

Offshore Wind Programme Board



The UK content of operating offshore wind farms

November 2015

Produced by:



Cover photo: Seajacks Zarantan performing O&M work at Gunfleet Sands. Image courtesy of Seajacks

The report "The UK content of operating offshore wind farms" was produced by BVG Associates. It was commissioned by the Department of Energy & Climate Change, RenewableUK and The Crown Estate on behalf of The Offshore Wind Programme Board



1. Foreword

The UK's offshore wind industry has delivered significant benefit to the UK since its inception in 2000. In the 15 years since the UK's first two 2MW offshore turbines were constructed at Blyth in North East England, the sector has grown rapidly. In the last five years, the UK's offshore wind industry has built 3.7GW of new capacity which is enough to power 3 million homes. By 2030 we can easily build 30GW of capacity, enough to meet 35% of UK electricity demand. This rapid growth has come alongside rapid cost reduction, with a 38% reduction in levels of subsidy, and offshore wind on track to be cost competitive with other new power sources such as gas and nuclear by 2025.

Alongside this contribution to UK power needs, the UK's offshore wind sector is also helping power our economy. The sector has already delivered £9.5bn of large infrastructure projects, with plans to deliver another £20bn by 2020 and £30bn by 2025, and the sector has created 13,000 UK jobs, driving regeneration of UK manufacturing and creating skilled jobs for the 25 year lifetime of wind farms.

To help track this remarkable progress, the Offshore Wind Industry Council, the joint industry-government body which I co-chair, is working to drive down cost and deliver increased UK content, and has agreed a methodology¹ to be used for all new offshore wind farms to measure UK content.

This report, coordinated by the UK's Offshore Wind Programme Board, is the first time that our industry has measured content systematically. BVG Associates was commissioned to take this new methodology and use it to set a baseline for UK content, against which we will measure our progress. BVG Associates collected data from 10 offshore wind farms built between 2009 and the end of 2013. To get a figure for UK content, the agreed methodology looks at the development, construction and manufacture, and operation and maintenance stages of wind farm development and operation, to give the total expenditure.

This first baseline analysis shows that we are achieving 43% UK content. Levels of UK content vary across the different stages measured. Highest is across the operation and maintenance stages where the UK is achieving 73% UK content. This is significant because operating wind farms provide skilled jobs for 20+ years of operation. The UK is also delivering 57% UK content in the initial development stages, highlighting that expertise in the planning and delivery of these sites is being led in the UK. It is in the manufacturing and construction phases that levels of UK content are lowest at 18%.

The commitment of the UK industry is to work to support a competitive and effective supply chain. As part of their development, all UK wind farms must submit a supply chain plan to Government setting out how they plan to support an effective supply chain. Contracts awarded by Government over the last three years have meant that UK operators have been able to commit turbine orders in sufficient numbers to attract Siemens and MHI Vestas to set up UK manufacture.

MHI Vestas has now brought blade manufacture to the Isle of Wight for their new offshore turbine, while Siemens' Hull factory is under construction and set to begin operation in 2017. These developments, alongside the other supply chain opportunities which will arise if industry and government continue working together, will mean that UK content levels can increase further.

UK offshore wind has a bright future. Industry has a track record of delivering on time and on budget, and is making significant steps to bring down costs and increase UK content. By using the methodology across our industry, we can confidently report on actual levels of content, and are not reliant on projections based on studies or aspirations. With new manufacturing now committed, and offshore wind set to deliver 10% of UK power needs by 2020, our industry is confident we can increase on the 43% figure currently achieved and increase the economic benefits to the UK of offshore wind.

Benj Sykes
Co-Chair, Offshore Wind Industry Council

2. Introduction

The Crown Estate commissioned BVGA Associates (BVGA), on behalf of the Offshore Wind Programme Board (OWPB), to develop a methodology to gather, report and analyse UK content data from UK offshore wind farms. The “methodology” was adopted in November 2014 and was published in May 2015 alongside guidance from RenewableUK on the purpose, requirement, timing and publication of data.¹

To provide a baseline against which the industry could measure future progress in increasing UK content, The Crown Estate commissioned an analysis of the UK content of wind farms already in operation. This report presents the results of this analysis.

3. Study methodology

The aim of this study was to provide an anonymous, aggregated analysis of the UK content of UK offshore wind farms generating before the end of 2013. We excluded wind farms completed before 2009 or which have a capacity of less than 100MW, because these are not typical of larger, more recent projects. We included data from 10 wind farms.

The analysis followed the principles of the UK content methodology as far as possible and used the same definitions. In some cases, wind farm owners did not have access to the data or were unable to analyse retrospectively their data in detail. In these cases, we made logical assumptions based on data provided from other wind farms or from data we had collected for other purposes.

When aggregating the data from different projects, the UK content is weighted by the wind farm rated capacity, as described in the methodology.

Several wind farm owners stated that they plan to operate their wind farms for more than 20 years. To ensure that we combined comparable data, we assumed a 20-year life for all wind farms, thereby underestimating UK content somewhat on the average project.

In line with the methodology, OPEX was undiscounted to capture best the success of UK-based business in supplying UK offshore wind farms over their lifetime.

For UK offshore wind farms reaching FID from the beginning January 2015, wind farm owners must report UK content in:

- Development expenditure (DEVEX) until FID
- Capital expenditure (CAPEX), including the cost of the construction of the transmission assets
- OPEX, excluding the local transmission use of system charges, and
- TOTEX

Wind farm owners have the option of submitting the data in more detail. In this analysis, we further subdivided CAPEX into:

- Project management
- Turbine supply
- Balance of plant supply, and
- Installation and commissioning.

We also analysed separately the data for the wind farm generation assets and the wind farm transmission assets.

4. Results

4.1. UK content in TOTEX

The aggregated UK content in the TOTEX for the projects included in this analysis was 43%, with aggregated UK content in DEVEX of 57%, UK content in CAPEX of 18% and UK content in OPEX of 73%. They contribute 1%, 9% and 33% to UK content in TOTEX respectively (see Figure 1).

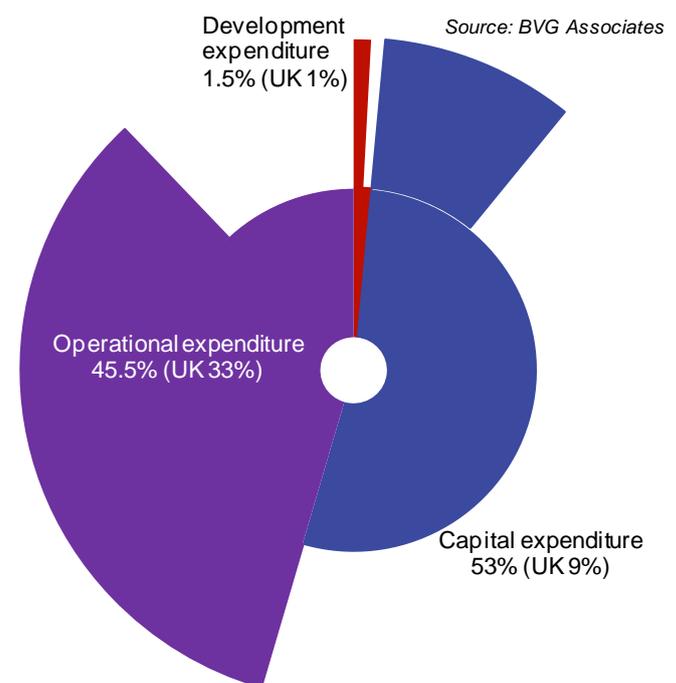


Figure 1. UK content in offshore wind farms. The inner ring shows undiscounted breakdown of TOTEX and the outer ring shows the contribution to UK content in TOTEX.

The range of levels of UK content for the wind farms considered in the analysis is shown in Figure 2 and Table 1.

¹ Methodology for Measuring the UK Content of UK Offshore Wind Farms, BVG Associates on behalf of RenewableUK, May 2015, Available online at: www.renewableuk.com/en/publications/index.cfm/uk-content-methodology

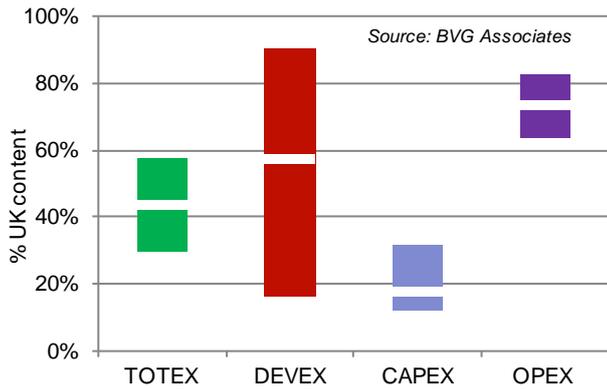


Figure 2. The range and average UK content in TOTEX, DEVEX, CAPEX and OPEX.

Table 1. The range and average UK content in TOTEX, DEVEX, CAPEX and OPEX.

	UK content		
	Lower	Upper	Weighted average
TOTEX	30%	57%	43%
DEVEX	16%	90%	57%
CAPEX	12%	32%	18%
OPEX	64%	82%	73%

4.2. UK content in DEVEX

Of DEVEX, CAPEX and OPEX, the largest variation in UK content is in DEVEX. This is because much of the work is conducted in house and because some development teams were based overseas.

4.3. UK content in CAPEX

The UK content in CAPEX is presented in further detail in Figure 3. The largest contribution came from installation and commissioning.

The average UK content in turbine supply was low at only 3%, although this excludes the significant UK spend by turbine manufacturers on installation and commissioning activity.

Only one of the wind farms analysed used turbine foundations manufactured in the UK.

An area of significant UK content was the supply and installation of onshore and offshore substations. Although most large electrical components such as switchgear and

transformers were imported, the UK captured a significant share of offshore platform and foundation fabrication.

There were several active UK installation contractors active on the projects analysed but the overseas construction of the large installation vessels limited the impact this had on UK content in the installation and commissioning element.

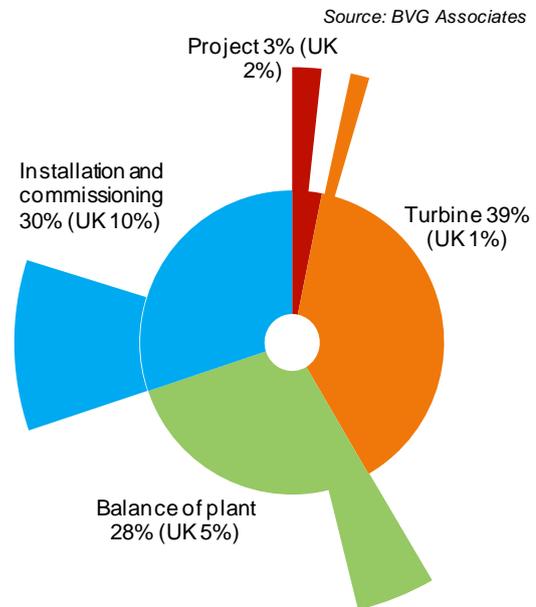


Figure 3. UK content in CAPEX. The inner ring shows undiscounted breakdown of CAPEX and the outer ring shows the contribution to UK content in CAPEX.

4.4. UK content in OPEX

The largest contribution to UK content in TOTEX came from OPEX, where the only significant leakages overseas were in the supply of replacement turbine components, the provision of central operation services by turbine manufacturers in fulfilling warranty and service agreements, and the use of overseas-manufactured vessels during repair and replacement.

4.5. Generation and transmission assets

The UK content in generation and transmission asset TOTEX was 44% and 40% respectively. Figure 4 and Figure 5 show the breakdown of UK content for wind farm generation assets and transmission assets respectively. The UK content figures for each are similar, but the contributions made by CAPEX and OPEX are quite different, reflecting the much higher contribution of OPEX for generation assets. UK content in transmission asset CAPEX is significantly higher than for generation asset CAPEX, reflecting the fabrication of most offshore platforms by UK suppliers.

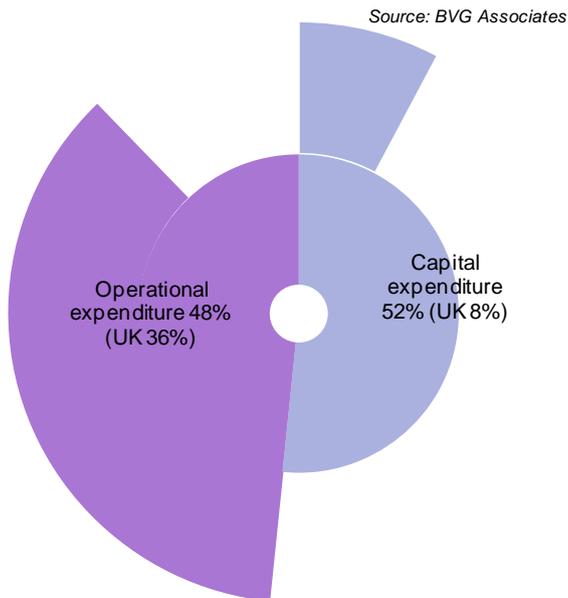


Figure 4. UK content in generation asset TOTEX. The inner ring shows undiscounted breakdown of generation asset TOTEX and the outer ring shows the contribution to UK content in generation asset TOTEX.

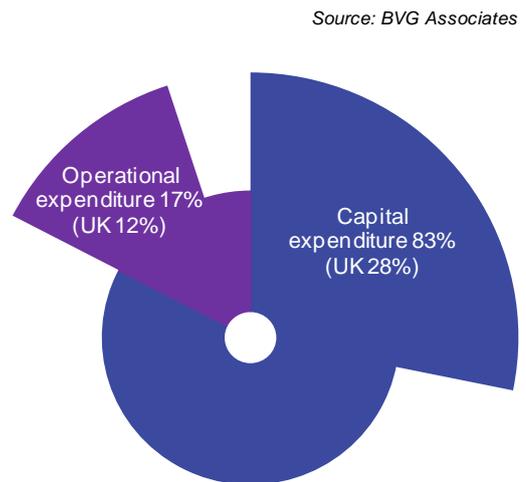


Figure 5. UK content in transmission asset TOTEX. The inner ring shows undiscounted breakdown of transmission asset TOTEX and the outer ring shows the contribution to UK content in transmission asset TOTEX.

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 offshore wind in the UK. BVG Associates has over 150 combined years of experience in the wind industry, many of these being “hands on” with wind turbine manufacturers, and 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
- The 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.

The views expressed in this report are those of BVG Associates. The content of this report does not necessarily reflect the views of The Crown Estate, DECC or RenewableUK.

Authors

Alun Roberts specialises in offshore wind supply chain analysis and development. He draws on a broad understanding of the offshore wind supply chain and project procurement trends in undertaking analyses on socioeconomic impact and skills analysis. A key area of work has been in enhancing the industry’s understanding of UK content in offshore wind farms and he has led work on developing a methodology for measuring the UK content of future wind farms on behalf of the Crown Estate and the Offshore Wind Programme Board and implementing this for a range of asset owners and suppliers.

Bruce Valpy founded BVG Associates in 2006 and has created a rapidly growing, diverse client base that includes the market leaders in the wind turbine and tidal turbine sectors, trade bodies, UK Government, utility providers, multi-nationals and private companies on four continents. He combines deep technical, engineering design and market knowledge to make a difference to customers both at the operational and strategic level.