

NIRIG briefing note for ETI Committee Electricity Policy Review Part 3: Grid Connections

Submitted 24 April 2014

1. CONTEXT

The Northern Ireland Renewables Industry Group (NIRIG) is a joint collaboration between the Irish Wind Energy Association and RenewableUK. NIRIG represents the views of the large and small scale renewable energy industry in Northern Ireland, providing a conduit for knowledge exchange, policy development support and consensus on best practice between all stakeholders in renewable energy. NIRIG welcomes the interest that the ETI Committee is taking in electricity policy and is happy to provide industry perspectives on grid connection as part of this review.

Major changes are taking place in our electricity needs, our sources of fuel and in our fleet of power stations. Change will increasingly be driven by issues of energy security, competitiveness, climate change and by the need to move away from imported fuels. We believe that the energy sector is also growing in complexity as market reforms affect Northern Ireland from the UK and across the island of Ireland. With increasingly diverse sources of electricity generation being accommodated by the Northern Ireland grid we wish to state our commitment to collaborating and co-operating with key stakeholders to facilitate appropriate and timely network infrastructure build and policy development.

Further details on any of the information submitted in the note can be provided to the Committee at any point, if required.

Strategic Context and Policy Framework

Key policy drivers for energy in Northern Ireland are the Strategic Energy Framework (SEF) and Programme for Government (PfG). Additionally, two other Executive and Departmental Strategies are of significance to the energy sector: the Regional Development Strategy (RDS)¹ and Sustainable Development Strategy (SDS)². Both highlight the need for sustainable development. The Regional Development Strategy contains a key objective to:

¹ http://www.drdni.gov.uk/rds_2035.pdf

- *Deliver a sustainable and secure energy supply (RG5)*

This specifies the need to increase the contribution that renewable energy can make to the overall energy mix and the need to strengthen the grid.

The SDS objectives include the following:

- *Ensuring reliable, affordable and sustainable energy provision and reducing our carbon footprint*
- *Driving sustainable, long-term investment in key infrastructure to support economic and social development*

European Directives, such as the Renewable Energy Directive, also set frameworks within which the energy system in Northern Ireland must operate.

The Transmission and Distribution System

The grid is made up of high-voltage (275kV and 110kV) transmission lines that are able to transport power efficiently over long distances, and lower voltage lines that distribute the power more locally to the users. High-voltage lines generally run overhead on pylons and along the sea-bed for the transportation of power offshore. Lower-voltage distribution lines (33kV and 11kV) are carried by smaller pylons and wooden poles, and are usually undergrounded in urban areas.

The transmission system is operated and balanced by SONI-EirGrid and the network is owned by Northern Ireland Electricity (NIE). Windfarms generally connect at 33kV, although some may connect at 110kV. 110kV cluster substation connections are being constructed which will allow less intrusive impacts with fewer long 33kV lines. Individual wind turbines generally connect at 11kV.

NI peak demand for electricity is 1777MW, with a summer minimum of 516MW. Currently 531MW of large-scale wind generation is connected to the electricity system in NI, with approximately 54MW of connected small-scale generation (including single turbines, solar, biomass and other technologies). The wind farms are predominantly located in the North and West of Northern Ireland, where wind resources are greatest and the electricity transmission network is lightest.

² http://www.ofmdfmi.gov.uk/sustainable-development-strategy-lowres_2_.pdf

2. NIRIG's KEY MESSAGES FOR ETI COMMITTEE CONSIDERATION (regarding recommendations and next steps)

- NIRIG believes that it is in everyone's interest that Northern Ireland is seen to be as attractive to investment as possible. This requires a stable regulatory regime and timely and efficient delivery of key infrastructure (including interconnectors) which in turn requires strong support from all stakeholders
- Cross-party support for the decarbonisation of the NI electricity system and for the long-term deployment of renewable energy would be one of the most effective methods of reducing carbon emissions
- NIRIG strongly recommends that the Sustainable Energy Inter Departmental Working Group (SEIDWG) be reformed now. Strategic coordination on our energy future is vital
- Further strengthening of Northern Ireland's sustainable development would be made possible by bringing forward the DETI Energy Bill to strengthen the requirements for sustainability
- Clear policy-making processes should be implemented to enable efficient and timely policy development. Recent experience demonstrates delays of many years in grid-related policy-making, for example in cluster development
- NIRIG believes that support should be given to NIE to enable work on small-scale connections to be taken forward within a reasonable timeframe
- NIRIG believes that the requirement to have a valid planning permission before making a grid connection application is positive for renewable electricity developments
- The rebate policy for transmission connections should be extended to non-domestic consumers and be extended to a 10-year period
- Contestability should be introduced as soon as possible
- Transmission System Operator (TSO) and Distribution Network Operator (DNO) Innovation should be encouraged. NIRIG would encourage in particular an emphasis on innovation with respect to smart grid solutions

3. NIRIG's VIEWS ON ISSUES PERTAINING TO LARGE-SCALE GENERATION

Explore the strategic approach to electricity grid investment;

Appropriate, future-proofed and timely network development is intrinsic to our security of supply. Our Strategic Energy Framework emphasised the need for strategic grid development and the Utility Regulator requested that additional guidance be provided by DETI on strategic investment. We still do not have a complete grid policy, strategy, or vision in NI and we can see that the lack of joined-up approach has led in some cases to very significant delays in network infrastructure. Clusters are one example; the North-South interconnector is another. In the Republic of Ireland such strategic direction is provided by EirGrid's Grid25 Strategy³.

Collaboration between Northern Ireland stakeholders and across the UK and Ireland is vital. Due to our location and excellent capacity to generate from indigenous energy sources, we need to collaborate with stakeholders across the UK and Ireland in order to utilise our resources efficiently and ensure that the NI consumer can avail of the opportunities in trading electricity effectively. Key stakeholders would include the UK Department for Energy and Climate Change (DECC), EirGrid, the Single Electricity Market Committee (SEMC), Irish Department of Communications, Energy and Natural Resources (DCENR) and GB National Grid.

The future of energy will be one with more diverse energy sources, more technologically advanced networks and a more flexible relationship between supply and demand. In order to achieve the network that we all need, coordination is vital and we strongly believe that government departments and key stakeholders need to engage through a forum such as the Sustainable Energy Interdepartmental Working Group. SEIDWG (and its grid sub-group) had an important role to play in coordination of sustainable energy policy. We strongly recommend that this group reform now – this is timely as it could therefore provide an advisory role in the forthcoming SEF review.

To meet our SEF targets and beyond we need to commit and invest now. The development of infrastructure requires a very long lead-time as it involves, among other things regulatory approval, planning consent, procurement processes and wayleaves. Recent experience demonstrates the regular delays in network infrastructure in Northern Ireland and we need to move forward in order to have the necessary grid in place to accommodate renewables that will enable us to reach our targets. This infrastructure will be in place for 40-50 years and needs to be understood as a long-term investment for consumers. There is a need for deep reinforcements such as RIDP (Renewable Integration

³ <http://www.eirgrid.com/media/GRID25.pdf>

Development Project) to commence now in order to deliver firm access to generators as early as possible.

Northern Ireland has seen very slow infrastructure development over recent years. Clusters are one example, where significant delays in policy development have led to a three-year wait for connection offers due to four separate consultations being issued by NIE and NIAUR to formulate cluster policy. This has led to a number of wind farms waiting for revised connection offers for more than three years, and pre-approval for clusters themselves, which will take in some cases a further 5 years to build have also been held up by delays in decision-making on NIE's fifth price control, RP5. RP5 itself took a considerable length of time to reach its conclusion.

Interconnection is vital for security of supply, efficient markets, utilisation of renewables and reduction of the constraint & curtailment of renewables. There is no alternative. All stakeholders need to support timely delivery and efficient functioning of current and planned interconnectors. A risk of security of supply from 2016 has been identified by the electricity system operator for Northern Ireland, SONI, in their Generation Capacity Statement for 2013-2022⁴. They make it clear that progress on the N-S interconnector is of utmost importance.

The estimated cost of the North-South Interconnector is around £90m⁵ and work to provide longer term repairs to the Moyle Interconnector is estimated to cost £60m⁶. However once operational it is expected that these two interconnectors have the potential to deliver significant annual savings to consumers, and resolve the security of supply concerns.

Increased interconnection will lead to the most efficient working of the market across both the island of Ireland and across the UK and ultimately mainland Europe. Increased interconnection will allow the most cost-effective energy source to be used in the Irish and GB markets, to the benefit of consumers. The DETI 2050 Vision⁷ sets out two scenarios for interconnection, both of which require new or upgraded interconnectors with GB and additional tie-line capacity with the Republic of Ireland. The Moyle interconnector has not functioned efficiently and has led to imports of electricity to Northern Ireland from GB even when Northern Ireland is generating high levels of wind energy. Indeed, this wind energy is curtailed (turned off) when we import electricity from GB. Coordination with equivalent departments and system operators in Scotland may wish to be considered by the Committee on this issue.

⁴ http://www.soni.ltd.uk/media/documents/Operations/CapacityStatements/All-Island_Generator_Capacity_Statement_2013-2022.pdf

⁵ Estimated cost provided by NIE is £84m (<http://www.nie.co.uk/documents/Policy-Statements/P-110404-Final-Capital-InvestmentRequirements-Publ.aspx>), plus costs spent to date.

⁶ Estimated costs provided by Moyle Interconnector Limited

⁷ http://www.uregni.gov.uk/publications/correspondence_between_the_ur_and_moyle_interconnector_regarding_the_repair

⁷ http://www.detini.gov.uk/2050_report.pdf

Future-proofing involves investment now in order to meet the needs of the future. The regulatory framework in NI and decision-making within RP5 and indeed RP6 and beyond must take account of the long-term needs of consumers and investors, rather than focusing on short-term cost-efficiency. DETI has the ability to ensure a more sustainable approach to network infrastructure by making progress on the Energy Bill, which was consulted upon two years ago. We would strongly recommend that this be progressed this year. The transmission network should be developed through a series of related investments that should be viewed as a whole, rather than through individual projects in isolation. NIE should publish Network 25 as soon as possible and this should be supported by all government departments and other stakeholders.

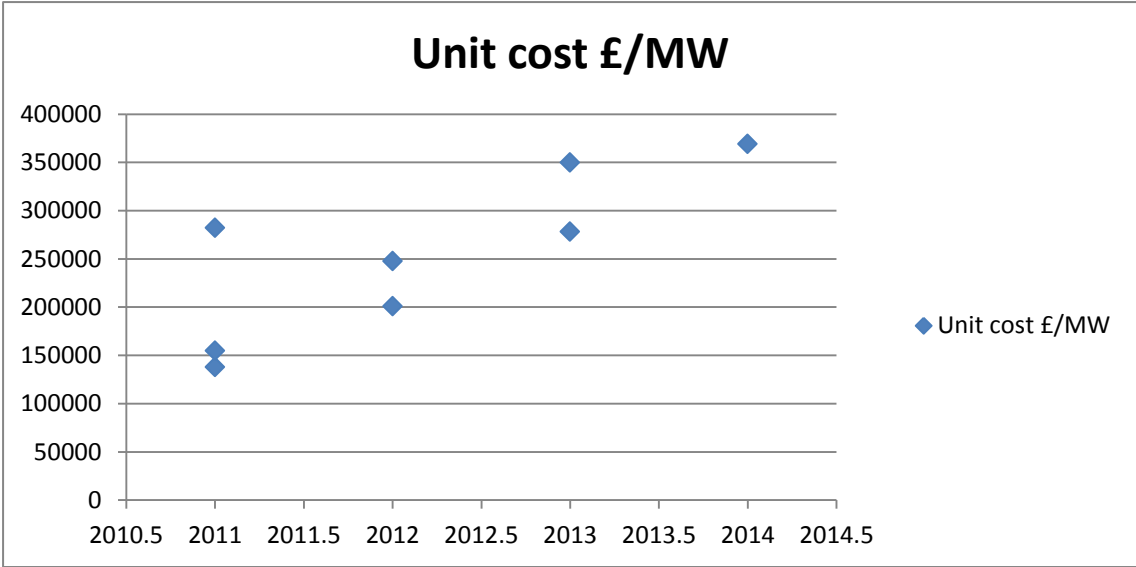
Broader policy frameworks, including the IME 3 Directive and RES Directive, must be fully complied with in decision-making on infrastructure investment. Most new renewable energy projects in NI will not have firm access to the transmission network during and beyond the current five year price control period and will be faced with grid constraints which require grid reinforcements to address. The RES Directive (Directive 2009/28/EC) which provides for priority dispatch and access for renewable generators and an obligation to reduce the curtailment of renewables should be a significant factor in all regulatory decision-making on grid infrastructure.

Explore the relationship between grid strength and connection costs for developers;

Network strength and flexibility are both important. Smart network management represents a very positive opportunity going forward but must be accompanied by infrastructure build-out. Northern Ireland has a historic legacy of low investment in infrastructure as the present electricity network was largely in place by the late 1960s, having been developed to link major fossil fuelled power stations and to deliver bulk electricity to the more heavily populated parts of the country. For security of supply and the facilitation of renewables, on-going maintenance, strengthening and build-out of the grid is required, particularly in the west.

Grid strength has an impact on costs for both small-scale and large-scale renewables. NI large-scale generators face higher connection costs per MW than any other region of the UK and Ireland and are also required to pay higher levels of deposits than most of the UK and Ireland. The cost of grid connections in Northern Ireland is likely to be higher on per MW basis than the rest of the UK mainly due to the scale of projects. A smaller number of turbines per project suggest that the "fixed" costs of grid and access are disproportionately high. The general trend of grid connection costs in Northern Ireland is upwards, as can be seen below:

Table 1: Sample grid connection costs Northern Ireland



NIE has also recently proposed the implementation of a new policy on security requirements for cluster connections which are extremely onerous. Stage payment triggers are described in the Statement of Charges as

- Stage 1** – 10% of connection fee with acceptance of terms.
- Stage 2** – 20% of connection fee prior to commencement of consents process (DOE Planning/land rights) if applicable.
- Stage 3** – 20% of connection fee post completion of consents process (DOE Planning / land rights obtained).
- Stage 4** – 30% of connection fee to order long lead time materials.
- Stage 5** – 20% of connection fee prior to construction commencing on site.

In 2013 NIE put forward a policy stating that all wind farms connecting to a cluster would be required to pay a security bond. The application of the security results in a situation where a development could potentially be asked for Stage payment 1 (10%), Stage payment 2 (20%) and security to cover the remaining 70% of connection cost all within 90 days of receiving planning consent and making a grid application.

The funding of such a security at that stage in the lifecycle of the development, well before financial closure, may be impossible for many developments. Moreover such a security would then have to remain in place for at least two years pending construction of the cluster. This is particularly onerous on developments appearing later in the process. This

could lead to a situation where certain developments would not proceed, creating a scenario where payback of customer does not take place.

NIRIG believes there is potential to remove, or at least minimise the risk of development being unable to proceed due to impossible financial demands, by postponing the request for a security payment to a later stage. This would result in the security being in place for a shorter period, making it easier to obtain funding, and as any stage payments made in the interim would be deducted from the security this would result in a lower security requirement. This would assist in allowing the development to progress to financial close before security is required.

NIRIG has also proposed that as late-comers to a cluster actually reduce customers' risk exposure (originally allowed by the regulator) that therefore these late-comers should not be expected to provide the same security requirements. The application of the same rule set as NIE proposes actually jeopardises the completion of those late connections.

The strength of the grid impacts upon generators' costs well beyond the point of connection. Additional costs can be incurred when the network is unable to absorb the electricity generated and particularly in the case of wind energy, it must be turned down/off or 'curtailed'. In March 2014 SONI published a paper⁸ which shows Northern Ireland in 2020 having curtailment ranging from 4-10% together with constraints in years up to 2020 of 8% at some nodes.

The SEM Committee acknowledges⁹ that "increasing levels of curtailment is a serious issue for the financial viability of certain wind farms". A number of initiatives are on-going to minimise curtailment. These initiatives include:

- DS3, *Delivering a Secure, Sustainable Electricity System* – a programme which aims to increase the secure level of system non-synchronous penetration (typically wind) from 50% (currently) to 75% in the coming years
- Integrated SEM (I-SEM) - a major review of the SEM design to implement the EU Target Model so as to improve the coupling of markets through the efficient operation of interconnection. The I-SEM has to be implemented before the end of 2016.
- In May 2011, the SEM Committee published its decision Single Electricity Market - *Demand Side Vision for 2020* (CER11/078) which set out thirteen decisions for implementation.

However, even with the successful implementation of these initiatives dispatch-down will remain at circa 4-7% when there are sufficient installed wind farms to meet the 2020

⁸http://www.soni.ltd.uk/media/documents/Operations/Generators/Northern%20Ireland%20Generator%20Output%20Reductions_2014-2020_v2.1.pdf

⁹ *Treatment of Curtailment in Tie-Break situations Proposed Decision paper (SEM-12-090)*, SEM, Oct 2012

government policy targets. If these mitigation measures are not met, curtailment will be significantly higher.

As per previous SEM rules, firm projects are currently paid market revenues through Dispatch and Balancing Costs when curtailed. However the SEM committee has decided (SEM-13-010) that no windfarm will receive curtailment compensation from 1st January 2018.

Review processes in place for developers applying for planning permission and grid connection;

NIRIG believes that the processes in place are adequate and that the requirement to apply for planning permission before grid connection has worked well for NI. However, the system requirements and energy mix are changing so rapidly that policy development needs to be properly resourced and managed. As noted above, policy-making on clusters has taken considerably longer than was expected and has been a long drawn-out process, impacting upon planning permission and progress towards our targets. The formation of the Renewables Grid Liaison Group is a welcome development in enabling key stakeholder discussion on operational connection policy; however, we believe that this could be improved still further. We have some concern that the consultation process to date has not always provided the rules and frameworks necessary to allow industry to move forward with confidence.

We would support the creation of a clear set of structures and principles regarding the consultation processes between SONI, NIE, DETI and NIAUR to avoid disputes and increase the effectiveness of the consultation and decision-making process. We believe that more effective consultation will lead to effective solutions and allow for informed decision-making on matters of policy. We would like to see a process whereby the following principles are adhered to:

- Clear processes should be in place so that regulatory and departmental buy-in is provided at all relevant stages of the consultation process
- Formal consultation should take place at a stage when there is scope to influence the policy outcome.
- Consultation documents should be clear about the consultation process, what is being proposed, the scope to influence and the expected costs and benefits of the proposals.
- Keeping the burden of consultation to a minimum is essential if consultations are to be effective

- Consultation responses should be analysed carefully and clear feedback should be provided to participants following the consultation.

Review any requirements there are for renewable electricity developers to connect to the grid;

NIRIG believes that the requirement to have a valid planning permission before making a grid connection application is positive for renewable electricity developments. The requirement to apply for planning permission before applying for grid connection was developed in the 1990s and is supported by industry. Experience from GB and ROI demonstrates the challenges that can arise when grid capacity is committed but due to planning permission delay or otherwise it cannot be utilised for long periods of time.

The rebate policy for grid connections should be extended. There are different refund policies associated with SONI Transmission and NIE Distribution Charging mechanisms. Under SONI's Connection Charging Policy¹⁰, partial refunds will be paid to all transmission connected customers up to 10 years from the date of the first connection. Under NIE's Connection Charging Statement¹¹ a rebate policy extends for 5 years and is only in relation to domestic customers.

Small generator connections are increasingly facing high and at times prohibitive costs of connection involving many kilometres of line upgrade. A rebate policy would potentially assist this problem. In addition, large (non-cluster) generator connections at 33kV sometimes face substantial lengths of 33kV new construction with spare capacity after the connection and a rebate policy could alleviate substantial upfront costs.

Under Transmission policy there is a rebate system if generators have a Connection Agreement with the TSO (SONI). As 33kV connections have Connection Agreements with NIE, this transmission rebate is not clear: many 33kV connections have to pay for transmission assets (under the 'one voltage level above' policy). We believe that this disconnect should be addressed.

Given the development life cycle of many of these larger developments (in many cases 8-10 years from concept to build) it is considered that 10 years would be more appropriate timeframe for rebate for this group of developments.

Delays in the development of cluster policy have had a negative impact upon the ability of developers to build out projects that received their planning permission a number of years ago. In March 2010 NIE launched a consultation on 'clustering': the connection of

¹⁰ Transmission Connection Charging Methodology, SONI – Effective from 22nd Dec 2010 Section 6

¹¹ Statement of Charges for Connection to the Northern Ireland Electricity Distribution System, NIE – Effective from 1st Oct 2012 Section 6.8

groups of electricity generators to the distribution system by a single line. As a result 14 wind farms that had already received grid connection offers were expected to wait for modified 'cluster' connection offers from NIE. It was only at the end of 2013, and after four separate consultations, that NIE began to reissue modified connection offers for those wind farm sites that had originally received connection offers in July 2010.

Wind farms comprising 475MW of capacity are now awaiting connection, involving 26 sites which have planning permission but have yet to be connected. Given that planning permission for many of these wind farms was obtained prior to 2010, the long delay has led to imminent planning permission expiry. Having recognised the potential expiry of planning permission for a significant number of wind farms, NIRIG has previously outlined a range of potential solutions to the problem to DoE such as legislative change to allow for planning permission extension, and the introduction of variations to pre-commencement conditions. We suggest that these proposals be given serious consideration.

Crucially, the need to reapply for planning permission will also have a knock-on effect on the entire cluster. If one wind farm in a cluster were to lose planning permission the whole regulatory justification for that cluster is likely to be jeopardised (as it will fall below the 56MW threshold at which a cluster is designated), meaning that the cluster will not get built and will further delay every wind farm associated with that cluster.

Resubmission of planning applications would also represent considerable cost to developers (breach of covenants, re-pricing of loans, additional planning fees, fresh EIA etc.), serious investor uncertainty, weaker investment cases due to increased levels of curtailment, and would also require considerable resources from DOE at a time of major change and restructuring.

Importantly however we also urge that serious consideration should be given to applications for 10-year planning permissions for wind farms going forward which is the regime in the Republic of Ireland.

Consider the feasibility of introducing competition into grid connections;

Contestability should be introduced as soon as possible, with detailed proposals for consultation. This is vital for maximisation of efficiency and ability to reduce cost to consumer. NIRIG fully supports the introduction of contestability, as outlined in the recent draft NIAUR Forward Work Programme 2014-15; however this needs to cover both Transmission and Distribution assets to be effective. Given the long development time associated with large sustainable generation projects and the prohibitive costs facing small scale generation, it is critical that contestability is introduced as soon as possible if 2020 targets are to be achieved. To facilitate progress we would recommend a consultation process that involves detailed proposals at an early stage.

4. NIRIG's VIEWS ON ISSUES PERTAINING TO SMALL-SCALE RENEWABLE GENERATION

Explore the strategic approach to electricity grid investment;

Currently there are major constraints on the 33kV network caused by the export from renewable generation connected to the 11kV network. It is likely that cost effective, SMART initiatives could solve much of the problem but agreement must be reached on a sensible approach to investment in the 33kV network to support the connection of small scale generation.

Explore the relationship between grid strength and connection costs for developers;

NIE has made good progress on managing the extremely high levels of small-scale applications they have received. More progress on funding, development and innovation is required and regulatory back-up is crucial.

Currently in the majority of cases developers are receiving very expensive offers to connect to the electricity network. Similar problems have been experienced on the networks of the Distribution Network Operators (DNOs) in GB and alternative solutions employing 'smart' technology have been applied. Essentially the 'smart' technology exploits the fact that the problem on the network only arises under certain conditions (i.e. when the generation from the turbine and load on the line is low). The 'smart' technology is then called upon to act to reduce the generation under these conditions thereby removing the problem on the network.

Using this technology means that it is not necessary to reinforce the line and the high connection costs are avoided. However, the project developer has to accept the fact that, under certain conditions, the output of its generation will be reduced – this is called *Non-Firm Access*. NIRIG would encourage more proactive use of 'smart' technology to provide viable connection offers.

Review processes in place for developers applying for planning permission and grid connection;

Currently developers require planning permission for their development before making an application for connection to the electricity network. This ensures the best utilisation of available capacity. Given the current problems with connection to the network we believe that some facility for an indication as to whether a potential site is likely to be high cost or constrained by 33kV congestion would be helpful - in effect be a 'budget estimate'. The

requirement for a development to have planning permission before making a full application for connection would remain.

When small scale renewable generation was in its infancy developers tended to look for good sites and then think about connection to the electricity network. This approach has had to change in that now developers have to first think of the electricity network and where it might be possible to get an economic connection before then looking for potential sites around those locations. The problem with this new approach is that information about the electricity network and its capacity is severely limited. NIRIG has previously requested that such information be provided by NIE, who have responded by publishing a heat map¹² which gives an indication of where there is limited potential for additional connection without significant line upgrades. However, it would also be of benefit to allow developer access to their geographic representation of the distribution network (Geographic Information System - GIS). Working together, positive progress has been made in the management of jobs from quotation through to construction, including provision of information but we believe that more could be done to reduce timescales for connection and further improve the flows of information to developers.

Consider the feasibility of introducing competition into grid connections;

As for large-scale generation, we believe that this would be a very positive step to help to address high connection costs.

¹² http://www.nie.co.uk/documents/Generation/SSG_Heat_Map_251013_V1_final.aspx