

# **BOWL socio-economic assessment**

Technical Annex

**SQW**

# 1: Technical Annex

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- 1.1 This Annex sets out the GVA and employment ratios used in the economic section of the socio-economic chapter and their sources.
- 1.2 The analysis is based on the pattern of expenditure anticipated by the project and provided by BOWL. This is converted to GVA and employment estimates using data from the Scottish Government's Input-Output Tables<sup>1</sup>.

## ***Fitting Project sub-phases to Input-Output table industry groups***

- 1.3 Each sub-phase involves a number of different elements which would be carried out by contractors in different industries. Their propensity to support employment and income differs. To calculate these effects, the Scottish Government's Input-Output Tables have been used. The sub-phases have been mapped against the Input-Output table's classifications. The fit between wind farm activity and these industry groups is shown in the following tables.
- 1.4 The input-output tables provide a picture of the flows of goods and services in the economy. For each industry group, they provide estimates of total turnover and GVA in Scotland. These estimates have been used to calculate GVA to expenditure ratios (project expenditure is considered to be equivalent to turnover for the project's suppliers). The most recent input-output tables were published in 2010, although they are based on 2007 data. These ratios have not been adjusted to reflect possible changes over time.
- 1.5 There are two areas where the Input-Output Tables have been deviated from. A large proportion of expenditure on the offshore installation elements requires the hire or ownership of specialist vessels. For this reason the ratio of employment to turnover and GVA is likely to be much lower than for many other phases of the work. This is not captured accurately enough in the Input-Output Tables and to address this, the assessment has used more detailed employment to GVA figures produced by the ONS at four digit SIC level<sup>2</sup>. The classification used is "sea and coastal water transport", which includes vessel services for cable laying and heavy lifting, and produces a GVA per employee estimate of £141,000, which has been inflated to 2011 prices.
- 1.6 The second area where it is difficult to use SIC codes and industry ratios is in operations and maintenance, where much of the expenditure is on the hire or purchase of capital goods (helicopters and vessels) rather than employment. Because of the difficulty categorising this phase, a recent report for Vestas Offshore<sup>3</sup> has been used which provides estimates of direct and indirect operations and maintenance employment per megawatt. Although it is recognised that there may be some economies of scale associated with the size of this

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<sup>1</sup> Source: Scottish Government Input-Output tables 2007 (2010). Available from <http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/IOAllFiles2007>

<sup>2</sup> ONS, Labour productivity measures from the ABI: 1998 to 2007 Economic & Labour Market Review | Vol 4 | No 5 | May 2010

<sup>3</sup> Oxford Economics (2010) Analysis of the Employment Effects of the Operation and Maintenance of Offshore Wind Parks in the UK. A Report for Vestas Offshore. Available from <http://www.vestas.com/en/media/news/news-display.aspx?PID=0&NewsID=2355&action=3>

development, this is not yet clear and the Vestas report is a useful measure of the employment impacts that have occurred.

- 1.7 These ratios are used to provide a measure of the employment and GVA that would be supported by the expenditure anticipated in each geographical area.

### ***Multipliers***

- 1.8 In addition to the direct GVA impacts, it is also important to consider the **indirect** and **induced** GVA effects that the development investment will generate.

- **Indirect effects** – as suppliers increase output to meet the additional demand for their goods and services, there will also be a knock-on increase in demand on their own suppliers and so on down the supply chain.
- **Induced effects** – as a result of the direct and indirect effects, household incomes will increase in line with the increased employment created by the development directly and throughout the supply chain. A proportion of this increased income will be re-spent on other goods and services.

- 1.9 UK input-output tables<sup>4</sup> do not provide GVA multipliers, but do provide output multipliers. These output multipliers have been adjusted using the ratio of output multipliers to GVA multipliers from the Scottish tables to provide equivalent estimate for the UK.

- 1.10 There are very few sub-national multipliers, although it is known that the values for the study area will be smaller than for Scotland as a whole. A recent Highlands and Islands Enterprise report<sup>5</sup> for Moray applied factors of 40% of the indirect effect and 70% of the induced effect to adjust the Scotland multipliers to Moray. Given that the study area here is substantially larger than Moray alone, the values are likely to be somewhere between these and the national figures. Highlands and Islands Enterprise do not use any set formula or multiplier values. The following adjustments have been made to the national figures to provide multipliers for the study area:

- 50% of the indirect effect
- 80% of the induced effect.

### ***Tables***

- 1.11 The first six columns of the Table show the employment and GVA multipliers used by the analysis at each of the three geographies. The following column shows the ratio of turnover to GVA calculated from the Scottish Input-Output Tables. The final column uses the data in the Input-Output Tables to provide values for GVA per employee.

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<sup>4</sup> Office for National Statistics (2005) UK input-output tables. Available from: [http://www.statistics.gov.uk/about/methodology\\_by\\_theme/inputoutput/latestdata.asp](http://www.statistics.gov.uk/about/methodology_by_theme/inputoutput/latestdata.asp)

<sup>5</sup> Highlands and Islands Enterprise (2010) Economic Impact of RAF Kinloss and RAF Lossiemouth. Available from: [http://www.moraytaskforce.com/userfiles/files/Economic\\_Impact\\_RAF\\_Kinloss\\_and\\_RAF\\_Lossiemouth\\_final\\_report.pdf](http://www.moraytaskforce.com/userfiles/files/Economic_Impact_RAF_Kinloss_and_RAF_Lossiemouth_final_report.pdf)

## Annex A: Multipliers and GVA per employee ratios

### Summary table of assumptions

Project Phase	I/O industry group	Type II employment multipliers			Type II GVA multipliers			Turnover to GVA ratio	GVA per employee (£)
		Study Area	Scotland	UK	Study Area	Scotland	UK	All	All
<i>Consenting &amp; Development</i>									
Management - Wind farm	112: Architectural and engineering activities and related technical consultancy, technical testing and analysis	1.48	1.78	1.67	1.44	1.70	1.72	1.73	57,554
Engineering - Wind farm	112: Architectural and engineering activities and related technical consultancy, technical testing and analysis	1.48	1.78	1.67	1.44	1.70	1.72	1.73	57,554
EIA - Wind farm	112: Architectural and engineering activities and related technical consultancy, technical testing and analysis	1.48	1.78	1.67	1.44	1.70	1.72	1.73	57,554
Site Investigation - Wind farm	112: Architectural and engineering activities and related technical consultancy, technical testing and analysis	1.48	1.78	1.67	1.44	1.70	1.72	1.73	57,554
Met Mast	112: Architectural and engineering activities and related technical consultancy, technical testing and analysis	1.48	1.78	1.67	1.44	1.70	1.72	1.73	57,554
Financial Close	100: Banking & Finance	1.56	1.89	1.53	1.29	1.46	1.46	1.57	105,474

<i>Manufacture</i>									
		Type II employment multipliers			Type II GVA multipliers			Turnover to GVA ratio	GVA per employee (£)
Project Phase	I/O industry group	Study Area	Scotland	UK	Study area	Scotland	UK	All	All
Technical and commercial management	112: Architectural and engineering activities and related technical consultancy, technical testing and analysis	1.48	1.78	1.67	1.44	1.70	1.72	1.73	57,554
<b>Supply: Turbines, transformers &amp; towers</b>									
Turbines	57: Structural Metal Products	1.55	1.86	1.80	1.52	1.83	2.10	2.61	60,090
Transformers	57: Structural Metal Products	1.55	1.86	1.80	1.52	1.83	2.10	2.61	60,090
Towers	57: Structural Metal Products	1.55	1.86	1.80	1.52	1.83	2.10	2.61	60,090
Supply: Substructure	57: Structural Metal Products	1.55	1.86	1.80	1.52	1.83	2.10	2.61	60,090
Supply: Array Cables	71: Insulated wire & cable	1.38	1.60	1.74	1.59	1.93	2.00	2.94	36,417
<b>Supply: OSP's</b>									
Structural	57: Structural Metal Products	1.55	1.86	1.80	1.52	1.83	2.10	2.61	60,090
Electrical	57: Structural Metal Products	1.55	1.86	1.80	1.52	1.83	2.10	2.61	60,090
Ancillary	57: Structural Metal Products	1.55	1.86	1.80	1.52	1.83	2.10	2.61	60,090
Supply: Export Cables	71: Insulated wire & cable	1.38	1.60	1.74	1.59	1.93	2.00	2.94	36,417
Supply: Onshore Substation	88: Construction	1.71	2.19	2.53	1.67	2.14	2.35	2.54	61,678

<i>Construction/Installation</i>									
		Type II employment multipliers			Type II GVA multipliers			Turnover to GVA ratio	GVA per employee (£)
Project Phase		Study Area	Scotland	UK	Study area	Scotland	UK	All	All
Technical and commercial management	112: Architectural and engineering activities and related technical consultancy, technical testing and analysis	1.48	1.78	1.67	1.44	1.70	1.72	1.73	57,554
Transportation & Logistics	95: Water transport	1.56	1.91	1.71	1.46	1.76	1.68	2.18	153,732
Onshore assembly	88: Construction	1.71	2.19	2.53	1.67	2.14	2.35	2.54	61,678
Installation: Foundations & MetMast	95: Water transport	1.56	1.91	1.71	1.46	1.76	1.68	2.18	153,732
Installation: Wind turbines	95: Water transport	1.56	1.91	1.71	1.46	1.76	1.68	2.18	153,732
Installation: Export Cable lay	95: Water transport	1.56	1.91	1.71	1.46	1.76	1.68	2.18	153,732
Installation: Array Cable lay	95: Water transport	1.56	1.91	1.71	1.46	1.76	1.68	2.18	153,732
Testing & commissioning	112: Architectural and engineering activities and related technical consultancy, technical testing and analysis	1.48	1.78	1.67	1.44	1.70	1.72	1.73	57,554

		Type II employment multipliers			Type II GVA multipliers			Turnover to GVA ratio	GVA per employee (£)
Project Phase		Study Area	Scotland	UK	Study Area	Scotland	UK	All	All
<i>Decommissioning</i>									
Decommissioning	95: Water transport/ 112: engineering	1.52	1.84	1.69	1.45	1.73	1.70	1.96	105,643