



UK content analysis of Robin Rigg offshore wind farm

BVG Associates

BVG Associates is a technical consultancy with expertise in wind and marine energy technologies. The team probably has the best independent knowledge of the supply chain and market for wind turbines in the UK. BVG Associates has over 120 man years experience in the wind industry, many of these being “hands on” with wind turbine manufacturers, leading RD&D, purchasing and production departments. BVG Associates has consistently delivered to customers in many areas of the wind energy sector, including:

- Market leaders and new entrants in wind turbine supply and UK and EU wind farm development
- Market leaders and new entrants in wind farm component design and supply
- New and established players within the wind industry of all sizes, in the UK and on most continents, and
- Department of Energy and Climate Change (DECC), RenewableUK, The Crown Estate, the Energy Technologies Institute, the Carbon Trust, Scottish Enterprise and other similar enabling bodies.

Author

Dr Alun Roberts has worked in the offshore wind industry for more than three years and has developed a comprehensive knowledge of the UK’s offshore wind supply chain. Recent work he has led includes the report *Towards Round 3: Progress in Building an Offshore Wind Supply Chain* for The Crown Estate and he has authored material to help suppliers understand the opportunities for them in offshore wind.

The views expressed in this report are those of BVG Associates.

UK Content Analysis of Robin Rigg offshore wind farm

Document history

Revision	Purpose and description	Originated	Checked	Authorised	Date
1	Initial draft	JJW	AER	BAV	25/07/11
2	Revised draft	AER	CLW	MJB	10/08/11
3	Final	AER	AMW	BAV	21/09/11

Contents

1. Introduction	1
1.1. Previous assessments of UK content	1
2. Methodology	2
2.1. Supply chain categories.....	2
2.2. UK geographical breakdown.....	3
3. Results.....	4
3.1. Supply chain area	4
3.2. Contract value.....	4
3.3. UK, regional and local content	5
4. Discussion	8
4.1. UK content.....	8
4.2. Local and regional content.....	8
4.3. Future	8

List of figures

Figure 2.1 Multicontract approach taken by EC&R for the Robin Rigg project.....	2
Figure 2.2 Supply chain areas in the construction of an offshore wind farm.....	3
Figure 2.3 Geographical breakdown of supplier costs	3
Figure 3.1 Breakdown of contract value by supply chain area.....	4
Figure 3.2 Breakdown of contract value by company location	4
Figure 3.3 Location of UK suppliers according to contract value	5
Figure 3.4 UK, regional and local content in Robin Rigg construction	6
Figure 3.5 UK content by supply chain area	6
Figure 3.6 UK, regional and local content in project management work	6
Figure 3.7 UK, regional and local content in the balance of plant manufacture phase	7
Figure 3.8 UK, regional and local content in the installation and commissioning phase	7

List of tables

Table 2.1 Supply chain categories used in this study	3
--	---

1. Introduction

The UK currently has approximately 1.6GW of operational offshore wind farm capacity with a project pipeline of about 50GW. For the Government, the economic activity generated by these projects is an important benefit in terms of the value and jobs that will be generated in the UK. There is little consistent data to demonstrate these benefits or the degree to which the UK supply chain is responding to the growth of the market.

E.ON Climate & Renewables (EC&R) commissioned BVG Associates to undertake an analysis of the economic value to the UK of the development, manufacture and construction work of its Robin Rigg wind farm as part of its efforts to demonstrate the potential benefits to the UK from its forthcoming offshore wind developments, notably the Humber Gateway and Rampion projects.

Robin Rigg is located in the Solway Firth, off the west coast of Scotland and close to the north coast of Cumbria, where its operational base and grid connection are located. The wind farm consists of 60 Vestas V90 3MW turbines, and the 180MW site began full generation in April 2010. The project is the third offshore wind farm built by EC&R, and its first commercial wind farm in Scottish waters.

1.1. Previous assessments of UK content

The only detailed analysis of the domestic content of UK offshore wind farms that is publicly available is that released by EC&R for its Scroby Sands project, which concluded that UK content was 48 per cent.¹ It is likely that other developers have undertaken detailed studies but the full details of these have not been made public.

UK content levels as low as 10 and 20 per cent for London Array Offshore Wind Farm and Thanet Offshore Wind Farm respectively have been quoted in the media.^{2,3} While this may represent the value of major tier 1 contracts that were awarded, it may not represent the full value captured by UK companies in lower supply chain tiers. Indeed, Vattenfall has indicated that UK content for Thanet was closer to 30 per cent when the smaller construction contracts are included. It also reports that the UK content in the Ormonde project was 31 percent of capital costs.

2. Methodology

Establishing the UK content of an offshore wind farm is a complex task because of the many components and services involved and because UK content within each element can occur lower in the supply chain than the supplier that the developer contracts with. In building the project, EC&R adopted a multi-contract approach that is similar to that currently taken by most offshore wind developers. This means the project is split into distinct packages, as shown in Figure 2.1. Beneath this high level contract breakdown, however, each main contractor will also have its own supply chain which may be globally spread.

This means that an analysis of the source of every component or service in the supply chain would be a significant challenge. We have therefore developed a methodology that provides an estimate of UK content within reasonable confidence limits and with less effort.

EC&R provided details of all the contracts it awarded during the development and construction of the wind farm, giving company name, address, and the nature and value of the work. The confidentiality provisions within the contracts meant that permission was needed from each supplier before this information could be passed to us. Of the contracts awarded to 136 companies, permission was given by 117. The identity and/or location of the remainder was assumed or deduced from public information sources.

One approach to deriving UK content is to assume that the components or services procured by tier 1 suppliers are sourced entirely from either the UK or overseas depending on the location of the contracting company. This approach assumes that any tier 2 or 3 suppliers to UK tier 1 contractors are also from the UK and that any subcontracts to overseas tier 1 contractors are also placed overseas.

Based on our understanding of the offshore wind supply chain, we believe that this approach has the potential to

lead to significant errors which may mislead if reported by the media. We have therefore sought to identify UK subcontracting value in all contracts that represented more than one per cent of the capital cost of the project. This was achieved through dialogue with the relevant companies or, in a limited number of cases, by making assumptions about the likely UK content of the contract. Industry knowledge was also used to determine the value of imported materials and components (to and from the UK), particularly for turbine and balance of plant suppliers where manufacturers source components and raw materials globally.

For installation contracts we have recognised that the purchase or charter of the vessel accounts for a significant proportion of the total cost. None of the main installation vessels used on the project was built in the UK. We have therefore removed a representative portion from the UK content in this category.

Using this methodology, we believe that the potential for significant errors in estimating the true UK content is small because none of the main manufacturing contracts were placed with UK companies and there are no grounds for thinking that any significant tier 2 or 3 manufacturing contracts went to UK companies.

2.1. Supply chain categories

Each contract value was assigned to a relevant area of the supply chain. In *A Guide to an Offshore Wind Farm*, published by The Crown Estate, we outlined key supply chain areas which reflect, as far as possible, all of the discrete activities undertaken by different suppliers.⁴ These are defined in Table 2.1. Operations and maintenance (O&M) activities were not included in this analysis.

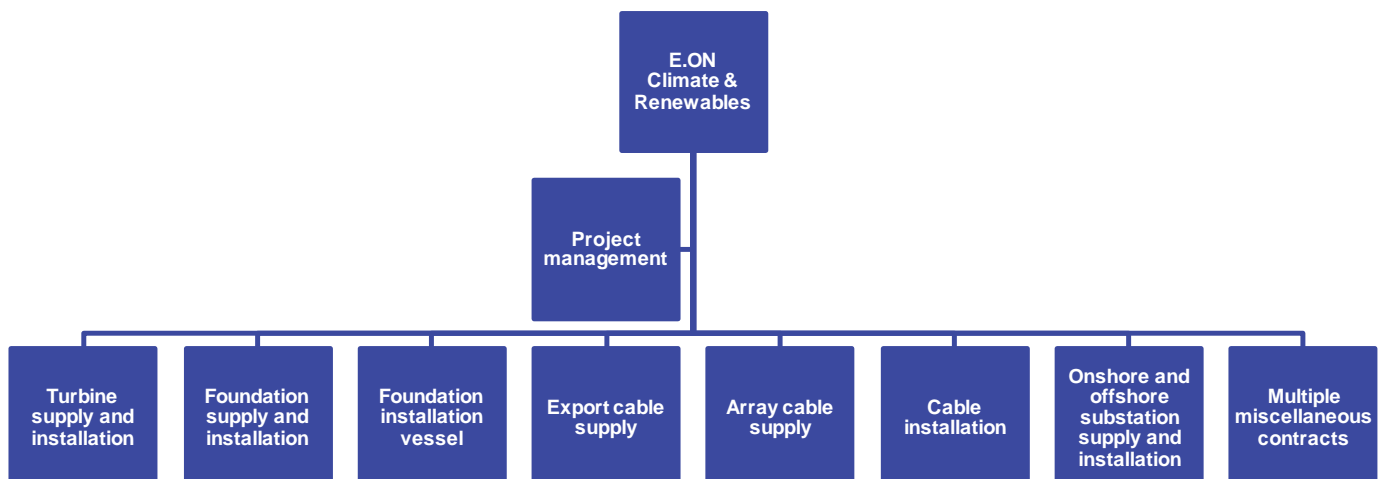


Figure 2.1 Multicontract approach taken by EC&R for the Robin Rigg project

UK content analysis of Robin Rigg offshore wind farm

Table 2.1 Supply chain categories used in this study

Supply chain area	Scope
Project management	The processes up to the point of financial close or placing firm orders to proceed with wind farm construction, and project management costs incurred by the developer before and during construction
Turbine manufacture	The activity by wind turbine manufacturers and their suppliers, covering nacelle component manufacture and assembly and blade and tower manufacture
Balance of plant manufacture	Manufacture of all the components of the wind farm, other than the wind turbine
Installation and commissioning	The installation and commissioning of balance of plant and turbines, including land and sea-based activity

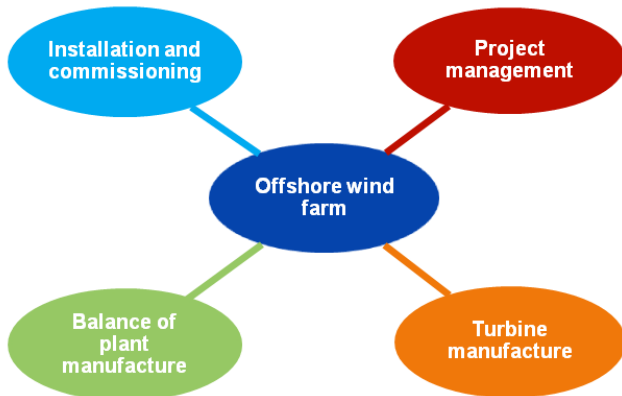


Figure 2.2 Supply chain areas in the construction of an offshore wind farm

2.2. UK geographical breakdown

As well as analysing the total UK content, we further categorised the location of suppliers, based on whether the value was captured by companies who were local to the wind farm or in the same region. This reflects the interest shown by public enablers in demonstrating the potential activity available to companies close to offshore wind projects. We used the breakdown in Figure 2.3, because:

- The wind farm lies in Scottish Territorial Waters and is Scotland's first commercial scale wind farm, and
- The operations base and grid connection is in North West England.

The subregions, Cumbria and Dumfries and Galloway, were chosen as the nearest counties to the project.

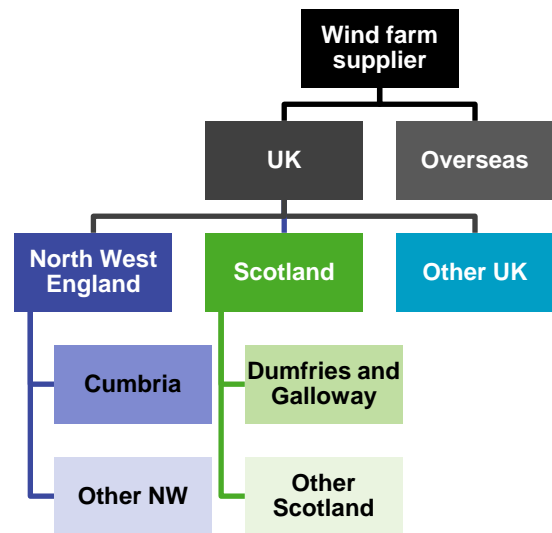


Figure 2.3 Geographical breakdown of supplier costs

3. Results

3.1. Supply chain area

The total project value for the development, manufacture, construction and installation of the Robin Rigg wind farm was £381 million, which is the equivalent of £2.1 million per MW.

Figure 3.1 shows that the cost of manufacturing the turbine accounted for the largest share of the capital expenditure of the Robin Rigg wind farm, followed by installation and commissioning. This breakdown was consistent with other published cost breakdowns.

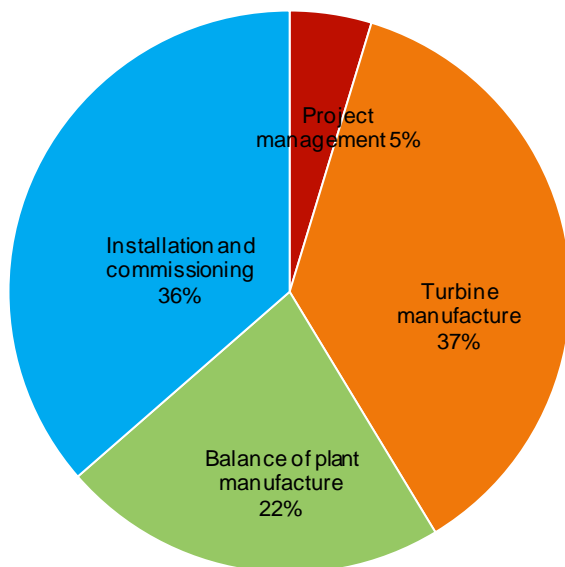


Figure 3.1 Breakdown of contract value by supply chain area

3.2. Contract value

Figure 3.2 shows the headline geographical distribution of suppliers by value. It should be noted that this only includes those suppliers directly contracted by EC&R. Overseas companies dominate the headline contract values, accounting for 63 per cent of total spend. Of the 37 per cent of headline contract value won by UK companies, 16 per cent is from Scottish and North West companies.

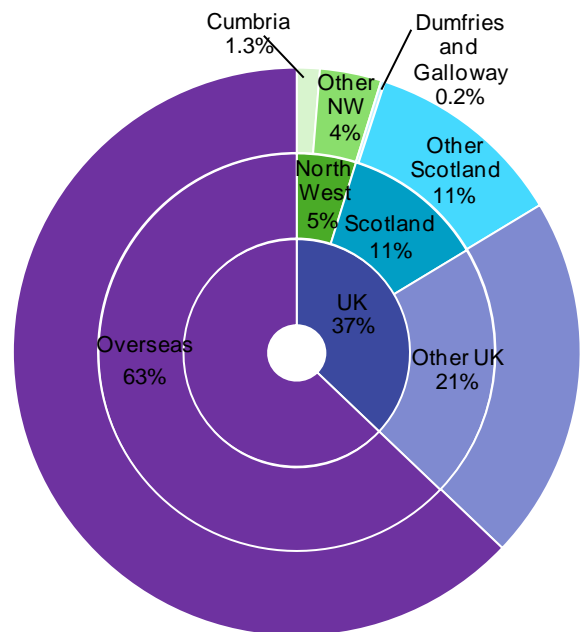


Figure 3.2 Breakdown of contract value by company location

UK content analysis of Robin Rigg offshore wind farm

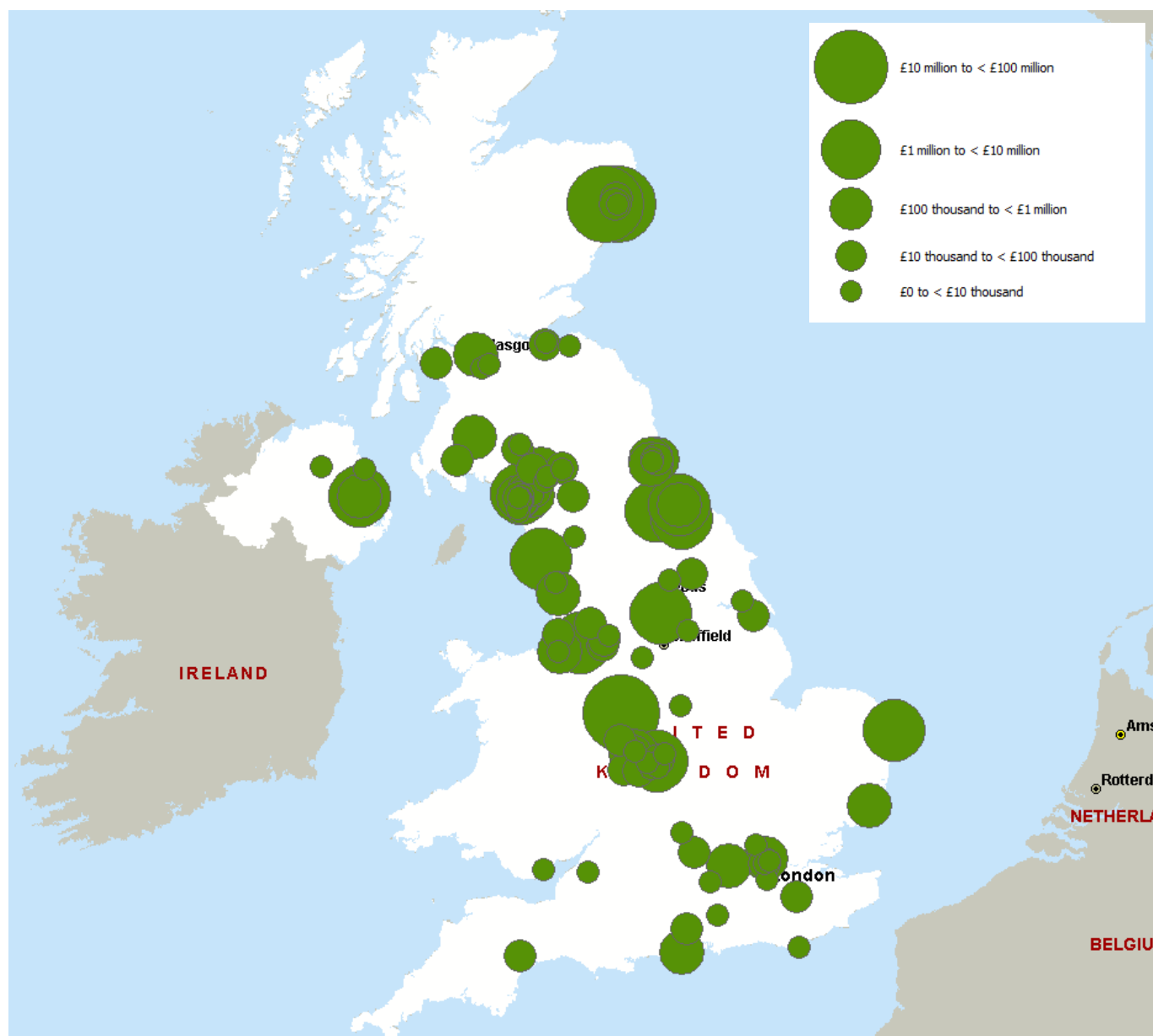


Figure 3.3 Location of UK suppliers contracted by E.ON Climate & Renewables according to contract value

Figure 3.3 shows the geographical spread of UK EC&R-contacted suppliers, according to contract value size. The largest concentration of contract value in the UK was in north east Scotland and in central England (see Figure 2.1). There were a number of local companies that were contracted directly by EC&R in the Robin Rigg project, but the contract values were small. Further contracts were awarded in Cumbria, in particular by Areva Transmission and Distribution (now part of Alstom Grid) for the onshore substation and by Balfour Beatty, the onshore cable installation contractor; these are not included in this plot.

3.3. UK, regional and local content

As discussed in Section 2, analysing UK content purely by the headline contract value and the location of the company can give a misleading impression of the value captured by UK companies. UK contractors will have sourced components or services from overseas and overseas contractors will have sourced components from the UK.

Figure 3.4 shows that by identifying the source of all subcontracting value, the UK content of the capital expenditure on Robin Rigg is 32 per cent.

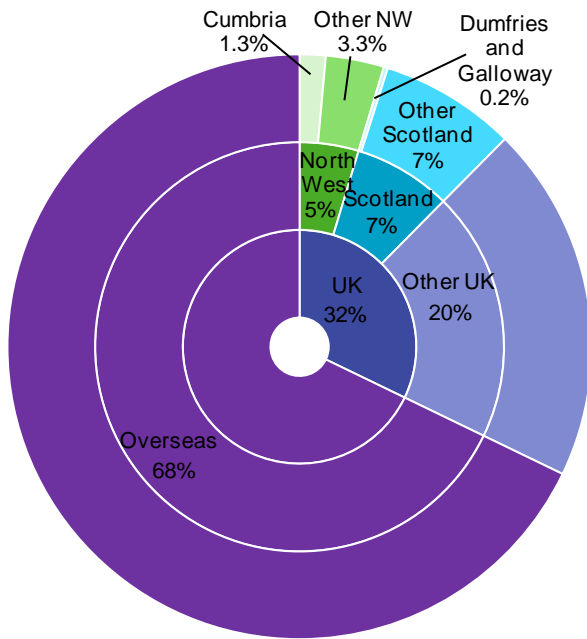


Figure 3.4 UK, regional and local content in Robin Rigg construction

Only a small amount of content is local to the project but on a regional basis, North West England and Scotland combined captured 12 per cent of the project's capital costs.

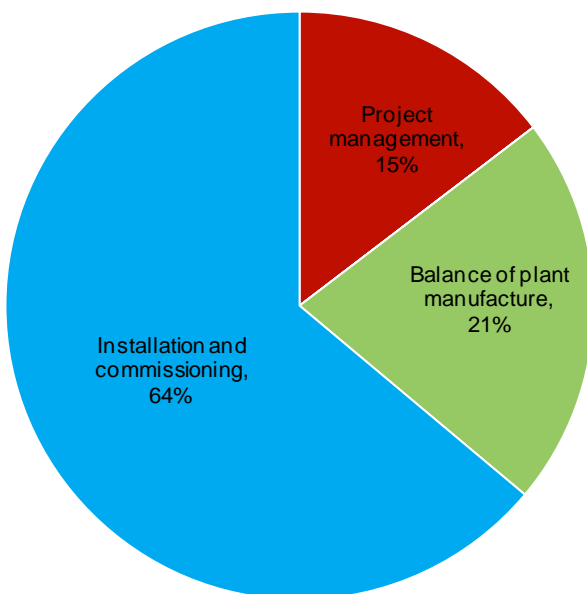


Figure 3.5 UK content by supply chain area

Figure 3.5 shows that UK suppliers were most successful in capturing business in the installation and commissioning phase, reflecting strong capability in offshore operations relevant to foundation and cable installation.

Project management

Despite the fact that the UK captured all the project management contracts, little of the business was won by local or regional companies (see Figure 3.6). What local supply there is in the form of small value contracts, such as those for land leasing and land agreements fees. EC&R's main environmental consultancy was in Dumfries and Galloway.

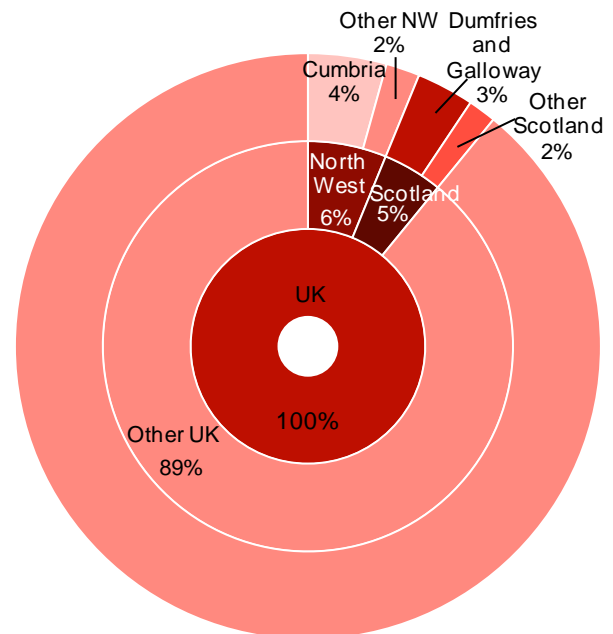


Figure 3.6 UK, regional and local content in project management work

Turbine supply

No UK value was recorded in turbine manufacture. It is possible that there is content further down the supply chain of Vestas Offshore or from its other UK operations but any analysis of this nature is beyond the scope of the project.

UK content analysis of Robin Rigg offshore wind farm

Balance of plant manufacture

The UK content in balance of plant supply is 31 per cent of total spend in this area, which is similar to the percentage of UK content in the project as a whole (see Figure 3.7).

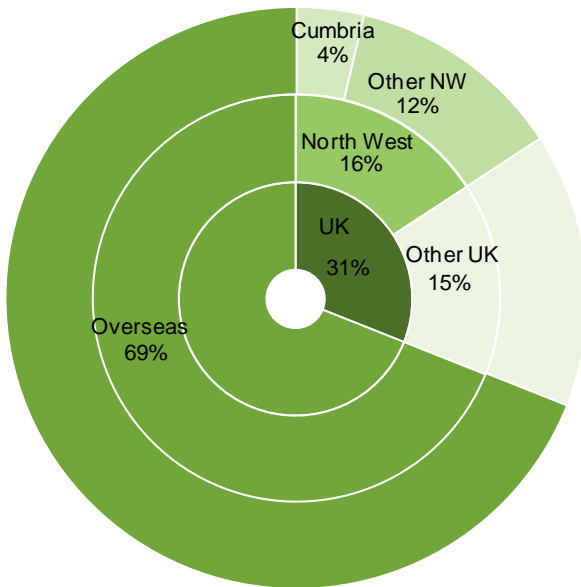


Figure 3.7 UK, regional and local content in the balance of plant manufacture phase

The contracts captured by UK companies include the grid connection (principally Areva Transmission and Distribution) and the infrastructure for the onshore operations base, such as facilities for offices, storage and vessels. No Scottish content was captured in balance of plant manufacture.

Installation and commissioning

Figure 3.8 shows that the highest proportion of UK content was captured in the installation and commissioning phase with a high level of value captured by Scottish companies.

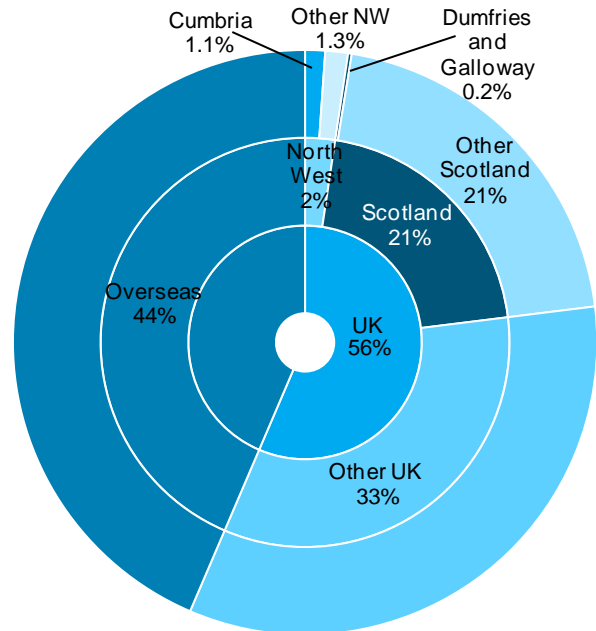


Figure 3.8 UK, regional and local content in the installation and commissioning phase

A large number of low-value contracts were also awarded to local companies in Cumbria associated with the construction of the operations base at the port of Workington, and the onshore cabling.

A significant amount of UK content came through the contracts awarded to Harland and Wolff in Belfast and Port of Mostyn in north Wales, which were used as the construction ports for the project, and the foundation and cable installation contracts, which were mostly placed with UK contractors. These form a significant proportion of the project costs, even when the value of the vessel is removed.

4. Discussion

4.1. UK content

The results of this study are generally positive for the UK supply chain. While the UK content of 32 per cent is lower than that reported for Scroby Sands, it is similar to Ormonde and higher than that reported for Thanet and London Array. This 32 per cent has been achieved for a project with little UK content in turbine, foundation and cable supply.

All identifiable project management was captured by UK companies. The type of activity is not substantially different from that undertaken for parallel sectors such oil and gas and civil engineering, and UK companies have long-standing capabilities in these areas.

The UK captured no value in turbine manufacture which reflects the fact that the UK currently only has a small number of component and material suppliers to turbine manufacturers. It is possible that there is lower-tier UK content in the turbine, for example in the composite material supply for blade manufacture, where some UK companies have a significant global market share that could not in this case be linked to supply to this project.

4.2. Local and regional content

Without much relevant industrial manufacturing and installation capability in Cumbria and Dumfries and Galloway, the capture of local and regional content for Robin Rigg was largely due to the logistics of the project rather than any specialism. The exception was EC&R's principal environmental consultancy, which was based in Dumfries and Galloway. It is uncertain whether the company's location conferred on it any significant advantage. In development and consenting, there is no clear advantage for a company in being local, with specialist skills often used from other sectors and for short periods.

The areas of work that typically require some level of local or regional supply fall into several categories in descending order of value:

- Offshore construction base
- Onshore grid connection, including the substation and cabling
- Onshore O&M infrastructure
- Land usage, and
- Stakeholder relations.

For Robin Rigg, the construction ports were in Belfast and north Wales, and the value of this work was therefore not captured locally. Both the onshore grid connection and the O&M base are in Cumbria, which explains why the county captured more value than Dumfries and Galloway.

The work involved in onshore grid connection and cable installation is not sector specific and there is significant UK capability that meets the needs of the domestic power transmission and distribution sector. North West England and the West Midlands in particular have traditional strengths in these areas. For subsea cable installation, the main pool of expertise comes mainly from the offshore oil and gas and telecommunications sectors. The strong contribution from Scottish companies reflects the supply chain for those sectors that has developed there.

While this analysis was confined to the capital expenditure on Robin Rigg, operations and maintenance costs are biased towards local content and one would anticipate significant value being generated in and around the port of Workington over the lifetime of the wind farm.

Of the total project capital costs, 12 per cent was captured by UK companies in Scotland and North West England. This could suggest some form of competitive advantage due to proximity to the site, but closer scrutiny suggests that, in most cases, the suppliers are active in the wider market and their location reflects the industrial strengths of these areas rather than any regional benefit from the project.

4.3. Future

During 2010 and 2011, a number of planned investments in new UK manufacturing plant have been announced by turbine, cable, foundation and electrical systems manufacturers. Higher levels of UK content should follow from higher levels of UK assembly and component manufacture, especially if the UK's market lead in offshore wind is sustained. Over time, this will result in gradually increasing average UK content levels compared with those for Robin Rigg.

Endnotes

Web links were checked shortly before publication.

¹ *Scroby Sands - Supply Chain Analysis*, Douglas-Westwood Limited and ODE Limited, A Report to Renewables East commissioned by the DTI, DWL Report Number 334-04, July 2005. www.berr.gov.uk/files/file20840.pdf

² Wind farms could power half of Britain's homes, but jobs could go overseas, *The Times*, 8 January 2010. www.timesonline.co.uk/tol/news/environment/article6980016.ece

³ British firms miss out as world's biggest offshore windfarm opens off UK coast, *The Guardian*, 23 September 2010. www.guardian.co.uk/environment/2010/sep/23/british-firms-worlds-biggest-windfarm

⁴ *A Guide to an Offshore Wind Farm*, BVG Associates on behalf of The Crown Estate, January 2010. www.thecrownestate.co.uk/guide_to_offshore_windfarm.pdf