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Green Job Estimates – supplementary

1 Introduction

The following paper provides supplementary information to Northern Ireland Assembly Research and Information Service paper 09/13 available [here](#). The purpose of this paper is to address a query raised during the Committee's discussion on the previous research. In this respect this paper:

- Revisits the Department of Employment and Learning (DEL)/ECORYS estimates of skills needed outlined in the previous research and provide further details on the potential skills gap identified in the DEL report.

2 The DEL Report

To provide some context to the data that follows, it is useful to briefly restate the methodology and overall findings of the DEL report. The report, which was published in 2011 and completed by ECORYS on behalf of the Department, had two primary objectives:

- To assess the skills required over the next ten years to support the growth of the Sustainable Energy (SE) sector in Northern Ireland; and

- To identify the short, medium and long-term actions needed to ensure that the supply of these skills in NI is sufficient to meet the predicted growth of this sector.¹

The report took a narrow² view of the ‘green economy’ focusing on four specific sectors. These were:

- The Integrated Building Technology (IBT) sector, which includes energy efficiency and the integration of renewables into existing buildings. The reasons for inclusion were threefold: the sector is a large energy consumer; a large amount of housing stock requires refurbishment; and the construction sector is a large employer;
- Offshore energy, which includes offshore wind, wave and tidal. The sector is included due to the ‘rapid’ development of wind and the ‘major future potential’ of wave and tidal.
- Bioenergy, which includes the production and utilisation of solid and liquid biomass for energy purposes. It was included due to the large potential resource and the potential for diversified employment the sector presents; and,
- Energy storage, which includes the development of the smart grid and the potential storage of electricity and other energy forms.³

The estimates provided by the DEL report only facilitate a snapshot of the green economy. They do not include certain large subsectors. Subsectors such as onshore wind, geothermal energy, and water supply and waste management which are currently large employers (see section 2 NIAR 09/13) according to data provided by the Department of Business, Innovation and Skills.

Three growth scenarios were explored – low, central, and high. This paper will focus on the central scenario (anticipated skills gaps in the other scenarios are included in the annexes to this paper). The main conclusion of the report was that in the central scenario an additional 3,327 skilled persons would be required between 2011 and 2015 across all four sectors. This implies nearly doubling of 2010 employment in the chosen sectors (2010 employment was estimated to be c.3,900 in the report). It should be noted, however, that the report assumes 13.9% of the 3,327 figure will be to replacement demand for those that leave the sectors over the five year period.⁴

3 Estimated skills gap

In addition to predicting the skills requirement necessary to meet growth in the identified sectors, the DEL report also compared the anticipated demand in these sectors against the predicted supply. The report quantifies and classifies the skills gap.

¹ Department of Employment and Learning/ECORYS *Research study to determine the skills required to support potential economic growth in the Northern Ireland sustainable energy sector* (August 2011)
http://www.delni.gov.uk/ni_se_final_report_-_pdf_version_-_final.pdf

² Narrow in comparison to the data provided by the Department of Business, Innovation and Skills – see previous research paper Section 2 of NIAR 09/13 for further details (link in introduction).

³ *Ibid*

⁴ *Ibid*

To calculate the level of gap in each sector, the report compares the average skills annual requirement (for each growth scenario, although the focus here will be the central scenario) according to occupation category to the current number places provided annually in qualifications servicing these occupational categories. The anticipated skills gap is calculated on an annual and total (2011-2015) basis.

A number of skills providers are considered, including:

- The six regional further education colleges (the report refers to these as the ‘key element in meeting vocational skills needs’) who offer a range of courses tailored (at all NVQ levels) to the needs of the sustainable energy sector (included in their Carbon Zero prospectus), as well as mainstream training provision which can also meet the needs of the sector;
- Private training organisations who deliver vocational skills training at NVQ levels 1 and 2 within in areas matching the sustainable sector’s needs; and,
- The University sector, which offers course specifically tailored towards the energy sector and which conducts research in sustainable energy.

The following sections will summarise skills gap estimates contained in the DEL report for each of the four sectors.

Two things should be noted before looking at the data in more detail. Firstly, the skills gap estimates quoted have, as is mentioned above, been calculated using 2010 “current place” figures. These figures are subject to change, that is, they could increase or decrease due to a range of factors (for example, a change in policy direction, or changes to funding). This leads to the second consideration, which is that skills providers were, at the time of the report’s publication:

...confident that they could meet the skills needs of the sector albeit with 2 caveats. The first caveat was that they felt that the continuation of some form of Innovation Fund to allow them to develop courses to specifically meet the needs of employers would be helpful. The second caveat was that they felt continued support for Carbon Zero to assist with the co-ordination of the colleges’ response to the needs of the sector would also be helpful.⁵

3.1 Integrated building technologies

Within the integrated building technologies sector, Table 1, skills gaps have been identified in four out of the five occupational categories. The report concludes that an additional 70 skilled persons will be needed per year to meet the sector’s needs, this equates to an additional 350 persons over the period 2011 to 2015.

The largest gap is identified in the process, plant and machine operations occupational category, where an estimated 44 persons are required per year, equating to 221 over

⁵ *Ibid*

the period. This represents 63% of the estimated annual gap. Occupations within this category include operators, electrical fitters, manufacturer, and maintenance. There are a broad range of qualifications associated with the category from no qualifications to mechanical engineering degrees. Other associated qualifications include NVQ up to level 3 and NVQ level 2 in assembly.

Commenting on the sector the report notes:

...the main training need will be for re-skilling from traditional trades and the colleges have already developed a range of courses to meet these needs. Going forward it will therefore be a case of making sure that the volume of provision meets the need and that training is kept up to date with technological advances. Some of our consultees also felt that there was a need for courses to develop the awareness and knowledge of architects and M&E [mechanical and electrical] engineers to improve the energy efficiency of building designs and move away from more traditional building methods.⁶

Commenting specifically on the skills gap, the report states that:

It is likely that this gap can be bridged through increasing existing course intakes.⁷

⁶ *Ibid*

⁷ *Ibid*

Table 1: IBT– Summary Skills Demand-Supply Gap Analysis (central scenario)⁸

Occupational Category	Specific Occupations	Typical Qualification Requirements	Average Annual Skills Requirements 2011-2015	Current places Annually	Estimated Annual Gap	Total Gap 2011-2015
Managers and Senior Officials	Commercial Manager, general manager, director, mechanical engineers, design and overseeing of contracts, Sales Manager, Managing Director, technical electrical engineers, senior engineer, Design and Management, Professional and Technical issues, Sales, Academics/Consultants, installer, Product research, Technical Manager	Degree level - engineering or marketing, training accredited safety, environment engineering, Electrical Engineering, Electronic Engineering, Chartered engineer, Civil Engineering, languages, plumbing qualifications, Qualified Industrial Chemist, Mechanical Technician, HNC	38	21	17	83
Professional Occupations	Commissioning engineers, admin, mechanical engineers, consultancy advice, electrical engineers, Structural and Civil Engineers, Engineering R&D, Project Design, academics and consultants, Acoustical consultants, business development, engineering	Engineering degree, Electrical Engineering, Master's degree, project design experience, PhD, Mechanical engineering, Acoustics, Electronic Engineering, Fully NICEIC qualified	40	25	15	77
Associate Professional and Technical Occupations	Installation Engineers, technical sales, design engineers, Electricians, engineering technicians, Manufacturing Technicians, project design and installation, Professional and Technical issues, research, electrical technician, Mechanical Engineer	Engineering or marketing degree/HND/BTEC, electrical qualifications, HNC & relevant time served, design and installation, Electrical Engineers, NVQ level 4 qualified electrician, Mechanical Engineering, NICEIC qualified	18	29	-11	-57
Skilled Trades Occupations	Design and Installation, overall production, plumbing & heating	Technical Installation experience, GCSEs, city and guilds	25	20	5	25
Process, Plant and Machine Operations	Operators, electrical fitters, manufacturer, Maintenance	Mechanical engineering degree, none, NVQ up to level 3, NVQ level 2 in assembly, Engineering experience, Trade Qualifications - mechanical - electromechanical	76	32	44	221
Total			197	127	70	350

Source: DEL/ECORYS (totals may not sum due to rounding)

⁸ Ibid

2 Offshore energy

Table 2 summarises the report's findings on the potential skills gap within the offshore energy sector. Again, gaps are identified in four out of the five occupational categories.

The total identified gap is 110 additional skilled persons per year, or 548 additional persons between 2011 and 2015. This is the largest of identified gap of all four sectors, despite the sector having the second largest annual skills requirement over the period.

Within the sector, the largest identified gap was in the skilled trades occupations, where it was estimated an additional 81 persons (74% of the total annual gap) would be required per year, equal to 406 persons over the period (74% of the total need). The report identifies a specific need for mechanical fitters with NVQ level 3 in mechanical engineering.

On the sector the report raises a number of points with regard to the sector:

- Initial demand in the sector is predicted to be for higher-skills in the design and deployment phase, although most of these could be met from external sources e.g. the home countries of the main contractors;
- The biggest opportunity and largest demand was identified within operation and maintenance. Here, it was thought that technicians could be drawn from existing trades although re-skilling would be required;
- Bottlenecks could be created due to the high-demand for these skills in other sectors; and,
- Industry placements will be necessary to ensure young fitters and electricians can be taught the required skills adequately.⁹

Commenting more generally on the skills gap the report notes:

These gaps, particularly around skilled trades occupations, may require expansion of existing, and introduction of new, courses.¹⁰

⁹ *Ibid*

¹⁰ *Ibid*

Table 2: Offshore Energy – Summary Skills Demand-Supply Gap Analysis (central scenario)¹¹

Occupational Category	Specific Occupations	Typical Qualification Requirements	Average Annual Skills Requirements 2011-2015	Current places Annually	Estimated Annual Gap	Total Gap 2011-2015
Managers and Senior Officials	Technical, development manager, Hardware design, tender and project management, engineering manager, Operations Manager Sales, Academics or Consultants, installer, Product research, Technical Manager	Degree – engineering, civil engineering, mechanical engineering, PhD in Physics, engineering experience and 3rd level qualification	34	19	15	76
Professional Occupations	Engineer, Accountant	Degree in Engineering, CIMA	18	23	-4	-22
Associate Professional and Technical Occupations	Design Draftsman, Project engineer, Rig Drivers and Operators	Civil engineering degree, Plant Card, HNC	23	19	4	21
Skilled Trades Occupations	Mechanical fitter	NVQ level 3 in mechanical Engineering	91	10	81	406
Process, Plant and Machine Operations	Maintenance Engineer	NVQ level 3 in maintenance engineering	23	10	13	66
Total			188	79	110	548

Source: DEL/ECORYS (totals may not sum due to rounding)

3.3 Bioenergy

Table 3 details the estimated skills gap anticipated in the bioenergy sector. Of the four sectors bioenergy is the only one in which a skills overall surplus is expected both on an annual basis and over the period 2011 to 2015.

Despite this, however, gaps are expected within the managers and senior officials, and professional occupations categories. Within the former an additional three skilled persons are required per year, or 19 over the period. This category incorporates occupations such as commercials managers, mechanical engineers, research, and energy consultants (a full list is included in the table). Qualification requirements in this category range from HNC in electrical engineering to PhDs and MBAs.

A bigger gap is anticipated within the professional occupations categories, with an estimated 10 persons required each year and 46 over the 2011 to 2015 period. This category incorporates occupations including commissioning engineers, consultancy,

¹¹ *Ibid*

plumbing engineers and installers. The range of required qualifications includes degree levels engineering and various professional qualifications/registrations.

The report notes the following about this sector:

- Government policy will be a major determinant of growth within the sector;
- There may be a need to ‘*provide refresher courses for architectural and mechanical and electrical professionals in the construction sector to ensure that they are up to date with the current technology in relation to IBT and renewable energy*’; and,
- The take up of the renewable heat incentive may lead to spikes in demand. Monitoring of this will be required to ensure there are enough trained installers to meet this demand.¹²

Commenting on the specific skills gaps the report notes:

*...under a central scenario few skills gaps are expected overall, with only small gaps at managerial and professional levels. It is understood that these could be accommodated within existing course provision, with relatively comprehensive provision of higher level courses with land-based components.*¹³

¹² *Ibid*

¹³ *Ibid*

Table 3: Bioenergy – Summary Skills Demand-Supply Gap Analysis (central scenario)¹⁴

Occupational Category	Specific Occupations	Typical Qualification Requirements	Average Annual Skills Requirements 2011-2015	Current places Annually	Estimated Annual Gap	Total Gap 2011-2015
Managers and Senior Officials	Commercial Manager, Sales, Mechanical Engineers, project manage, energy consultants, Product research, Technical Manager, Manager	Degree -Engineering PhD, MBA, MSc, energy related qualifications, Experience of Industry, Mechanical Technician qualifications, HNC -Electronic Engineering, professional engineer	29	26	3	19
Professional Occupations	Commissioning engineers, Mechanical Engineers, consultancy advice, Accountancy, business development manager, plumbing engineers and installers	Degree - Engineering, Electronic Engineering, ACA or ACCA, Registered plumber/installer - BPEC Qualified, Fully NICEIC qualified	37	27	10	46
Associate Professional and Technical Occupations	Installation Engineers, design engineers, Trainer, biomass installer, Electrical Installer	Engineering degree, NVQ level 4 qualified electricians and plumbers, NVQ LEVEL 3, NICEIC qualified	15	20	-5	-27
Skilled Trades Occupations	None included	None included	19	36	-17	-85
Process, Plant and Machine Operations	Technical operative, handling, storage, distributing and processing of biomass	General understanding of plant machinery, Trade Qualifications- mechanical - electro mechanical	15	16	-1	-7
Total			114	125	-11	-55

Source: DEL/ECORYS (totals may not sum due to rounding)

3.4 Energy Storage

The energy storage sector record the lowest level of skills gaps of all the four sectors reflecting lower levels of expected growth over the period measured and the lower levels of skills requirement as a result.

Table 4 shows an overall gap of seven persons per year is expected, equating to 35 persons over the entire period. The largest gap is predicted in the process, plant and machine operations category (6 per annum, 30 in total). This sector includes occupations associated with the handling, storage, distributing and processing of biomass, with skills requirements at NVQ Levels 2 and 3.

¹⁴ Ibid

Growth in the sector is expected to pick up after 2015. This is reliant, however, on the development of a smart grid (categorised as an energy subsector within the paper). On this, the reports notes:

Energy Storage and more specifically the development of a Smart Grid are seen as one area where more graduate level skills are needed. NIE find it difficult to recruit power engineers and will also face greater recruitment problems over the next few years due to an ageing workforce. However, the main response here is likely to come through the STEM initiative and moves to attract more young people to choose degree subjects in these areas which would include electrical engineering. Despite the many confident predictions of the future importance of Smart Grid and the significant efforts around the work to research the approaches and technology involved we were not able to identify any data on specific future skill needs or the scale of these needs. The reason for this is thought to be that the technologies are still under development so the exact nature and timing of the skills needs cannot yet be identified.¹⁵

Table 4: Energy Storage – Summary Skills Demand-Supply Gap Analysis (central scenario)¹⁶

Occupational Category	Specific Occupations	Typical Qualification Requirements	Average Annual Skills Requirements 2011-2015	Current places Annually	Estimated Annual Gap	Total Gap 2011-2015
Managers and Senior Officials	Project manager, mechanical and electrical engineering	MBA, Engineering degree, energy related qualifications	8	3	5	23
Professional Occupations	Engineering, Engineering supervisor	Engineering degree – refrigeration, electronics	10	9	1	6
Associate Professional and Technical Occupations	None included	Degree	3	6	-3	-12
Skilled Trades Occupations	None included	City and guilds	4	7	-3	-13
Process, Plant and Machine Operations	Handling, storage, distributing and processing of biomass	NVQ 2/ 3, general understanding of plant machinery	6	0	6	30
Total			31	24	7	35

Source: DEL/ECORYS (totals may not sum due to rounding)

¹⁵ *Ibid*

¹⁶ *Ibid*

Annexes: Estimated Skills Gap All Growth Scenarios

1 IBT

Occupational Category	Specific Occupations	Typical Qualification Requirements	Scenario	Average Annual Skills Requirements 2011-2015	Current places Annually	Estimated Annual Gap	Total Gap 2011-2015
Managers and Senior Officials	Commercial Manager, general manager, director, mechanical engineers, design and overseeing of	Degree level - engineering or marketing, training accredited safety, environment	Low	21	21	0	-1
			Central	38		17	83
			High	60		39	194
Professional Occupations	Commissioning engineers, admin, mechanical engineers, consultancy advice, electrical engineers,	Engineering degree, Electrical Engineering, Masters degree, project design experience, PhD,	Low	22	25	-3	-13
			Central	40		15	77
			High	64		39	195
Associate Professional and Technical Occupations	Installation Engineers, technical sales, design engineers, Electricians, engineering	Engineering or marketing degree/HND/BTEC, electrical qualifications, HNC	Low	10	29	-19	-96
			Central	18		-11	-57
			High	28		-1	-5
Skilled Trades Occupations	Design and Installation, overall production, plumbing and heating	Technical Installation experience, GCSEs, city and guilds	Low	14	20	-6	-31
			Central	25		5	25
			High	40		20	99
Process, Plant and Machine Operations	Operators, electrical fitters, manufacturer, Maintenance	Mechanical engineering degree, none, NVQ up to level 3, NVQ level 2 in assembly,	Low	42	32	10	53
			Central	76		44	221
			High	120		88	443
Total			Low	110	127	-13	-87
			Central	197		70	350
			High	312		185	925

2 Offshore

Occupational Category	Specific Occupations	Typical Qualification Requirements	Scenario	Average Annual Skills Requirements 2011-2015	Current places Annually	Estimated Annual Gap	Total Gap 2011-2015
Managers and Senior Officials	Technical, development manager, Hardware design, tender and project management, engineering manager, Operations Manager Sales, Academics or Consultants, installer, Product research, Technical Manager	Degree – engineering, civil engineering, mechanical engineering, PhD in Physics, engineering experience and 3rd level qualification	Low	17	19	-2	-11
			Central	34		15	76
			High	46		27	137
Professional Occupations	Engineer, Accountant	Degree in Engineering, CIMA	Low	9	23	-14	-68
			Central	18		-4	-22
			High	25		2	11
Associate Professional and Technical Occupations	Design Draftsman, Project engineer, Rig Drivers and Operators	civil engineering degree, Plant Card, HNC	Low	11	19	-8	-37
			Central	23		4	21
			High	31		12	61
Skilled Trades Occupations	Mechanical Fitter	NVQ level 3 in mechanical engineering	Low	44	10	34	174
			Central	91		81	406
			High	123		113	568
Process, Plant and Machine Operations	Maintenance Engineer	NVQ level 3 in maintenance engineering	Low	11	10	1	8
			Central	23		13	66
			High	31		21	106
Total			Low	93	79	13	66
			Central	188		110	548
			High	256		117	884

3 Bioenergy

Occupational Category	Specific Occupations	Typical Qualification Requirements	Scenario	Average Annual Skills Requirements 2011-2015	Current places Annually	Estimated Annual Gap	Total Gap 2011-2015
Managers and Senior Officials	Commercial Manager, Sales, Mechanical Engineers, project manage, energy consultants, Product research, Technical Manager, Manager	Degree - Engineering PhD, MBA, MSc, energy related qualifications, Experience of Industry, Mechanical Technician qualifications, HNC - Electronic Engineering, professional engineer	Low	15	26	-11	-50
			Central	29		3	19
			High	83		57	287
Professional Occupations	Commissioning engineers, Mechanical Engineers, consultancy advice, Accountancy, business development manager, plumbing engineers and installers	Degree - Engineering, Electronic Engineering, ACA or ACCA, Registered plumber/installer - BPEC Qualified, Fully NICEIC qualified	Low	19	27	-8	-41
			Central	37		10	46
			High	104		77	382
Associate Professional and Technical Occupations	Installation Engineers, design engineers, Trainer, biomass installer, Electrical Installer	Engineering degree, NVQ level 4 qualified electricians and plumbers, NVQ LEVEL 3, NICEIC qualified	Low	8	20	-12	-61
			Central	15		-5	-27
			High	41		21	107
Skilled Trades Occupations	None provided	None provided	Low	10	36	-26	-130
			Central	19		-17	-85
			High	54		18	90
Process, Plant and Machine Operations	Technical operative, Handling, storage, distributing and processing of biomass	General understanding of plant machinery, Trade Qualifications- mechanical - electro mechanical	Low	8	16	-8	-41
			Central	15		-1	-7
			High	41		25	127
Total			Low	60	125	-65	-324
			Central	114		-11	-55
			High	324		199	993

4 Energy storage

Occupational Category	Specific Occupations	Typical Qualification Requirements	Scenario	Average Annual Skills Requirements 2011-2015	Current places Annually	Estimated Annual Gap	Total Gap 2011-2015
Managers and Senior Officials	Project manager, mechanical and electrical engineering	MBA, Engineering degree, energy related qualifications	Low	7	3	4	17
			Central	8		5	23
			High	11		8	37
Professional Occupations	Engineering, Engineering supervisor	Engineering degree – refrigeration, electronics	Low	8	9	-1	-2
			Central	10		1	6
			High	13		4	23
Associate Professional and Technical Occupations		Degree	Low	3	6	-3	-15
			Central	3		-3	-12
			High	4		-2	-7
Skilled Trades Occupations		City and guilds	Low	3	7	-3	-16
			Central	4		-3	-13
			High	5		-2	-6
Process, Plant and Machine Operations	Handling, storage, distributing and processing of biomass	NVQ 2/ 3, general understanding of plant machinery	Low	5	0	5	25
			Central	6		6	30
			High	8		8	40
Total			Low	26	24	2	10
			Central	31		7	35
			High	42		17	87