energy projects is vital to sustainability.

In Wales, a spatial approach to wind deployment has been taken through the production of TANS, which identifies Strategic Search Areas: preferred areas for wind farm development. This approach is intended to ensure that protected sites for nature are removed from future development pressure, and deliver much more rapid deployment of onshore wind within the SSAs. The development of TANS highlights the importance of ensuring that applications can still progress while strategic planning exercises are underway; clear guidance is needed to ensure they are not used to block applications during their development. In Northern Ireland, the RSPB worked with Government and stakeholders to help draft Planning Policy Statement 18 – Renewable Energy, setting clear policies for onshore windfarm construction in harmony with nature.

In Germany, spatial planning has helped deliver large quantities of onshore wind energy, whilst protecting nature. Systems have been evolved at the Länder (regional) level, which exclude development from sensitive areas, whilst creating a uniquely positive planning regime in other zones, where development is generally permissible if there are no conflicting public interests, including nature conservation.



Golden plover by David Telling (birds.many.com)

Sensitivity maps can help developers to avoid wind farms in areas that are high risk for birds, such as upland areas where golden plovers breed

Hydropower

Hydropower developments vary in size, type and operation. How they are designed and managed affects how they impact the environment. Hydro schemes can have significant and lasting impacts on wildlife if they disturb species during construction, destroy habitat or create dramatic changes in physical and hydrological conditions. If inappropriately scaled and designed, they can result in a permanent loss of freshwater and terrestrial habitats, drainage of wetlands and bogs, and subsequent loss of habitat and species diversity. Large dams often disrupt the natural flows of rivers and migratory pathways of fish such as salmon and eels. Dams and reservoirs act as major sediment traps, interrupting natural transport of sediments.

Water level fluctuations in reservoirs and the loss of habitat diversity can have indirect impacts on birds such as black-throated divers by decreasing the invertebrates and fish they eat or by flooding or stranding their nests.

Most adverse impacts of hydropower development can be mitigated through careful siting, by avoiding important conservation areas and by careful operational procedures. A majority of the older schemes were designed without prior consideration of their environmental impacts.

The Water Framework Directive, European legislation in place since 2000, requires that best practice measures be taken to minimise environmental damage.



Atlantic salmon by Mark Hamilton/vega images.com

Dams can interrupt fish migration pathways, but these problems can often be overcome with careful siting and design

Novar wind farm: a pioneering development in Scotland

Npower's wind farm at Novar in Ross-shire was one of the first to be built in Scotland, in 1997 – at 34 turbines (17 megawatts), it was a relatively large-scale development at the time. The RSPB was involved from the beginning, as the site contained small numbers of typical moorland species such as golden plovers and red grouse. We did not have serious concerns about the bird impacts but sought some monitoring of breeding birds and bird strikes, which was carried out for the first five years. There was little conclusive evidence of significant changes in breeding numbers or distribution, and an extension to the wind farm was approved by the Highland Council in June 2005, for a further 16 1.25-2 megawatt turbines. The RSPB was supportive of this extension.

Moel Moelogan wind farm: a carefully designed project

The Moel Moelogan wind farm, Conwy, North Wales, was constructed in 2007. It consists of nine turbines, and the RSPB was involved in project design from the start, an involvement that resulted in the removal of a number of turbines, and the relocation of others away from sensitive wildlife areas. The RSPB brokered a planning agreement between the developer and the local council to ensure that important habitats on the development site were protected and enhanced, and a comprehensive monitoring programme was set up to inform this. A steering group was set up, on which the RSPB sits. The project is in its early stages, and all the signs are promising that this development can deliver both renewable energy and wildlife conservation.



Wind farm by Peter Carns petercarns.com

From vision to reality

policies for a green energy future

The RSPB has a vision for a sustainable energy future. Making this a reality will require policy changes in some critical areas. We outline our proposals for the UK's renewable energy future below.

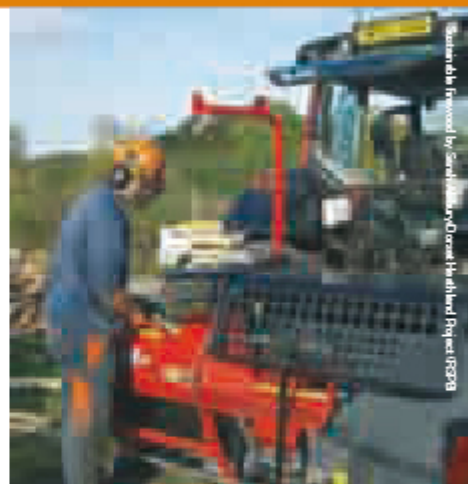
Rewarding renewables

Renewable energy sources are not yet price competitive with conventional fossil fuels, and so meeting our targets for renewable energy supply and climate change will require additional incentives and rewards. Some renewable support measures, for example, support for renewable heat, are promised in the next few years.

It is vital that these policies are bold enough to bring about a green energy revolution, delivering the low-carbon prosperity that we are seeking for all the countries of the UK in the next decade. Well-designed support for renewable energy will enable us to bring on a wide range of possible renewable technologies and to ensure that they are deployed without harm to nature.

Governments should benchmark their renewable support policies against the following simple criteria:

- **Ambition** – is the policy ambitious enough to meet the climate challenge? For example, will the Renewables Obligation ensure that at least 45% of our electricity is from renewable sources by 2020, in line with European targets?
- **Time-scale** – is it long-lasting enough to give confidence to those investing in the UK's renewable energy future?
- **Range** – does the policy provide support for a range of technologies, such as sustainable wave and tidal power options, which may not yet be close to market?



- **Sustainability** – does the policy protect the natural environment and sustainable development, for example through rewarding only bioenergy supplies with good greenhouse gas savings and sustainability records?

- **Accessibility** – does the policy enable participation by a wide range of energy generators including individuals, businesses and communities?

Renewable support policies must meet all these goals if they are to provide the financial engine for the UK's green energy future.

Strangford Lough marine current turbine: a promise of wildlife-friendly tidal power

Strangford Lough in County Down is a site protected under the European Birds and Habitats Directives for its importance to wildlife. It is a large, shallow inlet and bay, with coastal lagoons, reefs, and exposed mudflats and sandflats, all of which support common seals, a host of breeding birds (common terns, Sandwich terns) and wintering birds (knots, redshanks, light-bellied brent geese and other waterfowl).

In early 2008, a marine current turbine began operating in the Lough, supplying 1.2 megawatts of power through cables to the shore. The entire project is within the boundaries of a European-designated site (a Special Protection Area and Special Area of Conservation), and so risks to wildlife had to be considered, from the outset. In the early stages of planning, inadequate attention was given to assessing the ecological impacts of the project. However, in the later stages, these shortfalls were made up, following collaboration with organisations like the RSPB and the Ulster Wildlife Trust, and the end result looks promising for the natural environment.

The developers, Marine Current Turbines (MCT), minimised the impact of construction on the seabed. They invested heavily in wildlife survey work before construction: tagging and tracking seals, surveying birds and cetaceans on land and underwater for two years, and minimising the effects of turbine noise on cetaceans. The modelling of the turbine suggests that turbine speed and flow is very unlikely to suck creatures in.

They put in place a robust system for monitoring the impacts of operations on wildlife after construction. Should monitoring reveal negative wildlife impacts, they have provided for adaptive management so that operations can change accordingly. It was predicted that negative impacts may be more likely on marine mammals, rather than on birds. There is a careful procedure in place for identifying

any dead sea mammals quickly and assessing the cause of harm. Fortunately, there have been no collisions so far.

A Science Group, comprising the ecological consultants and relevant government departments, has been set up to make final decisions on how to respond if a major wildlife incident occurs. The Science Group consults openly with a wider stakeholder group that includes conservation groups such as the RSPB.

Overall, the effects of the turbine on wildlife are predicted to be small, particularly set against natural fluctuations in seal populations, and the impacts of human activities such as fishing. What we really don't know yet is: if this installation proves successful, how much of the information will be transferable to arrays of marine current turbines? The Strangford Lough project is a promising start, and provides a good foundation for expanding the use of this technology.



Boatswain dolphins by David Tilling (magma.com)

Best practice

in land-use planning

Meeting our renewable energy targets will require a broad mix of renewables, including wind, wave and solar power, and sustainable bioenergy. The RSPB supports the roll-out of these technologies, but we need planning systems that are fit for the job. Planning rules are often seen as a barrier to the deployment of renewable energy, and yet good planning is one of the most powerful tools we have to ensure that renewables deployment is rapid and equitable, and happens without undue impacts on nature.

As a contribution to the debate, the RSPB asked the Institute for European Environmental Policy to examine planning systems across the EU and UK regions, to find which approaches work best for onshore wind farm development and nature. They identified some critical issues affecting the success of renewables planning systems, and examples of good practice which could help to inform UK planning regimes in the future.

Appropriate use of spatial planning

There is clear evidence that spatial planning can help rather than hinder the roll-out of renewables. To be helpful, it should be timely and plans should balance the exclusion of certain areas from development with measures to promote development widely in less sensitive areas. We are convinced this can be done while respecting local considerations.

Downsides of an unplanned approach

Where a less planned approach has been taken to renewables planning, two kinds of risks are evident. In Spain, renewables deployment has been rapid, but has taken place at unnecessary cost to the natural environment. In areas of the UK, a less planned approach has resulted in delays to renewable projects, with projects held up or rejected altogether at the local level.

Respect for protected sites

It is possible to deploy renewable energy such as wind farms onshore away from protected nature areas without curbing the scale of a country's ambitions to tackle climate change – this has been achieved in Germany and Denmark. There is no evidence from the IEEP study to suggest that respect for Natura 2000 sites, for example, results in a significant limiting of onshore wind development.

Appropriate use of assessment tools

Environmental assessment tools can work effectively to help deliver renewables projects. Strategic Environmental Assessment and Environmental Impact Assessments, used in a sequential and complementary way, can make a real difference to the quality of outcomes.

Early and close collaboration

Evidence from across the EU shows that early data sharing and consultation during the planning process is the most effective way of ensuring good project siting and design, once initial guidance has been provided through spatial planning and Strategic Environmental Assessment.

Benefits for communities

Renewable energy projects can give a boost to communities living close to them. Evidence from Denmark shows that rewarding communities that develop clean energy can help speed up deployment. Consideration of community benefits is in its early stages in the UK, but should become an integral part of future strategies.

A planned approach to renewables development has many benefits. Planning must be seen to be transparent and accountable, with provision for protecting national assets such as wildlife, and guidance to counter objections that could derail our transition to a low-carbon economy. The RSPB wishes to play a constructive role in the development of good planning systems and practice, in the UK, and at a regional and local level.

Beinn an Tuirc wind farm: managing and monitoring for eagles



Martin Hurrell / RSPB

In 2008, a golden eagle pair nesting in the special habitat management area beside the wind farm fledged two chicks

When this 46 turbine wind farm was developed, there was a risk of harm to golden eagles: there are eagle territories nearby, and eagles hunted within the proposed turbine areas as it held a good population of red grouse. To mitigate against the possibility of eagle collisions, a full-time ranger was hired to create a habitat management plan, overseen by representatives from Scottish Natural Heritage, the RSPB and Argyll and Bute Council.

As eagles lost 280 hectares of hunting range, other habitat was created: two golden eagle management areas (of 1,215 hectares and 450 hectares), as well as a 250 hectare mitigation area, where non-native Sitka spruce was removed and the area was returned to a heather-grass mix. Alongside these measures, a new grazing regime was introduced to make the actual wind farm area

less attractive to eagles, although there have been some difficulties in achieving this.

Bird surveys have been carried out since the wind farm began operations in 1997, and they are continuing. The aim is to study interactions between golden eagles and turbines and the impact of wind farms on eagle populations. It seems that the mitigation measures have worked well so far and some good habitat has been created. There also appears to be an increase in the numbers of red grouse in the management area, and black grouse have been seen on the site. However, more data will be needed to clarify the impact of wind farms on golden eagles, and the RSPB hopes that data collected at wind farm sites elsewhere in the UK will be made publicly available to inform this and other projects.

Protecting special places from human impacts

The RSPB and other environmental groups have fought for many decades to ensure that habitats that support rare and vulnerable species are protected from the adverse impacts of human development. We are particularly proud to have helped shape some of the best nature protection laws anywhere in the world, in the EU Birds and Habitats Directives, and the network of "Natura 2000" sites which they have created. In the UK, sites within this network range from chalk grasslands in Southern England to peatlands in Scotland; elsewhere in Europe they protect Alpine meadows and Eastern European steppe, Spanish cork woodlands and Finnish lakes.

The Birds and Habitats Directives are a vital tool for securing our natural environment for future generations to enjoy, when we have conquered the looming threat of climate change. Far from being an impediment to sustainable development, they provide a litmus test for its implementation. The Sustainable Development Commission, in its report on the potential for tidal energy in the Severn, noted that the Nature Directives:

- are guided by sound science
- establish governance structures which aid rational decision-making
- represent an enlightened approach to dealing with environmental constraints
- help to define those "environmental limits", within which sustainable development must take place.

Recently, the Environment Commissioner, Stavros Dimas, put it very well, saying that the protection afforded by the Birds and Habitats Directives:

"... is also a very flexible system and I would like to

correct one of the common misconceptions about Natura 2000 – which is that once a site is designated all economic activities have to stop. This is simply not true and it is a shame that this myth continues. The Natura network consists of living landscapes in which farming, fishing, forestry and hunting can continue. Even major development projects can be carried out once certain safeguards have been respected. The experience from most Member States is that it is perfectly possible to use the flexibility provided in the nature directives in an intelligent manner and find a good balance between biodiversity protection and economic needs."

It is very likely that in meeting our renewable energy targets and facing up to the realities of climate change, proposals will come forward within protected areas for wildlife, including Natura 2000 sites. Designation per se does not block development. However, such sites contain some of our most important and sensitive species and habitats; assessing and addressing the environmental impact of energy developments is vital. Species across the world are already becoming early and largely powerless victims of climate change – another challenge to add to the impacts of persecution, habitat loss and pollution. It seems to us that we have a moral duty to try to manage the climate crisis we have created, without adding further insults to these existing injuries. The Nature Directives can act as a resource and guide to help us achieve this goal.

Resourcing the experts understanding impacts

The policies we have proposed at all levels require expertise to make them work. We need professionals in Governments and in Government agencies, who are committed to the rapid and large-scale deployment of renewables in a way that minimises damage to wildlife, and who understand the potential impacts of renewables developments on the natural environment.

At their current levels of resourcing, our regulators, advisors and planning authorities will not be able meet the challenges posed by a new, ambitious EU renewables

target, and a new urgency in our approach to climate change. Yet, if they cannot respond in a timely and well-informed fashion, the result will be resentment from stakeholders and communities, and delays for developers and Governments. A central plank in our policies towards renewable energy must, therefore, be to resource the experts. In the war against climate change, we cannot afford to let down the front-line troops, including those charged with an orderly and rational transformation of our energy infrastructure.

Black Law: an award winning wind farm in harmony with nature

This 54 turbine wind farm (124 megawatts) in North and South Lanarkshire and West Lothian is located in an area extensively damaged by mining, afforestation and drainage of wet heath. The area hosts a locally important population of breeding waders. The RSPB in Scotland worked closely with Scottish Power over several years, to restore habitat extensively around the development. Special measures included restoring a former opencast coal mine to wildlife habitat; removing a non-native conifer plantation; restoring a water course to benefit otters and water voles; and modifying the design to reduce its environmental impact. An Ecological Clerk of Works was appointed to oversee construction and pre- and post-construction bird monitoring are required by planning conditions. The scheme began operating in summer 2005. The RSPB was delighted that this development won the award for Best Renewable Project in the 2005 Green Energy Awards.



Wind turbine by Neil Bennett/rp/energy.com

Planning the grid

the need for change

Electricity transmission and distribution networks, as well as land-use planning, will need to adapt to take account of the expansion of renewable energy across the UK. At present, there is no requirement on those who fund and manage the networks, either to deliver renewable energy or to protect the natural environment. In fact, there are a huge number of good, environmentally sensitive renewable projects, unable to start generating and providing clean energy for customers, because they are stuck in an arcane "queuing" system supervised by Ofgem, the energy regulator. This absurd situation must be rectified immediately and not allowed to recur.

The RSPB believes that Ofgem and the companies who manage the networks must be reformed, so that they have a duty to ensure that renewables are the first choice for generation capacity in the UK.

We also believe that in planning renewables for connection to the grid and its extensions, they should be obliged to look for sustainable outcomes, rather than choose routes on a narrow "least-cost" basis, with little or no regard for the natural environment. This should include active measures to encourage smaller-scale and decentralised energy projects.





Account by Danny Green on <https://www.rspb.org.uk>

4. Shaping the vision

This is not the time to leave the future of our energy system to be determined by the operation of the market alone. Governments must set the direction of travel, and determine the boundaries within which companies make investment choices. A vision for our energy future should provide a guide for the development of new energy policies in the future.

5. Securing investment

To ensure that industry invests at the necessary level to secure a green energy future, Governments must have the right support mechanisms in place. These should have the right level of ambition to meet our climate goals, and operate over extended time frames. They should support a breadth of technologies, involve a wide range of players, and embed environmental safeguards, such as qualifying standards for bioenergy.

6. Involving communities

For years, Governments have significantly underestimated the benefits of empowering individuals and communities to

generate their own energy. This must change. Rewarding individuals and communities for green energy generation can deliver significant carbon savings with little impact on the natural environment, whilst ensuring that the economic benefits of a renewables revolution are felt locally.

7. Building the network

Electricity network investment should ensure that renewables are the first choice for generating power in the UK, and that new connections are developed with the environment in mind. Ofgem and network operators must be given explicit guidance to make this happen.

8. Planning location and design

The planning system is central to ensuring that renewables deployment is timely and sustainable. The RSPB would like to work with Governments across the UK to deliver really high quality land-use planning for renewables. This could combine appropriate national, regional and local targets with spatial planning and a community benefits package. In the marine environment, good planning will depend critically on having information available about our fragile seas and their wildlife.

Conclusions

and recommendations

We are running out of time to save ourselves, and the millions of species with which we share our planet, from the effects of the most dangerous experiment of all time – our unplanned experiment with the global climate. Unchecked, greenhouse gas emissions will create an environment unlike that experienced by any of our ancestors, and alien to many of the other creatures on earth. If we value our civilisation, if we feel an obligation towards our children, and take seriously our duty of care for the natural world, we must act now.

In the UK as a whole, and in Scotland, Governments have already pledged themselves to the long-term goal of cutting greenhouse gas emissions by 80% from 2050. This is laudable, and is a target for which tens of thousands of RSPB members have campaigned. The tough part begins here and now, however, in taking the action needed today to take the carbon out of our economy.

This must start with energy saving; but it must also involve a rapid switch to renewable sources of energy in our power and heat sectors. There is no time to wait; taking the carbon out of these parts of our economy is the only way to achieve the emissions cuts we need in the next ten years, if we are to play our part in avoiding dangerous climate change. The RSPB supports this essential energy revolution and is keen to play an active role in bringing it about.

Action in a time of crisis is not best left to chance. This is not a moment to trust the market alone to deliver the best outcomes at the right timescale. This approach will not guarantee the urgency we need; nor will it protect the needs of the vulnerable, and avoid trampling over those very assets – our natural environment, our communities – that we wish to protect from the impacts of climate change. A market-led, short-term, least-cost approach to

renewable energy is also ill-suited to securing the investment in new technologies – particularly wave and tidal power – which will be essential to meet our long-term climate goals, and to make the UK one of the world's leading green economies.

A rapid, rational transformation to a low-carbon energy system needs strong leadership from Governments across the country. It needs a vision, and it needs planned investment in the right places at the right times. We believe this is possible – indeed, we believe that it is an exciting and inspiring project – if Governments in the UK are prepared to work with industry, stakeholders and communities, and if they follow a simple recipe for a sustainable green energy system:

1. Saving energy

Any sustainable energy policy must be founded on saving energy first. Action to reduce energy waste from existing building stock, new homes and businesses, power stations and car engines should underpin any green energy revolution.

2. Fixing the framework

The regime that governs the UK power sector was not designed with the climate or sustainable development in mind. New duties for the energy watchdog, Ofgem, will be needed if the Government is to deliver its climate change, energy security and fuel poverty goals, in a truly sustainable manner.

3. Appraising the options

A sustainable approach to renewable energy must involve a thorough understanding of the environmental risks and benefits of different technologies, including their impacts on the natural environment. It should also assess the capacity for sustainable delivery from different technologies – particularly bioenergy.



Neil Brown / happyimages.com



Gordon Langhorne / happyimages.com



Emel James / happyimages.com

9. Using environmental laws wisely

Sites protected under the EU Nature Directives (Birds and Habitats Directives) are an essential part of our efforts to protect the natural world from the negative impacts of human activity. Compliance with this legislation is a key test of the Government's commitment to sustainable development. The Government should commit to ensuring the integration of renewable energy objectives with other environmental objectives, including compliance with existing environmental laws.

produced and used in the most efficient and sustainable manner. Bioenergy support policies should focus on achieving greenhouse gas savings and should be underpinned by strong, mandatory efficiency and sustainability standards. A new regulatory regime, applying such standards to biofuel and biomass suppliers, is needed to ensure that this industry grows in a truly sustainable manner.

10. Making bioenergy truly green

Bioenergy has an important role to play in tackling climate change. However, it is also a finite resource that should be



Assessing the cumulative impact of building many wind farms in one coastal area will help avoid any potential negative impacts on birds such as whooper swans

Ben Hall/Getty Images.com



a million voices for nature

For more information on the RSPB's renewable energy work, please visit
www.rspb.org.uk

UK Headquarters

The RSPB, The Lodge
Sandy, Bedfordshire SG19 2DL
Tel 01767 680551

Northern Ireland Headquarters

Belvoir Park Forest, Belfast BT8 7QT
Tel 028 9049 1547

Scotland Headquarters

Dunedin House, 25 Ravelston Terrace
Edinburgh EH4 3TP
Tel 0131 311 6500

Wales Headquarters

Sutherland House, Castlebridge
Cowbridge Road East
Cardiff CF11 9AB
Tel 029 2035 3000

www.rspb.org.uk

The RSPB speaks out for birds and wildlife, tackling the
problems that threaten our environment. Nature is amazing –
help us keep it that way.

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Northern Ireland Assembly Environment

Committee Inquiry into Climate Change

A written response from RSPB Northern Ireland, February 2009

1. The RSPB and its interest in the Committee's Inquiry

The RSPB is the largest nature conservation charity in Europe, supported by over a million members of which around 11,000 live and support our work in Northern Ireland. We employ around 40 members of staff and invest £1.4 million in conservation work in Northern Ireland annually.

The United Nation's Intergovernmental Panel on Climate Change (IPCC) involves many thousands of scientists from across the world. The RSPB believes the work of the IPCC provides the most authoritative opinion on the causes of climate change. The IPCC has concluded that:

'Warming of the climate system is unequivocal. Most of the observed increase in global average temperature since the mid-20th Century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations. It is likely that there has been significant anthropogenic warming over the past 50 years averaged over each continent. During the past 50 years, the sum of solar and volcanic forcings would likely have produced cooling'.

The RSPB considers that human-induced climate change is the greatest long-term threat to global biodiversity and will have very serious impacts on the wildlife of Northern Ireland and beyond. Up to one third of land-based species on earth could be committed to extinction by 2050 if we do not act to address this problem (see below).

We believe that rapid and deep emission cuts in developed countries, including Northern Ireland, are essential to avoiding dangerous climate change. This will require a massive reduction in energy use; action to curb the growth in aviation emissions; and a rapid switch from high to low carbon sources of energy.

For many years, we have been urging the Northern Ireland Assembly to introduce targets to reduce greenhouse gas emissions and measures to help Northern Ireland's wildlife to adapt to the inevitable changes in the climate we will experience in the coming decades. We are also at the forefront of the understanding of the effects and impacts of climate change on wildlife through our scientific work and we pride ourselves on developing sound policies based on the very best science available.

In summary, to tackle the causes of climate change and to help wildlife to adapt to these changes, we believe the Northern Ireland government should commit to:

- Reducing greenhouse gas emissions by 42% by 2020 relative to 1990 levels..

- Producing 20% of energy from renewables sources by 2020, with a minimum of 40% of this target met through electricity supply.
- Increasing energy efficiency in order to reduce energy use by 25% by 2020.
- Implementing emissions performance standards for all new power plants.
- Declaring 200 new Areas of Special Scientific Interest (ASSI) by 2016.
- Securing favourable, or approaching favourable, condition for at least 95% of features within the ASSI network by 2016.
- Delivering all existing UK and Northern Ireland targets for habitat restoration and creation, as published in relevant Habitat Action Plans.
- Securing at least 50% of the area of agricultural land in Northern Ireland covered by agri-environment schemes.

2. The impacts of climate change on wildlife

The following paragraphs explain the main threats to wildlife from climate change and the peer-reviewed science supporting our concerns in Northern Ireland and beyond.

2.1 Climate change is causing extinctions of our wildlife

Climate change has already begun to affect the natural world. Many species have become extinct or face an uncertain future if changes continue unabated. For example, research has shown that many species of frog in Costa Rica have gone extinct because higher temperatures have encouraged disease outbreaks[1]. One study has estimated that even for medium-range climate-warming scenarios, 15-37% of species studied were 'committed to extinction' unless immediate action was taken to tackle climate change[2].

2.2 Our wildlife is already moving because of climate change

Climate change is already affecting biodiversity in Britain and Ireland. In an analysis of 1,600 northern hemisphere species, it was found that the ranges had changed on average 6.1 km northward and 6.1 m upward[3]. A recent briefing paper commissioned by the Sustainable Development Commission in Ireland has identified specifically the challenges climate change poses to wildlife across the island[4].

With collaborators at the University of Durham, the RSPB has attempted to predict the potential change in the distribution of all European breeding birds by the end of the 21st century, by showing where suitable climate conditions are likely to be present[5]. We have attached a copy of a summary of this work for the Committee's use. Our results concur with those from other similar studies[6]. In brief, we have found that:

- The centre of the potential range of the average species is predicted to shift nearly 550 km northeast and will be 80% the size of current range.
- For some species, the potential future range does not overlap with the current range at all. The average overlap is 40%.
- Projected changes for some species found only in Europe, or with only small populations elsewhere, suggest that climate change is likely to increase the risk of extinction.

Of course, our models assume that species and the resources they need, will be able to respond at the uniquely rapid rates required. The behaviour of some sedentary species and landscape

fragmentation/physical barriers will limit the potential of these species to occupy future suitable range.

By 'retro-fitting' our models to known population trends for European birds, we have demonstrated that those species facing deteriorating climate conditions (e.g. redwing) tend to be declining whereas the populations of those that have improving climatic conditions (e.g. Dartford warbler) are increasing[7].

Milder winters are also affecting the vast numbers of birds that spend the winter in Britain and Ireland. Many wading birds and wildfowl are choosing to winter on the east coast of the UK, reducing their dependence on the milder west coast and saving birds the travel costs of getting there[8]. This change in winter movements has been put forward as a potential cause of the recent massive declines in the numbers of diving ducks visiting Lough Neagh in the winter[9]. A four-year research study at Queen's University, funded by the Northern Ireland Environment Agency and the RSPB is aiming to examine this relationship.

2.3 Climate change is creating indirect impacts on our wildlife

Changes in climate can affect wildlife indirectly, by impacting on food supplies. For example, climate change is detrimentally affecting breeding seabirds, such as the puffin, in the North Sea as increases in sea surface temperatures impact plankton and ultimately reduce the availability of their favoured sandeel prey[10]. Similar breeding failures for seabirds on Rathlin Island and other colonies around the North Channel may be related to the same pressure[11], and this is the subject of a major new research project undertaken by Queen's University Belfast and funded by the Northern Ireland Environment Agency and the RSPB.

Warmer spring weather in recent decades has caused the advancement in the timing of spring events, such as egg laying or invertebrate emergence[12]. One study has shown that spring events had advanced by an average of 2.8 days per decade[13]. If bird breeding and food availability advance at different rates, significant reductions in productivity can result. For example, our research has shown that an increasing mismatch between the hatching of golden plover chicks (a 'red-listed' species in Northern Ireland[14]) and the peak supply of their favoured food, crane flies, is reducing the survival of chicks[15][16]. Coupled with the desiccation of crane fly eggs in hotter summers, these threatened birds face a 'double whammy' of climate change impacts.

Unseasonably heavy summer rainfall can be detrimental, by increasing chilling of chicks and by reducing food availability[17][18]. There is also some evidence that reduced rainfall in tropical areas is having an adverse impact on the populations of Northern Ireland's trans-Saharan migrants, e.g. cuckoo, possibly again through effects on the food chain[19]. The effects of sea level rise may also become very important for our coastal wildlife in Northern Ireland in the future[20], especially given some of the major impacts being seen already along the east coast of Britain.

3. Helping Northern Ireland's wildlife through the Committee's Inquiry

We have chosen to respond to each of the bullet points outlined in the Terms of Reference for the Committee's inquiry:

To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets

Adaptation for wildlife

Observed evidence and predictive models of nature's response to climate change suggest that action is necessary to enable wildlife to adapt. The UK Government is committed to preparing an adaptation programme under the UK Climate Change Act. The Department of the Environment has indicated that the Climate Change Act 'will generate a structure for ensuring Northern Ireland's ability to adapt to climate change'. We believe adaptation measures for wildlife need to be central to the elements of the programme that apply in Northern Ireland.

Given that the changes are occurring against a continuing background of the loss of natural habitats (see results of the Northern Ireland Countryside Survey 2007[21]) and fragmentation, many species may struggle to survive in Northern Ireland. The RSPB is developing an agenda with the UK Government and devolved administrations to enable wildlife to survive, thrive and adapt to the conditions imposed by climate change[22].

It is clear that the current network of protected areas for biodiversity will be insufficient. It will be necessary to make the wider landscape more suitable for species as they shift in response to climatic change. This will require more than just better protection of existing 'hotspots', i.e. within Natura 2000 or the network of Areas of Special Scientific Interest (ASSI).

The Northern Ireland landscape will need to become more permeable to species that are attempting to respond by adjusting their distributions to new conditions[23] [24]. This means that maintaining existing patches of semi-natural habitat in the landscape will be important, and creating new ones will be necessary. The spatial locations of these patches will, of course, determine whether they can act as 'stepping stones' for the suite of species requiring them. The Northern Ireland Countryside Management Scheme offers an excellent mechanism to provide these patches of habitat. However, the decision to remove set-aside land will act to remove patches of habitat in Northern Ireland and needs to be replaced with another mandatory mechanism to support habitats for wildlife.

Many of our protected areas are based on the presence of rare or threatened species and habitats. Given that Alcamo & Krielman 1996 (Global Environmental Change-Human Policy Dimensions 6: 305-334) have identified that >40% of the global land area will no longer experience climatic conditions to maintain ecosystems or biomes following climatic change, the species and habitats for which a site was originally protected will, in many cases, not be able to survive there. However, this should not mean we dispense with protected areas because these high quality natural and semi-natural areas will become important homes to new species and habitats. They will remain important nodes in the overall network of sites if some proportion of global biodiversity is to be conserved as the climate changes. It is, therefore, very important the overdue plans to declare all qualifying sites as ASSI in Northern Ireland progress as a matter of priority.

Selecting new sites that offer a diverse range of physical habitats, even if they currently do not play host to rare or threatened species, offers the best way to sustain a wide diversity of species. In other words, we need to take calculated decisions if we are to maximise our ability to conserve biodiversity in a changing climate, accepting uncertainty requires a refreshed approach to site selection[25]. We must, however, continue to identify and protect less common physical habitats as well.

To ensure wildlife can adapt to a changing climate we propose the Northern Ireland Government adopts the following principles:

- All existing biodiversity laws, policies and strategies are implemented across Northern Ireland to create resilient populations of species in healthy habitats;

- The area of land managed for biodiversity and other environmental benefits is increased, including areas for buffering and linkage outside the protected area network; and
- Habitat features are protected and created across Northern Ireland to make the landmass more permeable to biodiversity.

We have attached a copy of our document 'Climate Change: Wildlife and Adaptation. 20 Tough Questions, 20 Rough Answers' so that the Committee can understand the issues around adaptation in more detail and the positive agenda we are suggesting to tackle this challenging area.

Mitigating the causes of climate change

The United Nations IPCC has published figures which show the likely impacts for different levels of warming. They have included information on the impacts on ecosystems that support global biodiversity. Their assessment suggests that extinction rates are likely to be increased with about a one degree Celsius rise in global mean temperature, and above a two degree Celsius rise the prospects are potentially catastrophic. This is why we do not wish to see global mean temperature rise above more than two degrees Celsius and advocate policies to reduce greenhouse gas emissions.

In their fourth assessment report, the IPCC examined the probabilities of staying below particular human-induced temperature rises for a range of atmospheric concentrations of greenhouse gases. They have shown that to be reasonably sure of staying below two degrees Celsius temperature rise, concentrations of all greenhouse gases must stabilise at less than 430 ppm, and to be fairly certain they need to be below 370 ppm. More recently, in the light of some new research findings, an increasing number of scientists are calling for the level of greenhouse gases (GHG) in the atmosphere to be stabilised at a significantly lower level than previously recommended, i.e. as low as 350 ppm CO₂ equivalent^[26].

To stay within safe levels, developed countries need to cut emissions by between 25% and 40% by 2020 and by 80% to 95% by 2050, according to the IPCC.

Under the Climate Change Act 2008, the UK Government has agreed that it should aim to reduce Kyoto greenhouse gas emissions by at least 80% below 1990 levels by 2050. The RSPB, as a member of the Stop Climate Chaos coalition, campaigned to ensure this target was adopted. This target is also accepted by the independent UK Climate Change Committee as an appropriate UK contribution to a global deal aiming to reduce Kyoto greenhouse gas emissions to between 20-24 billion tonnes by 2050. The UK is also committed to reducing greenhouse gas emissions by 42% by 2020 relative to 1990 levels, as recommended by the UK Climate Change Committee. Northern Ireland needs to play its part in meeting this target and must set legally-binding targets to reduce emissions.

The Northern Ireland administration is also committed, as part of the UK, to meeting its part of 20% of all energy supply being from appropriate renewable sources by 2020, as set out in the EU Renewable Energy Directive^[27].

To consider the necessary actions and a route map for each significant sector in Northern Ireland

The UK Climate Change Committee has proposed that the 80% target should apply to the sum of all sectors of the UK economy, including international aviation and shipping^[28].

The RSPB, with WWF, contributed to an analysis by the Institute for Public Policy Research (IPPR) of the route map for meeting the 80% target in the most cost-effective way. We have attached a copy of this report for the Committee's use. This analysis resulted in several clear general recommendations;

- A much greater focus on energy efficiency measures across all sectors of the economy is required.
- The UK must meet its fair share of the EU target for renewable energy;
- Carbon capture and sequestration (CCS) must be investigated and promoted;
- No new coal-fired power stations should be consented unless they capture and store their carbon emissions from the start;
- Urgent action is required to constrain significantly the forecast growth in aviation; and
- Sustainable development principles must be used when selecting climate mitigation measures in the future, to avoid, for example, the use of unsustainable volumes or sources of biofuels.

More specifically to Northern Ireland, the UK Climate Change Committee has identified that we could reduce our emissions by 2 million tonnes of CO₂ equivalent in 2020 by:

- Moving to clean, low carbon sources of energy such as renewable energy technologies;
- Emissions from buildings and industry could be reduced by up to 1 MtCO₂e in 2020 by using energy more efficiently;
- More efficient vehicles and new transport fuels could deliver reductions of up to 1 MTCO₂ in 2020; and
- Emissions from agriculture, land use and forestry and waste management could be reduced by up to 0.5 MtCO₂e in 2020.

The use of land to abate climate change is receiving much attention. Peatland restoration has been identified as a potential land-use mechanism for storing carbon and we are urging governments to examine the carbon value of peatland conservation. Given the extent of the peatland resource available in Northern Ireland, this research to quantify carbon savings through the management and restoration of this habitat should be prioritised.

Reducing energy use

A reduction in around 25% in energy use by 2020 is needed for the UK to achieve its medium and long-term climate change goals. This will require action across all sectors, and will need to involve behavioural change, infrastructure investment, and adoption of best available technologies.

The RSPB has always been strong supporter of demand management and energy efficiency measures, since they are generally the most cost effective and sustainable approach to cutting greenhouse gas emissions.

The UK Climate Change Committee has identified that, because there is little gas central heating in Northern Ireland, we could reduce emissions further by replacing carbon-emitting heating (e.g. from oil) to low-carbon technologies (e.g. combined heat and power, biomass).

Investing in renewable energy

Given the likely halt in investment in new coal capacity in Northern Ireland, there are excellent conditions to invest in low or zero-carbon energy options as an alternative. Such investment is an essential component of a climate change programme capable of achieving cuts at the scale and speed required.

Despite having some of the best renewable resources in Europe, the UK as a whole has a very poor record in deploying renewable energy, running at third bottom in the EU league table. With the advent of the EU Renewable Energy Directive, the chance to increase renewables has arisen.

Renewable energy has significant advantages above and beyond its contribution to managing climate change; deployed at scale, renewable sources would help protect future Northern Ireland customers and businesses from fossil fuel price rises and increased dependence on fuel sources from abroad. However, a renewables 'revolution' on this scale could pose a threat to the natural environment and we must ensure that it is developed with true sustainability in mind.

The UK Climate Change Committee have identified that Northern Ireland has potential for onshore and offshore wind-generated power. They also identify the potential for tidal and wave technologies here. The RSPB has produced a document entitled 'Power to the Planet' that sets out a truly sustainable approach to the development of renewable energy projects. We have attached a copy of this document for the Committee's use.

The Northern Ireland administration has the powers to approve onshore power generation and offshore capacity in adjacent waters. The administration is also responsible for consenting overhead electrical cables above 20kV and for investing in renewable technologies here.

The RSPB believes that the Northern Ireland Assembly should commit to the deployment of renewable energy in harmony with the natural environment and that this can play a major role in helping the UK to reducing greenhouse gas emissions by 80% by 2050. The development of a new Strategic Energy Framework for Northern Ireland in 2009 offers a superb opportunity to embed the commitment to renewable energy in Northern Ireland.

To identify the costs associated with meeting these objectives and compare them with the costs that will be incurred if they are not achieved.

The UK Climate Change Committee has calculated that the costs to the UK from reducing emissions by 80% below 1990 levels by 2050 can be made affordable. They estimate this at 1-2% of GDP in 2050. This estimate follows those provided by the Stern Review and other global and UK studies, including that undertaken by the IPRR with support from the RSPB and WWF (see above).

While the sums involved may appear large, by 2050 the UK economy is due to triple in size, even with a 80% reduction in emissions. GDP could reach the 2050 'business-as-usual' level less than two years later, in the spring of 2052. The costs of meeting the 80% target are also likely to be dwarfed by the costs of unmitigated climate change, which the Stern Review estimated would reduce global GDP by between 5% and 20%.

The UK Climate Change Committee analysed the potential economic impacts for Northern Ireland. In terms of Gross Value Added (GVA), they predict that sectors at risk from reduced national production account for only 0.1% of GVA. They have estimated that employment losses would amount to less than 0.5% and could be replaced with new jobs created in a low-carbon economy (e.g. in renewable technologies).

With regard to fuel poverty, the UK Climate Change Committee also estimates that there will be 220,000 households in fuel poverty in 2020 and electricity impacts could result in an additional 20,000 households entering fuel poverty. However, energy efficiency improvements could remove 20,000 households from fuel poverty, thus fully offsetting any increase. They suggest that income transfers and social tariffs for fuels are required to address fuel poverty impacts in Northern Ireland regardless of the impacts of reducing greenhouse gas emissions.

To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change/CO2 emissions

A requirement is being developed at Westminster to assess all policies for greenhouse gas emissions. If, as recommended by the UK Climate Change Committee, all UK administrations are eventually responsible for their own greenhouse gas budgets, it is essential that all new policy decisions are assessed to establish any likely rise or fall in greenhouse gas emissions associated with their implementation, and the resultant overall impact on greenhouse gas budgets.

To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan

Given our concerns outlined in the earlier parts of our response, we believe the Northern Ireland Government should commit to:

- Reduce greenhouse gas emissions by 42% by 2020 relative to 1990 levels (the current target is 25% by 2025).
- Produce 20% of energy from renewables sources by 2020, with a minimum of 40% of this target met through electricity supply.
- Increase energy efficiency in order to reduce energy use by 25% by 2020.
- Implement emissions performance standards for all new power plants.

To help wildlife to adapt to inevitable changes in climate, we believe the Northern Ireland Government should commit to:

- Declare 200 new Areas of Special Scientific Interest (ASSI) by 2016.
- Secure favourable, or approaching favourable, condition for at least 95% of features within the ASSI network by 2016.
- Deliver all existing UK and Northern Ireland targets for habitat restoration and creation, as published in relevant Habitat Action Plans.
- Secure at least 50% of the area of agricultural land in Northern Ireland covered by agri-environment schemes by 2013.

To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations

Given our concerns outlined in the earlier parts of our response, we believe the Department of the Environment should commit to a Public Service Agreement that captures the need to reduce

greenhouse gas emissions and help citizens and the wildlife of Northern Ireland to adapt to the changes we face as the climate inevitably changes in the future.

To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Act

No comments.

To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments

Following the lead taken by the UK and Scottish governments, we agree with the UK Climate Change Committee that the Northern Ireland Government should adopt a carbon budget. This would establish absolute limits on emissions during the Programme for Government. Responsibility for a carbon budget would require assessment of any likely decrease or increase in greenhouse gas emissions associated with new policy decisions, and thereby the impact of these on the budget overall.

To produce a report on the findings and recommendations of the inquiry by September 2009

The RSPB hopes that the Environment Committee finds our written response useful in their deliberations. If deemed appropriate, we would be delighted to make further representation to the Committee orally in due course. We would also be pleased to provide the Committee with any further information that may have been referred to in this response.

Prepared by Dr. James Robinson (Conservation Manager)
RSPB Northern Ireland, Belvoir Park Forest, Belfast BT8 7QT
Tel: (028) 9049 1547
Email: james.robinson@rspb.org.uk

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Sustainable Development Commission

SDC Submission to NI Assembly Environment Committee

Inquiry into Climate Change

February 2009

1. The Sustainable Development Commission (SDC)

1.1. The SDC is the Government's independent advisor on sustainable development, reporting to the Prime Minister, the First Ministers of Scotland and Wales and, in Northern Ireland, the First and Deputy First Minister. Through advocacy, advice, appraisal and capacity-building, we help to place sustainable development at the heart of Government policy.

1.2. The SDC thanks the Committee for its invitation to submit a written response to this inquiry and welcomes the opportunity to contribute to this important initiative. The SDC recognises the global nature of the challenge represented by climate change, necessitating that we move towards a low-carbon society. This will involve fundamental changes in the operation of government and business and in all of our lives as citizens and consumers. The SDC believes that the only consistent, effective and equitable way to meet this challenge is through the framework of sustainable development – applying the six principles of sustainable development agreed in our strategy, First Steps to Sustainability.

The principles of sustainable development

Achieving a sustainable economy

Living within environmental limits

Promoting good governance

Using sound science responsibly

Ensuring a strong, healthy and just society

Promoting opportunity and innovation

1.3. In providing advice to government and acting as an advocate for sustainable development, climate change is already a major element of all our work programmes and, in particular, our work on energy, transport and the built environment. A selection of recent pertinent initiatives is listed below:

- SDC is represented on the NI Climate Change Impacts Partnership
- SDC organised a workshop for Departmental officials on carbon neutrality and carbon offsets, supported by DOE & OFMDFM.
- SDC hosted a one-day UK workshop on the implications of aviation policy in NI

- SDC offered specialist advice to the Assembly's ARD Committee Inquiry on renewable energy
- SDC is a mentor to 20 young 'climate change advocates' from across the island of Ireland in the British Council's Challenge Europe project
- SDC staff have spoken at numerous conferences and seminars on climate change & energy matters, with particular emphasis on the built environment
- SDC has published a number of articles on climate change and related issues

2. Initial commitments for NI to contribute to UK climate change targets.

2.1. The government already has a series of stretching commitments relating to climate change, in both its Programme for Government and in its sustainable development strategy and implementation plan, viz:

- PfG PSA 22: Reduce greenhouse gas emissions by 25% below 1990 levels by 2025
- PfG PSA 22: Secure 12% of electricity consumption in Northern Ireland from indigenous renewable sources by 2012.
- NISDS - IP Target 36: Make the Government estate carbon neutral by 2015

In addition, the SD strategy lists supportive 'important steps', such as

- Reduce CO2 emissions by 30% below 1990 levels by 2025
- improving the overall energy efficiency of NI households by 25% and that of NI Housing Executive housing stock by 40% by 2025
- Where technologically and economically feasible, to ensure that beyond 2025, 40% of all electricity consumed in Northern Ireland is obtained from indigenous renewable energy sources with at least 25% of this being generated by non-wind technologies.

2.2. The UK's Climate Change Act contains another set of targets and, although Northern Ireland does not yet have an identified contribution towards the rolling five-year carbon budgets contained in the Act's provisions, the Assembly's Environment Committee has determined a largely positive position of support in relation to the UK Climate Change Act. It should be noted that Scotland, Wales and the Republic of Ireland have all identified emissions reduction pathways of around 3% per annum.

2.3. The UK Government's independent Climate Change Committee published its first annual report in December 2008, in which it made recommendations for the UK to reduce its greenhouse gas emissions by at least 80% by 2050, with attendant interim targets.

2.4. Beyond the UK, the European Union has a further suite of targets to be delivered by 2020 – a 20% cut in greenhouse gas emissions, a 20% cut in energy consumption, and a 20% contribution to energy generation from renewable sources. These are hugely ambitious targets.

2.5. It is important that Northern Ireland adopts a responsible position and plays a proportionate role in contributing to the attainment of UK and EU targets. What has been clear is that the existing NI targets are mostly distant in time and there are few, if any, interim 'milestones' or any clear plan as to how we might achieve even the most modest of these targets. The next Programme for Government should be in place by 2012 – it would be appropriate for its constituent PSAs and their delivery plans to indicate much more clearly exactly how departments

will contribute to the attainment of agreed climate change 'milestones', reflecting the EU, UK & existing NI targets listed above.

2.6. The SDC supports the concept of five-year carbon budgets. This mechanism allows for annual fluctuations due to factors beyond a government's control, such as extreme weather patterns or, as at present, a severe economic downturn which is likely to suppress emissions levels. The SDC recommends that such carbon budgets be introduced here, along with disaggregated SMART targets for NI. By June 2009, the UK Government has to set the first three carbon budgets and, shortly thereafter, it must report to Parliament on its policies and proposals to meet the targets in those budgets.

3. Proposed actions and sectoral route maps

3.1. Several studies have undertaken different assessments of the sectoral contributions to GHG emissions in Northern Ireland. Their different conclusions have been the result of their varied methodologies and data handling.

3.2. Among the reports most often quoted are the DOE-commissioned Northern Visions and Footpaths to Sustainability as well as the NI sections of the UK Climate Impacts Partnership reports. DETI & OFMDFM commissioned another useful report from consultants AEA in 2008 which published very illuminating comparative figures demonstrating the changes in sectoral emissions for Northern Ireland, Scotland and the Republic of Ireland.

3.3. In both the Footpaths to Sustainability report and in some earlier work by the Carbon Trust, its NI Vision Study of 2003, there are detailed scenarios tackling the emissions in the most significant sectors.

3.4. The Carbon Trust simplifies its recommendations under three steps:

3.4.1. Optimising energy use by implementing all possible energy efficiency measures

3.4.2. Decarbonising energy & fuel supplies by investing in renewable energy resources

3.4.3. Decoupling economic growth and social activity from the consumption of high-carbon fuels by developing low carbon technologies, products and services.

3.5. The SDC wholeheartedly endorses the first two steps but we are less certain about the feasibility of the decoupling process. Put simply, decoupling is about doing more with less: more economic activity with less environmental damage; more goods and services with fewer resource inputs and fewer emissions. Most of the data demonstrates that, while we are making some relative progress in using resources more efficiently, the overall picture is less encouraging. This is an area explored in significant detail in a new SDC report to be published in the Spring of 2009.

3.6. The Footpaths to Sustainability report adopts a slightly different approach by modelling a range of scenarios to test the ability of government policies to meet the (then) 2050 UK target of a 60% reduction in CO₂ emissions. Using scenarios focussed on sectors such as housing, food and transport, the report projected the effectiveness of different policy options in reducing the carbon footprint of each sector.

3.7. There is no need to duplicate the lengthy recommendations of these studies in this paper but the Inquiry should certainly consider these documents during its work.

4. Costs of meeting these obligations compared with costs if they are not achieved

4.1. SDC welcomes the inclusion of economic considerations within the Inquiry's terms of reference. Essentially, the causes of climate change are economic, through the progress of material prosperity, and so must the solutions be predicated on sound economics. The Stern Review on the economics of climate change is the most authoritative of reports on the subject and concludes that "if we do not act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year now and forever....While in contrast the costs of action – reducing greenhouse gas emissions to avoid the worst impacts of climate change – can be limited to around 1% of global GDP each year."

4.2. The Stern Review adopts a global perspective to draw its conclusions. In earlier work, the UK's Department of Trade & Industry (now BERR) estimated the cost of cutting UK emissions to meet the old 60% target by 2050 would be between 0.3 and 2.0% of GDP in that year

4.3. Existing assessments of the costs of meeting climate change obligations in Northern Ireland can only be considered speculative. The Carbon Trust Vision Study posits some estimates based on national figures but it seems more beneficial to focus on the economic opportunities presented by the need to move towards a low-carbon economy.

4.4. Several groups are currently developing versions of what is being called a 'Green New Deal', most of them based on variations of a public spending package intended to boost the economy in the current recession and at the same time help to kick-start activities to tackle emissions, such as:

- redesigning the electricity grid to facilitate renewable and distributed energy to promote the decarbonisation of electricity generation
- more sustainable management of the whole government estate, including schools, hospitals et al
- a programme to improve the energy efficiency of the existing housing stock
- a new approach to transport policy

While proposals of this nature are stimulated as much by the 'credit crunch' as by the need to tackle climate change, some of the ideas could form the basis of economic opportunities for the longer term. For example, the skills development fostered by the Renewable Energy Installer Academy helps to promote an increase in the use of domestic energy technologies.

4.5. Northern Ireland already has some significant strategic advantages in facilitating a shift towards a low-carbon economy. Both of our universities have dedicated research capacity in sustainable energy; our natural resources of wind, marine and agricultural potential provide a strong basis for low-carbon energy generation; our long tradition of engineering offers opportunities for the manufacture of wind and marine turbine components, to build upon the already existing assemblage of offshore turbine sets. These factors present a chance for NI to exploit its share of what is poised to be a significant global market in the coming years.

4.6. Some recent initiatives announced by Ministers in London indicate strengthening support for this approach. The proposed introduction of feed-in tariffs is designed to increase the uptake of renewable technologies and hasten the development of the nascent industry. Ministers also declared the government's intention to retrofit all UK homes by 2030 to make them much more energy-efficient. Such ideas need serious consideration here too.

5. Mechanisms for assessing the impacts of policies on climate change

5.1. Existing instruments to guide policy development within the NICS structure are legion – among them are OFMDFM's Policy Toolkit which contains excellent advice on screening policies for their adherence to sustainable development obligations; public sector procurement is covered by DFP's document, Equality of Opportunity and Sustainable Development in Public Sector Procurement and the more recent sustainable procurement action plan; CPD's Achieving Sustainability in Construction Procurement has a suite of worthy ambitions. These and other policy guidance are hampered by the fact that they are not mandatory – as guidance documents, they lack the authority of legislation.

5.2. It would certainly be possible and desirable to strengthen these existing guidance tools with more exacting criteria to assess their potential climate change impacts but the more deep-rooted problem is the need to see the guidance applied to policy development and implementation with greater rigour.

6. Targets for the new NI Sustainable Development Implementation Plan

6.1. As indicated earlier, the imperative is to ensure that departments have considered how they might contribute to the longer-term climate change targets. Virtually all departments of government have roles to play in tackling the effects of climate change – some focussed more on mitigation measures, such as DETI, others with a greater responsibility for adaptation, such as DRD.

6.2. Once the SD strategy has been approved by the Executive, it is critically important that each department becomes involved in a detailed consideration as to how it intends to contribute to the strategy's high-level aims. In terms of climate change, this should entail the development of SMART objectives that clearly track how a department will play its part in moving towards whatever targets are set for 2020 or 2050. The overarching principles of sustainable development will not change and we must therefore continue to devise and implement policy positions which simultaneously allow us to 'live within environmental limits' while we 'ensure a strong, healthy and just society.'

7. DOE Climate Change Unit PSA

7.1. The DOE is currently responsible for climate change policy but the reality is that many elements of policy which serve to combat the causes of climate change lie elsewhere within government. Energy policy and economic development sit within DETI; housing falls to DSD although Building Regulations are for DFP to determine; DRD covers transport strategy, DARD has sway over many aspects of land-use alongside DOE's Planning Service; DCAL has responsibility for the government's policy on architecture and the built environment. As with sustainable development, climate change touches almost every aspect of our lives.

7.2. In Whitehall, the government brought together into a single department the two most fundamental elements – climate change and energy. If we are serious about tackling climate change, it is our generation and use of energy that will be the largest determinant. Of the 22 million tonnes of CO₂ equivalent we produce each year, energy use accounts for 75% (with agriculture producing a further 21%). There is a strong case to be made for combining the two responsibilities into one department of energy and climate change in Northern Ireland.

7.3. Any PSA in the next Programme for Government would thereby be able to set out the ambitions for climate change which would contribute proportionately to UK and EU targets, while

also being able to have greater control over how those might reasonably be delivered through a sustainable energy programme.

8. Secondary legislation

8.1. The existing Statutory Duty on sustainable development, contained within Section 25 of the NI (Miscellaneous Provisions) Act 2006 is weak and ambiguous. It should be reviewed and strengthened to ensure that sustainable development is genuinely expressed throughout all government policymaking.

8.2. Any secondary legislation that is specifically related to climate change should find its focus in ensuring that Northern Ireland plays its proportionate role in meeting the obligations of the Climate Change Act by establishing disaggregated targets for Northern Ireland in a reflection of the legally binding targets of the UK Act.

9. Scrutiny

9.1. Plainly, the scrutiny committees of the NI Assembly will have a significant role to play in monitoring departmental progress against any future targets on climate change. This would be particularly important in the event that a new department of Energy and Climate Change was created.

9.2. In addition, however, the responsibility for a more detailed assessment of progress should be delegated to a body dedicated to that sole purpose. The NI Audit Office already undertakes work of this nature, reporting to the Assembly on other matters of policy and public spending and could be well placed to extend its responsibilities to this arena.

10. This submission can only introduce some limited aspects of the plethora of issues embraced by the extensive terms of reference for this important Inquiry. SDC will be pleased to expand on these comments with an oral presentation, if the Committee would find that helpful.

Sustainable Development Commission

Northern Ireland
February 2009

<http://www.afbini.gov.uk/index/about-us/location/hillsborough.htm>

Sustainable Energy Association



**SUSTAINABLE
ENERGY
ASSOCIATION**

Alex McGarel
Room 245,
Parliament Buildings,
Stormont,
Belfast,
BT4 3XX

09 February 2009

Dear Sir,

I am writing to you to request an opportunity for the Sustainable Energy Association to give evidence to the Environment Committee's Inquiry into Climate Change.

The Sustainable Energy Association (SEA) is an industry association which has been set-up by industry members to represent the small-scale, distributed renewable energy sector across the island of Ireland. Essentially the organisation has formed to give a voice to a growing and vital industry, and to provide a channel of communication between the Government and the SEA's member bodies.

Small renewable energy generators have an important role to play in providing a significant proportion of Northern Ireland's energy needs, as well as helping to reduce carbon emissions, and their role should be recognised with appropriate support. The Sustainable Energy Association believes that supporting micro-generation of heat and electricity can promote skills, job creation, energy security and environmental concerns. Northern Ireland has to use the threat of climate change as an opportunity for sustainable growth and environmental sensitivity.

We hope we will be able to present our views to the Committee and await the outcome of their decision.

Many thanks

John Hardy

Secretary

Sustainable Energy Association, Saint Patrick Centre, Market Street, Downpatrick, County Down, BT33 6JJ.
Tel: (0044)7515733347 info@sustainable-nig.org www.sustainable-nig.org

Sustainable Northern Ireland

INQUIRY INTO CLIMATE CHANGE

Evidence from
Sustainable Northern Ireland

89 Loopland Drive
BELFAST
BT6 9DW

T: 028 9050 7850
E: patricia@sustainableni.org



"There is still time to avoid the worst impact of climate change if we take strong action now"

Sir Nicholas Stern
STERN Review: The Economics of Climate Change HM Treasury, UK
30th October 2006

Summary Points

- There is a large distortion between the (early) costs associated with addressing climate change and the (late) benefits in reducing emissions
- The Assembly should categorically state its support for an international climate change agreement that limits global warming to no more than 2°C above pre-industrial temperatures.
- The Executive and Assembly should urgently make commitments to introduce a NI Climate Change Act with legally binding regional targets to reduce our CO₂ emissions by 80% from 1990 levels by 2050.
- The Executive should set an "intermediate" target for emissions in 2020, a series of legally binding five year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.
- The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland-specific budgets and action plans and monitoring performance against these.
- The Assembly should ensure that all plans, programmes and policies are assessed to determine their contribution to, or impact on, achieving carbon budgets.
- Each government department should investigate the opportunities and obstacles to carbon reductions within their competency areas and develop and deliver an action plan to decrease the emissions in line with targets.
- Long-term holistic planning, setting specific NI carbon budgets and action plans, and using Climate Impact Assessments should provide a framework for adaptation resources.
- Actions to reduce energy consumption and emission of GHGs need to be sector specific, realistic, cost effective, measurable, time bound and proportionate.
- The new Sustainable Development Strategy Implementation Plan needs to include the same targets that have been signed up to by Northern Ireland.
- Northern Ireland needs a Minister with joint responsibility for Sustainable Development and Climate Change.

Introduction

Sustainable Northern Ireland (SNI) is a charity established in 1997 to assist district councils, the community and voluntary sector, central government departments and non-departmental public bodies in understanding and moving towards sustainable development. SNI is a member of the Climate Change Coalition (NI) and Northern Ireland Environment Link (NIEL) and supports the comments they have submitted, but would like to further highlight some of their comments and make additional comments of our own.

SNI welcomes the opportunity to submit evidence to the Environment Committee's inquiry into climate change. Climate change is an integral element of Sustainable Development and was included as a priority area in the previous Sustainable Development Strategy (it is assumed it will also be a key feature of the revised Strategy) along with actions and targets. Climate change must be a fundamental part of any Sustainable Development Plan, and it is important that central government provides the lead that can then be replicated by the entire public sector, as well as being filtered out to influence the private sector through example and via procurement and contract requirements.

Northern Ireland has committed itself to the UK Climate Change Bill but without agreement on specific actions this has the potential to be meaningless. Northern Ireland must agree legally binding targets as well as identifying specific roles and responsibilities for each sector – the NI Assembly, central government, local government, business and communities. Northern Ireland needs its own Climate Change Act with legally binding targets.

SNI's comments are based primarily on the importance of addressing climate change within a long-term sustainability complex and include data from a recent survey (enclosed) undertaken by SNI on behalf of the Northern Ireland Climate Change Impact Partnership (NICCIP). This survey showed that 92% of public respondents were willing to make changes to their lifestyles to help reduce the impacts of climate change, especially if they were provided with clear leadership from the NI Assembly.

Response to the Terms of Reference

1. To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

Global temperature depends not on the current flow of emissions but on the cumulative amount of greenhouse gases (GHGs) in the atmosphere, with emissions taking decades to have their full effect. This means that little can be done to stop the increase in temperatures and the likely impacts of climate change over the next decade. While we need to put in place measures that will allow us to adapt to the inevitable impacts of climate change within this decade, we must also use resources to mitigate against the additional long-term impacts of further GHG emissions for subsequent decades. There is a large distortion between the (early) costs associated with addressing climate change and the (late) benefits in reducing emissions^[1].

Northern Ireland will not be able to tackle climate change alone. Given the global nature of climate change, it cannot be tackled by any individual country. At the same time it is important that we play a fair and proportionate role in line with our commitments to the UK Climate Change Act. The Assembly should be committed to playing its part in the international process and work in partnership with the UK government, the other devolved administrations and the Republic of Ireland government in developing and implementing a suitable response. The Assembly should categorically state its support for an international climate change agreement that limits global warming to no more than 2°C above pre-industrial temperatures.

Northern Ireland is a small country with our impact on climate change estimated at approximately 3% of UK GHG emissions. But small size of country or low amount of emissions cannot be an excuse for inaction. Northern Ireland needs to identify its 'share' based on the amount of carbon savings that should be made through its devolved policies to match savings from all developed policies in the UKCCP[2] on a per capita basis. This approach would provide clarification of Northern Ireland's climate change reduction commitments. It would also provide a method of benchmarking the effectiveness of the Executive's policies at delivering carbon savings against all policies across the UK, ROI and the rest of the world. The Executive and Assembly should urgently make commitments to introduce a NI Climate Change Act with legally binding regional targets to reduce our CO2 emissions by 80% from 1990 levels by 2050.

The Northern Ireland Sustainable Development Strategy, published in May 2006, committed Northern Ireland to a reduction of 25% in GHG emissions and 30% CO2 emissions below 1990 levels by 2025. This Strategy is now being rewritten and all targets may be removed from it. But this is not the only place that NI has committed to reducing GHG emissions. The UK has a domestic goal of reducing emissions of carbon dioxide to 20% below 1990 levels by 2010. The UK Climate Change Act has now set legally binding targets for the UK to reduce greenhouse gas emissions by at least 80% by 2050, and CO2 emissions by at least 26% by 2020, all set against a 1990 baseline. It also requires the Government to set five year carbon budgets, in order to set out a trajectory for emissions reductions to 2050. The first three budgets will cover the periods 2008-12, 2013-17 and 2018-2022, and must be set by 1st June 2009. The Executive should set an "intermediate" target for emissions in 2020, a series of legally binding five year "carbon budgets" and an annual carbon reduction target at an average of at least 3% per annum.

Northern Ireland needs to develop a considered long-term response to climate change. If the UK and NI are to achieve an 80% reduction in carbon emissions by 2050 we will require a significant change in lifestyle and an imaginative approach to ensure these changes are recognised as opportunities rather than perceived as burdens. The Committee on Climate Change's role in Northern Ireland should be enhanced to facilitate the setting of Northern Ireland-specific budgets and action plans and monitoring performance against these.

A 2008 survey[3] of attitudes to climate change conducted by SNI for NICCIP included MLAs. The results of this survey showed that, of the MLAs who responded, two of the incentives they supported were climate change impact assessments for all relevant government policies and Northern Ireland's participation in the UK Climate Change Bill. The Assembly should ensure that all plans, programmes and policies are assessed to determine their contribution to, or impact on, achieving carbon budgets.

Adaptation is intrinsically linked to mitigation, and it is essential that both be addressed as a matter of urgency. The Northern Ireland Assembly should put in place cross-departmental policies and measures which will allow people, infrastructure, biodiversity and natural systems to adapt to changing climatic conditions.

An adaptation strategy to detail how human infrastructure and natural systems will be managed to help them adapt to a range of climate change scenarios should be developed. It is particularly important that climate change impacts are a strong consideration in all decisions relating to nature conservation as new ways of looking at designated sites (e.g. buffer zones, corridors, low intensity networks and landscape scale actions) will be required for wildlife to adapt to changing climatic conditions.

2. To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector, etc.). Climate change will have direct impacts in Northern Ireland. The impacts are already being felt and well

thought-out planning for each sector will ensure they are better prepared to both adapt to the consequences of climate change and help to effectively mitigate against the longterm impacts.

Many sectors, in spite of a lack of leadership from Government, have already started taking steps to reduce their energy consumption and environmental footprint. It would be a reasonable comment that many sectors are in fact demonstrating more holistic and long-term strategic thinking than NI's decision makers. If the Executive continues to procrastinate over climate change rather than taking strong and decisive action it is going to weaken its reputation as a serious political body which follows behind the business sector rather than leading. Business leaders desire a firm and fair legislative framework to provide the basis for their actions.

Each sector must be considered separately. A blanket approach to policies and actions is unlikely to have the necessary impact. Action to help reduce climate change will have wider benefits and these need to be factored into a sector-specific route map. For example, micro-generation of energy will have wider self-sufficiency benefits and provide lower energy costs in the long term, as well as ensuring greater security of supply.

Each government department should investigate the opportunities and obstacles to carbon reductions within their competency areas and develop and deliver an action plan to decrease the emissions in line with targets. Some departments will have larger scope for action than others and climate change will have different impacts and consequences for each department. There may be a level of uncertainty over the exact impacts of climate change on each specific sector but no sector will remain unaffected. For example, in agriculture climate change may in the short-term provide some benefits to northern hemisphere crop production by increasing yields. But this is likely to only be in the first 2°C of climate change and does not take into account that extreme weather conditions (which we are already starting to experience) could reduce or eliminate any grain. This scenario also does not take into account the negative impacts of increased ozone at ground level, increased variability of temperature and precipitation and increases in levels of weeds, pests and diseases.

Improved energy efficiency and rapid deployment of renewable energy are mentioned by the Carbon Trust, Stern, WWF, RSPB, etc as key areas to target early in the decarbonisation plans. Energy efficiency is a mechanism in which all sectors and departments can have a significant role. Stronger legislation and enforcement from the Assembly in this area will help cut Northern Ireland's CO₂ emissions in line with targets set out in the UK Climate Change Act.

- Approximately 500,000 homes in Northern Ireland have either no loft insulation or have insulation below the recommended levels of 270mm while some 70,000 homes would benefit from cavity wall insulation. The Assembly should set annual targets to upgrade the existing housing stock to recommended insulation levels: all new homes should be zero carbon by 2016.
- The Assembly should set a Strategic Energy Framework target of sourcing 15% of all our energy (electricity, transport and heat) from renewable sources by 2020 (this is the target set for the UK in the EU Climate and Energy Package) will act as the driving forces towards a low carbon society. Government will have to provide additional support such as:
 - Ensuring that renewables are included in the design requirements for new public buildings;
 - Providing funding packages for smaller scale technologies (such as extending the Environment and Renewable Energy Fund);

- Requiring energy companies to generate an increased percentage of their energy from renewable sources (by increasing the NIRO; the obligation in the rest of the UK is significantly higher);
- Guaranteeing good long term prices for units of energy generated from renewable sources to encourage greater uptake of microgeneration schemes (provisions to implement a system of feed-in tariffs for small renewable energy producers by 2010 are included in the UK Energy Bill, which was given Royal Assent on 26 November 2008); and/or,
- Introducing mandatory micro-generation, including community heating schemes. It is estimated that by 2050 micro-generation could supply 30-40% of the UK's electricity needs.

Transport was responsible for around 30% of Northern Ireland's CO₂ emissions in 2004, highlighting the need for tailored transport solutions in Northern Ireland. At the moment highway measures have been allocated 80% of the transport spend. Only by increasing the share of the budget for other transport modes (walking, cycling and public transport) will significant strides be taken towards ending this reliance. The Assembly must increase the budget spent on creating a better public transport infrastructure for Northern Ireland. Consideration must be given to a government subsidised scheme to make non car related transport a viable alternative.

The survey SNI undertook regarding public attitudes to climate change³ found that 92% of public respondents felt that people are at least partially responsible for climate change, 87% thought that making changes to their lifestyle will help reduce climate change and 92% of respondents stated they were willing to make changes in order to help reduce climate change. This survey demonstrates that the public are willing to act now to help reduce climate change and do accept some responsibility. It is important to remember in any plans developed that public acceptance and action are important prerequisites to successful implementation. Action must include government departments, non-departmental public bodies and other stakeholders.

3. To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

Taking decisive action on climate change presents a win-win scenario. The economic costs of climate change mitigation are relatively well understood, as are the sectors and industries most likely to be affected by any mitigation policies and measures. By contrast, the economic costs of climate change impacts are not well understood – nor is how these balance with the cost of adaptation. It is essential that the economic assessment of climate change impacts are framed in the context of all the potential costs and benefits associated with climate change and our response to the situation. Once the net benefits are better understood then decisions can be made about the most appropriate combination of mitigation and adaptation measures needed in Northern Ireland. Lack of understanding on all the issues should not be used as an excuse for inaction.

Climate change and measures to respond to it have potentially significant macroeconomic effects. Government should see investment in a low carbon future as a way to stimulate the local economy. For evidence of this the Committee should look at the number of jobs created as a result of the Environment and Renewable Energy Fund (EREF) in NI. The renewable energy sector in Germany supports 170,000 people currently and it is anticipated that a future 130,000 new jobs will be created by 2020 as a result of the German government's support and promotion of renewable energy.

While action to help mitigate against and adapt to climate change may cost 1% of GDP in 2020 the cost of inaction will be much more. The SNIFFER report^[4] on the impacts of climate change

on NI identified a number of direct effects, mostly negative, on human health, the economy, natural habitats and water resources. Warmer temperatures will encourage the spread of diseases and insects not currently experienced within NI. These impacts all have associated costs which will be greater than the cost of mitigation and adaptation measures.

Invest NI's Maximising Business Opportunities from Sustainable Energy recommends that Northern Ireland should focus its sustainable energy efforts on four technology areas:

- Integrated Building Technologies (as buildings account for around 40% of all energy usage in most countries)
- Offshore Energy (including wind, tidal and wave – GB backing for 7000 offshore wind turbines to generate 33GW of power at an estimated cost of £64 billion. RoI has formally committed 2000 MW of offshore wind turbine generation at a cost of €4 billion over the next 5 years. £36 million spent in the UK on Marine Current Turbine research in the last 5 years [50% of the world total]. £50 million spent on wave power research in the UK [90% of the world total])
- Bioenergy (including anaerobic digestion [AD] and biofuels from waste and sustainable sources. A DARD report estimates Northern Ireland has an AD potential of 292 MW heat + 146 MW electricity; DOE indicated 747,000 tonnes of biodegradable municipal waste was collected in 2004. A RoI study indicates the potential for 1590 MW heat + 530 MW electricity in the Republic of Ireland)
- Energy Storage (to help smooth out fluctuations in demand, intermittent supply, and quality of supply. This developing technology is seen as being a significant factor once renewables exceed 10% of the grid supply). The current annual £21 billion global energy storage market is set to grow by 55% to £33 billion by 2012.

4. To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change/CO2 emissions (Akin to Regulatory Impact Assessment/Rural Proofing).

Northern Ireland needs to look to the other devolved administrations for models and assessments that are already being used. It is also important that existing policies are reviewed to identify their impacts on climate change and CO2 emissions. Assessments should be based on net GHG impact – so those that will help reduce emissions are automatically viewed more favourably than those that will increase them. Long-term holistic planning, setting specific NI carbon budgets and action plans, and using Climate Impact Assessments should provide a framework for adaptation resources.

5. To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

The target for reducing GHG emissions is already set and committed to by NI. We have committed to reducing our GHG emissions by 20% below 1990 levels by 2010, 80% by 2050, and carbon dioxide emissions by at least 26% by 2020, all set against a 1990 baseline^[5]. These are therefore the targets we should maintain and aim for and include in a Northern Ireland Climate Change Act. There is potential for assigning variable and specific targets to different sectors in order to ensure they contribute their fair share (or that this is at least included in determining who should play what part).

Actions to reduce energy consumption and emission of GHGs need to be sector specific, realistic, cost effective, measurable, time bound and proportionate. The new Sustainable Development

Strategy Implementation Plan needs to include the same targets that have been signed up to by Northern Ireland. To ensure we deliver an immediate and sustained decline in NI's GHG emissions the Executive should set an 'intermediate' target for emissions in 2020, a series of legally binding five year 'carbon budgets' and an annual carbon reduction target at an average of at least 3% per annum.

The Plan needs to identify how these targets are to be met, who is responsible for measuring compliance and the percentage reductions that can be applied to each sector. The Plan also must have full accountability and scrutiny where non-compliance can have budgetary repercussions for failing departments.

6. To make recommendations on a public service agreement for the DoE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

The DOE Climate Change Unit, along with NICCIP, needs to develop a detailed analysis of how NI is adding to human induced climate change, including a breakdown of sectors, but also an analysis of different policies, levies, and carbon trading impacts to give a net GHG figure. Every department in the Executive is part of the problem and therefore must be part of the solution. The additional problem we have in NI is that with a power sharing executive there is little cooperation between departments and there is no one individual to hold departments to account for not playing their fair share. For NI to have any impact on climate change the Executive must put in place a mandatory reduction target for each of the government departments (for their relevant sector, i.e. agriculture, business, homes, education, health, etc.) which is audited and monitored by the DOE CCU and the Committee for Climate Change and where non-compliance can have an impact on future budget allocations. Monies for each of the departments to undertake carbon reduction activities within their sector must be ring fenced.

A public service agreement should be drafted for the DOE Climate Change Unit's role to help all government departments develop climate change Strategies that are linked to the agreed reduction targets for that sector. The legal responsibility to deliver targets set in a Northern Ireland Climate Change Act and through the carbon budgets should fall collectively on the Executive. Specific responsibilities to deliver targets set in the Climate Change Act and in the carbon budgets should be identified in public service agreements for each Northern Ireland department.

7. To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Bill.

Northern Ireland should have its own primary legislation in relation to climate change rather than considering what secondary legislation raising powers within the UK Climate Change Act would contribute to NI's commitment. This would better enable the Northern Ireland Assembly to set its own budgets in relation to climate change and include tax raising powers to incentivise all sectors to actively contribute. This will also enable secondary legislation to be introduced to set 5-year carbon budgets and annual carbon targets (3% annual emissions reductions is a minimum) for the region. Secondary legislation under a Northern Ireland Act should be used to impose public sector duties to deliver targets and to set sectoral targets for emissions reductions.

Northern Ireland needs its own Climate Change Act with a legally binding regional target to reduce our CO₂ emissions by 80% from 1990 levels by 2050. The Executive must also set an

'intermediate' target for emissions in 2020, a series of legally binding five year 'carbon budgets' and an annual carbon reduction target at an average of 3% per annum.

8. To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

Sustainable Northern Ireland's experience of Assembly scrutiny committees is that they essentially have limited power to enact change. All power seems to lie with the Minister. Obviously in NI this creates a major problem as the Minister with responsibility for Climate Change does not believe any action to reduce atmospheric GHGs is necessary. In the UK there is a Minister dedicated to climate change. SNI has long called for a dedicated Minister for Sustainable Development. We now believe that a Minister with joint responsibility for Sustainable Development and Climate Change would make sense as both are cross-cutting inter-related issues for all departments so would require the same level of accountability, scrutiny and power.

Climate change is such a large, complex and pressing issue that it is imperative that when the Committee on Climate Change reports to the Executive and the Assembly that these reports are responded to and acted upon.

9. To produce a report on the findings and recommendations of the inquiry by September 2009.

Sustainable Northern Ireland is concerned that no action on climate change is going to be undertaken before September 2009 and that the length of time it takes to write legislation and implement change may make it too late for NI to play its fair share without large additional costs.

Even before the report is written and made public the Environment Committee must recommend that the Executive and Assembly urgently make commitments to introduce a Northern Ireland Climate Change Act with legally binding regional targets to reduce our CO2 emissions by 80% from 1990 levels by 2050.

Thank you for giving us the opportunity to submit written evidence. We would be happy to meet the Committee to provide additional oral evidence. We will be following the actions the Environment Committee, the Assembly and the Executive take with great interest.



Patricia Mackey
Sustainable Development Officer
Sustainable Northern Ireland
89 Loopland Drive
BELFAST

P: 028 9050 7850
E: patricia@sustainableni.org
W: www.sustainableni.org

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[1] Jones et al, 2007, "Climate Change: Economic Impact and Policy Responses," in World Economic Outlook, October (Washington: International Monetary Fund), Appendix 1.1

[2] UK Climate Change Programme – First published in 2000 and subsequently reviewed and updated

[3] Climate Change: What will you do' Northern Ireland Climate Change Impacts Partnership (NICCIP) written by Sustainable Northern Ireland, January 2009

[4] SNIFFER "Implications of climate change for NI: Informing strategy development, 2002

[5] UK Climate Change Act

Independent members of the NI Cycling Board Forum

Preamble

The independent members of the Northern Ireland Cycling Forum Board welcome the opportunity to contribute to the Environment Committee's Inquiry.

The NI Cycling Forum Board oversees the implementation of the NI Cycling Strategy. Membership of the Forum comprises staff from the Department of Regional Development, Government Agencies, Local Councils and non-governmental cycling organizations, Sustrans, CTC and the NI Cycling Initiative.

The Forum's independent members hold posts on the Forum on a voluntary, unpaid basis.

The short response time to the consultation constrained our ability to produce an in depth comprehensive response however we would welcome an invitation to present further to the committee if the committee considers it advantageous

Terms of Reference for the Inquiry

To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

The UK government has, by way of the Climate Change Act, made a commitment to the reduction of net UK carbon emissions of at least 80% by 2050 on a 1990 baseline. To meet this ambitious target it is vital that all countries of the UK fully contribute with efforts to reduce carbon emissions.

Current transport activities and policies within NI are not enabling reductions in carbon emissions and on current trends will result in an increase in emissions from the sector by 2050. To compound problems NI road surface transport system is nearly 100% dependent on imported fossil fuel, and as a result a significant amount of NI's annual wealth is consumed by payment for fossil fuel. The Royal Commission on Environmental Pollution concluded that the only fair, acceptable and workable method of implementing carbon reduction was to allocate carbon emission quotas to nations on a per capita basis upon which each would be expected to converge towards over 50 to 100 years

It is vital that there is a commitment to reduce net carbon emissions from Northern Ireland's transport system by improving alternatives to the car travel and by providing sufficient investment to make low carbon travel a reality for people.

To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

Specific areas of action should include:

Reducing work-related and shopping car travel. Making big cuts in car commuting and shopping car travel would have a big impact. Commuting, business and shopping related travel accounts for over 44% of all adult journeys in NI[1]. People are taking long journeys by themselves – 91% of car commuting and 87% of business car trips are single occupancy journeys[2]. Travel plans should be promoted to businesses to promote alternatives to car travel and shared car travel.

- Reducing journey lengths and transfer short car journeys to walking and cycling. People are travelling longer distances to get to essential services or their places of work. Car journeys less than five miles account for 20% of UK passenger transport CO2 – shifting some of these to walking and cycling will help cut congestion and obesity and improve health too. In NI 63% of all journeys are less than 5 miles[3] (a 30 minute bike ride). 97% of rural dwellers in NI live within 5 miles of a rural settlement[4]
- By introducing a 'Carbon Reduction Fund' for transport open to Districts, transport operators, charities and other organisations the essential capital and revenue funding for initiatives to improve walking and cycling would be reality.
- Increasing public transport trips to enable people to have a real travel choice. Key to improving the public transport offer is the necessity of providing more bus and train services in addition to delivering on small scale upgrades to services and infrastructure and for them to be integrated. The introduction of door-to-door ticketing would make door to door journeys attractive to car users.
- Reducing the transport carbon impact of rural homes by introducing a carbon tax on nonagricultural single rural dwellings. This would reflect the extra carbon cost associated with their dependence on private motorised transport and a carbon tax levied through the rating system on parking spaces at shopping centres and other car dependent attractors

The recent economic report into carbon reduction by Lord Turner[5] suggests

"Lifestyle-change (e.g. substituting cycling for driving on short trips) will reduce energy consumption/production, with households reallocating expenditure towards less energy intensive goods and services. This will have no significant impact on GDP"

The Campaign for Better Transport recently published a report[6] which shows how to reduce carbon emissions from transport through a comprehensive package of transport policies mostly extensions of current practices building on past successes.

To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

We look to informed expert knowledge for carbon cost mechanisms and the implication of the cost arising from climate change. Transport externalities excluding carbon and air quality already

cost NI society nearly one billion pounds per annum through obesity and road traffic collisions[7] Lord Turners report suggest carbon budgeting around 1% GDP

The Carbon Trust[8] estimates annual cost of carbon reduction in NI through to 2030 between £25 million and £55 million - less than half the annual cost of the NI Assembly

To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO 2 emissions. (Akin to Regulatory Impact Assessments/Rural Proofing)

We look to informed expert knowledge on these issues and note that the Energy Saving Trust show rural households emit more GHGs[9] than urban households. Will the principle polluter pays hold true?

To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

We suggest targets could include the number of children cycling and walking to school. The reduction of car parking spaces provided free to the NI Civil Service and the dependence of the Health Service on private motorised transport. Reducing the annual distance traveled in NI by private motor car. Increase in public transport patronage

To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

The public service agreement must include a targeted and measured reduction in GHGs arising from departmental transport including how the public and employees travel to various government buildings. The current Regional Development and Transport Strategies are long on talk of sustainability but short on the strategies that implement sustainability as measured by the ever increasing rates of GHG emissions from road transport. Targets should be set to reduce CO2 emissions from transport and measures outlined how to make this happen. There is an opportunity to do this given the imminent review of the Regional Transportation Strategy.

To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Act.

Adapt the legislation of local taxation and rating to allow for the carbon taxation of emissions associated with car parking provision and location.

To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

Climate change science robustly demonstrates that climate change is happening. If the anthropomorphic effects on climate are not constrained the late adulthood of NI's current generation of young children will be seriously compromised. The Assembly is obliged to act and shoulder responsibility for the highest rates by household of GHG emissions in the UK[10] The Assembly must give teeth and resources to scrutiny on a regular and searching basis

According to the Met Office, in their 2007 Report 'Together: Make a difference to your climate with the Met Office', the UK's transport system could be severely affected as a result of the effects of climate change. Prolonged high temperatures caused by climate change could cause road surfaces to melt and railway lines to buckle, creating delays and disruption. Railways would be threatened with wetter UK winters, greater storminess, coastal erosion and sea-level rise.

It is essential that mitigating climate change be a priority for the Assembly but in addition that work be undertaken to prepare for mitigation of some of the effects of climate change on our transport

networks. Research should be undertaken on adapting materials and techniques in highway works to the changing climate, together with a full assessment of how to manage the risk from climate change to its roads, walking and cycling networks.

[1] Travel Survey for NI 2005-2007 Dept for Regional Development

[2] Campaign for Better Transport

[3] Travel Survey for NI 2005-2007 Dept for Regional Development

[4] Rural Settlement Patterns and Access to development land: Developing the Evidence base

[5] Building a low Carbon Economy <http://hmccc.s3.amazonaws.com/pdf/TSO-ClimateChange.pdf>

[6] Shrinking Carbon Improving Lives – A plan for reaching Climate Change Goals, Campaign for Better Transport November 2008
http://www.bettertransport.org.uk/system/files/Low_carbon_companion_report_0.pdf

[7] NI population is the least active most obese population in the UK. Obesity costs in NI are £500 million pa and Road Traffic Collisions in NI cost £450 million pa

[8] Carbon Trust Northern Ireland Vision Study for NI published 2005
<http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=CTC520>

[9] GHG - Green House Gas

[10] Green Barometer Three Energy Saving Trust November 2007
http://www.energysavingtrust.org.uk/content/download/21447/80032/file/Green_Barometer_three.pdf

Ulster Farmers Union

Ulster Farmers' Union



Established 1918

Dr A McGarel
Clerk to the Environment Committee
Environment Committee Office
Room 245
Parliament Buildings
Stormont
BT4 3XX

Clarke Black
Chief Executive

FROM THE PRESIDENT

27 February 2009

Dear Alex

NI ASSEMBLY ENVIRONMENT COMMITTEE INQUIRY INTO CLIMATE CHANGE

Thank you for the opportunity to respond to the NI Assembly Environment Committee inquiry into climate change. The Ulster Farmers' Union is the largest farming organisation in Northern Ireland representing around 12,000 farming businesses.

The enclosed document outlines the UFU's current position on climate change from an agricultural perspective. I trust that this will be useful to the inquiry. The Ulster Farmers' Union would welcome the opportunity to provide oral evidence on this matter if required by the Committee.

Yours sincerely

GRAHAM FUREY

475 Antrim Road, BELFAST, BT15 3DA.
Tel: 028 9037 0222 Fax: 028 9037 1231

Email: info@ufu.org
Website: www.ufu.org

Ulster Farmers Union



UFU Response to NI Assembly Inquiry into Climate Change

27th February 2009

Introduction

Climate change is an important issue for agriculture and therefore would merit an inquiry on this aspect alone to fully consider the issues outlined in the terms of reference. Farm businesses in Northern Ireland need to adapt to a changing climate, potentially reduce greenhouse gas emissions while continuing to produce competitive quality food for the local and global marketplace. The UFU therefore feels that the agricultural sector needs to be specifically considered in the climate change debate and this response focuses on this aspect.

Emissions from Agriculture & Research

The Climate Change Committee report that 7% of UK Greenhouse Gas Emissions are from agriculture mainly coming from the use of fertiliser, enteric fermentation and manure management (in NI the proportion is much higher). This includes about 39% of UK methane emissions, about 67% of nitrous oxide emissions and 1% of carbon dioxide emissions. Agriculture is therefore a contributor to greenhouse gas emissions, particularly non-CO2 emissions.

It is recognised by the Committee on Climate Change that there is currently limited measurement of emissions at farm level. The UFU therefore feels that it is vital that more research is conducted in Northern Ireland to establish an accurate baseline before any decisions are taken on specific GHG emissions targets for the agricultural sector. We are aware that the Agri-Food and Biosciences Institute (AFBI) are working on some advanced research on the overall greenhouse gas emissions from dairying systems however this needs to be further analysed.

The UFU suggest that more research is also required in Northern Ireland on the potential impacts of climate change on the agricultural sector, adaptation measures and the consequences of these in terms of GHG emissions, and also on realistic measures for reducing greenhouse gas emissions.

It is also important to recognise that while agriculture contributes to greenhouse gas emissions, it could also play a significant role in mitigation through acting as a carbon sink and with the potential to produce renewable energy therefore displacing CO2 emissions produced by fossil fuels.

NI Commitments / Targets

Any proposals to identify Northern Ireland commitments or to set targets for local greenhouse gas emission reduction for the agricultural sector must be based on sound science, must be realistic and achievable. As it is not yet possible to produce accurate baseline figures at farm level, it is difficult to determine what actual effect potential actions on local farms will have on helping to meet overall targets. There are currently conflicting views on how agriculture should reduce emissions while continuing to produce quality food and therefore it is difficult to outline a route map for the sector until more work is carried out. E.g. a high yielding dairy cow will produce less methane per litre of milk but this is in a high input system. Others would propose that there are less overall GHG emissions on a grass-based dairying system using a lower yielding cow but ultimately producing more methane per litre of milk. A further example of conflict is that farmers were advised to consider minimal-tillage / no-tillage systems to increase organic matter in soils and therefore sequester carbon however it has been identified that as these soils become anaerobic the NOx emissions are significantly increased therefore outweighing any benefits of carbon sequestration.

International Commitments

It is also important to recognise that discussions will take place in 2009 regarding a successor to the Kyoto Protocol. There are important points that need to be addressed to ensure that local agriculture is not penalised in any new agreement. The UFU believes that the Clean Development Mechanism within the Kyoto Protocol is currently flawed. The Clean Development Mechanism (CDM) allows industrialized countries with a greenhouse gas reduction commitment to invest in projects that reduce emissions in developing countries as an alternative to more expensive emission reductions in their own countries. This means that industry and power stations in the developed world can purchase 'carbon credits' from farmers for example using anaerobic digesters in the developing world to off-set emissions however farmers in NI using the same technology cannot benefit from this mechanism. Countries like Brazil who are competing with NI on the beef, pork and chicken markets qualify for the CDM and are effectively receiving a subsidy via this mechanism from industry in the UK which allows them to sell produce at a much cheaper rate than local farmers in the local market place. It is vital that such arrangements are considered during the 2009 talks and addressed in the successor agreement to the Kyoto Protocol. Industry in the developed world should be permitted to purchase carbon credits from UK farmers for carbon sequestration in land, forestry or through producing renewable energy.

It may also be easier for other countries to meet international targets due to differences in the techniques permitted. For example farmers in USA, Canada, Brazil and Argentina will be able to significantly reduce methane emissions from cattle by using growth promoters which are banned in the EU. These will allow animals to grow faster and therefore produce more milk or beef in a shorter period of time and consequently lower methane emissions. It is unfair to expect similar reductions in the EU where these substances are illegal and alternative practices to deliver such reductions would result in much more costly changes on farm.

Adapting to a changing climate

Agriculture is dependent on the climate and continuously adapts to any changes. UK farmers can and will adapt their farming practices, but it is important that they are assisted through adequate advice and information from Government. Climate change presents significant threats to farmers e.g. decreased water availability in some areas, weather extremes etc, but also opportunities e.g. new crops may be able to be grown. It is important that NI is ready for potential changes by carrying out the necessary research work and technology transfer sooner rather than later.

The UFU would also ask the Environment Committee to note that changes to current practices in order to cope with a changing climate could lead to increasing greenhouse gas emissions from farms. For example to cope with a drier summer more irrigation may be required resulting in increased emissions at an individual farm level. Wetter winters may result in livestock being housed for longer periods which could also increase overall emissions for the sector. There will also be a cost associated with such adaptation (see below).

Genetically modified (GM) crops may become more important in helping to adapt to climate changes and the consequences arising from such change such as increases in pest or invasive species. Current policies on GM crops may need to be developed to take account of this.

Renewable Energy

Government is also focused on renewable energy and its potential to mitigate excessive climate change and the UFU believes that this new direction creates many opportunities for local farmers. Northern Ireland farmers are well placed to produce renewable energy and the UFU has outlined this fully to the NI Assembly Agriculture Committee in their recent inquiry into renewables. It is important to highlight that the policies the Northern Ireland Government decides upon encourage the integration of this renewable energy into an existing energy network. This will require difficult but minor changes to the current supply chain structure to

allow free competition for local markets that are currently exclusively supplied by external investors.

It is also important that the Northern Ireland Government opens strenuously protected markets such as electricity and fuel to local producers at financially viable prices. The previous NI Electricity Regulator reported that the producer of electricity should receive 80% of the retail value, this aspiration has not even come close for the average local renewable electricity supplier. If this figure could be achieved then direct financial support, required to install technologies, such as anaerobic digestion or small scale combined heat and power or even larger projects such as tidal power, would be supplied by commercial financial institutions without further ongoing government financial support.

In Germany, the government guaranteed the electricity supplied price from anaerobic digesters at approximately 20¢ per kilowatt hour. This promoted a very large number of installations because they became financially worthwhile – in Northern Ireland anaerobic digesters are currently not financially viable with the low electricity price offered resulting in gases from waste and organic manures that should be fuelling our local economy and displacing fossil fuels, currently adding to our greenhouse gas emissions. It is therefore important to consider these aspects in conjunction with developing policies on reducing greenhouse gas emissions and climate change.

Costs to Agriculture

The UFU would be concerned that policies put in place to meet emissions targets could result in rising costs for local farmers leading to higher food prices. If consumers are unwilling to choose the locally produced higher cost product this would have a severe impact on the agri-food sector. The sector in Northern Ireland could become uncompetitive in the global marketplace with the result that food production is moved elsewhere therefore simply moving the environmental problem with no global benefit. The consequences of this action would be considerable on the NI economy which relies heavily on the agri-food sector.

It is impossible to identify the costs associated with meeting obligations in the agricultural sector until there is better science and understanding of the size of the challenge for the sector. The costs are also very much dependent on the decisions taken by Government on how targets should be met. For example, it is suggested that lifestyle changes such as moving away from meat in diets will reduce methane emissions as the number of livestock will decrease however this would have catastrophic consequences for the agri-food sector and the local economy and there may be other environmental implications and costs by simply exporting the problem elsewhere and changing the way the countryside is managed. Reducing livestock numbers could may not reduce methane emissions e.g. if agricultural land lies dormant, vegetation will not be managed and may rot and produce methane during breakdown.

There is potential to reduce greenhouse gas emissions by changing farming practices and in some cases depending on what is suggested this could result in cost-savings for local farmers. For example, reducing fertiliser application where it is applied in excess and making better use of organic manures. NI is already being driven down this route since the introduction of the Nitrates Directive and therefore is already reducing GHG emissions indirectly via this water quality policy.

It is important that Government recognises that if more costly measures are imposed on local businesses such as forcing farmers to invest in new technologies, this would lead to increased costs for farm businesses which could affect the competitiveness of local farms as outlined above.

There are also likely to be increases in the costs to farm businesses in dealing with a changing climate e.g. increased need to spray crops due to increase in disease problems or a requirement to house livestock for longer periods due to wetter winters.

Rather than imposing costs, levies or taxes on farm businesses to force farms to reduce GHG emissions, the UFU would prefer an approach where farmers are rewarded for reducing emissions. The agriculture sector could be rewarded for their role in carbon sequestration into soils and vegetation, for changing practices to reduce emissions, for adopting new innovative technology or for producing heat and electricity from renewable sources. This could be advanced through trading schemes, incentivising the uptake of certain techniques and technologies and as outlined above making changes to the electricity supply chain.

The UFU would support the need for an effective mechanism to identify costs associated with the new climate change policies. As outlined above it is vital to properly assess the cost and benefits of any new climate change policies in NI but this cannot be looked at in isolation of other Government policies.

Retailers

UK retailers have already indicated a desire to move towards 'carbon labelling' of food products. The British Standards Institute have recently developed a Publicly Available Specification (PAS) for a method for measuring the embodied greenhouse gas (GHG) emissions from goods and services at the request of DEFRA and the Carbon Trust. The PAS method for measuring GHG emissions of goods and services will enable businesses to effectively measure the climate change related impacts of their goods and services with a view to using this information to improve the climate change related performance of these.

Demands from the retailers are at present the biggest threat to local farmers and food processors on this issue requiring almost immediate action to label products and ultimately moving towards 'lower carbon' products to apparently satisfy 'consumer demands'. It is reported that using this new standard, Brazilian beef is currently performing better than locally produced beef in terms of the 'carbon footprint', but this mechanism fails to take into account the destruction of the Brazilian rainforest, the use of GM crops and growth promoters in these systems and other environmental consequences. The UFU queries the ability of the consumer to interpret this information and would urge Government to consider the implications for local farming when the retailers go down this route. It is vital that Government moves in a joined-up approach to help rectify this position.

Government

It is vital that there is a joined up-approach within the Northern Ireland Executive and in partnership with the agri-food sector on all of the above. The Committee on Climate Change have outlined that any policy identified for reducing emissions from the agriculture sector cannot be taken in isolation as there may be implications for other policy objectives e.g. biodiversity, water quality, food production, energy, animal welfare etc therefore requiring all Government departments to work together. It is also important that discussions result in actions being taken to help the agri-food sector adapt to climate change and move towards achieving any targets in a managed way backed up with scientific and practical information and advice.

Woodland Trust's Response to the Environment Committee's inquiry into Climate Change



1. The Woodland Trust welcomes the opportunity to respond to this consultation. The Trust is the UK's leading woodland conservation charity. We have four main aims: no further loss of ancient woodland, restoring and improving woodland biodiversity, increasing new native woodland and increasing people's understanding and enjoyment of woodland. We own over 1,000 sites across the UK, covering around 20,000 hectares (50,000 acres) and we have 300,000 members and supporters.

Summary

- The Northern Ireland Executive should now legislate for a carbon reduction target in order to establish what contribution the province will make to the overarching UK wide targeted cut in carbon emissions of 80 per cent by the year 2050.
- Climate change will continue to have significant, and negative, impacts on both wildlife and people. Accordingly, there is a need for landscape scale action in Northern Ireland to help secure the natural environment and the ecosystem services it provides such as clean air, enhanced soil and water quality.
- Caution should be exercised when imposing a purely economic valuation on the natural environment. Indeed, it is widely accepted that there has been a decline in the quality and diversity of Northern Ireland's wildlife over the past fifty years, and therefore more must be done to safeguard vitally important environment assets such as ancient and long-established woodland.
- Given the crucial role woodland can play in helping Northern Ireland negate and adapt to climatic change, the Northern Ireland Sustainable Development Strategy should align its woodland creation target to that of the Northern Ireland Forestry A strategy for Sustainability and Growth by committing itself to doubling woodland cover in the province.
- The suite of PSA indicators should be expanded to include protecting, restoring and expanding the most important natural habitats. These habitats, including woodland, can help wildlife and people adapt to the negative impacts of climate change.
- All departments have a role in ensuring that Northern Ireland is able to meet its climate change objectives. As a consequence, the Assembly should be prepared to scrutinise the actions and pronouncements of any Minister whose policies might have an impact on the environment.

a. To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets

2. In the Climate Change Act there is no legally binding emissions reduction target for Northern Ireland, and therefore it is unclear as to what is expected of the province in terms of its contribution to the UK wide target of an 80 per cent cut by 2050. To give clarity and transparency to climate change policy, the Executive could now legislate for its own target; and should at the very least put into statute the commitment in the Programme for Government to 'Reduce greenhouse gas emissions by 25 per cent below 1990 levels by 2025'.

3. Section 60 of the Climate Change Act, 'Programme for adaptation to climate change: Northern Ireland', details the relevant duties Northern Ireland departments will have in relation to adapting to the negative impacts of climatic change. Crucially, the Assembly must be rigorous in its scrutiny of the adaptation programme, and this could take the form of annual report by the Environment Committee judging the actions and performance of the Executive's departments and agencies.

4. Climate change is already here. It impacts on woodland habitats and the species they support by disrupting life cycles, altering interactions between species, and often requiring them to migrate to more suitable conditions. In light of this dynamic an adaptation strategy should focus on certain principles such as protecting the best of the resource, expanding it where possible, and restoring it where it might have been degraded. This should mean absolute protection of ancient and long-established woodland, creating new woodland where it can benefit either wildlife or people, and restoring ancient woods that were degraded by the planting of non-native conifers.

b. To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

5. Northern Ireland has a highly fragmented landscape and the likely rates of climate change threaten the survival of its natural world. Accordingly, the Trust expects the Northern Ireland Executive and its departments to recognise the importance of native woodland, in particular ancient and long-established woodland and ancient trees, as the foundation for the restoration of this fragmented landscape.

6. The Trust believes that there is a need to target actions at a landscape scale level.^[1] When implementing an adaptation programme, the Executive could create new wildlife habitats within a sympathetically managed landscape that allows as many species as possible to adapt, and move, in response to changes in climate.

7. As climate change becomes a pressing issue for Northern Ireland, it is important that the Executive delivers on its commitments held within the following documents: the Northern Ireland Biodiversity Strategy, Northern Ireland Forestry A strategy for Sustainability and Growth, and the Northern Ireland Sustainable Development Strategy. These commit the Northern Ireland Executive to restoring ancient woodland, doubling woodland cover, and protecting important semi-natural habitats.

8. Further to this the Trust has produced its own manifesto, A vision for woodland in Northern Ireland. In response to a parliamentary question, OFMDFM welcomed our document as a 'useful perspective on the environmental and social aspects of forestry.'^[2] The Trust now hopes that our document will be incorporated into the wider policy framework.

c. To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.

9. There is much research going into whether it is possible to impose an economic valuation onto the natural environment – something that remains deeply controversial because it is easier to place a value on biodiversity or ecosystem services that can be traded, whereas it is it is near impossible to do this for those that are not marketable. The Assembly should therefore be cautious, and possibly avoid trying to evaluate environmental policies by using a purely economic rationale.

10. Nonetheless, The Economics of Ecosystems and Biodiversity (TEEB report)^[3] and an investigation into The Economic and Social Aspects of Biodiversity Benefits and Costs in

Ireland[4] have sought to impose an economic valuation on the natural environment. The TEEB report concluded that: 'The loss of biodiversity and ecosystems is a threat to the functioning of our planet, our economy and human society.'^[5] Such sentiments justify spending public money on protecting the environment and improving the public's engagement with, and understanding of, the natural world.

11. Moreover, in 2007 a piece of research, The Environmental Economy of Northern Ireland, put the gross value added accruing from forestry in the province at £3 million.^[6] Tourism was a vital component in this success, and therefore protecting the best of the resource is vital if the province is to continue attracting inward investment and visitors.

12. Northern Ireland suffers from a legacy of habitat removal with 13 per cent of ancient and long-established woodland that survived to the 1960s being lost; representing a total of 273 ancient and long-established woods that have been cleared altogether. Additionally, the Executive is committed in the Programme for Government to reduce significantly the loss of wildlife by 2010 and halt wildlife decline by 2016. In response to this point it is quite legitimate that any climate change adaptation programme ensures that biodiversity is able to adapt in the face of climatic change. In respect of woodland conservation this should mean absolute protection for ancient and long-established woodland, restoration of those woods previously degraded by the planting of non-native conifers, and targeted woodland creation to benefit both people and wildlife.

13. A DOE led adaptation strategy should afford an opportunity to implement landscape scale action and impress upon the public conscious the value of the 'services' that Northern Ireland derives from a healthy natural environment. For example, this could be an ideal moment to create new woodland and restore those woods previously degraded by non-native conifers. In support of this the Trust has evidence demonstrating the economic benefit of restoring ancient woodland,^[7] and perforce restoring PAWS should be a key strand in an adaptation strategy.

d. To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO₂ emissions. (Akin to Regulatory Impact Assessments/Rural Proofing)

14. No comment.

e. To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan

15. The original Northern Ireland Sustainable Development Strategy committed the Executive to increasing the area of forestry by 500 hectares per annum. This though is a less ambitious target than the one in Northern Ireland Forestry: A strategy for Sustainability and Growth that pledged to double woodland cover in the next 50 years. The Trust hopes that any revision to the Northern Ireland Sustainable Development Strategy furnishes an ambitious woodland creation target – primarily broadleaved woodland given its ecological value – in recognition of the benefits the province could derive from expanding its wooded resource.

16. It is estimated that Northern Ireland has 87,000 hectares of woodland, and therefore to double woodland cover there will need to be approximately 1,740 hectares of new woodland planted per annum. This then, is the figure the Trust would like included in the Northern Ireland Sustainable Development Strategy.

17. In the past OFMDFM admitted that they were unable to measure the increase of wooded area in Northern Ireland as they did not know comprehensively the location of the resource.^[8] Another action that should be identified in the Northern Ireland Sustainable

Development Strategy is the creation and maintenance of a record of all woodland in the province. The Trust has already compiled an inventory of ancient and long-established woodland, and would now ask the Executive to take over the mantle by creating and then maintaining a comprehensive inventory of all woodland. Such an amendment would deliver upon the recommendations in the Northern Ireland Biodiversity Strategy.

f. To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

18. Adapting to climate change will be one of the great challenges facing DOE in the coming years. To return the natural environment onto a sustainable footing it will be necessary to improve the connectivity between habitats in order that wildlife can migrate to more suitable conditions. This will involve protecting the most valuable semi-natural habitats, restoring those that have been degraded, and expanding the resource.

19. A new suite of public service agreements could be created to improve the current commitment to declare 75 ASSIs by 2011 held within the Programme for Government. This could include a commitment to protect all ancient and long-established woodland, to restore those sites previously degraded by the planting of non-native conifers, and to double the area of woodland in Northern Ireland.

20. The current target in the Programme for Government to increase by 1650 hectares the area of forests in Northern Ireland by 2011 will fail to double woodland cover. Indeed, this target will only increase the area of woodland in the province by approximately a quarter, and sits uneasily with other commitments. Any new public service agreement should seek to rectify this anomaly by providing a realistic target that is going to allow the Executive to deliver a doubling of woodland cover in 50 years.

21. There is broad ranging political support for creating new woodland in the Assembly as demonstrated by the cross party support for the Ulster Unionist no-day named motion stating:

That this Assembly notes the limited target set in the Programme for Government for increasing the area of forest and woodland; and calls on the Minister of Agriculture and Rural Development to detail the strategies that are in place to achieve the 2006 Forestry Strategy target of doubling woodland cover in the next fifty years.^[9]

g. To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Bill.

22. No comment.

h. To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

23. All government actions can have a significant impact on the success of climate change policies. It therefore behoves the Executive to test all of its policies against any negative impacts they might have on climate change. So as to ensure compliance with commitments in the Climate Change Act, the various departmental committees in the Assembly should be prepared to challenge ministerial pronouncements whenever appropriate. Additionally, the responsibility to challenge the Executive as a whole rests with the OFMDFM Committee, and therefore the Trust would hope that their inquiries reflect the importance of negating, and adapting to, climate change.

24. Moreover, the Assembly could also give the Environment Committee the power to scrutinise all aspects of policy that might affect climate change irrespective of whether the issue under consideration falls within the remit of the DOE.

Annex One

Landscape-scale principles for Northern Ireland

Northern Ireland has a highly fragmented landscape and likely rates of climate change threaten the survival of its natural world. Accordingly the Woodland Trust expects the application of landscape-scale principles to allow the widest range of species to move, survive and evolve in the face of climate change. This could involve:

- Conserving those species believed to be fundamental to wildlife habitats; and using individual species to promote wider protection, restoration and creation of wildlife habitats.
- Affording absolute legislative protection to all ancient and long-established woodland and ancient trees and other habitats in the NI Biodiversity Action Plan, and recognising this resource as the foundation for the restoration the province's fragmented landscape.
- Restoring all ancient woodland, in both Forest Service and private ownership, previously planted with non-native conifers and also other NI Biodiversity Action Plan open habitat previously planted with conifers.
- Creating new habitats, including native woodland, where wildlife is best placed to survive. In practice this could involve creating new habitat where ancient woodland and other semi-natural habitat is already in abundance.
- Implementing habitat creation to buffer ancient and long-established woodland from negative land-use.
- Ensuring that the wider countryside is managed sustainably in order that wildlife can easily move across it. Climatic uncertainty dictates that it is not sufficient to simply physically link existing habitats.
- Demonstrating the benefits that society derives from a healthy natural environment. These include improved air and soil quality, flood alleviation, high quality food and timber, improved public health and opportunities for recreation and employment. As an exemplar, wooded habitats should be protected and expanded where it offers benefit in regard to either public amenity or wildlife conservation.

Woodland Trust, 1 Dufferin Court, Dufferin Avenue, Bangor, County Down, BT20 3BX

www.woodland-trust.org.uk/campaigns

For more information, please contact:

Lee Bruce at LeeBruce@woodlandtrust.org.uk 08452 935 551

[1] See Annex One, Landscape scale principles for Northern Ireland.

[2] Northern Ireland Assembly, Written Answer, ref AQW 1851/09 (7 November 2008) <http://archive.niassembly.gov.uk/qanda/2007mandate/writtenans/2008/081107.htm>

[3] Pavan Sukhdev, The Economics of Ecosystems and Biodiversity (2008).

[4] Government of Ireland, The Economic and Social Aspects of Biodiversity Benefits and Costs in Ireland (2008).

[5] Sukhdev, The Economics of Ecosystems and Biodiversity, p. 14.

[6] Northern Ireland Green NGOs Group and the Environment and Heritage Service of Northern Ireland, The Environmental Economy of Northern Ireland (April 2007), p. 48.

[7] Woodland Trust, The cost of restoring plantations on ancient woodland sites – an analysis of the economics of future management options.

[8] Northern Ireland Assembly, Written Answer, ref AQW 2962/2 (1 February 2008) <http://archive.niassembly.gov.uk/qanda/2007mandate/writtenans/080201.htm>

[9] Northern Ireland Assembly, Official Report (4 November 2008), <http://archive.niassembly.gov.uk/record/reports2008/081104.htm#6>

WWF Northern Ireland



WWF Northern Ireland
2nd Floor
7 Exchange Place
Belfast
BT1 2NA

tel: 028 9330 2869
fax: 028
northernireland@wwf.org.uk
wwf.org.uk/northernireland

Alex McGarel
Environment Committee Clerk
Parliament Buildings
Belfast BT4 3XX

Reference: Environment Committee Inquiry into climate change

27th February 2009

Dear Alex,

WWF Northern Ireland welcomes the Environment Committee's inquiry into climate change and appreciates the opportunity to comment on this very important piece of work.

WWF Northern Ireland is part of the world's largest independent conservation organisation in the world which operates in over 90 countries. WWF is a challenging, constructive, science-based organisation that addresses issues from the survival of species and habitats to climate change, sustainable business and environmental education. WWF has some five million supporters worldwide and approximately 90% of our income derives from voluntary sources such as people and the business community.

WWF works to

- conserve endangered species - such as tigers, great apes and whales;
- protect endangered spaces - such as forests, savannahs, wetlands and seas;
- address global threats to the planet - such as climate change and toxic chemicals

for the benefit of people and nature.

If you have a further queries on this submission please do not hesitate to contact me.

Yours sincerely

Malachy Campbell

Policy Officer WWF Northern Ireland

WWF Northern Ireland response to the Terms of Reference of the Environment Committee Inquiry into Climate Change

(a) To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets

WWF Northern Ireland believes that Northern Ireland needs to set mandatory targets to reduce energy demand in absolute terms, reduce the overall contribution of fossil fuels, increase the contribution of renewables and reduce Carbon Dioxide (CO₂) emissions by 80% from 1990 levels by 2050 and to plan appropriately, with targets, for the investment necessary to meet those energy targets set. The above key principles overlap and so a long term integrated approach needs to be taken, preferably via a long term energy strategy.

WWF Northern Ireland is therefore delighted that the Environment Committee has previously expressed support for Northern Ireland targets, for example in the Committee's response dated 7th September 2008 to the UK Climate Change Bill.

WWF Northern Ireland is further encouraged by previous comments in January 2008, in relation to the North South study on renewable energy and the grid, made by the former Minister for Enterprise Trade and Investment, Nigel Dodds who said that Northern Ireland

"can make a significant contribution to the UK's climate change goals by enhancing the amount of electricity generated from local renewable sources"

and that

"it is clear that we must be more ambitious in setting future renewable energy targets."

WWF Northern Ireland also supports the comments made by the current Minister for Enterprise Trade and Investment Arlene Foster at the launch of the pre scoping consultation on the Strategic Energy Framework in November 2008 that there is a need for Northern Ireland to plan

"for a sustainable energy future that will also deliver on EU climate change targets and increase security of energy supplies for domestic and business use"

and that

"The objective for us all is to achieve a successful, sustainable, long-term future for energy in Northern Ireland, through innovative and ambitious actions, involving a shared vision with industry and partners throughout the rest of the United Kingdom and the Republic of Ireland."

The targets set in Northern Ireland should at the very least match, but preferably surpass, the relevant UK targets in order to ensure it (Northern Ireland) plays a fair and proportionate role as part of the UK in meeting climate change targets, for example those targets in the Climate Change Act of 2008 and the UK targets in the EU Energy package of 2008, as endorsed for example, by the Minister for Enterprise Trade and Investment.

Tackling climate change and meeting Northern Ireland specific targets will, as things stand at present, require cross departmental co-operation, since many of the issues referred to above including energy, transport and agricultural policy are not the responsibility of the Department of Environment. As such there is a need for much greater levels of interdepartmental co-operation on climate change and energy issues. However, one possible option which WWF Northern Ireland supports is the establishment of an integrated sustainable energy agency for Northern Ireland, as a means of assisting the integration and better delivery of renewable energy policy and tackling many of the problems caused by the lack of a central department with responsibility for renewable energy. This was supported by recommendation number 38 in the ETI Committee's "Report on the Energy Inquiry" published in March 2002 which said

"The Committee recommends the consideration of the establishment of a Renewable Energy agency."

This agency could operate on a similar basis to the existing agencies in Denmark, the Netherlands and Australia which have shown marked success in promoting the development of renewable energy in their respective countries. The agency, or body, should be responsible for inputs to policy and implementation. It should also have the political power to generate a public profile. The most appropriate option is for this body to be modelled closely or exactly along the lines of the Department of Climate Change and Energy (DECC) in Great Britain for facilitate greater UK wide cooperation.

(b) To consider the necessary actions and route map for each significant sector in NI (energy, transport, agriculture and land use, business, domestic public sector etc)

As stated above, some of the wide range of actions necessary to tackle climate change are beyond the remit of the Department of Environment and Environment Committee and the and as such the administrative/governance structures may need to be reviewed and amended if all these issues are to be tackled in more integrated fashion.

Overall, there is a clear need for Northern Ireland to move to a low carbon economy and WWF Northern Ireland believes ultimately, to a zero carbon economy. This needs to be the ultimate goal. Achieving such a transition will require urgent action in many sectors. The question of how

various sectors including energy, transport, the domestic and public sector could contribute to tackling climate change in Northern Ireland was explored in the Carbon Trust Vision Study (CTVS) of 2005. The CTVS looked at how Northern Ireland could reduce its CO₂ emissions by 60% by 2050 and estimated the cost of this at £775 million. Though both the level of CO₂ reductions and the price of achieving them outlined in the CTVS are likely to now be out of date, with even greater reductions needed and an associated likely increase in cost, the fundamentals of the CTVS should still apply. In the absence of any long term strategic energy strategy in Northern Ireland the CTVS could provide a very useful foundation for a long term strategy. More detail on some of the main actions needed in relation to some of the sectors mentioned and on some of the main findings of the CTVS is given below.

It is worth noting that the Committee on Climate Change's first report, released in December 2008, also includes an analysis of what opportunities exist for making emission reductions in Northern Ireland. It states Northern Ireland could contribute emissions reductions of over 2MtCO₂e (Million tonnes of carbon dioxide equivalent) in 2020. Specifically,

- Emissions from buildings and industry could be reduced by up to 1 MTCO₂ in 2020 by using energy more efficiently;
- More efficient vehicles and new transport fuels could deliver reductions of up to 1 MTCO₂ in 2020;
- Emissions from agriculture, land use and forestry and waste management sectors could be reduced by up to 0.5 MtCO₂e in 2020.

Though the timescales are different many of these figures are very close to the conclusions in the CTVS

Energy – decentralised energy and the grid

Basically there is a need to decarbonise, ultimately totally, the energy system. One of the key factors is the nature of the system for supplying/transmitting energy as the centralized grid is highly inefficient with two thirds of the energy generated wasted before it even reaches the consumer. There is then even further wastage at this point (of approximately 13%) resulting in a total cumulative loss of approximately 78%.

While WWF Northern Ireland recognises that the existing grid system will remain the primary vehicle for transmission and distribution of energy for much of Northern Ireland's energy needs for the foreseeable

future and that further investment for amongst other things, reinforcement of the grid will be necessary, this shocking and avoidable waste of energy can be significantly reduced by greater use of distributed or decentralised energy. WWF Northern Ireland supports greater development of decentralised or distributed generation, which already provides over 50% of electricity supplies in Denmark and over 40% in the Netherlands and see decentralised energy as a key component of a lower carbon future for Northern Ireland.

Decentralised energy is also conducive to greater deployment of renewable heat e.g. through Combined Heat and Power (CHP) plants, which operate at very high efficiencies of approximately 80%, because

they also use the heat generated in the course of the electricity production process. Kilroot by contrast operates at around 30% efficiency, or less. Greater use of CHP can significantly reduce the amount of energy consumed and CO₂ emissions – being, on average, twice as efficient as other plants, a CHP plant will, on average, produce approximately half the CO₂ emissions of a

conventional power plant. Though no new power plants are need, as Northern Ireland currently exports electricity any future power stations built should be CHP where possible.

Anaerobic Digestion (AD) offers a means of generating energy, in the form of natural gas, from animal and vegetable waste. According to AFBI in Hillsborough, the 9.7 tonnes of manure generated annually by housed livestock has the potential to produce 73MW electricity (10% of Northern Ireland demand) and 60 MW heat. Greater development of both CHP and AD in a more decentralised system would make a significant contribution to reducing our energy demands.

In the meantime, on the basis that the existing grid system will remain the primary vehicle for transmission and distribution of energy for much of Northern Ireland's energy needs for the foreseeable future, WWF Northern Ireland would like to see mandatory priority access to the grid for renewables ahead of fossil fuel power plants.

The UK Government has acknowledged^[1] that the nature of the current grid does pose challenges for

renewable energy and CHP industries. The 2002 House of Commons Trade and Industry Committee

(TIC) Security of Supply report says

"The Government agrees with the TIC's view that the current design of the electricity distribution networks present a number of challenges to the connection of renewable and other small generation."

Housing

Over 27% of the UK's CO2 emissions come from the residential sector. This needs to be reduced and the Government's National Energy Efficiency Action Plan (NEEAP) has a target to reduce emissions from the domestic housing stock by 31% by 2020. However, WWF's "How Low Can You Go?" report concluded that the UK can reduce CO2 emissions in the domestic housing sector by 80% by 2050 and this is the level of cutback we need to see achieved. The energy demand of houses also needs to be reduced, in line with Government targets for zero carbon housing

Transport

Emissions from road transport represented 29.4% of Northern Ireland's CO2 emissions in 2006, an increase of 49.5% since 1990, and second only to energy production (35%)^[2]. By comparison transport emissions in England increased by only 10% since 1990 so it seems clear that Northern Ireland has a disproportionate problem in relation to transport which needs to be tackled.

The use of alternative fuel sources, electricity in particular, for vehicles could help reduce these emissions, especially if the electricity were generated from a renewable source, such as wind power, thereby offering a completely green cycle for the fuel. WWF's book "Plugged In: The End of the Oil Age" focuses on solutions to our reliance on oil for transportation needs, in particular the electrification of transport. As electric vehicles make use of up to 75% of electricity taken from the grid, they are up to 4 times more efficient than conventional mechanical vehicles where only 18-23% of the energy contained in the fuel is converted into motion.

The Presidency Conclusions of the Brussels European Council in June 2008^[3] supported the greater use of electric cars – see paragraph 39 which said

"Other measures should be rapidly examined, in particular to promote competition in energy markets, promote modernisation of transport systems including the development of alternative technologies, inter alia electric cars"

Some European countries have already set targets for either the number or percentage of electric cars - Spain (1 million by 2014), Japan (50% by 2020) and the Republic of Ireland (10% by 2020). Gordon Brown has outlined his intention to have all new cars sold in Britain to be electric or hybrid vehicles producing less than 100 g/km of CO₂ by 2020. In light of this push for more electric vehicles and the huge potential that exists in Northern Ireland for wind power, Northern Ireland really needs to grasp the opportunity offered by the electrification of the transport network as a matter of urgency and the development of an appropriate recharging network will be fundamental to any such expansion.

Hydrogen is another alternative fuel. Though hydrogen powered vehicles that use fuel cells have a lower efficiency (of approximately 40%) they emit only water. Hydrogen buses have been running in Chicago since the mid 1990s.

The Department of Finance and Personnel has a very important role, particularly in relation to the strategic investment plans for Northern Ireland's transport system which are exacerbating rather than ameliorating the existing problems. The draft Investment Strategy says (page 12) that there will be £195.3 million spent on public transport 2008-11 and £611.8 million spent on roads 2008-11. According to the indicative budgets for the period 2011/12-2017/18 a total of £3,095 million will be spent on roads and £725 million on public transport. WWF Northern Ireland views this balance, whereby approximately three quarters of all of money is allocated for road building and approximately one third allocated for public transport as, at best, inappropriate as it compounds an existing problem, namely the inadequate provision of alternatives to car use, and is likely to make the achievement of Northern Ireland's target to reduce GHG emissions by 25% by 2025 much more difficult to achieve

There is a sharp contrast with the plans announced by the Danish government in December 2008 of a "green traffic initiative" featuring infrastructure investments and transport measures costing Dkr150bn (E20bn) over the next decade. According to the Danish plan, about two-thirds of the total will be spent on "renovating, improving and developing the railway network" with the aim of converting motorists to public transport. High emissions charges, road pricing, and financial incentives for fuel-efficiency are among a raft of additional measures. Similar strategic thinking and investment in greater public transport would be welcome in Northern Ireland.

Northern Ireland also has tremendous potential for the production of bioenergy, which could be used in the generation of electricity, a heating fuel and/or a transport fuel as discussed in greater detail below in the section on agriculture

Agriculture

In the course of 2008 both DARD and the ARD committee have explored how the agricultural sector and renewable energy may develop in the near future – DARD through the review of their Renewable Energy Action Plan (REAP) and the ARD Committee through their Inquiry into Renewables and Alternative Land Use. WWF Northern Ireland recommends that greater interdepartmental and inter committee collaboration is needed to tackle the issue of energy

The Northern Ireland Rural Development Programme does offer potential funding opportunities that can help contribute to the greater development of renewable energy in Northern Ireland thereby also contributing to the aims and objectives of other departments. A key underpinning rationale for the 2007-2013 Rural Development Programme is addressing climate change and WWF Northern Ireland is pleased that the Commission has guided Member States to include

measures that will contribute to this objective under all axes of their programmes and not simply be considered as an Axis II priority.

In the Community Strategic Guidelines for Rural Development for the 2007-2013 Programming Period, Member States are encouraged to focus support on 'development of new outlets for agricultural and forestry products, which includes "support for investment and training in the field of non-food production ...by ...helping the development of renewable energy materials, biofuels and processing capacity", under Axis I, 'Improving the competitiveness of the agricultural and forestry sectors'. Also, by "developing the provision and innovative use of renewable energy sources", under Axis III, 'Improving the quality of life in rural areas and encouraging diversification'. In addition to the more obvious 'combating climate change' element of Axis II these offer the potential for the NIRD to make a significant contribution to Climate Change objectives. There is a need now that the programme is in place, for DARD to ensure that these measures are readily available to farmers, rural businesses and communities and positively incentivised with clear monitoring target associated to their delivery.

The potential role for AD has already been referred to. On top of that, biofuel production offers the rural and agricultural community another potential alternative means of contributing to future climate change, energy and emission reduction targets. Land use strategies also have an important role to play through the preservation of existing carbon stores or sinks, primarily peatlands but also forests, as well as developing new carbon sinks through planting native trees and woodlands.

While WWF Northern Ireland recognises the potential for renewable bioenergy sources to be grown in Northern Ireland it believes the broader impact of their production must be considered and acceptable levels of social and environmental performance in the production of bioenergy among supply chain actors, from growers to end users should all be factored in. For example, there is a risk, especially on a small island, that a biofuel processing plant would create a market demand that cannot be met locally. This would put pressure for biofuel to be imported. This risks creating a demand for importing biofuels that may not have been produced sustainably and this could have significant, long term detrimental consequences for people and nature, as exemplified by the biofuels produced from the palm oil plantations that have been planted on former rainforest in Indonesia. The changes in land use for biofuel production in the US and subsequent changes in wheat prices demonstrates how global changes in policy and demand can affect commodity prices.

In WWF's view, the following environmental principles need to be addressed by any standard as a minimum both for crops produced in Northern Ireland and as a requirement for imported fuel sources

- not damage high conservation value habitats and biodiversity
- not degrade soil quality
- not adversely impact the quantity and quality of freshwater resources
- not lead to damaging release of toxic compounds into the environment
- lead to substantially positive lifecycle GHG balances compared to fossil fuel equivalents

Ireland has the greatest potential in Europe for growing biomass, which through the use of CHP offers the possibility of a much more efficient renewables based energy system.

The role of government

There is clear role for government, not least in relation to meeting the target in the NI SDS for the government estate to be carbon neutral by 2015. In order to meet this target WWF Northern Ireland believes each government department should investigate the opportunities and obstacles to carbon reductions within their competency areas. The Public Sector procurement budget should be targeted as a tool to deliver significant emissions reductions.

(c) To identify the costs associated with meeting these obligations and compare then with the costs that will be incurred if they are not achieved

There are two distinct but related parts to this section. The first deals with the predicted costs of inaction and/or delay in tackling climate change while the second part deals with the predicted benefits of tackling climate change by moving to a low/zero carbon future by reducing energy consumption and investing in low carbon/renewable energy sources.

The predicted costs of inaction and or a delay in tackling climate change

It is important to state that not only will tackling climate change be less expensive now than in the future, but costs of the impacts of climate change are also like to increase significantly the longer the delay in tackling climate change, as highlighted by the Stern Review of the Economics of Climate Change (2006) which said tackling climate change could cost 1% GDP each year but

"if we don't act it the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year now and forever. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more."

This makes a very clear and persuasive argument in economic terms alone that climate change must be tackled urgently and the sooner the better. The increasing costs associated with a delay in addressing the issue were highlighted in an article in the Guardian on 26th June 2008 by Lord Stern in which he claimed that the costs of tackling climate change have already doubled since his 2006 report and estimated that £28bn may be need to tackle climate change. It is clear then that climate change must be tackled urgently.

It appears likely that there will be additional costs from climate change across a range of sectors including, but not limited to public health, biodiversity and loss of ecosystem goods and services, increased cost of extreme weather, including flooding and other associated insurance losses and impacts on agricultural production.

The European heatwave of 2003 was responsible for 35,000 extra deaths across Europe as a result of heat stress, bad air quality, and high levels of air pollutants such as ozone. A report commissioned by the Health and Environment Alliance (HEAL), Climate Action Network Europe (CAN-E) and WWF claims that health savings of up to €25 billion could be achieved every year in Europe if the EU raised its 2020 target for domestic greenhouse gas emissions from 20 to 30%, based on economic evaluations of loss of life and health, working days lost and hospital costs: they show reductions in hospital admissions of 8,000 per year and 2 million fewer work days lost per year by raising the target to 30%.(4) A European Commission impact assessment estimated that currently every year 369,000 people die prematurely in Europe due to air pollution and that premature deaths, health care and medication associated with air pollution amount to 3-9% of EU GDP[4]. According to Northern Ireland's Chief Medical Officer Michael McBride

"Current predictions on climate change suggest greater long-term impacts on health than any current public health priority" [5]

The projected shift in precipitation patterns and distribution predicted for Ireland is likely to have a number of impacts. According to Sweeny et al[6] large parts of the south east of Ireland and Wicklow, Dublin, Louth and Down could receive less than half their current summer rainfall. On this basis the summer flow of the Boyne is predicted to drop by as much as 20% by the 2020s and up to 40% by the end of the century. The decrease in summer rainfall predicted may no longer suit the growing of potatoes, and as a result the report predicts

"It is likely that potatoes will no longer be a commercially viable crop over much of Ireland".

Evidence for a change in potato growing was provided by Hickey 2008[7] who stated that in 2001, perhaps 15% of Ireland's potato crop was being irrigated. Agriculture may change in other ways and increased warming as well as increased storminess could have a negative impact on the Orchard County's most famous agricultural product, as apples need a certain amount of cold to complete their development.

There is also a risk of more extreme weather resulting in higher numbers of large insurance claims and/or losses. In 2004 Swiss Re predicted that economic costs of global warming could reach \$150 billion a year in ten years though in 2005 weather-related insurance losses around the world totalled \$200 billion.

Projections from the Association of British Insurers suggest that by 2050 the annual cost of weather claims will double to €3.3 billion while an extreme year might cost €20 billion.

According to the WWF report "Stormy Europe" the UK is likely to see the most drastic increase in storm activity if CO2 emissions rise unabated. 3 out of 4 models show the number of severe storms would likely increase by up to 25% by the end of the century - an increase of up to nearly 10 more storms over the 30 year period 2071-2100. This provides grounds for concern because winter storms are the cause of nearly 70% of all insured losses in Europe, costing an average of over €2 billion in financial losses a year[8]

The predicted benefits of tackling climate change by moving to a low/zero carbon future

Given that the two principal strands of tackling climate change will be reducing our energy demand in absolute terms and decreasing the amount of energy used and generated from fossil fuels while increasing the amount of energy used and generated from renewable sources, there are likely to be very significant economic advantages from this move to a low/zero carbon future - it will be a win-win situation.

A HSBC evaluation[9] of the various economic stimuli packages from around the world highlighted the benefits of tackling climate change and noted that amongst the arguments for a low carbon stimulus

"The low-carbon economy can also be a job rich economy at a time of soaring unemployment, particularly through enhancing building efficiency, either via retrofit or new construction, and improving mass transit."

The New Economics Foundation have advocated the need for a green new deal[10] to deal with what they referred to as the 'triple crunch' of a credit fuelled financial crisis, accelerating climate change and soaring energy prices underpinned by an encroaching peak in oil production. Similarly, an evaluation of the case for a 'green' stimulus co-authored by Nicholas Stern concluded[11]

"this is the right time to be spending on measures to promote energy efficiency and low-carbon technologies"

This report evaluated and ranked 23 specific proposals in terms of economic benefit and climate benefit and energy efficiency measures were consistently the top performers across all sectors. Though the benefits were not taken into account in the formal scoring the authors acknowledged that energy efficiency measures

"also enhance energy security and help the less well off with their fuel bills"

Research in California^[12] found that well documented household energy savings of \$56 billion 1972-2006 energy efficiency measures have enabled California households to redirect their expenditure toward other household goods and services creating about 1.5 million FTE jobs with a payroll of \$45 billion. Similarly, the potential economic and environmental benefits of reducing demand, was outlined by the Performance and Innovation Unit^[13] who said

"The current, apparently cost effective, potential for energy efficiency is approximately 30% of final energy demand. The potential financial benefits in reduced costs to customers (net of taxes) are £12 billion annually. And the potential carbon reductions are 40 Mtc/year..."

The importance of energy efficiency was clearly highlighted by DETI who said that^[14]

"Reducing overall energy demand offers the potential for the most social, environmental and economic gains"

and that

"The Northern Ireland Authority for Utility Regulation (NIAUR) also recommends energy efficiency as the best opportunity to reduce emissions and energy bills in the near to medium term"

The target to reduce Northern Ireland's energy consumption by 1% annually between 2007 and 2012, was outlined in DETI's 2004 Strategic Energy Framework (SEF). However, a review of the sustainable energy market done by Arthur D Little Limited of electricity consumption in Northern Ireland between 1992 and 2007 in conjunction with NIE historic data shows the standard growth in electricity consumption to be 1.8% per annum between 1992 and 2007. The discrepancy between the target of 1% annual reduction in consumption and the reported 1.8% annual growth in consumption (1992-2007) is disappointing and needs to be turned around as a matter of urgency if this already weak and unambitious target is to be met. Given the target in the 2008-2011 Programme for Government (PfG) to reduce our carbon footprint by at least 25% by 2025, the level of reduction in energy consumption needs to be much higher than the 2004 SEF target, if this target is to be met. WWF Northern Ireland believes that in line with the emerging science, Northern Ireland should aim to reduce its CO₂ emissions by at least 40% by 2020 and at least 80% by 2050.

Overall, the energy supply system needs to be decarbonised as much as possible and ultimately completely - WWF has previously advocated EU energy supplies should and can be completely decarbonised by 2050. The 2008 report "80% Challenge – delivering a low carbon UK" (copy attached for reference) commissioned by WWF UK, ippr and RSPB, concluded that it is feasible to reduce the UK's emissions by 80% by 2050, without new nuclear build, including emissions from aviation and shipping and at costs that are not prohibitive, estimated to be between 2% and 3% of projected GDP in 2050, though energy efficiency could markedly reduce these costs to approximately 1.5% to 2% of GDP. This study used the MARKAL-MACRO model used by the Government for the 2007 Energy White Paper and a model developed by Professor Dennis

Anderson at Imperial College, employed by the Stern Review on the economics of climate change and

The very significant benefits in terms of job creation potential from greater investment in renewables should make this a priority area for investment in Northern Ireland. According to the terms of the EU Energy package announced in January 2008, one of the UK's legally binding targets is to achieve a 15% share of renewables in the final energy demand by 2020. A series of interim targets were also agreed by the EU on the following basis: member states must achieve a 25% of their 2005-2020 renewables increase by 2012, 35% by 2014, 45% by 2016, and 65% by 2018. Together these targets would make up an "indicative trajectory" that each member states would be expected to follow. Northern Ireland at present generates approximately only 1.8% of its energy from renewables (a total of 0.74 TWh). WWF Northern Ireland believes that Northern Ireland should at least match the UK level target of generating 15% of energy from renewables by 2015. On that basis and the basis that energy consumption does not increase beyond the current level of 40.7 TWh, in order to meet this EU target Northern Ireland energy production from renewables will need to increase by approximately by 731% by 2015 to approximately 6.16 TWh (15% of 40.7 TWh). This is a very significant increase and will require significant investment. Even if only a relatively small percentage of this investment is inward investment in Northern Ireland based industries there is enormous potential for both job creation and economic development as a result.

There have been many studies which show the economic benefits of investing in renewables, only some of which are referred to here, and the enormous potential that exists across the island for wind power is well known. According to the European Wind Energy Association, wind energy direct employment has increased from 48,363 in 2002 to 108,600 in 2007. In terms of direct jobs alone, on an average of 33 new people have been employed every day, seven days a week in the wind energy sector during that time period.^[15] Including indirect employment the wind energy sector employs more than 150,000 in the EU.

A study by European Foundation for the Improvement of Living and Working Conditions found that the adoption of best available energy conservation technologies could create 500,000 extra jobs in the EU.^[16]

A 2008 report by WWF France concluded that a 30% reduction in CO2 emissions by 2020 would create around 684,000 new net jobs in France.^[17]

Even on a regional the scale the economic opportunities are significant. The Yorkshire Regional Economic Strategy 2006-2015 found that meeting the regions targets to reduce GHGs by at least 30% by 2020 and 80% by 2050 and have 22% renewable electricity by 2010 could generate 13,000 new jobs.

The benefits of developing a low carbon/renewables based economy are well illustrated by the example of the Austrian town of Güssing which has been transformed by the initiative of the townspeople themselves, led by the Mayor, from one of the poorest towns in Austria, to one of the wealthiest, based upon the development of a 100% renewable supply of energy for the town, which has reduced its CO2 emissions by 95% since 1991 and is now exporting renewable energy to the grid shows how a transformation from a fossil fuel based energy system to a renewables based system can also generate significant economic benefits.

The potential for job creation from investing in renewable energy technologies was also highlighted by the Northern Ireland Manufacturing (NIM) group who have called on the Executive to accept the

challenges and opportunities presented by climate change. NIM have said climate change^[18]

"creates significant value creation opportunities for proactive companies and puts significant value at risk for companies that fail to adapt"

and that

"There is huge potential for Northern Ireland industry as a whole to be proactive, to establish itself at the cutting edge of these new technologies, bringing major opportunities and new markets."

Similarly the CBI have stated argued that delivering an investment framework to decarbonise the UK's energy supply should be one of the UK Government's priorities for 2009^[19] and that

"We must not allow the global economic crisis become an excuse for inaction on climate change"^[20]

According to the CBI,^[21] evidence suggests that over time dangerous climate change

"would inflict damage to the UK economy of over £75 billion annually".

Denmark has shown how an economy can thrive while developing clean energy and cutting carbon emissions. Between 1980 and 2004, the country's GDP rose 56% while CO2 emissions dropped 35%.^[22]

(d) To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change/CO2 emissions (akin to regulatory impact assessments/rural proofing)

WWF Northern Ireland is unclear what the Committee means as regards identifying a mechanism for assessing the potential impact of new policies on climate change/CO2 emissions. Given that CO2 emissions all across the UK are monitored, collated and published every year, at present by AEA Technology PLC on behalf of England, Scotland, Wales and Northern Ireland, there may be no need for any additional mechanism to assess the potential impact of new policies on CO2 emissions as any reduction or increase in CO2 emissions will be measured annually as a matter of course.

Similarly while climate change is a global phenomenon, there has been some work done on assessing the impact of climate change in Northern Ireland for example by SNIFFER^[23] and MONARCH^[24]. However, WWF Northern Ireland does believe that improving the level and frequency of environmental monitoring would be useful and should help provide better evaluation of any new policies. On the basis that the State of the Environment report will be an annual publication it should help provide some evaluation of how Northern Ireland's environment is being affected by and is responding to climate change. As such there may be no need for any additional mechanism to assess the potential impact of new policies.

In relation to policies, WWF Northern Ireland believes that long term plans, supported by a strong legislative framework, are the best way to promote efficiency and innovation in policy and technology design and thus the best mechanism to minimise costs and calls upon the Committee to support WWF's call for a long term energy strategy.

(e) To make recommendations for appropriate targets/actions that could be included in the new NI Sustainable Development Implementation plan

As regards appropriate targets for Northern Ireland, WWF Northern Ireland believes that given the huge potential that exists in Northern Ireland for renewable energy Northern Ireland should, as a minimum, commit to matching the standards and/or targets that apply to the UK as a whole. This means for example, that Northern Ireland should also adopt the targets set in the UK Climate Change Act of 2008 to reduce GHG emissions by at least 26% by 2020 and 80% by 2050, with annual reductions of at least 3%. In 2008 the UK Climate Change Committee recommended cuts of 34% below 1990 levels by 2020 without a global deal on emissions reductions, and 42% with a global deal. WWF Northern Ireland believes that Northern Ireland should set a target of a 42% reduction, to be delivered through domestic action. Similarly WWF Northern Ireland believes that Northern Ireland should at least match the target, to generate 15% of its energy from renewables, set for the UK as part of the EU Energy Package in 2008, which is likely to be one of the most important factors in the immediate future and in the medium term.

Unfortunately though, this far the Northern Ireland Executive has lacked ambition. The 2008 Programme for Government (PfG) for example, was not more ambitious than any of the existing strategies and only restated existing targets. For example, though welcome the target to reduce Northern Ireland's carbon footprint by 25% by 2025, was a pre-existing target from the Northern Ireland Sustainable Development Strategy (NI SDS). WWF Northern Ireland is disappointed that the 2008-2011 PfG did not raise existing targets in the NI SDS. Given that the interim target in the UK Climate Change Bill is to reduce greenhouse gas emissions by at least 26% by 2020 against a 1990 baseline, a target to reduce Northern Ireland's carbon footprint by 25% by 2025 again compares poorly with the UK target, in terms of both the level of reduction and the time by which this has to be achieved, again reflective of a lack of ambition in Northern Ireland. WWF Northern Ireland recommends that in line with the emerging science, that Northern Ireland aims to reduce its CO₂ emissions by at least 40% by 2020 and at least 80% by 2050, with annual reduction of at least 3%. Meeting the target previously outlined in the NI SDS for 40% of electricity consumed to be generated from indigenous renewable sources by 2025 is likely to prove challenging but is achievable, as demonstrated by the findings of the 2008 All Island Grid Study which found that up to 42% of power generation could be from renewable sources, a figure WWF Northern Ireland regards as more appropriate, minimum level for future targets.

However WWF Northern Ireland would encourage Northern Ireland to set even higher targets in relation to electricity as both the Welsh and Scottish administrations have done. For reference, the Welsh Assembly Government's (WAG's) Renewable Energy Route Map targets include generating 100% of Wales' electricity demand from renewable sources by 2025, that demand should not exceed the electricity consumption level of 2007, that all new buildings should be zero carbon by 2011 and supporting the development of distributed generation and energy supply companies.

It is important to point out that a recent analysis by Poyry "Closing the Energy Gap", (electronic copy of summary attached), commissioned in 2008 jointly by WWF-UK and Greenpeace, which looked at the implications for the UK electricity sector of meeting the UK's share of the EU renewable energy target found that if the UK government meets its own energy efficiency and renewable targets, new baseload electricity generation capacity will not be needed until the period beyond 2020. By this time (2020) other low carbon technologies will be close to commercialisation. In addition, in the scenarios developed, the combination of renewable energy generation and energy efficiency results in up to 42% reduction in gas use, so reducing UK dependency on gas imports and strengthening energy security and carbon dioxide (CO₂) emissions are reduced by up to 37% (from 1990 levels) by 2020, beyond the target in the Climate Change Bill for that time.

This analysis shows that in contrast to the views of government and industry, there is no need to build new fossil-fuelled power generation to keep the lights on in the UK. Instead, the focus

should be on delivering existing targets and commitments for energy efficiency and renewable energy. Knowing that no investment in fossil fuel power stations in the UK will be necessary before 2020 is a hugely significant message. This very significant finding applies to the UK as a whole but in light of the fact that since 2005 Northern Ireland has been an exporter of electricity, WWF Northern Ireland believes there is no need for any new fossil fuelled power station to be built in Northern Ireland before 2020.

(e) To make recommendations on a public service agreement for the DoE Climate Change Unit's commitments in the second programme for Government that will ensure NI will meet its climate change obligations.

It is likely to be very difficult for the DoE Climate Change Unit to ensure that Northern Ireland will meet its climate change obligations because as things currently stand many climate change and energy policy related policy responsibilities lie with and consequently can only be delivered by other Government departments. For example building regulations are the responsibility of DfP, housing policy is the responsibility of DSD, transport policy is the responsibility of DRD, while bioenergy development is primarily the responsibility of DARD. As such while DoE can and most likely will continue to have a scrutiny role as regards meeting any climate change commitments Northern Ireland might have, the very nature of the departmental structure makes it unlikely that DoE can ensure that other Government departments will meet their responsibilities and/or obligations under any future climate change targets.

As such, it may be advantageous for Northern Ireland to adopt a model of governance that is closer to, if not exactly like, that of the Department of Energy and Climate Change or DECC in England and Wales. This should ensure greater cohesion and facilitate better integration across the UK.

(f) To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to NI's commitments to the UK Climate change Act.

WWF Northern Ireland believes that establishing mandatory targets to reduce energy demand in absolute terms, reduce the overall contribution of fossil fuels, increase the contribution of renewables and reduce Carbon Dioxide (CO₂) emissions, by 80% from 1990 levels by 2050 would be best achieved by introducing primary legislation, though some of the specific issues referred to in this submission, for example mandatory priority access to the grid for renewables ahead of fossil fuel power plants, may be best dealt with by other mechanisms including secondary legislation. WWF Northern Ireland is not best placed to advise on the legislative path that must be followed for each of these options.

(g) To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments

The potential change to the departmental structure previously outlined, along the lines of a Northern Ireland DECC, may make the scrutiny of the Northern Ireland's climate change responsibilities easier as collating and scrutinising information from one department is likely to be much easier than trying to collate and scrutinise information held by a number of different departments.

In the meantime, as is the case with so much of Northern Ireland policy and legislation, there is a key role for the Executive, and in relation to climate change policy specifically for the chair of the Environment committee. WWF Northern Ireland believes greater liaison and collaboration

between the chair of the Environment committee and the chairs of other relevant committees including the Enterprise Trade and Investment committee, the Agriculture and Rural Development committee, Regional Development committee and Finance and Personnel committee, mirrored by similar liaison and collaboration between the same departments, should ensure better and more effective scrutiny of climate change responsibilities across all relevant departments. Such co-operation should also facilitate achieving the targets in the Act and within budget with all other departments.

Committee on Climate Change report to the Executive and the Assembly and that the Executive respond to their reports in the Assembly.

(h) To produce a report on the findings and recommendations of the inquiry by September 2009

In WWF Northern Ireland's view this inquiry will provide a welcome contribution to the debate. WWF Northern Ireland would be happy to help the committee in any way possible in the course of this inquiry and the production of this report and would be interested to learn more about how the Committee anticipate this report will be used, and what role it will play, once published.

-ENDS-

M Campbell Policy Officer WWF Northern Ireland February 2009

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[2] AEA's Greenhouse Gas Inventories for England Scotland Wales and Northern Ireland 1990-2006

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[6] Sweeny, K., Fealy R., McElwain L., Siggins L., and Sweeny J. (2008) Changing shades of green : "Changing shades of green: The Environmental and Cultural impacts of Climate change in Ireland" Irish American Climate Project Berkeley USA

[7] Kieran Hickey "Five Minutes to Midnight? Ireland and Climate Change " White Row Press 2008

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[9] HSBC A Climate for Recovery Climate Change Global February 2009

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[12] Roland-Holst, D. (2008) Energy efficiency, innovation, and job creation in California Center for Energy, Resources and Economic Sustainability, University of California, Berkley

[13] Performance and Innovation Unit, Energy Review, 2002, (page 182)

[14] DETI "Delivering Northern Ireland's 1% Energy Efficiency Target An Overview"

[15] EWEA Wind at work: wind energy and job creation in the EU 2009

[16] Ecotec (1994) The Potential for Employment Opportunities from Pursuing Sustainable Development, report to the European Foundation for the Improvement of Living and Working Conditions, Birmingham/Brussels: Ecotec.

[17] WWF France "-30% CO₂ = + 684,000 emplois pour la France, l'équation gagnante pour la France" or "- 30% CO₂ = + 684,000 jobs, France's winning formula". At the time of writing only the French version of this report was available via the WWF France website see http://www.wwf.fr/s_informer/nos_missions/changement_climatique but an English version is expected

[18] NI Manufacturing Group Manufacturing Counts available at <http://www.nimanufacturing.org/>

[19] CBI Climate change tracker 2008 available at <http://climatechange.cbi.org.uk/reports/00081/>

[20] CBI Director-General Richard Lambert speaking at CBI's Climate Change Summit in London 2 December 2008, see http://climatechange.cbi.org.uk/press_release/00091/

[21] CBI Opportunity knocks: business expectations for a global climate change agreement in 2009 Brief 2008 <http://climatechange.cbi.org.uk/reports/00099/>

[22] TIME magazine Feb 05 2009 see <http://www.time.com/time/health/article/0,8599,1876647,00.html>

[23] SNIFFER Preparing for a changing climate in Northern Ireland 2007

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Energy:09

WWF Northern Ireland
Briefing on Energy 2009



Northern Ireland currently imports 99% of our energy supply⁽¹⁾ - a challenge we must address urgently. There is only 41.6 years supply of oil left ⁽²⁾ at current rates of consumption, but global oil consumption rose 1.1% in 2007. The volatility of oil prices is also a major issue, changing by over \$107 a barrel within the last 6 months of 2008.

80% of all manmade emissions of Carbon Dioxide (CO₂) the most important of the greenhouse gases, come from burning fossil fuels making energy policy key to tackling climate change.

The 2008 EU Energy Package requires the UK to generate 15% of its energy from renewables yet 10 years after being devolved NI still lacks an integrated, strategic, long term energy policy.

In June 2008 a Northern Ireland Assembly motion was passed which called on the Executive to give further priority to measures to promote energy efficiency, combat fuel poverty, and drive a coordinated energy policy to diversify our energy supplies, reduce reliance on fossil fuels and harness the full potential of renewables.

WWF Northern Ireland believes Northern Ireland needs a long-term (at least 40 years) Energy Strategy which sets clear, mandatory targets to:

- reduce our over-dependence on fossil fuels and increase energy production from renewables
- improve energy efficiency, especially of homes and businesses, as this will help reduce our energy bills (at all scales) and increase our energy security
- take advantage of the significant opportunities for inward investment and job creation in those renewables for which this region has the greatest potential
- to reduce our emissions of those Greenhouse Gases, especially CO₂, that contribute to climate change

WWF Northern Ireland believes these targets can be achieved through, amongst other things:

• **Energy efficiency**

According to DETI ⁽¹⁾ "Reducing overall energy demand offers the potential for the most social, environmental and economic gains" a position endorsed by the NI Authority for Utility Regulation. The Performance and Innovation Unit's Energy Review concluded energy demand could be reduced by 30% through energy efficiency and that "The potential financial benefits in reduced costs to customers (net of taxes) are £12 billion annually." Reducing demand would also make achieving renewable energy targets easier and must be the top priority of any future energy strategies.

• **Decentralised generation, Combined Heat and Power (CHP) and Anaerobic Digestion (AD)**

The centralized grid is highly inefficient with two thirds of the energy generated wasted before it even reaches the consumer. CHP plants, which also use the heat generated in the course of electricity production, could significantly reduce this level of wastage as they operate at very high efficiencies of approximately 80%. Kilroot on average operates at 30% efficiency, or lower.

Greater use of CHP can significantly reduce the amount of energy consumed and CO₂ emitted. Decentralised generation with many smaller, more widely distributed power stations close to the demand, can also help reduce wastage and is conducive to greater deployment of renewable energy especially heat generation. AD offers a means of generating energy in the form of natural gas, from animal and vegetable waste. According to AFBI ⁽⁴⁾, the 9.7 tonnes of manure generated annually by housed livestock has the potential to produce 73MW electricity (10% of NI demand) and 60 MW heat. Decentralised generation already provides over 50% of electricity supplies in Denmark and over 40% in the Netherlands.

(1) DETI Executive Summary of a report on the assessment of the potential for bioenergy development in Northern Ireland 2008.

(2) According to the BP Statistical Review of World Energy 2008.

(3) DETI Delivering Northern Ireland's 1% Energy Efficiency Target An Overview" (pages 5 and 11)

(4) Frost 2005 offers opportunities for AD CHP systems to treat municipal and farm wastes



• Housing

27% of the UK's CO₂ emissions come from the residential sector. We need to make our existing housing stock much more efficient and reduce the impact from new homes by building low and zero carbon homes, in line with Government targets. A WWF Northern Ireland proposal to give NI householders a rate rebate for installing home energy efficiency measures is now being taken forward by DFP, but more can and must be done. WWF's 2008 "How Low Can You Go?" report, based on the first ever modelling of the UK's entire housing stock, concluded that the UK can reduce CO₂ emissions in the domestic housing sector by 80% by 2050. The report also identified measures which would reduce Northern Ireland's CO₂ emissions from housing by over 40%.

• Transport

29.4% of Northern Ireland's CO₂ emissions in 2006 resulted from road transport⁽⁴⁾, an increase of 49.5% since 1990⁽⁵⁾, second only to energy production (35%). As electric vehicles make use of up to 75% of electricity taken from the grid, they are up to 4 times more efficient than conventional mechanical vehicles where only 18-23% of the energy contained in the fuel is converted into motion and as such could help reduce transport emissions. Spain, Japan (50% by 2020) and the Republic of Ireland (10% by 2020) have already set targets for more electric vehicles.

• The economic benefits of a more sustainable, renewables based energy policy

According to a 2008 report by the Carbon Trust, there is the potential to create 33,124 renewable energy jobs in Northern Ireland in a sector that could be worth almost £1 billion (£969M) alone. A HSBC evaluation⁽⁶⁾ of the various economic stimuli packages from around the world concluded "The low-

carbon economy can also be a job rich economy at a time of soaring unemployment, particularly through enhancing building efficiency, either via retrofit or new construction, and improving mass transit."

• Learning from others

According to the All-Island Grid Study (2008), 42% of power generation could be from renewable sources. In 2008 the Republic of Ireland's target for the generation of electricity from renewables was raised from 33% to 40% by 2020. In light of the single energy market there seems to be no reason why Northern Ireland could not match this target. The Welsh Assembly Government's Renewable Energy Route Map targets include generating 100% of Wales' electricity demand from renewable sources by 2025 and that demand should not exceed the electricity consumption level of 2007. Scotland has a target to produce 50% of electricity from renewable sources by 2020 and according to WWF research ⁽⁷⁾ 50,000 new jobs could be created in Scotland in sectors like wave and wind energy, recycling, public transport and organic farming, on top of the 80,000 'green' jobs the report estimated already existed in 2004.

The mission of WWF is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by

- conserving the world's biodiversity
- ensuring that the use of renewable natural resources is sustainable
- reducing pollution and wasteful consumption

WWF Northern Ireland
Second Floor
7 Exchange Place
BELFAST BT1 2NA
t: 028 9033 2869
wwf.org.uk

(4) AEA Greenhouse gas inventories for UK, Scotland, Wales and Northern Ireland 1990-2006

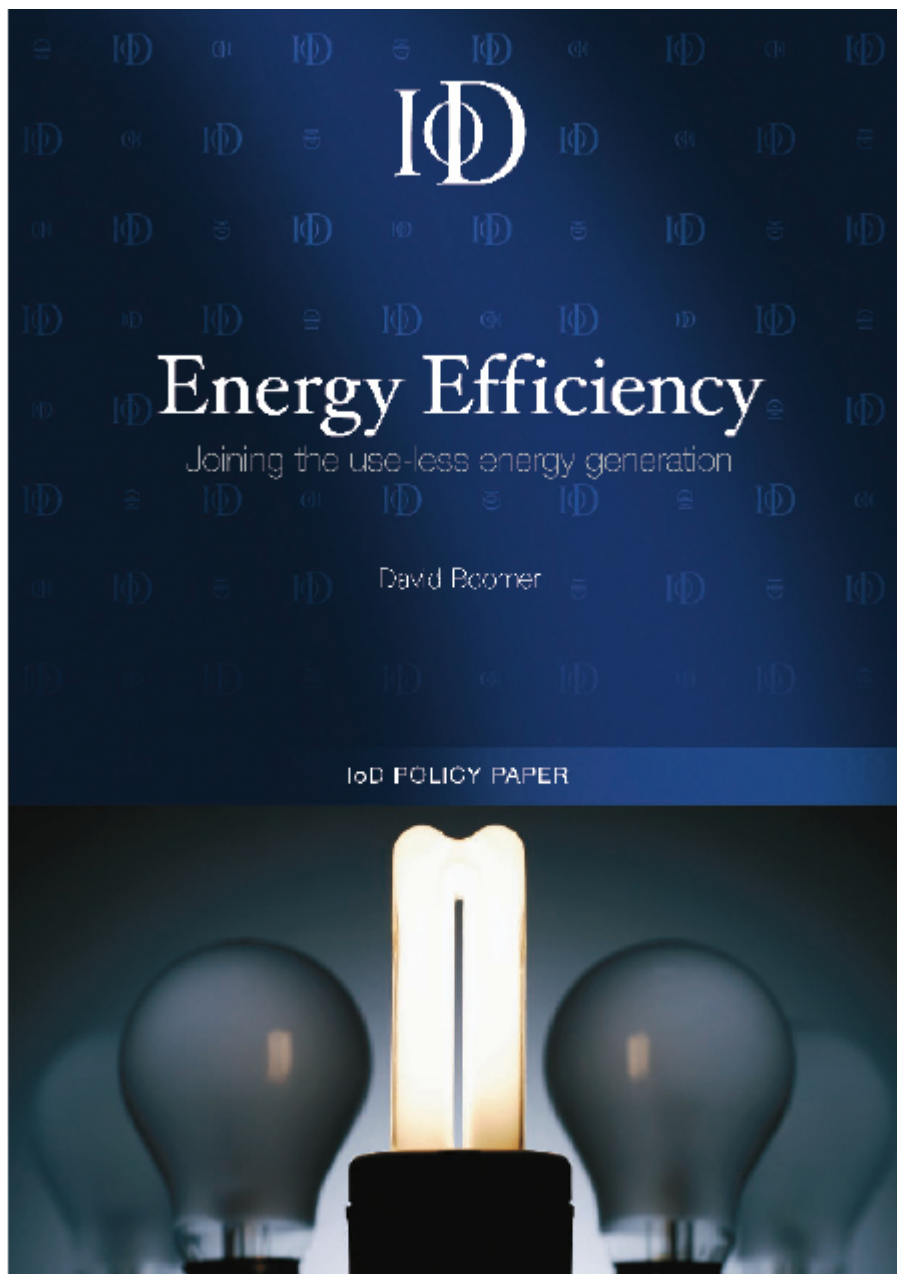
(5) By comparison transport emissions in UK increased by only 10% since 1990

(6) HSBC evaluation *A Climate for Recovery*

(7) WWF Scotland's report, "A Smart, Successful, Sustainable Scotland" 2004

Malachy Campbell Policy Officer WWF Northern Ireland March 2009.

WWF Northern Ireland is part of WWF UK
Registered office WWF UK, The World Wildlife Fund
Weybridge Park, Ascot, Surrey SL5 8EF, UK
A company limited by guarantee registered
in England number 4016726
WWF UK registered charity number 1080247



1: Executive summary and key points

1.1 Executive summary

The UK Government aims to reduce greenhouse gas emissions by at least 60% by 2050 and to increase the share of energy generated by renewables from the present 4% to 15% by 2020, in effect, moving to a low carbon economy. The UK is a net importer of energy and this is increasing. Our energy infrastructure is ageing and a large proportion of nuclear and coal-fired power stations will be decommissioned before 2020, creating a gap in available base load generating capacity. Even with the increase in renewable energy sources, significant investments in new fossil fuel (including coal) and nuclear power stations will be required in order to maintain electricity generating capacity. It is extremely doubtful therefore, whether either of these targets can be met.

However, there is an achievable and cost effective way to tackling some of the inherent difficulties of moving to a new lower carbon economy and that is through a concerted move to improve energy efficiency across the built environment. It is estimated that 40% of the UK's greenhouse gas emissions are the result of business activities and in particular their use of buildings and other facilities. The Carbon Trust has estimated that a 20% improvement in energy efficiency is easily achievable across most business sectors. This not only reduces greenhouse gas emissions; it reduces business costs and helps reduce the UK dependency on imported fuel, overall improving the economy and the competitiveness of UK business.

Data from Philips Electronics and the Carbon Trust, and the case studies in Section 5, indicate a huge opportunity for businesses to improve their energy efficiency and reduce greenhouse gas emission. The IoD would like to see the UK Government focus more effort in the area of energy efficiency, thereby enabling a significant, achievable and cost effective contribution to the UK climate change commitments. The IoD would also encourage UK business to adopt the cost effective approaches outlined in the Good Practice and Case Studies in Section 5 of this report. Improving energy efficiency will quickly enable UK business to reduce their operational costs and energy use, and reduce their individual greenhouse gas emissions.

All businesses and public sector organisations irrespective of size can benefit from becoming more energy efficient. This report outlines the practical steps which demonstrate how they can reduce their energy bills, reduce carbon emissions and 'join the use-less generation'.

1.2 Key points

Improving energy efficiency is the most cost effective way of reducing the UK's carbon emissions.

Energy efficiency can affect an immediate reduction in greenhouse gas emissions. It will help reduce the UK's dependency on imported energy sources, reduce the extent of the future energy gap and improve UK business's competitive ability.

Small businesses in the UK are missing out on energy savings of more than £1 billion.

In 2004 the Carbon Trust published a report stating that British business in the burgeoning Small and Medium Enterprise (SME) sector, is 'throwing away one billion pounds a year in wasted energy'¹. These figures were startling at the time but with the increases in energy costs since 2004 this figure will be significantly higher. Even taking steps to save 10% of business's energy bill, overall savings of £1.9 billion should be achievable.

Inefficient and out of date office lighting is costing UK public and business sector organisations up to £1 billion per year and resulting in 1 million tonnes of avoidable CO2 emissions.

Potentially 75% of the UK's public and private sector office lighting is based on outdated and inefficient

lighting systems. Research by Philips Electronics² has highlighted that if these lighting systems – primarily those using fluorescent lighting running on electromagnetic ballasts – were replaced by the latest lighting technology, realistic electricity savings of around £500 million per year (£6 billion for all EU) could be achieved and this could be doubled by the widespread use of lighting control systems. Currently, only 1% of office/building lighting uses lighting controls (timers, presence detection and daylight controls).

UK business energy spend in 2006 was around £19 billion.

According to the Department for Business, Enterprise & Regulatory Reform (BERR), UK business spend on energy in 2006 was in the region of £19 billion³.

The demand for energy is increasing.

Demand for energy in the UK is increasing and estimates of a 60% increase by 2030 have been forecast⁴. The UK's own reserves of oil and gas are declining and while significant amounts still remain, production has peaked. The UK has now become a net importer of energy and as our economy grows, we will become increasingly dependent on imported energy. Although the use of renewable sources of energy is increasing, coal, gas and oil will remain the primary sources for electricity generation for the next 10 years or so⁵ – putting at risk achievement of the UK Government's climate change targets and the overall move to a low carbon economy.

Prices will continue to rise.

The reality of current energy price rises since 2004 is that an industrial site with a gas bill of £1 million may have to pay an extra £500,000 by the end of 2008 for gas. A knock-on effect of this is the rise in electricity prices, as gas is used to fuel many power stations. A recent analysis by Thomson Financial expects to see further price increases this winter perhaps in the region of 8%⁶.

Energy efficiency is the most cost effective way to reduce carbon emissions.

Energy efficiency is the most cost effective way of reducing carbon emissions and thereby contributing to the UK and European emission reduction targets⁷. It improves business productivity and competitiveness, and can contribute to security of energy supplies by reducing the UK's reliance on imported energy. The technology is available today to improve energy efficiency. For example, efficient lighting and heating systems can be installed for relatively low costs with a payback period as low as 6 months. Also, there are simple steps that some businesses can take that do not require financial investment such as reviewing tariff rates and voltage optimisation which can reduce costs and energy use.

Results from a recent energy efficiency survey revealed that business still has significant opportunities to save energy.

Although many businesses are addressing energy efficiency, the results from a recent IoD survey⁸ showed that more than 60% of responding organisations did not have an energy management policy or strategy and more than half did not have a person with direct responsibility for energy management. A similar picture was revealed regarding energy saving or efficiency programmes – almost 60% of organisations did not address energy efficiency. Of those organisations which did address energy efficiency 30% reported energy savings of between 6–10%.

A focused approach to energy efficiency can yield savings for all businesses.

The case studies in this report demonstrate that all types of businesses can tackle the issue of energy use and in so doing reduce their operating costs, increase their profitability and improve their competitiveness. Relatively simple approaches to managing energy demand can significantly reduce energy bills and CO₂ emissions by, in some cases, up to 20%.

2 Introduction

This report does not focus on the issue of climate change policies – a recent IoD policy paper 'A Competitive Response to Climate Change'⁹ has addressed this issue. Nor will this document cover energy use related to transport. This has also been the subject of a number of separate policy papers published by the Institute of Directors. This report concentrates on the practical steps that businesses can take to deliver improvements in operational energy efficiency within the built environment, i.e. in the buildings occupied and used by businesses, and in so doing reduce energy costs and address emissions associated with climate change.

The IoD clearly recognises that improving energy efficiency is an area where business activities and government climate change policies can move forward together. Improving energy efficiency reduces business operating costs and improves overall organisational efficiency, thereby contributing to improved competitiveness. It also reduces carbon dioxide (CO₂) emissions and makes an active contribution to the UK government's energy policy and climate change commitments. The IoD also acknowledges that although many businesses are currently engaged in addressing the issues of energy and climate change, further improvements, particularly in energy efficiency, can be achieved. This report, through highlighting a variety of case studies, aims to provide a resource for and encouragement to our members and UK business as a whole in the drive to improve energy efficiency.

Businesses in the UK spend billions of pounds annually on energy and even small price increases can have a dramatic effect on their ability to compete on the global stage. For example, Small and Medium Enterprises (SMEs), which contribute more than half of our GDP, spent an estimated £3.5 billion on energy in 2006¹⁰. These smaller businesses, particularly if they are energy intensive such as printing, plastics and glass product manufacturing companies, and food producers, have been significantly affected by recent energy price rises – in the region of 50% in the past 18 months! This is compounding many of the financial problems small businesses face.

UK business activities account for around 40% of the UK's carbon emissions and almost half of these emissions result from the energy used in buildings and operational activities¹¹. Energy intensive businesses already face regulation and incentives to reduce carbon emissions through for example, compliance with Climate Change Agreements (CCAs) and the EU Emissions Trading Scheme (EU-ETS). A further cap and trade scheme as part of the forthcoming Climate Change Bill, the Carbon Reduction Commitment (CRC), will be in place by 2010. This new Government regulation is aimed at large non-energy intensive public and private sector organisations i.e. those which use more than 6,000MW/h per year (see Box 2). The organisations which will come within the CRC scheme are estimated to account for around 10% of UK emissions. However, there still remain a large number of smaller companies, which in total also contribute around 10% of the UK CO₂ emissions. These businesses, like larger organisations, pay the Climate Change Levy (CCL) but in the main are not directly addressed by government policies or support from government organisations such as the Carbon Trust funded from the levy¹².

All businesses and public sector organisations irrespective of size can benefit from becoming more energy efficient. This report outlines the practical steps through a variety of case studies which demonstrate how they can reduce their energy bills, reduce carbon emissions and 'join the use-less generation'.

2.1 Energy efficiency and climate change

There appears to be little doubt within much of the international scientific community and most governments, including the UK's, that the issue of climate change is one of the most challenging problems faced by this generation (and possibly subsequent generations). The UK Government

has made a number of climate change commitments which will impact across all parts of society including business. The Government aims to reduce the UK's carbon emissions by a minimum of 60% by 2050¹³. The UK Government supports the EU renewable energy target of 20% by 2020 and has also indicated that it will adopt a binding UK share of this target – 15% of all the UK's energy (covering the electricity, heat, and

transport sectors) to be sourced from renewables by 2020.

To address climate change successfully will require a variety of changes within government, business and society. These include developing effective energy policies, implementing more efficient use of existing energy sources to generate electricity, development of low-carbon energy sources, technological innovation and increasing skill levels. These will all take a significant time to be put in place and to contribute effectively to a low carbon economy. However, it is clear that significant reductions in emissions can be achieved immediately through the implementation of efficiencies in energy use from existing practices and technologies.

The IoD actively promotes the part that business can and should play in helping deliver the changes required to move towards a lower carbon economy. The IoD also recognises that businesses in the vanguard of the move towards a low-carbon economy will be those which will be in a position to realise new and emerging market opportunities.

No matter what view is taken regarding climate change there is no doubt that it has become one of the most important issues facing governments, business and society at large. Increasing use of energy sourced from fossil fuels such as coal, gas and oil is generally understood to be a major contributor to increasing levels of the atmospheric gases which are driving climate change.

The Institute of Directors recognises that business is integral to success in addressing the problems of climate change, and also in helping the UK and EU to achieve their emission reduction targets.

Reducing CO₂ emissions through improving energy efficiency is primarily about reducing end-use demand. In most commercial and industrial buildings energy is used in the forms of electricity (indirect) and gas (direct). The description of electricity as indirect is because it is generated through the burning of fossil fuels (gas, oil and coal). The burning of fossil fuels results in the direct emission of CO₂, the main greenhouse gas believed to be responsible for global warming. The more electricity is demanded by the end user, the more electricity has to be generated, causing more fossil fuels to be burned and resulting in increased greenhouse gas emissions. The CO₂ emissions are calculated for natural gas at 0.19 kg/kWh based on its carbon content, whereas grid electricity is calculated at 0.43 kg/kWh electricity used. The actual CO₂ emissions associated with grid electricity vary depending on the energy generation mix but for the purposes of current emission accounting, the UK Government (Defra) will use the existing figure of 0.43 kg/kWh until 2010.

2.2 UK energy efficiency – the current view

The Department of Trade and Industry (DTI) – now known as The Department for Business, Enterprise and Regulatory Reform (BERR), published the Energy White Paper, 'Meeting the Energy Challenge'¹⁴ in 2007, which set out two long-term challenges:

- Tackling climate change by reducing carbon dioxide emissions both within the UK and abroad; and
- Ensuring secure, clean and affordable energy as we become increasingly dependent on imported fuel.

A key point emphasised in the Energy White Paper was that using energy more efficiently is the fastest and most cost effective way of reducing energy use and cutting CO₂ emissions. There are various government instruments and policies aimed at encouraging the implementation of and investment in energy efficiency, which includes the Climate Change Levy (CCL) and Emission Trading Schemes.

Although businesses in the UK are improving energy efficiency, recent research by the Institute of Directors found that 60% of organisations surveyed were not addressing energy efficiency¹⁵. The result of the IoD survey reflected similar findings of the National Audit Office report on The Carbon Trust¹⁶, which highlighted that although the Carbon Trust's work had contributed to significant energy savings and carbon emission reductions in a number of larger organisations, it had worked with a relatively small proportion of businesses and that wider market penetration would be required to generate greater reductions in CO₂ emissions.

In 2004 the Carbon Trust pointed out that British businesses in the growing Small and Medium Enterprise (SME) sector was 'throwing away 1 billion pounds a year in wasted energy'¹⁷. Given the significant increase in energy costs since then, this figure will be significantly higher today. Overall, even taking a conservative average (and easily achievable) of a 10% saving this could represent savings of around £1.9 billion for UK business as a whole! Since 2004 energy prices have spiraled. Gas prices from the beginning of 2004 to the end of 2006 rose by 67%. This was coupled with a 41% increase in electricity prices in the same period. The crude oil price was around \$55/barrel in 2004 and apart from a dip during early 2007, by mid 2008 the price had exceeded \$140. Many forecasters are expecting the price to exceed \$150 by the end of 2008.

In addition, research by Philips Electronics in 2006¹⁸ highlighted that inefficient and out of date office lighting was costing UK public and business sector organisations up to £1 billion per year. Their research found that potentially 75% of the UK's public and private sector office lighting is based on outdated and inefficient lighting systems – primarily those using fluorescent lighting running on electromagnetic ballasts. If these were replaced by the latest lighting technology, realistic electricity savings of around £500 million per year (16 billion for all EU) could be achieved and this could realistically be doubled by the widespread use of lighting control systems. They estimated that in 2006, only 1% of office/building lighting used lighting controls (e.g. timers, presence detection and daylight controls).

The Philips data and the Carbon Trust information, as well as the case studies in Section 5, indicate a huge opportunity for businesses to improve their energy efficiency, reduce their energy use and costs and therefore reduce their CO₂ emissions.

2.3 Outline of UK regulatory framework

The 2007 Energy White Paper noted that improving energy efficiency will require everyone – individuals, businesses and Government – to take action. Individuals and businesses can play their part by reducing the waste of energy, by investing in energy efficiency measures for the home and workplace, by constructing more energy efficient buildings and by choosing to purchase more energy efficient products. The Government's aim is to encourage and enable action by businesses and individuals by ensuring that the right regulatory and fiscal frameworks are in place.

The European Commission published a Green Paper on Energy Efficiency¹⁹ in 2005 'Doing More With Less', which estimated that the EU could save at least 20% of its present energy consumption in a cost effective manner, equivalent to 160 billion per year, or the present combined energy consumption of Germany and Finland.

In order to ensure integration of energy efficiency measures into national legislation the European Commission (EC) proposed several directives. In response to the EC directives, and in order to achieve its Kyoto commitments the UK government has put in place a range of policies, schemes and regulations which transpose the EC directives and aim to reduce emissions and develop the transition to a low-carbon economy.

The following is a brief list of the main regulations and policies related to energy efficiency in the UK which currently and in the near future, will impact businesses and consumers. It is not comprehensive and this document does not aim to detail their impact on the various business sectors:

- Climate Change Levy and Climate Change Agreements – A levy introduced in 2001 for most non-domestic energy users. Further details are contained in Box 1. For more information see www.defra.gov.uk/environment/climatechange/uk/business/ccl/index.htm
- The Climate Change Bill (currently going through Parliament) – Sets out the targets for cuts in UK carbon emissions, making them legally binding and will enable new powers for the Government more easily to implement emissions policies. It also describes the formation of an independent Committee on Climate Change to monitor and advise on progress towards these targets. The Bill contains enabling powers to introduce new trading schemes, such as the Carbon Reduction Commitment (see Box 2), through secondary legislation. The Bill increases the policy options which Government could use to stay within budgets and meet emissions targets, while maintaining the need for thorough analysis, consultation and scrutiny of proposals before a new scheme is introduced. The devolved governments of Scotland and Wales have already enabled or are in the process of putting in place their own Climate Change Bills. For more details see <http://www.defra.gov.uk/Environment/climatechange/uk/legislation/index.htm>

Box 1 Climate Change Levy (CCL)

The Climate change levy (CCL) is a government imposed tax which came into effect from 1 April 2001. The money collected from this tax goes towards the Government's energy efficiency programme to reduce greenhouse gas emissions by 2010. Consumers who pay VAT at 17.5% will pay CCL. Suppliers do not make any money from the CCL charge, all money goes to the Government.

Rates of the CCL from 1 April 2009 are as follows:

Electricity 0.47p/kWh LPG 1.05p/kg

Natural Gas 0.164p/kWh Coal 1.281p/kg

Fuel oils are exempt from levy because they are already subject to excise duty. It was the Government's intention to raise approximately £1 billion during 2001/2, with the intention to redistribute the taxation collected via a 0.3% reduction in employers' N.I. contributions, together with an allocation of £150 million for support to energy efficiency and renewables.

Exemptions from the CCL include:

- New forms of renewable energy except large hydro electric plants or nuclear power stations
- 'Good quality' combined heat and power plants under the CHPQA programme

- Energy products that act as both fuel and feedstock, within the same process (electrolytic processes)
 - Public transport services that pay 0% VAT
 - Charities
 - 5% VAT rated users < 1,000kWh per month (12,000 kWh or Units per year)
 - The horticulture sector was eligible for a discount of 50% in the rate of levy for up to 5 years
 - Certain energy intensive users – in particular cement, chemical, ceramics, food & drink, aluminium, paper, foundries, non-ferrous metals and steel. These Industries will be entitled to 80% discount from CCL providing they sign up to a Climate Change Agreement (CCA) with energy saving targets agreed with the Government.
 - The purchase of green electricity.
-
- EU Emissions Trading Scheme – A mandatory cap and trade scheme for specific energy intensive activities. For more information see <http://www.defra.gov.uk/environment/climatechange/uk/business/trading.htm>
 - Energy Performance of Buildings Directive and Energy Performance Certificates – By January 2009, as part of the directive, Energy Performance Certificates (EPCs) must be produced when buildings are constructed, sold or rented. For homes the requirement for EPCs is already in place. For more information see <http://www.defra.gov.uk/environment/climatechange/uk/energy/efficiency/index.htm>
 - Enhanced Capital Allowances for energy efficient equipment. This allowance is claimed when equipment is installed if it is included in the Energy Technology List (ETL) which details over 6,000 products meeting Government-prescribed energy efficiency criteria. The scheme allows up-front tax relief for businesses paying corporation tax or income tax that invest in energy saving equipment. A large number of technologies are listed including automatic monitoring and targeting equipment (smart meters), lighting equipment and controls, motors, variable speed drives etc – for more information see <http://www.eca.gov.uk/etl>. For example, if a business pays corporation tax at 28%, every £1,000 spent on qualifying equipment would reduce its tax bill in the year of purchase by £280. In contrast, for every £1,000 spent the generally available capital allowance for spending on plant and machinery is 20%/year on the reducing balance basis, which would reduce the business's tax bill in the year of purchase by £56. In other words, an ECA can provide a cash flow boost of £224 for every £1,000 it spends in the year of purchase. ECAs provide 100% tax relief, so there is no further tax relief in later years. The general rate of capital allowances does not provide 100% tax relief so there is a balance of spending to carry forward on the reducing balance basis for relief in later years.
 - Carbon Reduction Commitment – Due to come into force in 2010. A mandatory 'cap and trade' scheme covering emissions from larger business and public sector organisations. For more information see Box 2 overleaf.
 - Building Regulations – Building Regulations 2000 (as amended) which are made up of:
 - Procedural regulations that set out what kind of work needs Building Regulations approval and how that approval should be obtained
 - Technical requirements that set the standards that should be achieved by the building work. This area contains the Part L Approved Documents which relate to the Conservation of Fuel and Power in buildings other than dwellings. For more information

see

<http://www.planningportal.gov.uk/england/professionals/en/1115314112742.html>

- Environmental Transformation Fund – Funding for Low Carbon Technologies amounting to £400m over the next three years. A new joint Defra/BERR fund part of this year's budget. For more information see <http://www.defra.gov.uk/environment/climatechange/uk/energy/fund/index.ht>
- Market Transformation Programme – a programme which supports the development and implementation of UK Government policy on sustainable products. For more information see www.mtprog.com/
- Public procurement policy and standards – for more information see http://www.ogc.gov.uk/procurement_policy_and_the_eu_sustainability.asp
- Carbon Trust – an independent company set up by the Government with the aim to accelerate the move to a low carbon economy through providing assistance to business and organisations to reduce carbon emissions and develop commercial low carbon technologies.
For more information see www.carbontrust.co.uk
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Box 2 Carbon Reduction Commitment (CRC)

CRC is a cap & trade scheme announced in the Energy White Paper 2007, which will apply mandatory emissions trading for large non-energy intensive organisations in the private and public sectors. It is designed to drive energy efficiency and carbon savings through the financial incentive of emissions trading. This will be combined with publishing organisations' performance in a league table. The CRC is scheduled to start on 1 January 2010 but the qualification year is 2008. During 2008 UK organisations with annual energy consumption of 6,000 MWh and above will be included in the CRC. This equates to an annual energy bill of around £500,000. It has been confirmed that the CRC will be a UK wide based scheme.

In terms of identification there will be an obligation on energy suppliers to supply bill payers of half hourly metered electricity with an information pack, listing their half hourly meters and their annual consumption for 2008. Suppliers will also provide government with a list of these organisations and annual consumption figures in each case.

The scheme uses a top-down approach to identify if an organisation comes under CRC and will place an obligation on the highest UK parent organisation. The parent organisation will be required to report the aggregate emissions of all parts of its organisation including subsidiaries. The parent company will then be required to collate the information it has been given from all parts of its organisation and its electricity suppliers to enable it to assess as a whole if it falls within CRC. The organisation will be required to account for all its energy use, not just half hourly metered electricity.

Timetable:

- Climate Change Bill in Parliament – November 2007
- Report of Consultation on draft CRC regulations – Summer 2008
- CRC qualification year – 2008

- CRC regulations in force – January 2009
- Identification of CRC participants – Early 2009
- CRC scheme begins – January 2010
- Initial Phase – 2010 to 2012
- The price of allowances for the initial phase has been set at £12/tCO₂.

For additional information:

<http://www.defra.gov.uk/environment/climatechange/uk/business/crc/index.htm>

3: The basics of energy

According to recent data from BERR, total energy spend by UK business exceeded £19 billion in 2006 and commercial and industrial buildings currently account for around 20% of UK greenhouse gas emissions²⁰.

It is widely understood that energy efficiency is the most cost effective and achievable approach to reducing greenhouse gas (GHG) emissions. This is an area where significant savings in costs and CO₂ emissions can be made in a relatively short time through addressing energy efficiency both in existing buildings and in standards for new builds.

There are a number of points related to the use of energy in business and public sector organisations:

- It contributes to the operational costs of organisations and in some energy intensive businesses it has a significant part to play in a business's maintaining its competitive edge
- It results in emissions of greenhouse gases from the direct burning of fossil fuels in the production of heat and generation of electricity
- In order to achieve Government climate change targets significant investment is required to move towards low carbon sources of energy
- As demand for energy and related infrastructure developments increase there is a resulting increase in energy costs
- The majority of energy use for the foreseeable future will be based on fossil fuels
- The UK is a net importer of energy and as the main sources of fossil fuel supplies are located in politically volatile areas, there is therefore increased risk to energy supply.

In overall terms most energy used by businesses and other organisation in their buildings and facilities is in the forms of:

- Natural gas – mainly used in heating systems for both buildings and processes, and
- Electricity – used for lighting, air conditioning systems, motor drives and office equipment including IT and other communication equipment.

However, as shown in the BERR statistics, electricity is the major energy source²¹ used by business in operating their facilities and processes. The efficiency of electricity production in most thermal power stations is between 30–50%. Therefore, the unnecessary consumption of

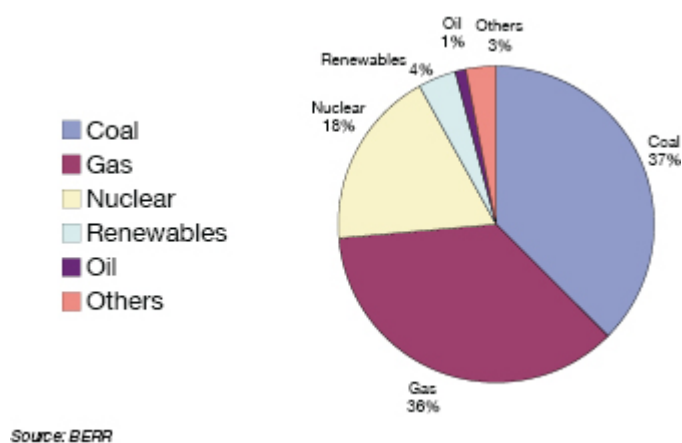
electricity can result in a two or three fold increase of CO₂ emissions per delivered unit of energy, typically measured in kWh when compared to the direct consumption of fossil fuels.

The electricity supply industry has three areas:

- Generation – primarily by large centralised power stations
- Transmission network or Grid which transmits electricity via overhead high voltage lines
- Regional distribution networks of lower voltage (132kV and below) via overhead and underground lines.

Electricity is generated from a diverse mix of fuel sources. Figure 1 shows the 2006 fuel mix used to generate heat and electricity at the UK power stations.

Figure 1: The 2006 Energy Mix



In 2006, most of the UK's electricity was generated by gas, coal and nuclear power stations. Thirty large (>1GW) power stations meet the majority of the UK's base electricity demand, which is ~40GW at a typical point in time and ~60GW at peak.

The contribution from coal and nuclear plants will fall as stations close, leaving an estimated 'gap' of ~15GW by 2015/22. This will be filled in the short-term by new gas and renewable (mainly wind) generation but will also require the introduction of new generation nuclear and coal-fired power stations to meet the current energy demand. However, as set out in The 2007 Energy White Paper, the UK aims to increase the proportion of electricity produced from renewables from the current 4% to 10% by 2010 and 20% by 2020. Note that the 15% renewable target currently being considered by the UK Government is related to total energy use and not just electricity generation. The renewable portion of electricity generation to meet the target is in the region of 40%.

Renewable energy is arguably no less reliable than energy generated from more traditional sources and using it does not mean that an organisation would have to change to new equipment or appliances but renewable energy does tend to be intermittent. Neither wind nor solar energy, both of which are inherently intermittent, can replace continuous base-load power. Basically, the only technologies that can produce large amounts of base-load power that supplies the necessary electricity to cope with standard and variable peak demand are fossil fuels (oil, coal and gas) and hydroelectric plants. Nuclear power plants can be considered in some circumstances to provide variable demand. Given that the Government aims to reduce fossil fuel use and that potential hydroelectric sites are limited, nuclear power must form a significant element in the energy power supply mix. Every solar panel and every wind turbine must be

backed up by reliable power when the sun isn't shining and the wind isn't blowing, at least until the considerable problem of electricity storage is overcome.

Renewable energy sources and technologies in the UK include:

- Biomass/biofuels
- Geothermal (mainly through use of ground source heat pumps)
- Hydro-electrical small scale hydro
- Wind power/wind turbines
- Solar – photovoltaic (solar PV)
- Solar – water heating
- Tidal and wave power.

Other energy sources may be considered as low-carbon and include energy from waste, including capture and combustion of methane, and co-generation such as good quality Combined Heat and Power (CHP).

The Government in its 2007 Energy White paper also recognised that even if we increase the proportion of renewables and realize more potential for increasing low carbon sources of energy such as nuclear, fossil fuels (coal, oil and gas) will still play a significant part in meeting the UK's energy needs for the foreseeable future.

Both the European Commission's green paper 'Doing More With Less'²³ and the subsequent UK Energy Efficiency Action Plan 2007 published by Defra²⁴ positioned energy efficiency as the quickest and most cost effective way of cutting CO₂ emissions.

The price of energy (gas and electricity) is closely aligned to the price of crude oil and as we have seen over recent months, the price of crude oil has continued to increase and now stands in the region of \$140/barrel (June 2008). This has the effect of increasing the wholesale cost of gas, the cost of energy transportation and therefore prices to consumers but there are other factors which cause the cost of energy to increase, including the energy supply companies having to comply with UK regulatory requirements. These include the obligations on energy supply/generation companies to increase investments in infrastructure and costs associated with regulations such as the Renewables Obligation and the future installation of smart meters.

The UK power generation landscape is changing; firstly through phasing out around 35% of the UK's electricity generating capacity as the older coal and nuclear plants are taken out of commission, and secondly through the increasing supply of energy from renewable sources. As older plants close and until the renewables sources can take up the difference, the UK will be even more reliant on imported gas, possibly importing up to 80% of our gas requirements by 2020. However, given the intermittent nature of renewable energy sources, a greater investment in new generation nuclear and coal fire power stations may be required to ensure an adequate base-load and an alternative to imported gas.

This potential energy gap emphasises the critical importance of energy efficiency which could partly fill this gap in a cost effective manner. If the demand for electricity (and gas) is reduced then the UK will be in a better position to move forward towards lower carbon energy sources and to enable significant reduction in CO₂ emissions to be achieved.

4: Delivering energy efficiency

The approach to reducing energy use and associated greenhouse gas emissions is similar to almost any other aspect of improving a business's or organisation's operations. If the business improvement is to be successful and sustainable in the long-term it must form part of the overall business strategy and have appropriate resources, planning, key performance measures, communication and reporting.

4.1 Strategy – an economic, risk-based approach

Energy efficiency is often referred to as a 'no-brainer' or 'no-cost' business activity. However, if either of these terms were actually true we would not be writing this report and all businesses would be doing it! To address energy efficiency in an effective and sustainable manner will require management and staff time and, depending on the extent, it may also require direct financial investment. The main point here is that the allocation of resources to address energy use should be clearly appropriate to the economic and environmental aspirations of the organisation.

In order to make an informed decision as to whether or not, and to what extent, energy efficiency is to be tackled as part of the organisation's operational activities, it is first essential to know:

- how much energy is being used and its cost within the organisation and;
- what benefits would be realised by adopting an energy efficiency programme.

Then the organisation can decide if and how to tackle energy use. The old adage that 'if you can't measure it, you can't manage it' is particularly relevant to energy use. It is worth mentioning that in carrying out a cost benefit analysis or return on investment (ROI) assessment, consideration of the various tax reliefs should be included. This might include relief from CCL, Enhanced Capital Allowances etc.

All organisations can reduce their energy use and associated greenhouse gas emissions but it has to make both economic and business sense before committing to spend what can be relatively significant amounts of time and resources. It may not be a wise use of resources to tackle energy use if a company has a low energy bill, say less than £5,000/pa (although it should be recognised that most reductions in operational costs will make sense) or say, if a business has a turnover of around £500,000 with energy representing less than 1% of operating costs, then it may be considered uneconomical to invest significantly in energy efficiency. This being said, it may fit with the overall profile and aspirations of the company to address and minimise energy use, perhaps in line with other environmental aspects as part of its corporate responsibility objectives. It may also be that the organisation decides to take a wider, supply chain approach to mitigation of greenhouse gas reduction (its carbon footprint).

4.2 Resourcing

Allocation of sufficient resources to address energy efficiency can present something of a challenge to many businesses, in particular smaller businesses that may not have the necessary in-house technical expertise. However, even in this situation or where the energy costs represent a small proportion of operating costs it can make economic sense to define and allocate resources to plan and manage these costs. Although there are basic principles which apply to addressing energy use in all companies, such as switching off lighting and equipment that is not in use, the development of an overall programme should be tailored to the character and type of a business – it is not a one-size fits all situation. It is also worth reiterating that any improvement plan should include an element of ensuring sustainability in order to gain the maximum benefit. For example, an energy intensive manufacturing business could develop a

broad-based plan aimed at reducing base and operational loads (see the Marshalls case study for a typical approach) but the details will be specific to the business and sector. This should ideally identify all energy-using equipment and processes then target the high energy use but not forgetting the small items which collectively can account for significant levels of energy use and essentially engagement of people.

4.3 Developing a plan

Planning to address energy use is similar to most business improvement plans and good project management skills will go a long way towards effectively delivering improved energy efficiency. Briefly, a plan should include:

- Know your starting point – as previously mentioned, know what energy use/cost is and when an outline plan is being created set a realistic start date
- Set your overall policy and objectives – these can be fairly general and may form part of the organisation's corporate responsibility and/or environmental policy. However, the more specific the policy is the better. It is essential that the policy and objectives are communicated to all relevant stakeholders. Objectives may form part of the policy statement or be developed by management teams in response to the policy – it depends on the complexity and scale of the organisation.
- Establish the processes and/or project plans necessary to deliver the objectives including who is responsible, the timescales and how these and the overall plan's progress will be communicated
- Identify and allocate a budget and other resources – it may be beneficial to include targets for individuals and groups
- Ensure there are measures and targets against which to check progress
- Review process to measure and report progress against your objectives and targets.

This is in effect a version of the Plan, Do, Review process. One point to make is that the details of the plan and processes adopted should not turn out to be the 'tail wagging the dog' but should effectively and efficiently facilitate the achievement of reducing energy use and costs.

If the energy costs are significant and/or the organisation decides to address energy use in a comprehensive way, an energy survey is usually required in order to identify the areas where maximum benefit for a given cost can be gained. The cost of a survey will depend on the extent and depth to which it goes but costs may be partly offset by either working with the energy supplier (or an energy services company (ESCO) or in conjunction with a Government support organisation such as the Carbon Trust or Envirowise). If the organisation has sufficient internal resources the survey could be carried out by in-house engineers or it may be decided to employ a consultant engineer.

The following is a list of items that may be included in a survey – it is not comprehensive but covers many of the areas found in most business premises. Some processes will have specialist equipment which may require the services of competent engineers in order to monitor and check efficiency:

- Review of energy bills and how these are recorded and managed
- Measurement of energy use – requires reasonably accurate metering and where possible energy use should be split by type of equipment. This is where monitoring and targeting is a useful procedure. The following list gives examples of areas to be considered but it will depend on the complexity and operations of the organisation:

- Lighting levels and controls – internal and external
- Ventilation/air conditioning levels and controls
- Thermostat settings
- Heating systems and controls
- Processes e.g. compressed air
- Small power e.g. IT equipment and other office equipment
- Substation voltage levels (if appropriate)
- Assessment of timers and other controls.
- Identify inefficient equipment and poor practice, which may include:
 - Maintenance issues e.g. compressed air leaks, flickering lights etc
 - Lights and other equipment left on when not required
 - Local air conditioning units left on when an area is unoccupied.

A comprehensive energy survey or audit should include a series of 'walkabouts'. As energy use will vary throughout the day and/or week it is best to carry out a number of these tours and at various times. For example, during normal working times, lunch times when staff are away from their areas of work, during and after cleaners, outside normal work hours and at weekends (if work patterns differ from Monday to Friday).

The output from a survey should be a report which provides the energy consumption and patterns over a given time period. If half-hourly data is available this can show how electricity is used throughout a 24 hour period and if high and low use areas can be identified so much the better. The report should also provide an action plan detailing a prioritised list of areas/equipment to be tackled including outline costs. The aim is to ensure that energy supply is matched to demand and then reduce demand.

4.4 The people approach

At the heart of any energy efficiency endeavour are people and influencing the energy behaviours of an organisation's people must form a central part of any plan to reduce energy use.

Depending on the complexity, size and operational diversity of an organisation it may be useful to carry out a 'stakeholder analysis'. This should include employees at all levels, senior management, staff, customers, suppliers (especially the energy supplier), regulators, investors etc. A stakeholder analysis needn't be a complex process but it should be aimed at identifying and understanding who the key players in energy efficiency are, where their influence lies, whether they are for or against the changes and what it will take to influence them.

Many of the case studies in this report, although they may focus on technological improvements, make it apparent that well-motivated people are at the heart of effectively reducing energy use.

A key part of sustaining changes like energy efficiency is communication – know what your main message for the various stakeholders should be and develop your communication campaign around this. For example, you may focus on the environmental benefits of tackling climate change and/or your main outcome could be focused on an economic, or a competitiveness approach through reducing costs.

In larger organisations it can pay dividends to survey the understanding and commitment of employees. The results can then be used to develop a more flexible approach which can allow for the different views of the various staff groups.

4.5 The technology approach

The important point to make here is that an effective approach to energy efficiency should not just rely on trying to persuade people to switch lights and equipment off – important as this is. A people approach may in fact be the limit of an organisation's energy efficiency plan but this singular approach is generally limited to organisations with very small energy costs. However, even in smaller businesses the installation of energy efficient equipment such as presence detectors to control lighting, especially where a light may be left on in a room or area that is not easy to see such as cupboards or toilets, or installing simple timers etc., can have a very quick payback – sometimes as short as a few weeks.

Another important point to understand is that even if you do fit, for example, energy saving light bulbs, if they are not switched off when not required then the maximum benefits will not be realised. Equally, if lighting or heating controls are fitted to optimise operations and these are then regularly over-ridden the potential savings will be lost, and finally, equipment should be maintained to ensure optimum efficiency. For example, flickering fluorescent lights will use more energy and should be repaired as quickly as possible.

The following section outlines case studies which illustrate successful energy reduction in a wide range of businesses and other organisations.

5: Good practice and case studies

This section forms the most important part of this report which both outlines areas of good practice and provides examples of companies that have adopted energy efficiency as a strategic part of their business processes.

5.1 Managing the energy bill

As previously mentioned, it is essential that you know how much you are paying in order to decide your approach to energy efficiency. However, even if your energy costs are not particularly significant, it is always worth asking the questions: Is the business paying too much for its energy? Is the business on the correct tariff?

The simple way to approach these questions is to contact your energy supplier to explain your bill and tariff rate. This may be as simple as making a phone call to the supplier's help-line but it may require a visit from the supplier. Although energy suppliers are not obliged by law to offer help to business, as they are required to advise domestic customers on ways to reduce energy use, it makes good sense to form a partnership with the supplier. A good supplier is one that will respond to a customer's requests to become more energy efficient.

An invoice or bill should include data on:

- Charges and CCL rates
- Time period of invoice and meter readings
- Consumption – this is usually shown covering the two periods; daytime (7am to midnight) and night-time (midnight to 7am) measured in kWh i.e. the kilowatts used per

hour. Note that in many situations if there is high night-time consumption this should be investigated.

- Total consumption again expressed as kWh
- Maximum demand – the peak power in kW in a 30 minute period during the period of invoice, usually monthly. This needs to be the minimum required. Note that if the maximum demand capacity is exceeded high charges are levied.
- Price – the costs of the various charge periods in p/kWh

Gas invoices normally only include total consumption over the period in kWh.

Questions to consider:

- Can you avoid paying the Climate Change Levy (CCL)? All businesses are charged this levy if the energy bill applies to an industrial or commercial facility and there are ways to reduce or avoid this charge. For example, green electricity is exempt from the CCL and depending on the supply contract it may not always be more expensive than a standard tariff.
- Are your electricity charges based on a maximum demand which is above that ever reached?
- How accurate is the energy meter/bill?
- Are you charged for what is used or is the charge based on estimated usage?

All these questions are best answered in discussion with your energy supplier.

5.2 Monitoring and targeting – invoices and metering (sub-metering)

The principles of monitoring and targeting are to:

- Measure present energy consumption
- Compare and assess over time – identify trends
- Set benchmarks and future improvement targets
- Provide data for progress reports.

It should be noted that metering does not save energy in itself but provides essential information on consumption which enables improvements to be made. The basic four-step process is data collection; analysis; reporting; action.

Most energy consumption and cost information can be obtained from invoices and meters and these can be used to cross reference consumption and charges to check the accuracy of the bill – see above for information on invoices.

As mentioned above there is no obligation for a supplier to go beyond supplying accurate billing and overall meter data but most will support collection and analysis of data if required, although there may be a charge for this service. However, if an organisation has a significant energy bill then it should employ the services of a competent energy manager with appropriate data management tools to monitor energy costs and ensure efficient use over time.

Once a reliable monitoring process has been established improvement targets can be set to reduce energy use.

A general point is that monitoring energy use needs to account for the seasonal differences in energy demand through changes in weather conditions. A system called degree-days is used which allows energy use to be assessed to take account of differences in heating (and cooling demands in air-conditioned buildings) due to different weather conditions.

Basically, the energy required to maintain an internal temperature depends on the difference between the internal and external temperatures. Degree-days utilise the daily difference between a base temperature and the 24 hour mean external temperature. Using correction for degree-day data in the analysis of energy bills can help eliminate changes in energy consumption resulting from weather conditions. This can provide a more consistent picture of energy performance. However, the correction should only be applied to the energy consumed by building services i.e. the energy to heat or cool a building. Process-related energy consumption should be independent of outside temperature. UK degree-day data and information on their use can be found at <http://vesma.com/ddd/index.htm>.

Even at its most basic level, metering is essential to allow management of energy use. Metering and monitoring systems are essential in order to provide the detailed information required to help minimise plant or building power consumption. Without a detailed understanding of current energy usage, services and equipment may be running when not required or running sub-optimally. Efficient management of services such as electricity, gas, steam, high pressure hot water (HPHW) heating systems, processed cold water, and compressed air will make significant contributions to energy costs within a facility. However, facility or energy managers often spend considerable man-hours gathering, collecting, checking and analysing metered data so that they can produce information in order to optimise the facilities' energy use. Due to these restrictions the information is often generated at periodic intervals rather than in real time introducing a delay to the response time – resulting in further potential energy wastage.

The ideal situation has always been to have real-time information. However, the cost and practicalities of wiring main meters back to central data collection system usually result in only a few main meters being installed. Sufficient sub-metering and monitoring to allow efficient energy management may be considered too costly.

Digital wireless technologies are now available as alternatives to many traditional wired applications and digital wireless technologies that replace conventional wiring are now a realistic proposition. Technologies based upon the IEEE 802 working group's standards have been adapted for industrial use. Developments in the areas of battery life, energy harvesting and energy management allow wireless sensors to operate without the need for wired power or unrealistic intervention intervals.

Conventional industrial signals (i.e. 4-20mA) can be transmitted across wireless infrastructures to more convenient locations where they can – via a gateway – be connected to structured wiring. Wireless infrastructures can be rapidly reconfigured and are relatively tolerant of interference.

Even if there is no need for real-time data acquisition, digital wireless technologies can eliminate the need to be physically close to the meter in order to take a meter reading and they can avoid or reduce recording errors.

Key benefits of digital wireless metering:

- enables management of energy supply and use
- wireless technology is now available and can reduce cost (labour and materials) of installation
- allows energy optimisation of existing services or equipment

- can be used to reduce energy costs
- easily deployed for energy auditing purposes.

Digital wireless technologies (so called smart meters) can dramatically reduce the cost of infrastructure required for data acquisition and allow collection of data that without wireless links would not be economically viable to obtain. The ability to collate a greater depth of information allows energy usage to be monitored closely and can enable prompt corrective action to be initiated. Wireless technologies can also be deployed with less operational disruption and on a temporary basis for energy auditing purposes.

Figure 2: An example of a smart meter



5.2.1 Case study – Canary Wharf building services company

The company is a leading real estate services and money management firm, delivering strategic, fully-integrated services for property owners, investors and occupiers. It is an industry leader in property and corporate facility management services, with a portfolio of over one billion square feet worldwide.

The company manages properties all over the world, including a high profile building in Canary Wharf, which is sublet to a number of leading financial institutions and commercial enterprises. Siemens Energy Services was awarded the contract to provide and maintain a tenants' sub-metering system for the new building.

Siemens Energy Services delivered a metering system that would allow the customer accurately to allocate energy costs per floor – per tenant.

Requirement: accurate allocation of energy costs

The customer needed to allocate energy costs accurately to each of the tenants in the building to enable accurate billing. It needed to be able to identify exactly how much energy was used by each tenant on each floor, so that they could provide accurate bills as well as energy consumption monitoring.

Customer requirement:

- enable accurate billing
- access a monitoring system via the internet
- break out costs per floor – per tenant
- install hardware and software for meter assets
- provide expertise in data collection and data management
- provide consultancy on the sub-metering provision.

Solution: end-to-end metering package

Siemens Energy Services provided the design, supply, installation and commissioning of a sub-metering system, as well as meter maintenance and data collection services. A networked metering system was installed in the new Canary Wharf building to monitor over 250 meter points. As part of the data collection service, the data are consolidated into subgroups to enable cost-centre calculations. Regular reports are created which break out the cost and consumption elements.

Siemens Energy Services solution:

- install sub-metering system
- maintenance over the full meter-life cycle
- web-based energy efficiency application
- data management
- bespoke reporting systems.

Benefits: accurate tenant billing and added-value services

With the Siemens solution in place the property services company is now able to bill its tenants monthly, which helps them to manage cash flow and secure cost coverage. It also helps them to add value to tenants by raising awareness of the electricity used. This information enables tenants to be more energy-aware and to take steps to reduce energy consumption.

Customer benefits:

- monitor electricity consumption
- bill tenants monthly
- manage cash flow
- satisfy tenants' information needs
- understand accruing costs
- put steps in place to reduce energy expenditure
- data constantly accessible via Intranet
- one supplier for the whole process
- flexible in changing supplier.

5.3 Lighting

The use of artificial lighting in the built environment has the ability to perform a number of functions. The main functions of lighting can be classed as: architectural, accent, ambience and task lighting and if these are used well can add functionality, atmosphere and character to any room whether at home or at work. Poor lighting will annoy and can affect working operations, while good lighting will blend seamlessly into the surroundings – used well, lighting will enhance an office, retail, reception, manufacturing or even a warehousing facility. Another point to be aware of is that all lighting gives off heat. This may be useful in winter but can compete with cooling systems in warmer periods, adding to the energy required to cool a room. Generally, the more efficient a lighting system is, the more of the energy used is converted to light and not

heat. Incandescent lights are particularly inefficient, utilising less than half the energy they use to produce light.

Various surveys of a number of business facilities indicate that lighting accounts for around 30% of the total electricity used but in offices lighting is the single largest cost within the electricity bill. Why should lighting use so much energy? One factor is that a fluorescent or discharge lighting systems will actually use around 125% of the power shown on the lamp or light tube (shown in watts). This is because energy is also consumed by the ballast or control unit of the light fitting. Also, in many offices the lighting levels can be higher than required. Although guidelines for the lighting levels for various commercial and industrial facilities are available from the Chartered Institute of Building Services Engineers (CIBSE), many installations exceed the recommendations. It is not difficult therefore to see why lighting is such a high proportion of the electricity bill when one also considers how often lights are left on when not required. In many offices, corridors, meeting rooms, etc., lighting is only actually required at most for around 6 hours during the working day – carry out an out of hours audit to see how often these lights are left on and it is easy to see that huge savings can be made.

The use of efficient lighting systems and controls can therefore contribute to large electricity cost savings. If we consider office lighting alone we can see the kind of savings that can be achieved. Research by Philips in 2006²⁵ revealed that more than 75% of Europe's office lighting is outdated and inefficient. Total cost savings up to 16 billion per year were estimated to be available to both public sector and businesses across Europe through cost effective upgrading of lighting systems to more modern technology. Philips figures show that if office lighting – primarily fluorescent lighting systems running on electromagnetic ballasts – were replaced by the latest lighting technology, realistic electricity savings of 13 billion per year could be achieved and this could be doubled by the widespread use of lighting control systems.

A similar picture can be seen in the UK and similar upgrades could represent an estimated cost saving of around £500 million/year in office lighting systems alone!

The payback on retrofitting these new office lighting systems can be achieved in as little as two or three

years. In addition, this could represent a reduction in the UK's CO₂ emissions of more than 1 million tonnes per year.

Solid-state lighting, mainly in the form of light emitting diodes (LEDs) is now showing wider application. Although this is a relatively new technology it has been used for a number of years, with considerable success in external lighting of bridges, buildings and monuments. For example, it is currently used to light the facade of Buckingham Palace. However it is now being used to light freezers and refrigerated cabinets in supermarkets resulting in more effective lighting and reduced electricity consumption.

A summary of the lighting facts:

- Currently most office lighting runs on outdated electromagnetic ballasts and uses older 1930's based fluorescent lamp technology
- Huge savings can be made by upgrading lighting systems to fittings with high frequency ballasts and a new generation of T5 fluorescent lamps with their higher quality light. Higher levels of light also allow better spacing of light fittings meaning fewer are needed per office. Energy savings of 30% are easily achievable and these savings start immediately after installation. This does not even consider the use of even more modern

LED systems which are particularly efficient for external architecturally based lighting use.

- Additional savings can be achieved by installing modern lighting control systems such as presence detectors which automatically turn off or reduce lighting levels when no one is present and daylight linking controls which reduce the lighting levels when more natural daylight is present
- A basic Philips Light Master Modular (LMM) system does not cost more than a conventional installation, and payback times of less than a year are possible
- Modern fluorescent lighting provides far higher quality light than older technology. This is in addition to the energy-saving potential.

TABLE 1: ENERGY SAVING LAMP OPTIONS (PHILIPS LIGHTING)

Area of Lighting	Old lamp	New energy saving lamp	% Energy saving	CO2 saving/lamp/year
Retail outlet	Halogen PAR 30	Master colour CDM	80	115kg CO2
Office & industrial	TL 8	T5 with high frequency	61	77kg CO2
Home	Incandescent	Compact fluorescent	85	34kg CO2
Road	SON 70	Cosmopolis 60	13 (possible 50)	17kg CO2

Table 1 above, based on Philips data, outlines the energy saving lamp options with an indication of the energy saving and associated CO2 reductions that can be achieved.

The most efficient lamp types, associated control gear and luminaries (light fittings) for most interior and exterior lighting applications together with appropriate types of lighting controls are included in the lighting section of the Energy Technology List (ETL) which, like many investments in energy efficient equipment, attracts 100% capital allowances. For further information see Section 2.3 on regulatory framework. Details of the scheme can be found at <http://www.eca.gov.uk>.

5.3.1 Case study – Big Ben

If you have been to London you may have heard Big Ben – but it's doubtful if you've ever seen Big Ben. What you have seen is St. Stephen's Tower, the 400-foot-high, four-sided clock tower rising above Britain's Houses of Parliament, on the banks of the Thames. Big Ben is inside the tower – it's a 13 tonne bell, designed by the Baron Grimthorpe, cast in 1856, and named in honour of Sir Benjamin 'Big Ben' Hall, the Chief Commissioner of Works at the time. Londoners set their watches by the tower's glowing clock faces by day and by night – and until recently, some poor soul frequently had to climb all 340 steps to the top with replacement bulbs, to keep those clock faces glowing.

That has all changed and the clock faces are now illuminated by means of 112 bulbs (28 per clock face), using Philips QL's induction lighting system. The previous lamps were replaced with 55 watt lamps, guaranteed for an lifetime of 60,000 hours – around 15 years of normal usage. This has reduced maintenance and energy costs resulting in overall savings of an estimated 60 per cent. Newer versions of the QL system now offer 100,000 hours operation.

These QL lights offer not only economy, durability and high luminous efficiency but, since they are 'solid state' and contain no filaments or electrodes, they are also resistant to the immense

vibrations of Big Ben's bongs! In addition, a Philips QL system is used as the beacon light which, by tradition, shines from the top of the tower whenever Parliament is in session.

Energy efficient QL systems are now installed at various facilities worldwide, including Austria's Military Museum, Sweden's National Archives, the Rotterdam World Trade Centre, the Eurostar station in Brussels and Singapore's Changi Airport.

5.3.2 Case study – retail organisation: The Co-operative Group

Commercial retail organisations large and small can make significant reductions in lighting costs and enhance their appeal to customers. Organisations including Thomas Cook, Crabtree & Evelyn, Tesco and the Co-operative Group have significantly improved the effectiveness of the lighting in their retail facilities and reduced their overall energy bills.

The Co-operative Group case study below is an example of taking a comprehensive approach to energy management of which a significant part covers lighting. They have operations that comprise food stores, banking, insurance, funeral care, travel agents and pharmacies with more than 3,000 high street outlets.

It was one of the first UK businesses publicly to acknowledge the need to cut carbon emissions and set internal targets for energy and emissions reductions and all business within the Co-operative Group have implemented energy strategies. These include refurbishment and procurement guidelines to make sure that all electronic equipment, such as lights, refrigeration and air conditioning, is as energy efficient as possible and the requirement that the Energy Technology List is used for all equipment purchases. Moreover, all electricity used by the Co-operative Group is generated by renewable energy sources.

The Co-operative Group wanted to see if it could make further improvements to existing activity so carried out a number of site surveys and a technical review of plant and equipment specifications as well as an inspection of existing equipment in conjunction with the Carbon Trust.

The recommendations included intelligent lighting, improved procurement processes, improved metering, monitoring & targeting and an energy awareness & training programme.

The group is currently delivering a programme to refit 250 retail stores per year, as well as embarking on a refurbishment programme for its pharmacy outlets.

What has been done? Half-hourly metering has now been installed at more than 1,400 sites. This selffinancing programme has identified opportunities for tariff/procurement savings. A retrofit programme designed to reduce energy at the 300 most energy intensive stores includes replacing their lighting systems with more energy efficient fittings. The programme was based on absolute energy reductions of c.14% gained at a trial of six stores, which will save in excess of £2m each year in energy costs.

The initiatives covered more than just lighting and included:

- Many of their stores still used old style fluorescent lamps in either twin or single fittings. A programme of work to replace these with more energy efficient lamps and occupancy control equipment is being installed. At a cost of £0.9m, it is estimated these measures will provide a 2% reduction in overall energy consumption – representing a reduction of almost 2 million kWh/year.

- Installation of a combination of fridge cabinet blinds and freezer trim controls, together with refrigeration pack controls in high consuming stores. At a cost of £3.5m, it is anticipated that these measures will provide a 7% reduction in overall energy consumption.
- Enhanced heating, ventilation and air conditioning (HVAC) control equipment, which will be more efficient than those switching heating, hot water, ventilation, cooling, lighting and appliances off when not required. The use of remote communication will ensure that the equipment is commissioned correctly and is appropriately maintained. At a cost of £2.3m, it is anticipated that these measures will provide a 5% reduction in overall energy consumption.

5.4 Case study – office-based energy efficiency

5.4.1 Case study

A local authority highways divisional office was surveyed and an improvement plan was put in place. The following table outlines the list of findings and associated improvements. The total investment costs were just over £2,000. The energy savings were more than 60,000 kWh, representing cost savings of almost £2,500 per year – payback was less than 10 months.

TABLE 2: LIST OF ISSUES AND IMPROVEMENTS IN LOCAL AUTHORITY OFFICES

Issue	Solution	Comments
Standard 60w incandescent bulbs fitted.	Replace with compact fluorescent lamps (CFL).	In terms of light output a light 20w CFL gives equivalent light to a 100w tungsten filament type.
Twin 100w fluorescent light tubes.	Replace with twin 70w tubes.	
Lights were switched in banks – many on when not required.	Split lighting circuits and install occupancy sensors.	
Rooms with natural daylight had all lights on.	Daylight sensors fitted near windows.	
General lighting level was too high.	Some fluorescent tubes or fittings removed.	
Computers and monitors left switched on when not in use.	Communicate to users to switch off when not required.	Behavioural change plus enabled shutdown to power save mode and disabled screen savers.
Heating and cooling systems could run at same time. Cooling setting was too low. Windows and doors left open. Boiler was old and inefficient.	Provided interlock in system to avoid competition. Closed windows and replaced boiler controls.	Also adjusted room temperatures down to 23oC and adjusted thermostats on radiators.

5.5 Voltage optimisation

Prior to 1 January 1995, the date of the European harmonisation of voltages, electricity in the UK was supplied at 415v 3 phase and 240v single phase. Equipment supplied in the UK around this time was rated accordingly. Harmonisation of voltages has meant equipment supplied now is rated at 400v 3 phase and 230v single phase, with tolerances of +10% and - 6%.

In the UK most industrial low voltage (LV) electrical networks are still running at or near to the higher limits of the voltage range as they have equipment pre-dating 1995. However, this equipment is becoming increasingly rare and running distribution networks at these higher voltages is wasting energy and having detrimental effect on certain types of equipment life. The voltage level coming off a substation into a distribution system can be reduced or 'tapped down' to provide significant energy savings.

Supplied power in the UK operates with what are called transients which are generally short-lived oscillations in the distribution grid caused by sudden change of voltage, current or load. Transients are increasing in line with the increasing use of small-scale generating plants, including wind generation, which gives rise to more switching on the grid – and hence more harmful transients. A voltage power optimiser (VPO) has the potential to buffer and eliminate transients up to 25,000 V. Harmonic distortion from nonlinear loads is also reducing power quality as more power control equipment comes online. To combat this, the Government introduced the G5/4 guidelines in 2003 that require both utility companies and customers to limit their harmonic outputs. So, by reducing harmonics in the supply, a VPO has the potential to protect sensitive equipment (especially IT) and provide a clean power supply.

The use of voltage optimisation or more accurately voltage power optimisation, through the use of a VPO, can offer similar savings to the simple 'tapping down' of a substation. Voltage power optimisation can be used not just in commercial applications but also in industrial based businesses.

There are further advantages to the use of VPOs in that not only do they ensure electrical equipment operates close to rated power but they are relatively easy to fit and can be installed on both LV supplies (415 V) and larger sites where HV is supplied (11,000 V and above) and transformed to LV.

However, simply 'tapping down' (if you own your HV/LV transformer) does not necessarily deliver the same efficiencies as fitting a VPO. Some companies (where they have a HV transformer) have 'tapped up' the transformer and then set a larger step-down using a VPO, which is reported to improve stability of supply and increased savings.

So, how does a VPO work? The supply voltage is optimised basically through a transformer, which corrects and improves the power quality. It reduces harmonics and improves the balance of the three-phase voltage supply allowing equipment to run closer to its optimum operation level, thereby reducing losses and consumption in three-phase equipment such as heating ventilation and air conditioning (HVAC) equipment, refrigeration and motor drives and compressors. For example, supplying a motor with a 5% imbalance in three-phase supply will cause the motor to draw up to 20% more power. In general, VPOs generate lower energy losses throughout their operating range (0.1%) and generate significantly less heat compared to a conventional transformer – the reason being their design and construction, which avoid the dual-wound configuration of a voltage transformer.

VPO is effective in most applications with a significant electrical load and businesses and organisations of all sizes can install this equipment. Businesses who have installed a VPO have reported reduced noise levels as well as reducing electricity costs by up to 15%.

Benefits:

- 5%–15% reduction in electricity consumption through operating electrical equipment at rated voltage levels
- Increased equipment life and lower maintenance requirements

- Potential to free up capacity on electrical distribution (by 5%–15%), possibly negating the need for expansion
- No capital investment required unless a Voltage Power Optimiser (VPO) is used which give further benefits and wider applications.

5.5.1 Case study 1 – AstraZeneca

This case study is based on work carried out at AstraZeneca, a multinational pharmaceutical company with a number of manufacturing and R&D sites across the UK.

Voltage was reduced across UK sites on a wide range of facility types including offices and laboratories. Each facility type has been monitored for savings and results demonstrated savings varied with the type of facility. Laboratories and offices provided the greatest potential for saving as they generally operated equipment rated at 230v.

The R&D site in Loughborough produced the most comprehensive set of data with all substations reduced by 2.5% at 11kv/400v level. This was then followed up with a 3% reduction at site incomer level at 33kV/11kV level (see Table 3).

The scope of this work was to reduce the voltage levels as close as practical to the European harmonised levels. There may be further savings by operating at lower voltages but the operational outcomes may be more difficult to predict and further drops should be managed and monitored for problems. However, the voltage levels can be reinstated to the higher levels if problems do occur.

There are two particular points to make in this example. Firstly, there was no capital cost associated with the change in voltage but it did require a shutdown of the substation for the short period of time it took to 'tap down' voltage. So, it is an improvement that can be carried out during planned maintenance schedules or at times when the building or facility is not in use e.g. at weekends if this is the case.

The other point is that after the reduction in voltage was carried out follow-up monitoring of plant and equipment such as pumps and motors were found to be running at lower temperatures mainly through running slower – not slow enough to affect their operational aspects but slow enough to reduce wear thereby reducing maintenance requirements.

At one particular site located in the south west of England, the electricity supply company was brought in to carry out the changes with the agreement to monitor electricity usage and also to reinstate to the original settings if the facility's equipment showed signs of malfunction. No problems were experienced and the new settings have shown a significant reduction in electricity consumption.

TABLE 3: TYPICAL SAVINGS IN ELECTRICITY CONSUMPTION

Scale of reduction in voltage Electricity savings (%)	
2.5%	5% – 7.5%
5%	10% – 15%

The table above (Table 3) summarises the range of 'tap down' voltage reductions made at various substations and the associated electricity savings achieved.

5.5.2 Case study 2 – Defra

Another example of voltage optimisation which delivered similar electricity savings is seen in the installation of a VPO at the Department of Environment, Farming and Rural Affairs (Defra) Central Science Laboratory (CSL) which, although requiring some capital investment, has been shown to have a rapid payback.

The CSL is a public sector science organisation which provides research and information services to governments and industry. It is an Executive Agency of Defra and works closely with Defra's other science agencies CEFAS and VLA.

As part of its Carbon Management Programme, the Built Environment Sustainability Team (BEST) – Defra Estates, investigated technologies which had the potential to improve energy efficiency and reduce carbon emissions within the Defra Network.

A VPO was subsequently chosen as a technology that could help deliver the required improvements and similarly to the AstraZeneca case study, Defra found that energy use and costs were reduced and the efficiency and operation of electrical equipment was improved. To date (2007), six VPOs have been installed in a number of Defra facilities with savings on target or above those initially predicted i.e. between 8% and 11%. Current estimates are that savings of more than £500K per year in electricity costs and 475 tonnes of CO₂ per year are being achieved, with some sites having the potential of up to 15% savings.

5.6 Heating, Ventilation and Air Conditioning (HVAC)

This section outlines the control and operational efficiency of heating and ventilation systems generally used in the majority of existing commercial buildings. It does not discuss the detailed design of new and generally more energy efficient new buildings. New buildings can be designed to operate at excellent levels of efficiency in overall energy terms but most are constructed with significant levels of inefficiency built in and, although they may include very sophisticated controls, their operation wastes large amounts of energy. One only has to look at the modern office tower blocks of Canary Wharf or an industrial site to see that lighting and air conditioning systems are left on when occupancy and/or process operations should indicate otherwise – lighting switched off and HVAC systems either off or set back.

New buildings in general, although increasing in efficiency, are using more energy than older building types. This reflects an increase in energy service demands, including:

- increased lighting levels
- increased hourly use e.g. 24 hour call centres
- increased service provision – showers, crèche and leisure facilities
- increased information and communication technologies
- different building layouts – open-plan allowing for higher occupation density.

All the above demand increased cooling and heating requirements.

5.6.1 Heating systems

Heating and hot water systems can account for up to 60% of a building's total energy costs²⁶. By understanding the system(s), ensuring the heating capacity is appropriate to the areas and making sure that systems are installed, maintained and operating efficiently, it is possible to reduce these costs by up to 30%.

Note that the insulation of a building will have a marked effect on the efficiency of a heating system: poor insulation will minimise any benefits, even from the most efficient system.

The controls in a heating system are crucial to make certain that the best operational efficiencies are achieved in any heating system. The minimum controls should cover:

- timing – when the heating comes on and when it goes off, and
- temperature – the minimum temperature that brings the heating on and the maximum temperature that turns it off.

More comprehensive controls can be used to monitor internal and external temperatures, switching the heating on/off, higher/lower to ensure the optimum internal conditions for staff or processes. These controls with the capability to control water (or air) flow rates are regulated using a weather compensator and will operate the system at minimum flow and temperature which then increase as the external temperature drops, or maximum when weather conditions result in very low external temperatures. This system requires careful setting up to get the best results but can operate very efficiently. Often the maximum and minimum setting are manually set on a seasonal basis i.e. summer and winter settings.

In many commercial buildings a larger version of a domestic central heating system may be installed. In radiator heating systems individual thermostatic valves (thermostatic radiator valves – TRVs) can be fitted to give individual room control.

In some buildings a ducted heating system may be installed. This will include a boiler (gas or electric) which heats a battery of pipes across which air is forced and then circulated to rooms via a duct system.

In older buildings it is common to find a hot water and radiator system augmented by wall or ceiling mounted individual air conditioning fan cassette units. These may incorporate a cold water system to provide some cooling element. Unless this combination system is well balanced and controlled to ensure the radiators and cassette units are not 'competing', it can be very inefficient and expensive to operate. The occupants may also find the room conditions uncomfortable and may not work to their best potential.

5.6.2 Managing the heating system for maximum efficiency

General measures to reduce heating costs:

- Ensure a high level of building insulation and reduce drafts from open windows etc
- Regularly check settings of boilers and radiators and make sure pipes and ducts are insulated
- Communicate to staff so that they know how the heating system operates and what they can do to reduce heating demand
- Install controls to include timers, cylinder and room thermostats and weather compensators
- Make sure fans and other systems are switched off when not required
- Ensure boilers and other elements of the system are maintained so they operate at maximum efficiency
- Poorly maintained systems can waste more money and energy through breakdowns and inefficient running than it takes to employ a competent maintenance engineer

- Great reductions in energy use can be obtained by varying the speed of fans or pumps and motors as the load requirement changes (see Section 5.7).

5.6.3 Ventilation and air conditioning

Natural ventilation

Natural ventilation has the ability to provide cooling and fresh air supply with very little energy use, however it is only suitable for buildings in which fresh air direct from outside can be accepted, where heat gains are nominal, temperature control & airflow regimes are not critical and external noise sources are low, and security risks are low in the case of using opening windows.

Key benefits:

- Significant reduction in energy usage for cooling and ventilating suitable buildings
- Reduced CO₂ and other emissions.

Background

Fresh air for building occupants is commonly provided via a ducted system powered by a fan and generally it is controlled to the amount necessary to satisfy the occupants. Windows in this situation should be sealed closed to prevent unwanted ingress of air.

However, there are many periods when external air is cool enough to provide some useful cooling within a building. To make use of this potentially low cost cooling source, a more flexible ventilation strategy can be utilised.

Natural ventilation is the introduction of air into a building by natural means such as a temperature differential or external wind pressure. For example, by opening windows on either side of a building, external wind pressure will encourage air to flow through the building. Alternatively, high level vents will encourage air flow due to temperature rise and buoyancy differences, where it can be vented whilst new air is simultaneously drawn in through low level openings.

Natural ventilation can be used to provide air for ventilation purposes and to provide cooling. The circulation of cool external air on summer days can be sufficient to cope with internal heat gains. Alternatively, natural ventilation can be used with night cooling/thermal mass to provide higher cooling outputs. Also solar chimneys and windcatchers can be employed to optimise the availability of cooling energy.

A number of control strategies can be considered to optimise the performance of a natural ventilation system including:

- Powered actuators – to open and close windows and natural ventilation openings as required
- Wind speed sensors – to limit or prevent window opening if wind speed is considered too high
- Wind direction sensors – to optimise window opening around the building such that only windows on windward and leeward sides of the building are opened.

In winter, uncontrolled air infiltration would allow heat to escape and waste energy. Therefore automatically opening windows must be able to seal shut during these periods. Openings must also be designed to prevent the ingress of rain and to maintain the security of the building. Supplementary trickle vents or other ventilation system would need to be provided to ensure fresh air provisions and cooling where available during winter and rainy periods.

Of course the provision of controlled natural ventilation systems as a retrofit in older buildings would require extremely high capital outlay. But there are few reasons not to fit these systems in new buildings.

Key points

Advantages:

- Reduces the need for mechanical cooling (especially when used with night cooling)
- Avoids the need for mechanical ventilation systems (fans and ductwork)
- Avoids the energy consumption of fans and cooling plant
- Where intakes are manually controllable, the occupants may feel more comfortable as they have the ability to influence their environment.

Issues to consider:

- Noise may be an issue
- Building security – but this can easily be overcome
- Nuisance drafts may cause disruption to occupants (disturbance of papers etc)
- Difficult to ensure that internal space temperatures stay within fixed temperature limits
- No control of humidity levels (only a problem if internal zones generate humidity)
- Occupants nearest the point of intake may be uncomfortable whilst those furthest away may get no benefit
- Can lead to overheating when external ambient conditions are warmer than required to offset internal gains.

An example of a naturally ventilated building is the Environment Agency's Red Kite House. See www.solarcentury.com/projects/public_sector/environment_agency_red_kite_house

5.7 Motors, drives and variable speed drives

Motors account for an estimated two thirds of the electricity used by industry e.g. a motor running for 11 hours/day has an annual running cost of about 10 times its purchase cost²⁷. Energy savings of around 5% can be achieved by using High Efficiency Motors (HEMs) compared to standard motors which have similar purchase costs. In addition, HEMs qualify for Enhanced Capital Allowances.

In many situations a motor or drive is larger than required and could be replaced with a smaller one resulting in significant electricity savings. If the size/power rating exceeds the requirements for a particular application then it should be replaced with an appropriate sized item. Also, in many cases motors can be 'exchanged' between applications to get better operational fit without any additional replacement costs.

Most motors, fans and pumps are not required to operate at full output all the time and their speed can be controlled by variable speed drive (VSDs). A 20% speed reduction can result in a power reduction of around 50%. Often a process can be operated at a reduced speed for significant periods of time and only returned to higher speeds when the demand requires it. In addition to the energy savings of implementing a process control and/or VSD there will be reduced maintenance and breakdown or repair costs.

In practice operational energy efficiency should be a key factor when buying new items or replacing old motors. Make sure motors are not running when not required (this gave significant savings in the Marshalls case study – Section 5.9.1). This can easily be achieved by fitting automatic controls.

Many motors deliver their power via gears, belts or pulleys and these transmissions of power result in various levels of inefficiency. Where possible it is better to connect motors directly to a process rather than via a drive train. If gears are required, in general, it is better to use helical, planetary or cycloid gears rather than worm-drive gears and in the case of belts, synchronous, chain or cogged V-belts are more energy efficient than standard V-belts, which tend to result in more slippage.

It should be noted that well-maintained motor and drive systems will always result in less energy use and fewer breakdowns. This should include lubrication, alignment, belt tension etc.

5.8 Co-generation schemes

Conventional power plants only utilise the product of the fuel burn cycle i.e. they burn, say gas to produce hot water and/or steam for use in heating or an industrial process. The conventional electricity power station uses the hot water to drive turbines to produce electricity for the National Grid. Co-generation, also known as combined heat and power (CHP) and/or Tri-generation, are energy generation schemes which use an energy centre simultaneously to generate both electricity and useful heat.

Smaller scale schemes are often used to provide heat and electricity for either domestic or industrial purposes – similar to district heating systems commonly seen in Europe and with excess electricity being available to sell back to the Grid.

A major barrier to the installation of a co-generation system is often the high capital cost involved. The following case study demonstrates the development of a co-generation heat, electricity generation and cooling scheme whilst managing investment costs, benefits and risks through partnering in a Public Private Partnership (PPP) arrangement with an energy services company or ESCO.

In brief, energy services companies (ESCOs) offer to finance, design, build/install, operate and maintain client agreed energy services and equipment and undertake energy efficiency measures (e.g. monitoring, auditing, metering, control and demand reduction), under long-term contract arrangements. This can extend to the provision of the energy itself i.e. combined heat and power (CHP), or other energy services e.g. solar water heating, wind power, etc. These incentivised long-term contracts, typically 5 years, with associated efficiency performance criteria can reduce the clients' exposure to financial risk whilst improving environmental performance.

ESCOs are suited to clients concerned with the wholesale cost of energy, reducing their carbon emissions and sharing risk associated with energy project.

The ESCO generally retains ownership of the energy services equipment.

5.8 1 Case study – tri-generation for the Natural History Museum

The development of a PPP agreement and finance package combined with the commissioning of a CHP unit on programme in December 2006 has made a success story for both Vital Energi and their client the Natural History Museum (NHM). The NHM estimated to save in excess of £500,000 per annum over the 15 year agreement of the project and to save 1,800 tonnes CO₂ emissions annually. With the investment funded by Vital Energi, the museum's allocated £3m energy investment fund available for plant refurbishment could be assigned elsewhere.

Apart from the financial and greenhouse gas emissions benefits, the onus is on the designer under the CDM regulations to eliminate or reduce hazards where feasible. This was achieved with regard to safety in that the conversion from a high temperature hot water (HTHW) system at 130°C/100°C to a low temperature hot water (LTHW) scheme at 95°C/65°C achieved the following safety benefits:

- PM5 compliance – does not fall under terms of Pressure System regulations
- Reduced calorifier failure – no risk of over-pressurising the heating systems
- Reduced risk to staff, public and museum exhibits.

The installation demonstrated that the 1.8MWe CHP unit could accommodate existing and projected future loads and deliver greater overall benefits including:

- Increased heat and electrical outputs
- Increased absorption cooling
- Financial savings – Capex and Opex
- Greater CO₂ emission reduction.

Project details

The Central Boiler House (CBH) at the Natural History Museum (NHM) has had a long operational history going back to the 1880s. Originally a coal-fired installation it until recent times provided the core heating for the South Kensington Cultural and Academic Estate comprising the NHM, The Victoria and Albert Museum (V&A), Imperial College and The Science Museum. The installation was most recently upgraded in the early 1980s and at this time it comprised 4 large boilers totalling 42MW of heat output at 130°C.

In 2000 Imperial College and The Science Museum withdrew from the heat network leaving the CBH with only half its original load. Imperial College with their increasing energy demands opted for their own dedicated combined heating and power (CHP) installation.

This left the NHM and the V&A, which inevitably led to underutilisation of the existing plant and resulted in 2 boilers being mothballed and the reduction in economies meant cost increases, resulting in the cost of heat rising from 1.8p/kWh to 2.7p/kWh in 2000.

The challenge that the Environment & Special Projects Manager at the NHM, set himself was to achieve a relative level of cost of heat of 1.8p/kWh at 2000 prices. A budget of £3 million had been set aside to undertake this target and an assessment of possible improvements showed that in increasing order of investment the following unit heat charges could be achieved: 2.5p/kWh by plant refurbishment and replacement; 2.2p/kWh by automation and de-manning; 2.1p/kWh with further investment in a 375kWe CHP unit; 2.0p/kWh with a 750kWe CHP unit and the target 1.8p/kWh with a 1,300kWe CHP unit.

Looking at the demand profiles and paybacks the results did not appear to be so good economically. The existing operating conditions limited selection options. The critical summer base heating load for CHP operation was limited by the V&A having no heat requirement during the summer, their domestic hot water (DHW) being provided by local boilers, leaving the NHM with a relatively low 375kWth summer base load. This meant the larger the CHP unit chosen the greater the heat that would be wasted in the summer. The 1,300kWe CHP unit showed a £3m payback over 15 years!

The NHM then looked at other options to bring both finance and innovation to achieve a better solution by finding an energy services company (ESCo) as a partner. A tendering process based on a nominal 1,400kWe CHP but asking for alternative proposals, led to Vital Energi Utilities Limited being chosen as the preferred partner based on experience, capability and their proposal for a tri-generation (heating, cooling and power) installation, dealing with the summer heat load issue.

Vital Energi offered to the NHM a turnkey capability covering energy centre, energy distribution (heat, cooling and power), consumer interface and metering. Vital Energi's core market is the small and medium scale CHP/tri-generation/biomass market. Vital Energi worked with the NHM to ensure the best solution technically, financially and environmentally leading to them taking responsibility for design, build, finance and operation of a tri-generation scheme rated at 1,800kWe, surpassing the NHM's best case scenario.

The NHM and V&A project is one example of an ESCo developed as a Public Private Partnership (PPP) scheme, with finance also being provided by Vital Energi. The UK public sector has substantial and varied service requirements and this approach offers great opportunities for private sector organisations in the energy sector.

A business gets paid for taking and managing risks, with businesses willing to take those risks provided that those risks can be managed profitably. A financed ESCo installation requires risk management and to achieve a quality delivery of services there also has to be effective risk management. The basis of risk allocation should be that they are allocated to the party best able to manage them. If this is not the case then an investor will charge a disproportionately higher price for risks they cannot manage effectively.

The risk matrix for this project included specific risks such design, construction, operation and financial all of which were effectively managed between both the NHM and Vital Energi; other risks such as development of concept, political and energy (electricity, heat, and cooling) supply source guarantees are possibly shared or are in the ownership of the customer.

To ensure that the NHM achieved its expected returns over the 15-year life of the ESCo a performance management process was instigated. The targets included specific and measurable outputs including a minimum of 8.9 GWh/yr electricity production from the CHP unit, heating and cooling temperatures to be met and guaranteed savings plus a share of any additional savings. Key performance indicators (KPI's) were set to provide a clear definition and management of required standards. Service requirements were set covering operation, planned preventative maintenance and 24 hour callout (the NHM has a 24 hour need to maintain the collections and prevent any deterioration). In addition performance reporting was agreed to provide operational feedback to the NHM on a quarterly and annual basis.

The museums have critical heating, cooling and power requirements 24 hrs/day to in order to preserve their world-renowned collections, and any major alterations proposed to these systems, have to ensure a robust and reliable supply is maintained.

In summer 2006 the refurbished boilers were brought on line (with an extended life time of 25 years) and commissioned, and the two existing operational boilers were removed to accommodate the tri- generation system's waste-heat boiler and absorption chillers. The network was commissioned for operation in summer of 2007.

5.9 Multi-site energy management

5.9.1 Case study – Marshalls energy management

In organisations with a larger energy bill, significant reductions in overall energy use can be achieved by adopting a comprehensive energy management approach.

This case study is based on the energy management approach by Marshalls Group, a UK based company manufacturing and supplying a wide range of hard landscape products to the domestic, public sector and commercial markets. Their energy management programme was implemented across all their manufacturing and distribution sites.

Their main drivers to improve energy efficiency were energy costs, climate change, legislation e.g. building regulations, UKETS/EUETS, EPC, stakeholder concerns shareholders (FTSE4Good, CDP4&5), customers, corporate social responsibility and their Olympic bid.

Again, the starting point was to know how much energy was being used and in what areas. They used what can be termed the 'Top Hat' approach which established base and operational loads, generally through the use of e.g. half hourly metering, and then established a programme across the various sites and areas in order to match energy supply to demand. Their aim was then to reduce demand. This can be seen in Figure 3 which illustrates an energy use profile at their Landscape House. It shows the energy use profile before and after the improvements were achieved.

Areas addressed at the various sites included lighting and process equipment operation times, PCs and VDUs, heating, pump and drive controls, and materials mixing equipment. Interestingly they did not miss even small opportunities and put a timer on the coffee machines.

The results are outlined in the following figures which show in Figure 3 the reduced electricity demand at a site following a 'switch off' programme involving lights and process equipment. Figure 4 illustrates the reduction of electricity use at the St Ives sites. Figure 5 shows the overall reduction in costs of £225,000 achieved over a 15 month period. Figure 6 displays a reduction in kgCO₂/tonne material produced of 25%.

Figure 3: Reduced electricity use at Landscape House – The Top Hat Approach

Improvements The 'Top Hat' approach – Result

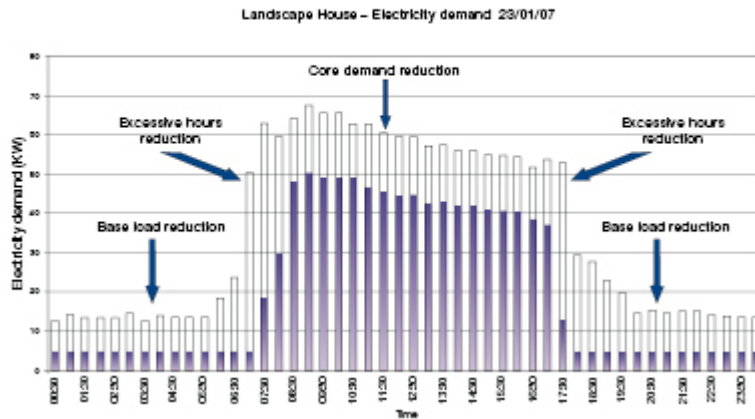


Figure 4: Electricity demand reduction St Ives sites

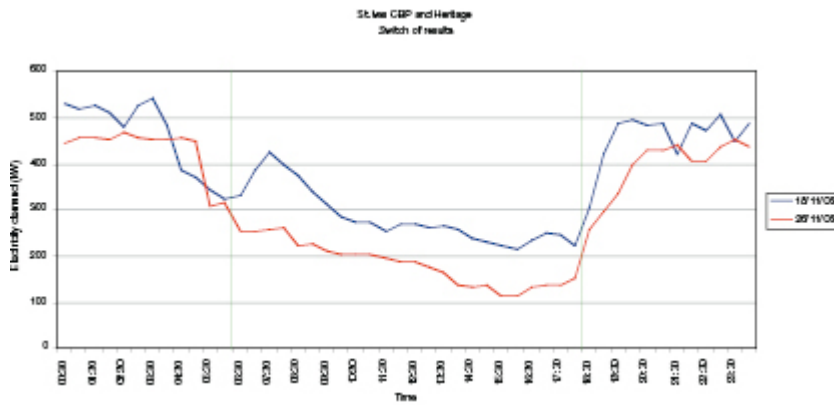


Figure 5: Annualised energy savings (£/p.a.)

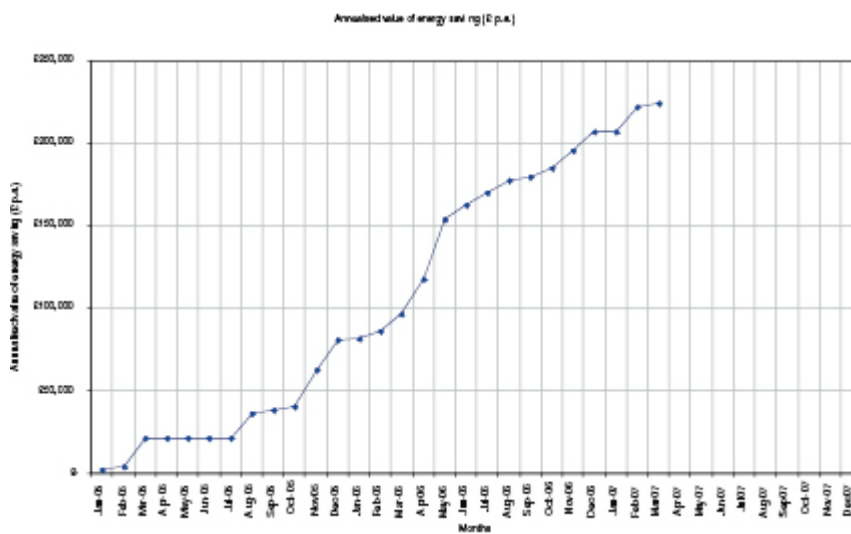
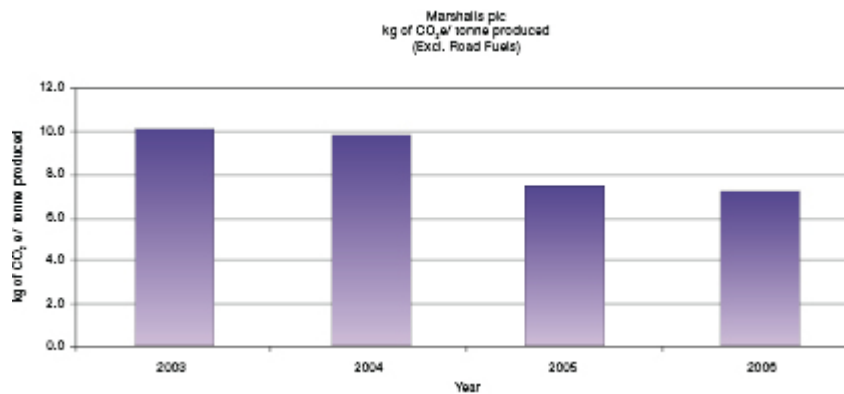


Figure 6: Improvements on the KPI of kg CO₂/tonne produced



6: Support available to business from government funded organisations

The Carbon Trust

The Government funded Carbon Trust was set up by Government in 2001 to accelerate the move to a low carbon economy. It aims to do this by working with organisations to reduce their carbon emissions and develop commercial low carbon technologies. The Carbon Trust has a Solutions group which offers support in reducing energy and carbon emissions through free surveys, carbon footprinting, interest free loans for qualifying projects, research grants, Small & Medium Business Toolkit etc. More information can be found on their website at <http://www.carbontrust.co.uk/solutions/>.

The interest free loans are available to SMEs who fall within the following EU definition under the state aid scheme rules: it is available to SMEs in England and Scotland, all businesses in Wales and Northern Ireland that have been trading for at least 12 months and have an acceptable credit rating.

Loans between £5,000 and £100,000 are available in England, Scotland and Wales, and up to £400,000 in Northern Ireland.

There are regional variations and details are available from the Carbon Trust.

The EU State aid definition of an SME is a company with:

- Fewer than 250 employees
- Less than 50m Turnover (approximately £35m) OR
- Less than 43m assets (approximately £30m)
- No controlling interest more than 25% by a non-SME (i.e. part of a larger organisation).

For more information contact the Carbon Trust.

The Carbon Trust also manages the Enhanced Capital Allowance (ECA) scheme on behalf of Defra, which provides businesses with a first year 100% tax allowance on designated energy efficient equipment investments (see Section 2.3 for further information).

The Carbon Trust also runs a consultant accreditation scheme and will help fund the use of consultants for an appropriate approved project.

The other main Government support organisation which supports environmental improvement projects with business is Envirowise, which aims to deliver a Government-funded programme of free, confidential advice to UK businesses. This assistance can enable companies to increase profitability and reduce environmental impact. Envirowise solutions are specific to the needs of individual businesses, to improve their business practices, profitability and competitiveness. Since 1994, Envirowise has helped UK industry save more than £1 billion.

The Envirowise programme is available to any UK business, free of charge. For more information visit their website <http://www.envirowise.gov.uk/home>.

6.1 Case study – Universities and Colleges Admission Services Offices

The UCAS organisation had an energy bill of around £345,000 and employs around 300 staff. It operates from a modern air-conditioned office facility which is well insulated with few draft issues. It contacted the Carbon Trust for a free survey to identify ways it could reduce its energy use and CO₂ emissions. The survey resulted in an action plan with the following recommendations:

- Appoint an Energy Manager from within the existing facilities team
- Install energy sub-metering to enable monitoring and targeting (see Section 5.2)
- Install weather compensation boiler and controls for hot water radiators
- Review air conditioning system and optimise settings and controls
- Install heat recovery on main air handling plant
- Improve lighting by replace halogen lamps with LEDs
- Install variable speed control on chilled water pumps to match supply to demand.

The estimated savings equated to reducing the energy bill by £19,000 and a CO₂ emission reduction of 294 tonnes.

6.2 Case study – Exmoor Forest Inn

The Exmoor Forest Hotel and Bar is located in the centre of Exmoor and employs 9 staff. It has 9 letting bedrooms, is open through the year and has an energy bill of around £13,000. There were concerns that the existing inefficient boiler system was reaching the end of its life, being over 30 years old. However, the capital costs of replacement were daunting and the small business did not feel it was affordable.

The company contacted the Carbon Trust who agreed to provide an interest free loan of £6,300 for the purchase of new LPG condensing boilers. The new boilers proved their worth by reducing the business's energy bill by around £2,700 per year. Based on the energy savings alone the investment payback was just under 3 years.

7: Conclusions

The Government has set out in the 2007 Energy White Paper a route to achieve its commitments to reduce carbon emissions by at least 60% by 2050 based on 1990 emissions. In addition, the government is indicating that the UK will accept the renewables target to source 15% of total energy from renewable sources. To meet the renewables target translates to a requirement to generate around 40% of the electricity supply from renewable sources. Both these targets require massive levels of investment in both energy generation and distribution to ensure

improved energy security (less reliance on imported energy sources) and reduced carbon intensity of power generation. Some of the ageing coal and nuclear power stations will be removed from the grid and decommissioned over the next 10 to 15 years. This coupled with the long timescales to provide the low carbon alternatives will necessitate investments in new power stations based on fossil fuels such as coal if the UK is to avoid an energy gap, possibly of around 20% generating capacity, and to ensure an adequate base load electricity supply, which is one of the significant issues with renewable energy sources.

However, there is a way of tackling some of the inherent difficulties of moving to a new lower carbon energy supply and that is through a concerted move to improve energy efficiency across the built environment. It is estimated that 20% of the UK's greenhouse gas emissions result from businesses and their use of buildings and other facilities. The Carbon Trust has estimated that a 20% improvement in energy efficiency is easily achievable across most business sectors. This not only reduces greenhouse gas emissions but it also reduces business costs, helps reduce the UK dependency on imported fuel and overall improving the competitiveness of UK business.

The UK Government recognises that the commitment of business and public sector organisations to tackling climate change is growing and many have recognised and acted on the cost effective opportunities that are available to reduce energy consumption and greenhouse gas emissions. Some leading firms and authorities have adopted high profile initiatives bringing wide-ranging benefits. They report real cuts in emissions and offer good examples for others to emulate. Another benefit is that with businesses improving their energy performance, a constructive and practical note has been introduced into the climate change debate.

In general, the heating, ventilation and air conditioning (HVAC) and lighting systems used in the majority of existing commercial buildings are inefficient in terms of energy use. New buildings can be designed to operate at excellent levels of efficiency in overall energy terms but most are constructed with significant levels of inefficiency built in and, although they may include very sophisticated controls, their actual operation wastes large amounts of energy resulting in high levels of greenhouse gas emissions. This is despite having improved Building Regulations with energy efficiency standards, the excellent work of the Buildings Research Establishment (BRE) in setting out the BRE Environmental Assessment Method (BREEAM) standard and the work of the Chartered Institute of Building Services Engineers (CIBSE).

One has only to look at the modern office tower blocks of Canary Wharf or a modern commercial site to see that lighting and air conditioning systems are left on when occupancy and process operations should dictate otherwise.

When the whole range of business premises and energy using equipment and systems is considered it is no surprise that implementing cost effective energy efficiency solutions is seen as 'a no-brainer'. So, why are we not seeing a greater improvement in energy efficiency? What is preventing the wider adoption of good behaviours such as switching off lights and other equipment when not required or installing the existing technologies that offer better control?

Using lighting as a way of answering these questions shows that some organisations take a singular approach focused on people's behaviours and although people are at the heart of an energy efficiency campaign, it needs to be accepted that only taking a behavioural change approach will be found inconsistent and difficult to sustain. A better approach is to also invest in changing from older fluorescent lighting to a new generation of lighting systems and controls. Although this involves initial investment costs the payback can be very rapid indeed. Again, Philips figures show that upgrade alternatives can have a payback time of less than three years and as some of the case studies have shown, sometimes a payback in a few months can be achieved.

All business premises and facilities offer opportunities to improve their energy efficiency. The good practice and case studies outlined in this report illustrate the wide range of cost effective options available to reduce energy costs today.

Business has shown that it is willing to engage in energy efficiency – in effect to play its part in reducing carbon emissions. However, it is the IoD's view there still remain impressive opportunities for business to do more. Also, although there is Government support to business in general there are areas in which it could improve:

- It needs better to understand the barriers and constraints to energy efficiency that smaller businesses in particular face in a highly competitive environment
- The Government funded organisations, such as the Carbon Trust, could refocus in order to reach and support more SMEs.

It is the hope of the IoD that this report will ultimately encourage more businesses and other organisations to adopt the cost effective approaches to energy efficiency outlined in this report.

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27 Carbon Trust publication GIL124 at <http://www.carbontrust.co.uk/energy/>.

The National Trust submission to Inquiry into Climate Change



THE NATIONAL TRUST

for Places of Historic Interest or Natural Beauty

NORTHERN IRELAND REGION - ROWALLANE HOUSE - SAINTFIELD

BALLYNAHINCH - COUNTY DOWN BT24 7LH

Telephone +44 (0)28 9251 6721 - Facsimile +44 (0)28 9251 1242 - Website www.nationaltrust.org.uk

Northern Ireland Assembly
Committee for the Environment
c/o The Committee Clerk
Room 245
Parliament Buildings
Belfast
BT4 3XX

E-mail	andrew.mcdowell@nationaltrust.org.uk
Direct Tel	028 9751 2330
Your Ref	
Our Ref	
Date	20/02/2009

Dear Ms McGarel

Inquiry into Climate Change

Please find enclosed two copies of a response from the National Trust to the Committee's *Inquiry on Climate Change*. This is a paper copy of our submission made by email on 20/02/09. Also included is a copy of our summary report on the impacts of climate change on the coast, "Shifting Shores".

We commend the Committee on bringing forward this Inquiry and we wish it well in its deliberations. We hope this submission will make a constructive contribution to this important debate.

We would welcome the opportunity to expand on our written submission by providing oral evidence to the Committee, and/or hosting a fact-finding visit to a relevant National Trust property to see some of our initiatives at first hand.

Yours sincerely

Andrew McDowell
External Affairs Officer

PRESIDENT: HRH THE PRINCE OF WALES
REGIONAL CHAIRMAN: PATRICK CASEMENT REGIONAL DIRECTOR: HILARY MCCRAID
Registered Office: Strala - Keeble Drive - Stralton - Widdow - SN1 2RS Registered Charity Number: 205765



THE NATIONAL TRUST

Northern Ireland Assembly Environment Committee

Inquiry into Climate Change

A submission by the National Trust to the Northern Ireland Assembly
consultation
February 2009

Summary

- i. The National Trust believes that climate change is a deep and defining challenge. We are committed to tackling its causes and adapting to its impacts in an integrated way, so as to inspire the public and others to act.
- ii. Climate Change will have a serious impact on Northern Ireland, as the National Trust has shown in its work on coastal change. While such impacts should not be overstated, we believe the Committee and others should pay greater attention to adaptation policy alongside the urgency for mitigation. Mitigation and adaptation efforts should be much better integrated.
- iii. On adaptation, more work needs to be done to identify the impact of climate change on natural resources – soils, water and biodiversity. Impacts on priority species and habitats need to be better understood – as do the roles of new and climate activated invasive species.
- iv. Northern Ireland should play a full part in achieving the UK target of an 80% reduction in greenhouse gases by 2050 (on 1990 levels). This would be best driven by new NI primary legislation, drawing on the advice of the UK's Climate Change Committee and others.
- v. We believe that the protection and restoration of land based carbon stores is an urgent priority for efforts to mitigate climate change in Northern Ireland. The Committee should recommend the Department and others rapidly increase their work in this area, including considering the impact of peatland restoration. Government should drive innovative and more sustainable land-management practices through incentives, regulation and advice.
- vi. An ecosystem approach would be helpful: assessing where ecosystem services (including climate change mitigation) are provided by natural habitats, and putting in place policies to ensure more sustainable land use as a result.
- vii. Changing our food system is a key part of mitigating and adapting to climate change. Food producers need to prepare for a future where less oil and water are available. Government needs to consider how to encourage this shift and start finding alternatives now.
- viii. Planning reform needs to take greater account of climate change: encouraging measures for adaptation and mitigation to be undertaken

together and promoting much greater re-use of historic buildings to save embodied carbon and promote sustainable settlement.

- ix. High level and cross-cutting leadership should encourage a dramatic increase in the proportion of energy supplied from renewable sources and action on energy efficiency to reduce overall demand. Many of the necessary measures have already been mapped out: they now require political will across government to be implemented.
- x. The changes required for Northern Ireland to meet its obligations present an economic opportunity, as we have proved in our own business.
- xi. The provisions of the UK Climate Act may not provide a strong enough incentive for leadership and compliance on the part of NI Ministers and Departments. NI primary legislation would drive Departmental and sectoral targets and measures. Secondary powers on single use plastic bags should be taken up.

The National Trust in Northern Ireland

- xii. The National Trust is an independent environmental and conservation charity founded in 1895 to preserve places of historic interest and natural beauty permanently for the benefit of the nation. The Trust has over 3.5 million members, including nearly 50,000 members in Northern Ireland.
- xiii. In Northern Ireland we currently own 15 major countryside or coastal estates, over 60 miles of coastline, eight National Nature Reserves, the World Heritage Site at the Giant's Causeway and almost 4,500 hectares of land designated as Areas of Special Scientific Interest (ASSI). We care for nine major historic mansions and houses, five industrial heritage sites open to the public, over 200 listed buildings, 12 scheduled historic monuments, over 150 archaeological sites, most of the villages of Cushendun and Kearney, and two public houses.
- xiv. We are committed to promoting and opening up our properties as spaces which represent and reflect our shared cultural heritage. We accept a shared responsibility for increasing understanding of the environment and helping to motivate people from all sections of the community to enjoy, protect and sustain the natural and built heritage of Northern Ireland. We provide opportunities for both formal and informal learning experiences which are open, accessible and relevant to all.

Climate Change

- xv. As one of the leading champions of our natural and historic environment, the National Trust is working to inspire our visitors, members, staff and others with positive and innovative ways to meet the challenge of climate change.
- xvi. We are monitoring the effects of climate change on the countryside, buildings and historic collections for which we care. We work to adapt where possible to the impacts of climate change and to reduce our

contribution to its causes. We want to ensure that the special places we look after for everyone can continue to be enjoyed by future generations.

- xvii. The evidence is clear: climate change is "the defining challenge of our generation"¹. Warming of our climate system is unequivocal². Most of the observed increase in global average temperatures since the mid-20th century is *very likely* due to observed increases in man-made greenhouse gas emissions³. Northern Ireland's climate is already changing and we should expect these changes to accelerate over the coming century⁴.

Response to the Inquiry's Aims

On the "implications" of climate change for Northern Ireland

1. While there is no longer any doubt that anthropogenic greenhouse gasses are having a critical impact on our climate system as a whole, there remains a degree of uncertainty as to how this impact will play out at a regional scale.
2. Scientists have been able to give a range of likely scenarios for the impacts of climate change on NI's future average temperatures and precipitation⁵ and on the island's biodiversity⁶. This information will be improved further by the forthcoming UK Climate Impacts Programme family of reports "UKCIP09".
3. For our part, the National Trust commissioned a major study in 2006 on the implications of climate change for Northern Ireland's coastline (almost a third of which is cared for by the Trust). As well as revealing a worrying lack of public data and government monitoring of our coastline as a whole, our report examined potential impacts on three environmentally and economically important areas. (See box, "Shifting Shores" overleaf.)
4. Overall, the evidence shows that several of the implications of climate change for NI directly are serious. All impacts will require timely planning

¹ UN Secretary General, Ban Ki-Moon – as quoted in *UNEP 2008 Annual Report* The United Nations Environment Programme (2008), pg. 14

² IPCC 2007, Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Millers (eds.)) Cambridge University Press, (2007) pg.5

³ *Ibid*, pg. 3 – emphasis in the original: 'Very likely' indicates a scientific certainty of at least 90%

⁴ *Preparing for a Changing Climate in Northern Ireland: summary report*, Arkell, B., Darch G., and McEntee, P. (eds.) SNIFFER UKCC13A (2007), pg3

⁵ See *Climate Change Scenarios UKCIP02* (summary maps for NI can be accessed at http://www.ukcip.org.uk/index.php?option=com_content&task=view&id=174&Itemid=9), and *Preparing for a Changing Climate in Northern Ireland: summary report*, Arkell, B., Darch, G. and McEntee, P. (eds.) SNIFFER UKCC13A (2007)

⁶ *Biodiversity and Climate Change in Ireland, Briefing Paper*, Coll. J., Maguire, C. and Sweeney, J.; submitted to Comhar SDC (2008)

and adaptation if we are to avoid damage to our society, economy and environment.

Shifting Shores – Living with a Changing Coastline

Shifting Shores draws on detailed research commissioned by the National Trust and undertaken by leading coastal experts from Queen's University and the University of Ulster. The coastal research report, entitled 'Future Coastal Scenarios for Northern Ireland' was undertaken by J.D. Orford, N. Betts, J.A.G. Cooper and B.J. Smith. The research focussed on the Giant's Causeway World Heritage Site, north-east Strangford Lough and Murlough National Nature Reserve. Key findings include:

- The Giant's Causeway is likely to experience increased storminess, with a greater area of the Causeway stones washed by waves by 2050, while by 2100 access to parts of the Causeway could be more difficult, particularly in winter.
- At north-east Strangford Lough, sea level rise of up to 25cm is predicted by 2050, and possibly by up to 1 metre by 2100. This would result in significant loss of feeding and nesting grounds for the Lough's birdlife. Increased winter storms would result in sea walls being overtopped more often and undefended areas of coast experiencing greater erosion.
- At Murlough National Nature Reserve it is possible that between 50 and 400 metres of dunes could be eroded away, while tidal and storm flooding could reach one metre higher than present day extremes, with a profound impact on the habitats and species for which the Reserve is designated a Special Area of Conservation and an Area of Special Scientific Interest.

Shifting Shores highlights the importance of long-term planning to adapt effectively to climate change; the need to work with nature rather than against it; the importance of all stakeholders working together; and raising awareness and understanding of the public so that sustainable solutions to the challenges ahead can be reached by consensus. The crucial need for much better coastal data, and mapping of the coastline is also stressed.

On mitigation

5. There is an urgent need to reduce greenhouse gas emissions by meeting or exceeding the UK government's target of an 80% reduction in greenhouse gases by 2050 (on 1990 levels).
6. The National Trust welcomes the Environment Committee's engagement with the UK Climate Act, and would strongly reaffirm its call to provide for specific NI targets. We believe that these would be most effective if enshrined in NI primary legislation: -
7. We believe that the protection and restoration of land based carbon stores is an urgent priority for efforts to mitigate climate change in NI. The National Trust is working to understand our main stores and sources of land-based carbon as well as carbon sinks. Other devolved administrations have been working to map the extent of carbon storage and loss in their soils⁷. We would urge the Committee to recommend

⁷ *Estimating Carbon in Organic Soils: Sequestration and Emissions (ECOSSE)* Scottish Executive and Welsh Assembly Government (2007)

that government in Northern Ireland does the same, building on encouraging research already being undertaken⁸.

8. While the focus of the Committee and others on mitigation is both welcome and essential, we believe it is important that adaptation initiatives are given similar priority in any recommendations. The UK Climate Change Act requires NI Departments to bring forward timetabled measures for adaptation⁹, and requires these to be sustainable¹⁰. We would add that it is vital such measures do not contribute to further greenhouse gas emissions. Mitigation initiatives should also maximise efficiency savings by addressing adaptation simultaneously (e.g. when undertaking work to reduce a building's emissions it can also be made more resilient).
9. An ecosystem approach to mitigation (and adaptation) would be helpful. This involves assessing and valuing where ecosystem services (including climate change mitigation) are provided by natural habitats, and putting in place policies to ensure more sustainable land use as a result.

On economic implications

10. As a significant employer, substantial landowner and one of Northern Ireland's largest tourism businesses, the National Trust has a profound interest in the future health of the economy in Northern Ireland. In this context, we believe that initiatives for climate change adaptation and mitigation should be seen as an economic *opportunity* and not a threat.
11. We would urge the Committee to focus on the potential for job and wealth creation offered by a 'new green deal'— alongside counting the "costs of action and inaction" in mitigation and adaptation.
12. The current economic crisis means that increased ambition and resources will be required to help householders and businesses deal with the upfront costs of investing in carbon saving measures. Such measures make clear financial sense in the medium to long term and could be supported by interest free loans, feed in tariffs and other incentives.

On adaptation

13. The National Trust has worked over a number of years to understand and prepare for the impact of climate change on the countryside,

⁸ See for example the recent work of the British Geographical Survey, Rothamsted Institute and AFBI - *Airborne radiometric survey data and a DTM as covariates for regional scale mapping of soil organic carbon across Northern Ireland* Rawlins, B. G., Marchant B. P., Smyth, D., Scheib, C., Lark, R. M., & Jordan C., *European Journal of Soil Science*, Vol 60, Issue 1 (Dec 2008)

⁹ UK Climate Change Act 2008 60 (1)

¹⁰ UK Climate Change Act 2008 60 (2)

gardens, coastline, buildings and historic collections we look after - so that they can continue to benefit everyone for the long term¹¹.

14. As a result we, like others, have had to face difficult choices. Our pioneering work on UK coastal change has led to an approach which emphasises the need to take a long term view and work with natural coastal change wherever possible – while taking into account the social, economic and environmental impacts of our decisions. It is an approach based on direct experience and one we would urge government and others in NI to adopt.
15. Taking full account of future risks in this way and making sure that projects are able to adapt to future climate change need not lead to soulless compromise, as our new visitor facilities at Portstewart Strand demonstrate. Designed to be “de-mountable”, they can ultimately be removed and relocated with minimal impact, as and when the coastline migrates at this point.
16. There should be integrated planning to adapt for the impacts of climate change on Northern Ireland’s natural resources, building on the work of the NI Climate Change Impacts Partnership and others. The National Trust is particularly concerned that preparations are put in place for the changes in surface waters (due to increasing temperatures), increased soil erosion and run off, as well as more frequent storm events, floods and droughts.
17. Adaptation measures may need to include water conservation, the naturalisation of aligned rivers and catchment-level management of water resources. On this last point, we look forward to engaging with the Department’s River Basin Management Plan process.
18. The impacts of climate change on Northern Ireland’s plants and animals need special attention: they can not be adapted in the same way as a policy or building can. Specifically, we would ask that the committee recommends the Department and its agencies work to identify impacts of climate change on:
 - a. priority species – including the impact on population dynamics and changes in distribution
 - b. priority habitats – to identify which areas will be physically lost and those that will experience habitat transformation from changing abiotic factors
 - c. designated sites - impacts on, and areas potentially lost/changed due to sea level rise
 - d. new and climate activated invasive species.

¹¹ See for example, *Forecast? – Changeable! Some examples of climate change impacts around The National Trust* Watson, A. and Jarman, R., The National Trust (2005)

Response to specific points under the Inquiry's *Terms of Reference*

To identify initial commitments for Northern Ireland that will ensure it plays a fair and proportionate role as part of the UK in meeting climate change targets.

19. The Committee on Climate Change was established by the UK Climate Change Act to advise how the UK can meet its target of an 80% reduction in greenhouse gases by 2050 (on 1990 levels), set interim targets, and scrutinise the UK's progress towards them.
20. It is also part of the Committee on Climate Change's remit to recommend how government in Northern Ireland can play its role in meeting UK targets. It recently advised that Northern Ireland could and should reduce its emissions by 2 MtCO₂e to be on track for a fair and proportionate contribution¹² to the interim UK target of a *minimum* 34% reduction in greenhouse by 2020.¹³ This target already implies greater ambition than the aspiration adopted by the Assembly of a 25% cut by 2025: but it is one that can be achieved at marginal cost if timely and systematic action is taken.
21. We believe carbon reductions across NI government and society could be driven more effectively if Northern Ireland had its own binding legislative targets on reducing greenhouse gas emissions: set in parallel with (and certainly not lower than) other parts of the UK.
22. There are risks in relying solely on the UK Climate Act to drive NI mitigation efforts. The NI Executive and its Ministers have a lower degree of accountability and visibility to meet targets than is the case for Ministers at a UK level and Ministers in Scotland (which has its own primary legislation).
23. Specific leadership from within Northern Ireland on commitments/targets is vital if government, business and society here are to meet the challenge.

To consider the necessary actions and a route map for each significant sector in Northern Ireland (energy, transport, agriculture and land use, business, domestic, public sector etc)

24. Much of the work on mapping the necessary mitigation actions for different sectors in Northern Ireland has already been done¹⁴, not least by the UK Climate Change Committee. It showed that:
 - a. Emissions from existing residential and non-residential buildings could be reduced by 0.9 MtCO₂e in 2020.

¹² See <http://www.thecc.org.uk/news/headline-news/n-irelands-emissions-can-be-reduced-at-manageable-cost-to-economy> for a summary

¹³ This will increase to 42% by 2020 if international agreement can be reached at the UN climate talks this December (UN COP15, Copenhagen)

¹⁴ See for example The Carbon Trust's *Reducing our carbon footprint: An initial plan for Northern Ireland* – with annexes for each key area, produced in 2005, and the research done by SNIFER (Scotland and Northern Ireland Forum for Environmental Research) for DoE/NIEA

- b. Energy-intensive industry may achieve savings of 0.1 MtCO₂e in 2020
- c. Road transport has reduction potential of up to 0.7 MtCO₂e in 2020
- d. Emissions from agriculture, land use and forestry and waste management sectors could be reduced by up to 0.5 MtCO₂e in 2020.¹⁵

The focus now needs to be implementation, based on the political will to drive it.

- On energy

- 25. The National Trust supports a major increase in renewable energy generation. We emphasise the primary importance of energy saving through energy efficiency and conservation to reduce overall demand. We recently gave detailed proposals in this area while commenting on DETI's Scoping Paper on NI's Strategic Energy Framework (SEF) – and would be happy to share these comments on request.
- 26. We welcome the SEF and the recent reviews of the NI Renewables Obligation (NIRO) and Energy Efficiency Levy (NIEEL). We have suggested changes to these to make them more effective as NI's current policy instruments for driving increased energy efficiency and renewable energy development.
- 27. We are also participating in the DETI led Strategic Environmental Assessment (SEA) for off-shore renewables. We would ask the Committee to back our call for government to commence a similar SEA process for the land-based grid upgrades required to support increases in both on-shore and off-shore renewable energy generation¹⁶. This is necessary so that we can understand landscape and environmental impact in a timely way while rapidly increasing renewable energy generation.
- 28. The National Trust has made reducing our own energy consumption, increasing energy efficiency and switching to renewable sources of energy a key priority across our own work.
- 29. During 2007-8, we worked with support from NIE Energy (funded by the NIEEL) to install 8,855 square metres of insulation in a variety of National Trust buildings throughout Northern Ireland. NIE Energy had previously provided 1,330 low energy light bulbs which have been installed as part of the Trust's National 'Big Switch' project. It is estimated that the total carbon saved as a result of these projects is 956 tonnes (72 tonnes from lighting and 884 tonnes from insulation).

¹⁵ Abatement opportunities in Northern Ireland – Extended Ambition Scenario in *Building a low-carbon economy – The UK's Contribution to Tackling Climate Change* The UK Committee on Climate Change (2008). See presentation at http://hmcc.s3.amazonaws.com/pdfs/report%20launch/presentation_n-ireland.pdf

¹⁶ Building on the work of the *All Island Grid Study* - Department of Communications, Energy and Natural Resources/DETI (2008)

30. We have established renewable micro-generation projects on some of our buildings on Rathlin and are due to install systems at Murlough National Nature Reserve, Ardross House and Florence Court this year. We are also undertaking a feasibility study for micro-hydro generation at Patterson's Spade Mill.
31. We have proved in Northern Ireland and elsewhere in the UK that it is possible to use efficiency measures and renewable energy generation to save money and reduce emissions even in the most environmentally and historically sensitive locations.

- On agriculture and land use

32. As mentioned under 'mitigation' above, The National Trust believes that the protection and restoration of land based carbon is an urgent priority for efforts to tackle climate change. Soil is as important a resource as air and water, but the current level of protection for soil is inadequate.
33. There is a range of evidence and guidance that suggests which land management practices are best suited to retaining carbon in soil and other land based carbon stores.¹⁷ However, agricultural practice will only change if land managers understand what is required and see a benefit in doing so. The National Trust believes that the reduction of emissions from rural land use should be driven by a combination of regulation, funding incentives and advice.
34. Incentives, for example, could be driven through adjustments to agri-environment schemes, backed by a concerted effort from DARD and others to educate and encourage farmers of the benefits. In the future carbon markets and trading may provide additional funding for this necessary change in culture.
35. Peatlands are the single largest carbon reserve in the UK. They store around 3 billion tonnes of carbon, the equivalent of 20 years of UK CO₂ emissions¹⁸. Damaged peat soils are believed to be a source of carbon emissions: it is possible that their restoration could contribute to mitigation efforts, but more research is needed. We would ask that the Committee recommends DOE and its agencies explore how this might apply to Northern Ireland as a priority.
36. The National Trust will play our part by restoring, creating and conserving carbon banks on our land in soils, peats and woodland.
37. Changing our food system is a key part of mitigating and adapting to climate change. The National Trust is facing up to these challenges: accepting that we cannot carry on as before. We are working to make the food we grow and serve in our restaurants more sustainable for

¹⁷ See for example, *Greenhouse Gas Mitigation in Agriculture*, Smith, P. et al in *Philosophical Transactions of the Royal Society, B* (2007)

¹⁸ Research for the Moors for the Future Partnership see <http://www.moorsforthefuture.org.uk/mf/fresearch/Carbon.htm>

people and the environment: supporting and challenging our tenants and suppliers.

38. Food producers need to prepare for a future where less oil and water are available. Our forthcoming report on food will ask government and others in GB and NI to consider what support and incentives can be given to farmers to help them use scarce resources more efficiently. It will urge a greater focus on the water and carbon footprint of the food we eat - to help identify the biggest risks and where we need to start finding alternatives to foods that are most 'thirsty'.

- On business

39. As a major business, the National Trust has proved the business case for mitigation and adaptation for climate change across our activities.
40. One particular example which we would commend to the Committee is our reuse of historic vernacular buildings. We have brought 15 of these buildings back into use in the past 5 years as holiday cottages and longer term rental properties in Northern Ireland. This has not only saved huge amounts of embodied energy but helped preserve our built heritage at the same time.
41. The National Trust believes ongoing planning reform presents an opportunity to strengthen the protection of historic buildings and reduce emissions by putting in place stronger incentives for their re-use. It should also be used to promote more sustainable settlement patterns. We remain deeply concerned about the weakness of planning regulations in Northern Ireland and their tendency to exacerbate greenhouse gas emissions and overall inefficient use of resources.

- On Domestic

42. With domestic property accounting for 25% of UK emissions (150MtCO₂e), there is a huge potential for mitigation in the domestic sector: both in terms of energy efficiency and switching to less carbon-intensive sources of energy. For example, the Energy Saving Trust has shown that with the right policies in place, up to 10 million micro-generation units could be installed by 2020 across the UK— saving up to 10MtCO₂e.¹⁹
43. Smart metering should be rolled out in Northern Ireland to allow customers to better monitor and reduce their energy use. The National Trust has experimented with the potential of smart metering with our tenants at the Wallington Estate in the north east of England, where we supplied some of our tenants with portable, 'real-time' electricity meters. Along with other measures, smart metering helped participants lower their carbon footprint significantly, and we hope to expand the project.

¹⁹ *Emission Impossible?* The Energy Saving Trust (2008), pg. 7

44. There is strong evidence that encouraging lifestyle change can work to reduce greenhouse gas emissions and significantly combat climate change. The Committee on Climate Change estimates that reducing washing temperatures, turning off unnecessary lights and turning down thermostats by 1°C could save UK consumers £690m per year and significantly reduce 'carbon footprint'.²⁰
45. The National Trust strongly backs efforts to educate the public on the part they can play in tackling climate change. We have worked with schools in Northern Ireland to help young people better understand climate change impacts.
46. Our key lifestyle campaign for 2009, promoted to millions of visitors, members and supporters across the UK, is 'Food Glorious Food'. This campaign will encourage people to eat local and seasonal produce and 'grow their own' – to help fight climate change, support local producers and engage in healthier lifestyles. We are a leading member of a wider coalition (including businesses and NGOs) working to spread these messages as widely as possible in 2009.
47. Other devolved governments have acknowledged the fact that they are not always best placed to convince the public to act on climate change: community groups and NGOs may be more successful²¹. Trial initiatives like the joint DOE/Southern Environmental Health Group "Community Eco-Challenge" should be evaluated and refined, then rolled out to a much wider audience.
48. As well as driving much needed action on domestic mitigation, The National Trust would like to see government place much greater emphasis on educating and informing the domestic sector about adaptation. We welcome the Rivers Agency/DARD's recent publication of Strategic Flood Maps for Northern Ireland, but would urge government to bring such initiatives together in a more coherent and climate change-centred way.
- To identify the costs associated with meeting these obligations and compare them with the costs that will be incurred if they are not achieved.*
49. The National Trust believes that it is best to focus on the *positive* value to the economy and environment of meeting mitigation and adaptation obligations.
50. Over 250,000 people are employed in the renewable energy sector in Germany (249,300 in 2007 – a rapid increase on the 160,500 employed in 2004). As many as 1 in 4 workers in the USA will be working in renewable energy or energy efficiency industries by 2030 (when

²⁰ See <http://www.theccc.org.uk/sectors/buildings/abatement-2> for detail on these abatement opportunities

²¹ *Attitudes to Climate Change and Environmentally Friendly Behaviours in Wales, COI and WAG (2007)*

manufacturing, construction, accounting, and management are taken into account alongside engineering)²².

51. A recent Invest NI report focussing on energy highlights the fact that the "...generation of transferable skills and expertise would be the basis of a new economic sector"²³. Making energy more sustainable in Northern Ireland would not only create new jobs in large-scale renewable energy schemes, but also help re-skill the construction industry in retrofitting for efficiency and micro-renewables; something we would strongly encourage. The Reconnect scheme and the Renewable Energy Installers Academy had a very positive impact in this area. However, there is still a worrying lack of clarity over what should succeed these schemes. We welcome the formation of the Inter-Departmental Working Group on Sustainable Energy, and urge it to address these issues as rapidly as possible.
52. Considering the 'costs' of obligations directly, the Stern Review showed it takes \$25 or less to mitigate a tonne of CO₂, whereas each tonne of CO₂ emitted results in \$85 worth of damage. The Review calculated the net benefits of stabilising CO₂ by 2050 to be in the order of \$2.5 trillion and above²⁴.
53. Alongside this, we need to consider the substantial opportunity costs for Northern Ireland in continuing to invest in new infrastructure that is not climate change proofed - both in terms of mitigation and adaptation. The Committee should strongly recommend a new approach to investment across government, business and society in NI; lest we be left with higher long-term costs and redundant projects. There is a serious lack of over-arching leadership in this area at present.

To identify a formal cost effective mechanism for assessing the potential impact of new policies on climate change / CO₂ emissions. (Akin to Regulatory Impact Assessments/Rural Proofing)

54. As outlined above, we believe NI primary legislation could be a more effective driver for climate change policy, with each NI Department mandated to draw up plans for their respective sectors, and legally accountable to the Assembly for implementation.
55. In the absence of this, a process akin to Strategic Environmental Assessment could be useful, but needs to be more than a "tickbox" exercise. In Wales, climate change is included in Wales Assembly Government's Policy Integration Tool: a process used to see how any

²² *Jobs from Renewable Energy and Energy Efficiency* U.S. Environmental and Energy Study Institute (EESI) (2008)

²³ *Maximising Business Opportunities from Sustainable Energy: Energy Technology & Service Sector Collaborative Opportunities in Northern Ireland* Invest NI (2009) pg. 82

²⁴ Executive Summary in *The Stern Review: The Economics of Climate Change* HM Treasury (2006) pgs xvi-xvii

policy meets cross-Government goals. However, it is not universally applied.

To make recommendations for appropriate targets/actions that could be included in the new Northern Ireland Sustainable Development Implementation Plan.

56. Again, we believe targets/actions could be better driven by a new central commitment enshrined in primary NI legislation – rather than trying to find a home for such a commitment in existing (and frequently fluid) plans and strategies. In such a context, targets and actions in the Sustainable Development and other strategies would become a means to help deliver an over-arching commitment which applies across NI government and society.

To make recommendations on a public service agreement for the DOE Climate Change Unit's commitments in the second Programme for Government that will ensure Northern Ireland will meet its climate change obligations.

57. The DOE's Climate Change Unit has and will have a vital role in providing scientific advice and expertise on climate change across government, and this should be reflected in any PSA.
58. However, The National Trust believes that what is required for climate change adaptation and mitigation measures is much greater in scope than what one Unit, one Department or one Minister can provide. While it is vital that there is an expert home for climate change science and policy in government, it is not fair or reasonable to expect DOE CCU to lead on this agenda across NI's economy and society. All Ministers and Departments, from OFMDFM outwards, should take responsibility for ensuring NI meets its obligations.

To consider what secondary legislation raising powers within the UK Climate Change Act would contribute to Northern Ireland's commitment to the UK Climate Change Bill.

59. As outlined above, we have concerns about the robustness of measures short of NI primary legislation for driving local commitment to tackling climate change.
60. That said, one secondary power that should be immediately taken up in Northern Ireland would be to introduce charges for single-use plastic carrier bags.²⁵ The National Trust has unequivocally proved the effectiveness of this measure in our own operations: we introduced charging for plastic bags in May 2008 and saw demand for them drop by 95% in the first 100 days. We previously gave away 1.25 million bags every year.

²⁵ UK Climate Change Act 2008 77 (3)

To express views on if and how the Assembly might conduct more effective scrutiny of climate change responsibilities across all relevant departments.

61. The Assembly could conduct more effective scrutiny of Departments' climate change activities by ensuring they are legally bound to report on progress towards targets established under NI primary legislation.

Conclusion

The National Trust commends the Committee on bringing forward this Inquiry and we wish the Committee well in its deliberations. We hope this submission will make a constructive contribution to this important debate. We would welcome the opportunity to expand on our written submission by providing oral evidence to the Committee, and/or hosting a fact-finding visit to a relevant National Trust property to see some of our initiatives at first hand.

For further information, please contact:

Andrew McDowell
External Affairs Officer
The National Trust
Rowallane
Saintfield
Ballynahinch
Co. Down
BT24 7LH

Tel: 028 9751 2330
e-mail: andrew.mcdowell@nationaltrust.org.uk

or
Diane Ruddock
External Affairs Manager

Tel: 028 9751 2301
e-mail: diane.ruddock@nationaltrust.org.uk

NI 11 09

**CBI SUBMISSION TO THE NORTHERN IRELAND ASSEMBLY'S ENVIRONMENT COMMITTEE
INQUIRY INTO CLIMATE CHANGE**

- 1 CBI agrees with the Environment Committee that climate change is one of the major challenges facing Northern Ireland and the UK, and needs urgent action. As the report of the CBI Climate Change Task Force, *Climate change: everyone's business**, made clear, business is committed to working in partnership with Government and consumers to tackle climate change, and believes that with the right policy mix and effort, this can be achieved in a cost-effective manner. The CBI report sends out five clear messages:
 - The UK government's targets for 2050 are stretching but achievable at a manageable cost – provided early action is taken
 - In the run up to 2020, the emphasis must be on much higher energy efficiency together with preparations for a major shift to a low carbon energy sources in the years to 2030 and beyond
 - Technology has a vital part to play in opening up sustainable solutions – this also provides significant business opportunities
 - Empowering consumers to make low carbon choices is equally vital and
 - Market forces will drive big changes, but will not by themselves be enough to do the job – a full range of public policies will be required to create the right incentives
- 2 The CBI supports the challenging carbon targets which have been set at EU and UK level, and the framework set out in the UK Climate Change Act which puts these targets on a statutory footing. We believe the UK Act's approach to long term and interim targets, and rolling carbon budgets, provides the a balance of certainty for business and flexibility where needed.
- 3 The challenge is that the policy levers available to the Northern Ireland Executive/Assembly will only directly affect some of Northern Ireland's emissions (for over 40% of all emissions will be covered by the EU Emissions Trading Scheme, where all key decisions are now made at EU level).
- 4 In addition, whereas in the UK as a whole there is still much opportunity for making cost-efficient savings through increased energy efficiency, the historically high energy prices in Northern Ireland are likely to imply that more of the 'low-hanging fruit' in terms of energy efficiency have already been taken. Certainly in the case of the business community there is good evidence that over the last 10-15 years large energy consumers have invested heavily in energy conservation and energy efficiency.



Nigel Smyth Director

DL: 028 9650 1300 E: nigel.smyth@cbi.org.uk

CBI Scottish Amicable Building 45 Donegall Square South Belfast BT1 5JE
T: +44 (0) 90 305500 F: +44 (0) 90 305509 E: info@cbi.org.uk W: www.cbi.org.uk/ni

Director General Richard Lambert President Martin Donaghy

Registered No. 1626135 (England and Wales) Registered Office: CBI Centre Point 117 New Oxford Street London WC1A 0BU

- 5 For these reasons, the Northern Ireland Executive/Assembly should focus on targets and commitments that it can affect and ensure that these are delivered, rather than locking itself into targets or commitments where it has limited ability to deliver, as there is a risk that this will lead to policy decisions which are not cost-effective. A key requirement will be to ensure there is a good understanding of emissions from all the key sectors in Northern Ireland. It is also vital that policy decisions result in a global reduction in carbon emissions, as there is a risk that some interventions may lead to a re-location of investment (offshoring), with no net environmental benefit.
- 6 The particular challenges for Northern Ireland include emissions from:
 - **Transport:** transport emissions from Northern Ireland increased by 50% between 1990 and 2006. This is largely due to the dominant role and growth in cars and in part due to increased air travel over the period. Between 2002 and 2007 the total number of vehicles registered/licenced increased by 26.9%! In 2006 transport accounted for 24% of total greenhouse gas emissions in Northern Ireland
 - **Power:** there has been a significant change in energy source in the last decade with natural gas now forming around 70% of power generation. Onshore wind power has started to make some inroads, with current capacity of around 300 Mw operational (6% of total generating capacity) with significant potential to expand this towards 30% taking advantage of the strong wind resource available, provided that appropriate planning policies are in place (there is a major risk that they will not be if current planning guidance associated with PPS 18 are put in place – see below). Northern Ireland's geographic location has to the potential to offer comparative advantage with regards to wind power. In 2006 energy supply accounted for 25% of total greenhouse gas emissions.
 - **Agriculture & land use:** Northern Ireland has a disproportionately large agricultural industry relative to the rest of the UK which is also reflected in agricultural emissions (particularly methane) – addressing these emissions will be particularly challenging and will need cross-departmental action. Agriculture does of course offer the opportunity of helping to mitigate climate change, through acting as a carbon sink. In 2006 agriculture accounted for 23% of total greenhouse gas emissions in Northern Ireland.
- 7 In setting targets and commitments for Northern Ireland the Executive/Assembly should make maximum use of the expertise of the Government's Climate Change Committee (CCC). In particular their report, *'Building a low-carbon economy – the UK's contribution to tackling climate change'* should act as the main source of advice, although the Committee may need to supplement their expertise on certain issues specific to Northern Ireland. Given the amount of work that has gone into the CCC's report, it would be foolish for the Committee to try to repeat this exercise. In CBI's recent response** to DETI's scoping paper for a new Strategic Energy Framework we recommended that the Executive should establish a Northern Ireland target for renewables.
- 8 One way for the Committee to understand the role of Northern Ireland in meeting the UK's climate change targets could be to draft 'roadmaps' for the areas of the economy where emissions reductions are most meaningful. These roadmaps could help accelerate action and provide business certainty. These roadmaps could include the following elements:

- **Boosting the proportion of renewable energy in the energy mix:** this will require particular attention on unlocking land use planning and additional provision of research and development to facilitate new low-carbon energy technologies. There is extremely worrying that the strategic guidance accompanying the current draft PPS 18 could totally undermine the potential of Northern Ireland wind power, leading to unnecessarily higher costs for businesses and domestic consumers. Favourable planning policies are essential to support the development of low cost renewable, including facilitating the development of the grid. The extension of the gas network, and encouraging take up by public, private and domestic sectors will also help reduce carbon emissions by replacing higher carbon alternative fuels.
- **Increasing energy efficiency in the buildings:** this must be a key priority in the Strategic Energy Framework. Investment in energy efficiency can create 'win win' situations by reducing energy consumption (and related costs) and emissions. In April 2010 the Government's carbon reduction commitment (CRC) will come into force for all organisations with total half-hourly metered electricity use greater than 6,000 megawatt-hours (MWh) between 1st January 2008 and 31st December 2008. This will impact upon most, if not all government departments eg in education we understand the Department of Education will be responsible for all its schools.

The Northern Ireland Executive/Assembly has demonstrated real leadership by committing in its Sustainable Development Plan to making the government estate carbon neutral by 2015 – this does look particularly ambitious without the necessary 'roadmaps' in place as to how it is to be achieved. Likewise, the Executive/Assembly could investigate more ambitious initiatives on energy efficiency (even with limited spending) such as greening business rates (for example a discount for all companies rated as 'Carbon Trust standard' would provide a valuable incentive), bonus-malus schemes for energy efficient appliances, or requiring energy performance certificates in commercial buildings.

CBI has welcomed the announcement by the Minister for Finance in 2008 that there will be a rates rebate scheme to reward householders for energy efficiency improvements, expected to be in place by 2010. This will involve a 5-year rates holiday for zero-carbon homes and a 2 year rates holiday for low-carbon homes, while energy efficiency improvements will entitle householders to a rates reduction.

Encouraging long-term emissions cuts from transport: although it will be challenging to cut emissions from transport in the short-term, the Assembly could commit to a feasibility study (maybe working with the CCC) to understand what prospects there maybe for medium term abatement. For example, there may be opportunity to work with the Republic of Ireland to trial electric cars across Northern Ireland and the ROI, and ensure the appropriate infrastructure is in place to facilitate this development. In *'Building Ireland's Smart Economy'* the Irish government have committed to working towards a target of 10% of Ireland's road transport fleet being electrically powered by 2020. Clearly

improvements in public transport must be a key priority in the future in order to secure a modal shift, particularly in urban areas.

- **Cutting agriculture & land use emissions:** as for transport, cutting emissions in the agriculture sector will be challenging. The Assembly should consider working with the CCC to understand what potential exists for emissions reductions in this sector. We understand there are conflicting views on how best the agricultural sector can reduce emissions while continuing to produce high quality food. Northern Ireland should seek to agree the lowest carbon footprint per unit of production and exploit this advantage.
- **Low-carbon procurement :** if the Northern Ireland Executive/Assembly wants to demonstrate real leadership in addition to committing to improving energy efficiency in its own estate (while also avoiding technology 'lock-in'), it should green its procurement practices to create demand for low-carbon technologies. Some progress here has already been achieved with the publication jointly by the Equality Commission and the Central Procurement Directorate last year on sustainable procurement. CBI members support the use of public procurement to meet wider environmental and social policy goals, but only where such criteria are directly relevant to the contract.

Specifically on the need to move to a low-carbon economy (and a resource efficient one) CBI has highlighted (in a response early in 2008 to the draft Sustainable Action Plan****) a number of key issues which must underpin procurement policy:

- sustainability must not be a 'bolt-on' activity, rather it must be considered an integral part of the procurement project
 - the strategy needs to be inspirational, rather than aspirational – its needs substance
 - there is a need for clear milestones and timelines over a much longer time frame which should fit with the Programme for Government's long term goals
 - there should be consistency in guidelines across all Centres of Procurement Expertise – different approaches and practices across government should be avoided (albeit that there may be good reasons which can be demonstrated for some flexibility)
 - better prioritisation and focus is required to achieve meaningful results – we need to avoid a 'box-ticking' exercise which adds to bureaucracy and cost
 - adequate training to both public and private sector practitioners is necessary
 - Northern Ireland need not necessarily wish to be in a leading position regarding green procurement (which carries potential costs and risks) but it should aim to be the best at identifying, learning and implementing best practice from other regions/nations
- **Developing skills for a low-carbon economy** - the Assembly will need to encourage partnership working between local education providers and businesses to ensure future demand for low-carbon skills in Northern Ireland can be met. This will require engagement with sector representatives to develop technical training courses and higher education programmes that anticipate low-

carbon technologies and reflect changes in industry. Many Northern Ireland based companies are well placed to take advantage of low carbon investment opportunities across a range of technologies (a recent report from Invest NI on *'Maximising Business Opportunities from Sustainable Energy'* identifies some of these) as well as a considerable amount of research activity.

- 9 In order to identify the costs associated with meeting these roadmaps, and/or other specific obligations for Northern Ireland, the Assembly should look to instituting a mechanism for assessing the impact of new policies on emissions. One option could be to use the shadow cost of carbon approach, though this is far from perfect (subjective and currently based on poorly explained economic models).
- 10 At CBI we are focused on working with Government to deliver emissions cuts across the UK economy. We will shortly be launching a series of carbon roadmaps that map out how existing and new policies will deliver the appropriate investment climate to enable business to deliver emissions cuts across the economy. The roadmaps focus on four areas; power, transport, buildings and industry. CBI is willing to share this work with the Committee and support work to develop similar roadmaps specific to Northern Ireland.
- 11 More broadly, the CBI understands that business activities account for about half of all emissions in the UK. We recognise that firms of all sizes and in a variety of sectors have the ability not only to curb emissions from their own operations but also drive wider improvements in Northern Ireland and abroad. Business also has a critical responsibility to design new low-carbon products and solutions and in helping employees and customers make choices, which can in turn reduce their own emissions. Companies must consider carbon from the outset in designing all new products and services.
- 12 Therefore, we are working with our members to support them implement legislation such as the CRC. We are also developing a common approach to reporting corporate carbon emissions that will feed into revised guidelines to be published by DEFRA in the autumn, which we will then promote with our members. The work with our Climate Change Board members to audit and reduce emissions from the buildings and transport fleets is also helping us to spread best practice from climate leaders to the wider business community.
- 13 Achieving the necessary reduction in emission, and ensuring this is done in a cost effective manner will require strong political leadership. Government, business and consumers have all an important part to play. Failure to act now will mean that the costs of tackling climate change in the future will be significantly higher.

CBI Northern Ireland

March 2009

* CBI Climate Change Taskforce Report: Climate change: everyone's business' – published November 2007

** NI 02 09 CBI response to the Northern Ireland Strategic Energy Framework 2009 – pre-consultation scoping paper.

*** NI 02 08 CBI response to Draft Sustainable Procurement Action Plan