# Neart na Gaoithe Offshore Wind Farm

## Onshore Work – Employment Estimates Technical Annex

June 2012

1 This technical annex further outlines the assessment methodology used to estimate the potential employment impacts associated with the onshore works on the economies of the study area and the rest of Scotland. This methodology is based on assessing the impact of project expenditure (on the economies of the study area and Scotland). The study area is defined in Chapter 17 Socioeconomic issues and recreation.

2 Estimates for project expenditure were split between the study area, the rest of Scotland, the rest of the UK and elsewhere.

3 The timeline for the onshore works used for the assessment is around 2 years for construction/installation and around 22 years for operations and maintenance (as stated in Chapter 23: Socioeconomics in the Offshore Works Environmental Statement).

4 The economic impact processes that are assessed and estimated can be sub-divided into three distinct but related effects, as follows:

| Impact | Definition |
|---|---|
| **Direct** | The Direct effect results from increases in economic output and/or employment generated by the developer/operator of the project as a result of the project going ahead, plus increases in economic output and employment among suppliers who provide goods and services directly to the project as a result of contracts obtained; |
| **Indirect** | As suppliers to the project increase output to meet the additional demand for their goods and services associated with the project, there will also be a corresponding increase in demand on their own suppliers and so down their supply chains – the resulting increase in economic output and employment is termed the Indirect effect; |
| **Induced** | As a result of the direct and indirect effects, an injection of additional expenditure will be provided that will re-circulate throughout the economy: for example, workers will spend their additional incomes on a range of goods and services, and a proportion of this spending will then be re-spent in turn by other businesses (and their workers) and thus there will be a "ripple effect" throughout the economy as a whole. The resulting additional increase in demand for economic output and employment is termed the Induced effect. |

Table 1: Definitions

### *Employment Assessment Methodology*

5 The impact of increased jobs is modelled through the following approach:

- Employment multiplier values from the Scottish Input-Output Tables (Scottish Government, 2010) which best fit the types of goods and services to be purchased, are applied to the expenditure in each year and by geography (i.e., study area and rest of Scotland) and for construction/installation phase of the onshore work.
- The Gross Value Added (GVA) (direct, indirect and induced)[1] in construction/installation phase and year (for both the study area and the rest of Scotland) and the GVA per employee figure were used to arrive at an estimate for employment in each phase and year (for both the study area and the rest of Scotland). GVA per employee figures for each industry group used is based on Scottish Government Input-Output Tables (Scottish Government, 2010a). These figures have been adjusted using the HM Treasury GDP deflator (HM Treasury, 2011).
- The indirect and induced employment is estimated using standard Type II GVA and employment multipliers. For Scotland, the Scottish Input-Output Tables have been used to identify multipliers for construction/installation phase. The study area multipliers are estimated by reducing the Scottish multiplier values to reflect the relative smaller geographical area and more limited supply chain links associated with the study area. A complete list of multipliers used in the assessment is shown in **Table 4**.

### *GVA Assessment Methodology*

6 As estimating GVA is a step in the conversion to employment impacts, this section outlines how GVA was modelled.

7 In order to assess the potential GVA (and employment) associated with the onshore work that could be generated in the study area and the rest of Scotland if the project proceeds, estimates of the approximate expenditure on construction/installation were used.

8 Estimates of the percentage of this expenditure (for each of these sub-phases) that were likely to be delivered by businesses based in the study area, the rest of Scotland (rest of the UK and overseas) were also used.

9 In calculating the additional GVA attributable to the project, and obtained through the workings of the direct, indirect and induced effects defined in Table 1 above, a 'low case' scenario was developed whereby the percentage of expenditure by construction/installation and geography was described. This low case **refers to the total value of contracts that have been delivered, or are expected to be delivered, from within each geography[2], assuming the current supply chain**. This represents a conservative estimate of the supply chain.

### *Direct GVA Impact*

10 Direct GVA, in this case, refers to the contribution of individual businesses, industries or sectors to the economy as a result of the direct expenditure associated with the proposed development. Taking into account the above, the direct GVA for the development of the project was modelled by taking the following steps:

- Estimation of the project expenditure by construction/installation and geography (i.e., between the study area, the rest of Scotland, rest of the UK and elsewhere) according to projected distribution (refer to **Table 3**);
- Distribution of these values equally across the relevant years for construction/installation phase according to projected distribution; and

[1] GVA represents the difference between the value of goods and services produced and the cost of raw materials, from which is paid wages, salaries and profits. According to the Scottish Annual Business Statistics (Scottish Government, 2012), the Office for National Statistics (ONS) defines GVA as *"the amount that individual businesses, industries or sectors contribute to the economy. Broadly, this is measured by the income generated by the business, industry or sector less their intermediate consumption of goods and services used up in order to produce their output. GVA consists of labour costs (e.g., wages and salaries) and an operating surplus (or loss)"*. In essence, GVA is a sub-national approximation of Gross Domestic Product, and is a measure of the overall value of economic activity in a sub-national area.

[2] i.e., expenditure in study areas; rest of Scotland; rest of the UK; and elsewhere.

- Application of expenditure to GVA ratios to the expenditure figures for construction/installation, location and year. This gives estimates of the direct gross GVA per annum for the study area and the rest of Scotland. To do this, the construction/installation phases were mapped against Scottish Input-Output Tables Industry Group (Scottish Government, 2010) and then a ratio calculated between the total industry group turnover and GVA (this approach was used for assessing both GVA and employment generated).

11 Discount rates are applied in line with Green Book guidance (HM Treasury, 2003) to provide present values of the gross GVA impact in each year. These annualised estimates are then totalled together to give the present value of estimated gross GVA to the study area and the rest of Scotland of the project.

12 In order to estimate the direct GVA associated with construction/installation, a ratio of expenditure to GVA has been applied to the relevant expenditure values. To do this, the construction/installation phase has been mapped against standard industrial classification (SIC) codes which are used in statistical publications to categorise different sectors of the economy. It is important to acknowledge that this mapping is a 'best fit' exercise because not all of the activities in the wind farm sector match exactly with the divisions provided by current SIC codes.

13 The supply chain activities associated with construction/installation phase of the project has been mapped against SICs. The fit between wind farm activity and these industry groups are presented in **Table 4**. These SIC codes have in turn been mapped against the Scottish Government Input-Output Table classifications. The Scottish Government's Input-Output Tables provide a complete picture of the flows of goods and services in the economy. For each sector, they also provide estimates of total turnover and GVA. These estimates have been used to calculate expenditure to GVA ratios (project expenditure is equivalent to turnover for the project's suppliers). The latest input-output tables were published in 2010 but are based on 2007 data. These figures have been adjusted using the HM Treasury Gross Domestic Product (GDP) deflator. The figures used in the assessment are presented in **Table 2**.

| Input-Output Classification | Turnover (industry totals in £ million) | GVA (industry totals in £ million) | Turnover to GVA ratio |
|---|---|---|---|
| 88: Construction | 19,182.6 | 7,557.4 | 2.54 |
| 112: Architectural and engineering activities and related technical consultancy, technical testing and analysis | 4,144.4 | 2,391.9 | 1.73 |

Table 2: Turnover, GVA, ratios by industry (Source: Scottish Government, 2010)

14 The appropriate turnover to GVA ratios were applied to the expenditure estimates for construction/installation phase in each year and geography. It is assumed that the expenditure to GVA ratios remain constant across the study area and the rest of Scotland. This provides estimates of the gross direct GVA in each year for both the study area and the rest of Scotland.

### *Indirect and Induced GVA Impact*

15 The indirect and induced GVA impacts that the project investment will generate are also considered in the economic model.

16 The Indirect GVA effect is the incremental increase in the value of economic output brought about by the additional business activity among businesses supplying goods and services to support the development and operation of the project.

17 Induced GVA measures additional economic output from the re-circulation of direct and indirect expenditure from business procurement and workers' incomes (that is, the ripple effects throughout the economy that result from the workings of the Direct and Indirect effects).

18 These impacts are measured using standard assumptions (multipliers) based on a Scottish Government model of the Scottish economy (Scottish Government, 2010). The value of the multiplier provides an estimate of the direct, indirect and induced effects in combination.

19 For Scotland, the Scottish Input-Output Tables have been used to identify GVA multipliers for each of the individual project sub-phases. The study area multipliers are estimated by reducing the Scottish multiplier values to reflect the relative smaller geographical area and more limited supply chain links associated with the study area. The following adjustments have been made to the national figures to provide multipliers for the study area: 50% of the indirect effect; and 80% of the induced effect.

20 The GVA multipliers take into consideration the expenditure in the supply chain relating to the study area economies.

21 A complete list of the GVA multipliers used in the assessment is shown in **Table 4**. These multipliers have been applied to the direct GVA estimates for construction/installation and geography to provide an estimate of the total (direct, indirect and induced) GVA impacts associated with the construction/installation phase

## Economic impact model key inputs and assumptions

| *Geographical breakdown of expenditure - low case* | | | | | |
|---|---|---|---|---|---|
| **Project phase** | **Expenditure in Study Area (%)** | **Expenditure in rest of Scotland** | **Expenditure in rest of UK** | **Expenditure elsewhere (%)** | **Total expenditure (%)** |
| *Construction/Installation* | | | | | |
| Installation: MetMast | 10% | 0% | 0% | 90% | 100% |
| Installation: Cable lay and testing and commissioning | 10% | 90% | 0% | 0% | 100% |

Table 3: Geographical breakdown of expenditure – low case. Source: Mainstream Renewable Power

### *Multipliers, turnover to GVA ratios and GVA per employee values (see below)*

The table below provides multipliers, turnover to GVA ratios and GVA per employee values used in the economic modelling.

The figures in *red italics* are averages of where there is more than SIC code for a project sub-phase.

| | | **Type II employment multipliers** | | **Type II GVA multipliers** | | **Turnover to GVA ratio** | | **GVA per employee (£)** | |
|---|---|---|---|---|---|---|---|---|---|
| **Project Phase** | | **Study Area** | **Scotland** | **Study Area** | **Scotland** | **Study Area** | **Scotland** | **Study Area** | **Scotland** |
| **Construction/installation** | | | | | | | | | |
| Installation: MetMast | 88: Construction | 1.71 | 2.19 | 1.67 | 2.14 | 2.54 | 2.54 | 61,678 | 61,678 |
| Installation: Cable lay and testing and commissioning | 88: Construction | 1.71 | 2.19 | 1.67 | 2.14 | 2.54 | 2.54 | 61,678 | 61,678 |
| | 112: Architectural and engineering activities and related technical consultancy, technical testing and analysis | 1.48 | 1.78 | 1.44 | 1.70 | 1.7 | 1.7 | 57,554 | 57,554 |
| | | *1.60* | *1.98* | *1.56* | *1.92* | *2.14* | *2.14* | *59,616* | *59,616* |
| **Operation and maintenance** | | | | | | | | | |
| Operation & maintenance | 97: Supporting and auxiliary transport activities, activities of travel agencies | 1.90 | 2.49 | - | - | - | - | - | - |
| | 112: Architectural and engineering activities and related technical consultancy, technical testing and analysis | 1.48 | 1.78 | - | - | - | - | - | - |
| | 57: Structural Metal Products | 1.55 | 1.86 | - | - | - | - | - | - |
| | | *1.64* | *2.04* | - | - | - | - | - | - |

Table 4: Multipliers, turnover to GVA ratios and GVA per employee values. Note: - denotes 'not applicable'

## References


HM Treasury, 2003. *The Green Book*. Available online from: http://www.hm-treasury.gov.uk/data_greenbook_index.htm [Accessed Jan 2012].

HM Treasury (2012) GDP Deflators. Available from: http://www.hm-treasury.gov.uk/data_gdp_guide.htm [Accessed Jan 2012].

Scottish Government, 2010. Input Output Tables 2007. Available from http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/IOAllFiles2007. [Accessed February 2012].

Scottish Government, 2012. Scottish Annual Business Statistics. Available from http://www.scotland.gov.uk/Topics/Statistics/Browse/Business/SABS/Definitions [Accessed March 2012]