BERWICK BANK WIND FARM
ONSHORE ENVIRONMENTAL IMPACT ASSESSMENT APPENDICES

Appendix 13.2: Socio-Economics Technical Impact Report

CONTENTS

APPENDIX 13.2 SOCIO-ECONOMICS TECHNICAL IMPACT REPORT

This appendix sets out technical analysis underpinning the Onshore Socio-economics EIA Report.

This appendix provides the Socio-economics technical impact report: an economic analysis of the Project, prepared to inform the Socio-economics impact assessment. The technical impact report considers direct, indirect and induced employment and GVA effects at Local, Scotland and United Kingdom (UK) levels across a detailed breakdown of development phases. The approach draws on BVG Associates proprietary approach.

BVGAssociates

Client discretion

Berwick Bank Wind Farm

Socioeconomic technical report

May 2022

Document history

Revision	Description	Circulation classification	Authored	Checked	Approved	Date
5	For client	Client discretion	AER	MIP	AER	27 May 2022

Strictly confidential to XX Not to be circulated beyond the named persons or group within client

Commercial in confidence Not to be circulated beyond client (or BVG Associates if no client specified)

Supplied under NDA Not to be circulated beyond client or other organisation party to a non-disclosure agreement (NDA) with the client (subject to any additional terms agreed with the client in [state details of agreement])

Client discretion Circulation is at the discretion of the client (subject to any terms agreed with the client in [state details of agreement])

Unrestricted No restriction on circulation

Note: Circulation classification may not be changed on a document. Only BVGA may issue a revised document with a revised circulation classification.

Copyright

Disclaimer

The views expressed in this report are those of BVG Associates. The content of this report does not necessarily reflect the views of SSE Renewables.

BVGAssociates

Contents

List of tables

Summary

To support the planning application for the Berwick Bank Wind Farm, SSE Renewables has commissioned BVG Associates (BVGA) to undertake an analysis of the socioeconomic impacts of the wind farm. This report considers four potential scenarios:

- A baseline UK supply scenario, where procurement decisions are based on the current competitiveness of the Scottish and rest of UK supply chain.
- An enhanced UK supply scenario, where all plausible procurement decisions for local, Scottish and UK supply are included.
- An low UK content scenario, where significant UK, Scottish and local suppliers are uncompetitive in the procurement process.
- A 60% UK content scenario, which considers what procurement decisions are needed to reach 60% UK content.

SSE Renewables is exploring two grid options:

- Option 1: 2.3GW HVAC and 1.8GW HVDC.
- Option 2: 4.1GW of HVDC.

Table 1 Economic impacts created locally[1], in the rest of Scotland and in the rest of UK under the three scenarios.

Scenario	Impact		Option 1	Option 2
Baseline UK supply scenario	Gross value-added (£million)	Local	1,282	1,264
		Total Scotland	3,370	3,364
		Total UK	6,724	6,816
	FTE years	Local	12,330	12,150
		Total Scotland	35,430	35,550
		Total UK	73,660	75,160
	Content	Local	7.4%	7.2%
		Total Scotland	19.2%	19.0%
		Total UK	36.2%	36.3%
Enhanced UK supply scenario	Gross value-added (£million)	Local	1,262	1,240
		Total Scotland	4,086	3,937
		Total UK	8,301	8,267
	FTE years	Local	12,150	11,900
		Total Scotland	45,030	43,060
		Total UK	95,520	95,180
	Content	Local	7.3%	7.1%
		Total Scotland	23.1%	22.2%
		Total UK	44.4%	43.8%
Uncompetitive UK supply chain scenario	Gross value-added (£million)	Local	1,254	1,229
		Total Scotland	3,152	3,109
		Total UK	5,760	5,716
	FTE years	Local	11,990	11,730
		Total Scotland	32,730	32,320
		Total UK	60,880	60,450
	Content	Local	7.2%	7.0%
		Total Scotland	17.8%	17.5%
		Total UK	31.1%	30.6%
60% scenario	Gross value-added	Local	1,262	1,240
		Total Scotland	6,401	6,367
		Total UK	10,707	10,818
	FTE years	Local	12,150	11,900
		Total Scotland	78,820	78,510
		Total UK	130,650	132,410
	Content	Local	7.3%	7.1%
		Total Scotland	36.0%	35.5%
		Total UK	57.8%	57.7%

[1] For the purposes of this analysis, we defined local to be the location of the operations base and the onshore grid connection.

1. Introduction

SSE Renewables is planning to develop the Berwick Bank Wind Farm in the Firth of Forth on the east coast of Scotland. As the largest offshore wind project currently in development in Scotland, it presents an opportunity to develop the offshore wind industry in Scotland by creating jobs and facilitating economic growth.

To support the planning application for the project, SSE Renewables has commissioned BVG Associates (BVGA) to undertake an analysis of the potential socioeconomic impacts of the wind farm.

Once Berwick Bank is complete, which is assumed to be 2030, it will play a significant role over its expected 30 year life in meeting Scotland's target of 11GW of offshore wind installed by 2030 and make a significant contribution towards reaching Scotland's and UK's net zero emissions targets.

The analysis considers the potential economic impacts of the wind farm under two different wind farm options, and four different potential procurement scenarios.

The design of the wind farm is the same in both options, except the following related to transmission:

- Option 1: 2.3GW HVAC and 1.8GW HVDC.
- Option 2: 4.1GW of HVDC.

Procurement scenarios:

- A baseline UK supply scenario, where procurement decisions are based on the current competitiveness of the Scottish and rest of UK supply chain.
- An enhanced UK supply scenario, where all plausible procurement decisions for local, Scottish and UK supply are included.
- A low UK content scenario, where significant UK, Scottish and local suppliers are unsuccessful in the procurement process.
- A 60% UK content scenario, which considers what procurement decisions are needed to reach 60% UK content.

Berwick Bank is located around 43km off the coast of East Lothian. Berwick Bank could have a total capacity of up to 4,100MW, which could consist of around 250 turbines if 15MW and 18MW turbines were to be used, as is assumed in this report. The strategic location of the wind farm means it will be able to deliver large amounts of power to the GB National Grid.

2. Methodology

The analysis in this report was undertaken in the following stages:

- Stage 1 – Establish supply chain narrative for the three scenarios.
- Stage 2 – Undertake local, Scottish and UK content analysis.
- Stage 3 – Undertake full-time equivalent job years and gross value-added analysis.

The analysis was split between the onshore and offshore aspects of the wind farm (see Table 2).

2.1. Interpretation of Analysis within EIA

This report sets out impacts across three spatial levels: Local, Rest of Scotland and Rest of UK. Construction phase impacts (turbine, balance of plant and, installation and commissioning) listed as Rest of Scotland could occur within the Local Study Areas under consideration as part of the socioeconomics analysis within the Environmental Impact Assessment. The exact location of activities is subject to procurement decisions, port capacity and scheduling.

BVG Associates and Hardisty Jones Associates agreed that for purposes of assessment, should final procurement and contracting decisions lead to all of the installation and commissioning sub-activities (turbine installation, foundation installation, array cable installation, export cable installation and substation installation) being located in Scotland, these would most plausibly be sited within different port locations. It is possible that more than one sub-activity could be sited at a single port location subject to capacity and scheduling. It is highly unlikely that all would be located at a single port. It was agreed that testing the co-location of two of the five activities (excluding substation installation) would form a reasonable maximum scenario for assessment.

2.2. Stage 1 – Establish supply chain narrative for the four scenarios

For each of the scenarios and categories in Table 2, we developed narratives on what is supplied in Scotland and the rest of the UK. Our conclusions were based on:

1. Procurement options for Seagreen
2. The local, Scottish and UK economic and infrastructure strengths
3. Specific, known supplier capabilities
4. Potential future investments in Scotland and the rest of the UK
5. The logistical benefits of sourcing locally, in Scotland or in the UK, and
6. Long-term procurement trends, particularly in turbine maintenance.

For the second and third, we drew on our understanding of the UK and European supply chain, and for the fourth, we built on our understanding of how offshore wind supply chains develop. We know that there are certain services that are almost always provided locally, while other specialist services are only available from a small number of companies operating across Europe.

We held workshops with SSE Renewables to present, discuss and agree the Scottish and UK supply chain for each scenario.

For the purposes of this analysis, we defined local to be location of the operations base and the onshore grid connection. The locations of these have not been determined (and may not be that close to each other) but the size of the impacts is unlikely to change significantly with location.

The two grid options use the same assumptions on the location of the supply chain. They create different impacts because the differences in cost between the technology and scale of the grid infrastructure.

Table 2 Supply chain categories.

	Level 1	Level 2
Onshore and offshore	Development and project management	Developing and permitting
		Project management (technical and non-technical)
Offshore	Turbine	Blades
		Nacelle, hub and assembly
		Tower
	Balance of plant	Foundation supply
		Array cable supply
		Offshore substation supply
		Offshore export cable supply
	Installation and commissioning	Turbine installation
		Foundation installation
		Array cable installation
		Other installation
Onshore	Balance of plant	Onshore export cable supply
		Onshore substation supply
	Installation and commissioning	Civil works
Offshore	Operation, maintenance and service	Turbine maintenance and service
		Balance of plant maintenance and service
		Transmission maintenance
		Vessels
Onshore	Operation, maintenance and service	Maintenance of onshore grid connection
		Decommissioning

2.3. Stage 2 – Undertake local, Scottish and UK content analysis

The local and national content analysis builds on the supply chain narratives for each scenario. For each Level 2 supply chain category in Table 2, we made an estimate of the fraction of expenditure that is made locally, in Scotland and in the UK. These assumptions use the same definition of 'content' adopted by the industry.[2] We established the percentage net local and national expenditure by considering the breakdown of costs for each Level 2 category.

2.4. Stage 3 – Undertake FTE years and GVA analysis

Once content percentages were established, economic modelling was carried out.

We calculated GVA and FTE years for the projects in each of the scenarios. GVA is the value generated by any unit engaged in the production of goods and services[3], and one FTE job year is the same as one full-time job for one year. This method of measuring jobs created is important, as many workers working on Berwick Bank will work for a fixed period or be involved in other projects in parallel.

GVA and FTE job years were split into direct, indirect and induced impacts.

- Direct impacts result from the activities of SSE Renewables and its major contractors.
- Indirect impacts result from the activities of suppliers to SSE Renewables or its major contractors, and
- Induced impacts result from the personal expenditure of individuals working on the wind farm (direct and indirect).

Jobs created in the hospitality sector are considered to be indirect on the basis that the costs incurred are likely to be met by the employer rather than the individual and hospitality providers therefore form part of the supply chain.

The methodology used here was developed specifically for the offshore wind sector by BVGA. Our approach is described in more detail in Appendix A.

The assumed lifetime costs for Berwick Bank were provided by SSE Renewables, and in addition to these and the content percentage estimates, the economic model uses several different data inputs, including salary and employment statistics.

Salaries and employment costs were researched from public sources and from data collected by BVGA during previous analyses and using relevant salary data collected by the Office for National Statistics.

The local analysis captures the place of work of individuals. While individuals may live outside the local area, as defined, they are unlikely to travel significant distances to work and this is difficult to forecast with any confidence.

BVGA has gathered a significant amount of data over 10 years on the local, Scottish and UK content of offshore wind farms and number of jobs associated different offshore wind activities. The results of this analysis were validated using this data.

All costs are in 2020 prices.

Assumptions made in the modelling can be found in Appendix B.

[2] https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/Publications/Guides/uk_content_methodology.pdf

[3] https://www.ons.gov.uk/economy/grossvalueaddedgva

3. Results

This section provides the results of the analysis for options 1 and 2 under the four scenarios.

3.1. Baseline UK supply scenario

Offshore

Development and project management

Development and project management includes activities required to secure planning consents, such as the environmental impact assessment (EIA), as well as activities required to define the design and engineering aspects of the wind farm.

SSE Renewables manages Berwick Bank project development mainly from its offices in Glasgow and Perth.

The EIA forms a key part of the wind farm development process, as it assesses the potential impact of the project on the physical, biological and human environment. SSE Renewables appoints consultants based in Scotland, which subcontracts Scottish and UK based service providers.

Environmental surveys, used to inform the EIA, are undertaken to establish baseline environmental conditions so that impact modelling can be carried out. These include benthic surveys, fish surveys, shipping and navigation studies, ornithological surveys, marine mammal surveys and onshore impact surveys. These environmental surveys are typically completed by companies from the home market. This is partly because there is sufficient local resource and partly because some of the wildlife impacts are site specific and require detailed local knowledge and expertise. Local guard vessels are used during the surveys.

Resource and metocean assessments are also carried out to provide atmospheric and oceanographic data on the development site. This informs the engineering design, the potential energy production and the operating conditions of the proposed wind farm. Several international companies with a presence in Scotland or elsewhere in the UK offer these services.

Geological and hydrographical surveys will be conducted to analyse the sub sea bed environment of the proposed wind farm sites and export cables routes. The data collected is utilised in environmental studies and engineering design. SSE selects a company with a significant UK presence.

Engineering and design consultancies provide wind farm system design services and develop the concept of the wind farm in advance of procurement, contracting and construction. The Berwick Bank project uses consultants based in the UK.

Turbine

The manufacturing of turbines refers to the fabrication of towers, nacelles and rotors. Berwick Bank Wind Farm could have around 250 turbines.

In this baseline UK supply scenario, turbine blades are manufactured in the UK. Other turbine components, such as towers, nacelles and rotor hubs, are manufactured in continental Europe and transported to site via a construction staging port in the UK.

Balance of plant

The offshore balance of plant includes the foundations, array cables, offshore export cables and offshore substation.

In this baseline UK supply scenario, foundations, export cables and array cables are manufactured outside the UK.

For the offshore substation, the major electrical equipment and topside platform will be fabricated outside the UK but parts of the offshore substation are supplied by Scottish or UK providers.

Installation and commissioning

The installation and commissioning phase involves the transportation of wind farm components from the construction port to the development site where they will be installed.

Offshore installations are typically carried out by established installation companies with good track records and access to installation vessels. In this baseline UK supply scenario, vessels are operated from outside the UK, although there is some project management and engineering, use of UK ports and offshore support services.

Operations, maintenance and service

Operation, maintenance and service (OMS) supports the ongoing operation of the wind turbines, balance of plant and associated transmission assets. Given the continuous nature of OMS work, this area of the supply chain usually has a high level of local content.

SSE Renewables selected Montrose Port to be the OMS base for the Seagreen offshore wind farm and in this scenario, Berwick Bank also uses a Scottish OMS base from which service operation vessels (SOVs) are operated. Balance of plant OMS is undertaken by a combination of service providers, mostly based in Scotland or the rest of the UK.

Decommissioning

Decommissioning involves the removal or making safe of offshore infrastructure at the end of its useful life. Turbines, foundations, cables and substations are removed, shipped to shore and either disposed of or reused.

The work uses similar contractors to installation and commissioning, with non-UK companies subcontracting to Scottish and other UK companies where possible.

Onshore

The construction of the onshore substation (or substations) is carried out by a Scottish civil engineering contractor using Scottish and other UK suppliers to provide support systems, such as low voltage electrical equipment, control systems and security systems. Onshore cable installation and construction of the OMS base uses Scottish suppliers.

Economic impacts

Table 3 to Table 6 show the combined direct, indirect, and induced GVA and FTE years delivered in the UK over the lifetime of the project for options 1 and 2. The split between direct, indirect and induced is shown in Appendix C: Additional data.

UK

Total GVA in the UK for option 1 was calculated to be £6.7 billion. The total number of FTE years created in the UK was calculated to be 73,570.

Total GVA in the UK for option 2 was calculated to be £6.8 billion. The total number of FTE years created in the UK was calculated to be 75,100.

Scotland

In Scotland, the total GVA for Berwick Bank in option 1 was calculated to be £3.4 billion. The total number of FTE years created in Scotland was calculated to be 35,410.

In option 2, the total GVA in Scotland was calculated to be £3.4 billion. The total number of FTE years created in Scotland was calculated to be 35,530.

Local

GVA locally for Berwick Bank in option 1 was calculated to be £1.3 billion. The total number of FTE years created locally was calculated to be 12,320. In option 2 the local impacts are the same as option 1.

Workforce

The onshore and offshore workforce is described in this section. There are no qualitative differences between options 1 and 2 and they are therefore described together.

Development and project management

In development and project management, a significant proportion of the work will be undertaken in house by SSE Renewables, drawing on specialist engineering and consultancies. Scotland is well represented in the supply chain and many of the jobs are created in the major Scottish cities. The work will also draw heavily on specialist third-part contractors in the rest of the UK also. The work is for both onshore and offshore parts of the wind farm.

There are some local jobs created and these will relate to surveying the onshore aspects of the work and stakeholder engagement. Offshore surveys are undertaken by specialist data acquisition companies. These may come from Scotland but companies undertaking work using large vessels by draw on expertise from across Europe.

Turbine

Job creation in the supply of the ex-works turbine comes for the supply of blades and a small number of additional products and services from within the UK. Almost all the workers will be permanent employees of the supplier and in the baseline UK supply scenario, these are all based outside Scotland. All the work relates to the offshore parts of the supply chain.

Balance of plant

None of the major components are supplied from the UK in the baseline UK supply scenario. There are some lower tier suppliers and some jobs created in Scotland and the rest of the UK in engineering and project management functions. This work is typically delivered from locations from companies' centres of excellence, which may be in Scotland but also significantly from the rest of the UK, particularly for the substations. There are

therefore significant jobs relating to the onshore aspects of the wind farm, as well as offshore.

Installation and commissioning

By its nature, many workers in installation and commissioning are mobile and work where the wind farm assets are being installed.

For the offshore aspects of the wind farm, workers are mainly drawn from the turbine supplier and the marine contractors. The workers for the turbine supplier undertake the final and mechanical and electrical installation and commissioning. This is specialist work and move project-to-project across Europe. Some of these individuals will work onshore at the installation port selected for the work. These are likely to require onshore accommodation for between 100 and 200. For a large project like Berwick Bank, this work may continue for at least two. In the baseline UK supply scenario, the port is outside Scotland (In line with the arrangement for Seagreen). The work will draw on a workforce local to the port, either working in the port or in providing a range of services to installation contractors.

The crew on the turbine installation vessel consists of the marine crew, responsible for the operation of the vessel and employed by the marine contractor, and the installation crew, employed by the turbine supplier. A vessel is likely to have a combined crew of up to 100, split approximately equally between the marine and installation crew. They are likely to work on a two-week on, two week off patten and they are likely to travel to and from home to the installation port and this may require overnight stays. The crews are likely to be international, regardless of the nationality of the company.

During commissioning, the turbine supplier may have up to 60 technicians working offshore at any one time for each of two shifts. These typically live on walk-to-work vessels on two week shifts. As with installation crews there is likely to be an onshore demand for accommodation during crew changes.

The situation for foundation and cable installation vessels is a little different in that the contractor employs all the crew but the working pattern is similar to turbine installation. Cable vessels also have a crew of about 100.

An offshore substation is typically installed in a single lift from a barge with the installation vessel having a crew of although 100, although this is for a short period.

Offshore construction is supported by smaller vessels, involved in transporting crew, materials or providing guard vessels. Such services may be sourced local to the port.

For the onshore parts of the wind farm: the cable route, the onshore substation and the construction of the operations base, the situation is quite different from the offshore aspects. The important difference is that the skills required for the work are found in other sectors such as construction and power transmission. These skills are needed across the UK and it is likely that a large proportion of the workers will be recruited locally and may be able to travel from home to the construction sites. More senior project management and engineering roles and are likely to come from further afield, requiring local accommodation for perhaps two years while the work is being undertaken. The onshore substation has the greatest labour requirement and there are likely to be over 200-300 people onsite during peak construction for about three years with lower numbers for enabling works and commissioning before and after this.

Operations, maintenance and service

The OMS work force can be split into:

- Standing workforce for the wind farm based either offshore (on the service operation vessel (SOV))
- Period wind farm maintenance roles either for regular service or large component replacement or repair campaigns
- Head office asset management and engineering functions, and
- Third party contractors.

In theory, the offshore workforce could live anywhere and travel to the wind farm for two weekly shifts. In practice, however, the continuity of the maintenance team is important in consolidating learning and optimising maintenance. For this reason, the standing workforce is likely to live locally. A wind farm of the size of Berwick Bank could have three SOVs each with a technician crew of about 30 and a similar number of marine crew for each two-weekly shift.

The operations base will also have a local workforce, covering management, engineering and administrative functions, perhaps employing 20-30 people. The base will draw on a range of local services, some specialist in relation to the operation

of the vessels and others offering more generic business services.

Large component replacement or repair has a similar workforce requirement to installation.

Both the turbine supplier (under a service agreement) and the SSE Renewables will have head office functions supporting the wind farm but these are also likely to work across their respective wind farm portfolios.

The wind farm has a periodic balance of plant maintenance requirement. These can be grouped into above water and below water services. These functions are specialist and do not need to operate local to the wind farm. Nevertheless, there are strong synergies with the oil and gas industry for this kind of work and there is a reasonable chance that workers will be drawn from parts of Scotland if not locally. The labour requirement is quite low, however, and is not likely to have a major requirement for local accommodation and services.

Decommissioning

The workforce for the offshore parts of the wind farm is likely to be sourced in a similar way to installation and commissioning.

There is a reasonable expectation that the onshore parts of the wind farm will be retained and upgraded as needed for other uses.

Table 3 Employment created (FTE years) under the baseline UK supply scenario for option 1.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	20	380	300	20	280	220	-	100	80
	Project management	60	280	80	40	220	60	20	80	20
Turbine	Blades	-	-	6,820	-	-	6,820	-	-	-
	Nacelle	-	-	700	-	-	700	-	-	-
	Tower	-	-	-	-	-	-	-	-	-
Balance of plant	Foundation supply	-	1,480	50	-	1,480	50	-	-	-
	Array cable supply	-	530	20	-	530	20	-	-	-
	Export cable supply	-	-	-	-	-	-	-	-	-
	Onshore and offshore substations	250	2,110	3,120	190	1,580	2,340	60	530	780
Installation and commissioning	Turbine installation	-	-	910	-	-	910	-	-	-
	Foundation installation	-	560	120	-	560	120	-	-	-
	Array cable installation	-	70	160	-	70	160	-	-	-
	Export cable installation	630	1,080	40	570	980	40	60	110	-
	Substation installation	-	200	980	-	200	980	-	-	-
	Other CAPEX	180	700	1,190	-	-	-	180	700	1,190
O&M	Wind farm operation	3,190	10,940	18,460	-	-	-	3,190	10,940	18,460
	Turbine maintenance and service	6,060	680	850	6,060	680	850	-	-	-
	Balance of plant OMS	170	930	2,100	170	930	2,100	-	-	-
	Transmission maintenance	70	380	850	50	290	640	20	100	220
	Vessels	1,690	2,180	720	1,690	2,180	720	-	-	-
Decommissioning	Decommissioning	-	590	690	-	590	690	-	-	-
	Total	12,320	23,090	38,160	8,780	10,550	17,420	3,540	12,540	20,740

BVGAssociates

Table 4 Employment created (FTE years) under the baseline UK supply scenario for option 2.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	20	380	300	20	280	220	-	100	80
	Project management	60	280	80	40	220	60	20	80	20
Turbine	Blades	-	-	6,820	-	-	6,820	-	-	-
	Nacelle	-	-	700	-	-	700	-	-	-
	Tower	-	-	-	-	-	-	-	-	-
Balance of plant	Foundation supply	-	1,480	50	-	1,480	50	-	-	-
	Array cable supply	-	530	20	-	530	20	-	-	-
	Export cable supply	-	-	-	-	-	-	-	-	-
	Onshore and offshore substations	330	2,820	4,170	250	2,120	3,130	80	710	1,040
Installation and commissioning	Turbine installation	-	-	910	-	-	910	-	-	-
	Foundation installation	-	560	120	-	560	120	-	-	-
	Array cable installation	-	70	160	-	70	160	-	-	-
	Export cable installation	350	610	20	320	550	20	40	70	-
	Substation installation	-	270	1,310	-	270	1,310	-	-	-
	Other CAPEX	180	700	1,190	-	-	-	180	700	1,190
O&M	Wind farm operation	3,190	10,940	18,460	-	-	-	3,190	10,940	18,460
	Turbine maintenance and service	6,060	680	850	6,060	680	850	-	-	-
	Balance of plant OMS	170	930	2,100	170	930	2,100	-	-	-
	Transmission maintenance	80	410	900	60	310	670	20	100	230
	Vessels	1,690	2,180	720	1,690	2,180	720	-	-	-
Decommissioning	Decommissioning	-	560	690	-	560	690	-	-	-
	Total	12,130	23,400	39,570	8,600	10,720	18,550	3,530	12,680	21,020

Table 5 GVA (£million) created under the baseline UK supply scenario for option 1.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	1.2	26.5	20.2	0.9	19.9	15.1	0.3	6.6	5.1
	Project management	5.6	22.1	6.1	4.2	16.6	4.6	1.4	5.5	1.5
Turbine	Blades	-	-	500.7	-	-	500.7	-	-	-
	Nacelle	-	-	48.9	-	-	48.9	-	-	-
	Tower	-	-	-	-	-	-	-	-	-
Balance of plant	Foundation supply	-	101.1	3.7	-	101.1	3.7	-	-	-
	Array cable supply	-	37.2	1.4	-	37.2	1.4	-	-	-
	Export cable supply	-	-	-	-	-	-	-	-	-
	Onshore and offshore substations	18.6	146.0	211.6	14.0	109.5	158.7	4.7	36.5	52.9
Installation and commissioning	Turbine installation	-	-	77.8	-	-	77.8	-	-	-
	Foundation installation	0.1	46.0	10.1	0.1	46.0	10.1	-	-	-
	Array cable installation	0.1	5.9	12.7	0.1	5.9	12.7	-	-	-
	Export cable installation	57.2	90.1	3.1	51.4	81.1	2.8	5.7	9.0	0.3
	Substation installation	-	15.3	71.0	-	15.3	71.0	-	-	-
	Other CAPEX	15.4	54.9	90.3	-	-	-	15.4	54.9	90.3
O&M	Wind farm operation	333.9	1,086.0	1,802.1	-	-	-	333.9	1,086.0	1,802.1
	Turbine maintenance and service	663.4	70.6	86.6	663.4	70.6	86.6	-	-	-
	Balance of plant OMS	16.6	85.6	189.1	16.6	85.6	189.1	-	-	-
	Transmission maintenance	7.4	38.1	84.2	5.6	28.6	63.2	1.9	9.5	21.1
	Vessels	163.0	200.6	65.7	163.0	200.6	65.7	-	-	-
Decommissioning	Decommissioning	-	61.5	69.0	-	61.5	69.0	-	-	-
	Total	1,282.3	2,087.6	3,354.2	919.2	879.6	1,381.0	363.2	1,208.1	1,973.2

Table 6 GVA (£million) created under the baseline UK supply scenario for option 2.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	1.2	26.5	20.2	0.9	19.9	15.1	0.3	6.6	5.1
	Project management	5.6	22.1	6.1	4.2	16.6	4.6	1.4	5.5	1.5
Turbine	Blades	-	-	500.7	-	-	500.7	-	-	-
	Nacelle	-	-	48.9	-	-	48.9	-	-	-
	Tower	-	-	-	-	-	-	-	-	-
Balance of plant	Foundation supply	-	101.1	3.7	-	101.1	3.7	-	-	-
	Array cable supply	-	37.2	1.4	-	37.2	1.4	-	-	-
	Export cable supply	-	-	-	-	-	-	-	-	-
	Onshore and offshore substations	24.8	195.1	282.6	18.6	146.3	211.9	6.2	48.8	70.7
Installation and commissioning	Turbine installation	-	-	77.8	-	-	77.8	-	-	-
	Foundation installation	0.1	46.0	10.1	0.1	46.0	10.1	-	-	-
	Array cable installation	0.1	5.9	12.7	0.1	5.9	12.7	-	-	-
	Export cable installation	32.0	50.4	1.7	28.8	45.4	1.6	3.2	5.0	0.2
	Substation installation	-	20.3	94.3	-	20.3	94.3	-	-	-
	Other CAPEX	15.4	54.9	90.3	-	-	-	15.4	54.9	90.3
O&M	Wind farm operation	333.9	1,086.0	1,802.1	-	-	-	333.9	1,086.0	1,802.1
	Turbine maintenance and service	663.4	70.6	86.6	663.4	70.6	86.6	-	-	-
	Balance of plant OMS	16.6	85.6	189.1	16.6	85.6	189.1	-	-	-
	Transmission maintenance	7.8	40.3	89.2	5.9	30.3	66.9	2.0	10.1	22.3
	Vessels	163.0	200.6	65.7	163.0	200.6	65.7	-	-	-
Decommissioning	Decommissioning	-	57.9	69.0	-	57.9	69.0	-	-	-
	Total	1,263.8	2,100.5	3,452.1	901.5	883.6	1,460.0	362.3	1,216.9	1,992.1

3.2. Enhanced UK supply scenario

Under the enhanced UK supply scenario local, Scottish and UK supply are used where there is one or more credible suppliers or where there are plausible new investment in UK capability.

Offshore

Development and project management

As for the baseline UK supply scenario, UK, Scottish and local companies are used where possible in development and project management phase.

Turbine

Under the enhanced UK supply scenario, blades and nacelles are produced in the rest of UK and towers are procured in Scotland but not locally.

Balance of plant

Jacket foundations are procured outside of the UK, with export cables procured in rest of Scotland and array cables in the rest of the UK, with some spend in rest of Scotland.

For the offshore substation, most of the components are from outside of the UK, but that some of the HV and MV components are procured in the rest of the UK.

Installation and commissioning

In the enhanced UK supply scenario, a Scottish port is used for turbine installation. For foundation installation, export cable installation and array cable installation there is no change from the baseline UK supply scenario, with most of the spend outside of the UK, but with some in the rest of the UK, rest of Scotland and locally.

For the offshore substation installation, about half of the spend will be in the rest of UK, with the remaining outside of the UK.

Operations, maintenance and service

As for the baseline UK supply scenario, the project uses UK, Scottish and local companies where possible.

Decommissioning

As for the baseline UK supply scenario, overseas contractors undertake the work using UK, Scottish and local subcontractors where possible.

Onshore

As for the baseline UK supply scenario, the construction of the onshore substation is carried out by a Scottish civil engineering contractor using Scottish and other UK suppliers to provide support systems, such as low voltage electrical equipment, control systems and security systems. Onshore cable installation and construction of the OMS base uses Scottish suppliers.

Economic impacts

Table 7 to Table 10 show the combined direct, indirect, and induced GVA and FTE years delivered in the UK over the lifetime of the project for options 1 and 2. The split between direct, indirect and induced is shown in Appendix C: Additional data.

UK

Total GVA in the UK for option 1 was calculated to be £8.3 billion. The total number of FTE years created in the UK was calculated to be 95,510.

Total GVA in the UK for option 2 was calculated to be £8.3 billion. The total number of FTE years created in the UK was calculated to be 95,180.

Scotland

In Scotland, the total GVA for Berwick Bank in option 1 was calculated to be £4.1 billion. The total number of FTE years created in Scotland was calculated to be 45,030.

In option 2, the total GVA in Scotland was calculated to be £3.9 billion. The total number of FTE years created in Scotland was calculated to be 43,060.

Local

GVA locally for Berwick Bank in option 1 was calculated to be £1.3 billion. The total number of FTE years created locally was calculated to be 12,150.

In option 2 the local GVA was calculated to be £1.2 billion. The total number of FTE years created locally was calculated to be 11,900.

Workforce

The section below describes the key differences to the baseline UK supply scenario.

Development and project management

No significant change from the baseline UK supply scenario.

Turbine

The scenario includes nacelle assembly (from the rest of the UK) and tower supply (from Scotland but not local). The workforce pattern is similar to blade production with factories using a standing workforce.

Balance of plant

Cable production is included in this scenario and these are produced from specialist factories with standing workforces.

Installation and commissioning

The key difference between the enhanced and baseline UK supply scenarios with respect to the use of a Scottish port for turbine installation. The working patterns are described in the baseline UK supply scenario.

Operations, maintenance and service

No significant change from the baseline UK supply scenario.

Decommissioning

No significant change from the baseline UK supply scenario.

Table 7 Employment created (FTE years) under the enhanced UK supply scenario for option 1.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	20	380	300	20	280	220	-	100	80
	Project management	60	280	80	40	220	60	20	80	20
Turbine	Blades	-	-	11,450	-	-	11,450	-	-	-
	Nacelle	-	-	6,270	-	-	6,270	-	-	-
	Tower	-	2,670	-	-	2,670	-	-	-	-
Balance of plant	Foundation supply	-	1,480	50	-	1,480	50	-	-	-
	Array cable supply	-	530	2,870	-	530	2,870	-	-	-
	Export cable supply	-	4,450	-	-	4,010	-	-	440	-
	Onshore and offshore substations	110	2,400	3,310	80	1,800	2,490	30	600	830
Installation and commissioning	Turbine installation	-	860	-	-	860	-	-	-	-
	Foundation installation	-	580	110	-	580	110	-	-	-
	Array cable installation	-	80	160	-	80	160	-	-	-
	Export cable installation	650	1,060	50	590	960	50	60	100	-
	Substation installation	40	950	1,090	40	950	1,090	-	-	-
	Other CAPEX	210	1,550	770	-	-	-	210	1,550	770
O&M	Wind farm operation	3,100	10,840	18,500	-	-	-	3,100	10,840	18,500
	Turbine maintenance and service	6,010	680	1,100	6,010	680	1,100	-	-	-
	Balance of plant OMS	170	930	2,100	170	930	2,100	-	-	-
	Transmission maintenance	70	380	850	50	290	640	20	100	220
	Vessels	1,690	2,180	720	1,690	2,180	720	-	-	-
Decommissioning	Decommissioning	-	590	690	-	590	690	-	-	-
	Total	12,130	32,890	50,490	8,690	19,080	30,070	3,440	13,810	20,420

Table 8 Employment created (FTE years) under the enhanced UK supply scenario for option 2.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	20	380	300	20	280	220	-	100	80
	Project management	60	280	80	40	220	60	20	80	20
Turbine	Blades	-	-	11,450	-	-	11,450	-	-	-
	Nacelle	-	-	6,270	-	-	6,270	-	-	-
	Tower	-	2,670	-	-	2,670	-	-	-	-
Balance of plant	Foundation supply	-	1,480	50	-	1,480	50	-	-	-
	Array cable supply	-	530	2,870	-	530	2,870	-	-	-
	Export cable supply	-	2,490	-	-	2,250	-	-	250	-
	Onshore and offshore substations	150	3,210	4,420	110	2,410	3,320	40	810	1,100
Installation and commissioning	Turbine installation	-	860	-	-	860	-	-	-	-
	Foundation installation	-	580	110	-	580	110	-	-	-
	Array cable installation	-	80	160	-	80	160	-	-	-
	Export cable installation	360	590	30	330	540	30	40	60	-
	Substation installation	40	930	1,560	40	930	1,560	-	-	-
	Other CAPEX	200	1,420	810	-	-	-	200	1,420	810
O&M	Wind farm operation	3,100	10,840	18,500	-	-	-	3,100	10,840	18,500
	Turbine maintenance and service	6,010	680	1,100	6,010	680	1,100	-	-	-
	Balance of plant OMS	170	930	2,100	170	930	2,100	-	-	-
	Transmission maintenance	80	410	900	60	310	670	20	100	230
	Vessels	1,690	2,180	720	1,690	2,180	720	-	-	-
Decommissioning	Decommissioning	-	590	690	-	590	690	-	-	-
	Total	11,890	31,170	52,120	8,470	17,510	31,380	3,420	13,660	20,740

Table 9 GVA (£million) created under the enhanced UK supply scenario for option 1.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	1.2	26.5	20.2	0.9	19.9	15.1	0.3	6.6	5.1
	Project management	5.6	22.1	6.1	4.2	16.6	4.6	1.4	5.5	1.5
Turbine	Blades	-	-	840.6	-	-	840.6	-	-	-
	Nacelle	-	-	437.1	-	-	437.1	-	-	-
	Tower	-	225.8	-	-	225.8	-	-	-	-
Balance of plant	Foundation supply	-	101.1	3.7	-	101.1	3.7	-	-	-
	Array cable supply	-	36.9	195.2	-	36.9	195.2	-	-	-
	Export cable supply	-	303.8	-	-	273.4	-	-	30.4	-
	Onshore and offshore substations	8.3	166.5	224.4	6.3	124.9	168.3	2.1	41.6	56.1
Installation and commissioning	Turbine installation	-	74.8	-	-	74.8	-	-	-	-
	Foundation installation	-	46.5	8.7	-	46.5	8.7	-	-	-
	Array cable installation	-	6.5	13.1	-	6.5	13.1	-	-	-
	Export cable installation	57.7	89.2	4.2	51.9	80.3	3.8	5.8	8.9	0.4
	Substation installation	3.2	70.0	78.9	3.2	70.0	78.9	-	-	-
	Other CAPEX	17.2	120.6	58.6	-	-	-	17.2	120.6	58.6
O&M	Wind farm operation	324.4	1,076.7	1,805.4	-	-	-	324.4	1,076.7	1,805.4
	Turbine maintenance and service	657.6	70.6	111.5	657.6	70.6	111.5	-	-	-
	Balance of plant OMS	16.6	85.6	189.1	16.6	85.6	189.1	-	-	-
	Transmission maintenance	7.4	38.1	84.2	5.6	28.6	63.2	1.9	9.5	21.1
	Vessels	163.0	200.6	65.7	163.0	200.6	65.7	-	-	-
Decommissioning	Decommissioning	-	61.5	69.0	-	61.5	69.0	-	-	-
	Total	1,262.3	2,823.2	4,215.8	909.2	1,523.3	2,267.7	353.1	1,299.9	1,948.1

Table 10 GVA (£million) created under the enhanced UK supply scenario for option 2.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	1.2	26.5	20.2	0.9	19.9	15.1	0.3	6.6	5.1
	Project management	5.6	22.1	6.1	4.2	16.6	4.6	1.4	5.5	1.5
Turbine	Blades	-	-	840.6	-	-	840.6	-	-	-
	Nacelle	-	-	437.1	-	-	437.1	-	-	-
	Tower	-	225.8	-	-	225.8	-	-	-	-
Balance of plant	Foundation supply	-	101.1	3.7	-	101.1	3.7	-	-	-
	Array cable supply	-	36.9	195.2	-	36.9	195.2	-	-	-
	Export cable supply	-	170.2	-	-	153.1	-	-	17.0	-
	Onshore and offshore substations	11.1	222.4	299.8	8.4	166.8	224.8	2.8	55.6	74.9
Installation and commissioning	Turbine installation	-	74.8	-	-	74.8	-	-	-	-
	Foundation installation	-	46.5	8.7	-	46.5	8.7	-	-	-
	Array cable installation	-	6.5	13.1	-	6.5	13.1	-	-	-
	Export cable installation	32.3	49.9	2.3	29.0	44.9	2.1	3.2	5.0	0.2
	Substation installation	3.1	68.7	112.0	3.1	68.7	112.0	-	-	-
	Other CAPEX	16.8	110.4	61.6	-	-	-	16.8	110.4	61.6
O&M	Wind farm operation	324.4	1,076.7	1,805.4	-	-	-	324.4	1,076.7	1,805.4
	Turbine maintenance and service	657.6	70.6	111.5	657.6	70.6	111.5	-	-	-
	Balance of plant OMS	16.6	85.6	189.1	16.6	85.6	189.1	-	-	-
	Transmission maintenance	7.8	40.3	89.2	5.9	30.3	66.9	2.0	10.1	22.3
	Vessels	163.0	200.6	65.7	163.0	200.6	65.7	-	-	-
Decommissioning	Decommissioning	-	61.5	69.0	-	61.5	69.0	-	-	-
	Total	1,239.6	2,697.0	4,330.3	888.7	1,410.0	2,359.3	350.9	1,286.9	1,971.0

3.3. Low UK content scenario

Onshore and offshore

Development and project management

We have assumed no changes from the baseline UK supply scenario, where UK, Scottish and local companies are used where possible in the development and project management phase.

Turbine

We have assumed that no contracts are placed in the UK, Scotland or locally for the turbine supply chain category in the low UK content scenario.

Balance of plant

For the foundations, export cables, array cables and offshore substation we have assumed no changed from the baseline UK supply scenario, with few contracts placed in the UK. We have assumed that no contracts are placed in the UK for the electrical system, and that some contracts are placed in the rest of the UK and rest of Scotland for the onshore substations, including for civil works, but that the majority of the contracts are placed outside of the UK.

Installation and commissioning

For the installation and commissioning of the turbine, onshore substation and array cable we have assumed no changes from the baseline UK supply scenario. For the foundation and export cable installation we have assumed fewer contracts are placed in the UK, and for the offshore substation we have assumed no UK content.

Operations, maintenance and service

We have assumed no changes from the baseline UK supply scenario, where UK, Scottish and local companies are used where possible in the operations and maintenance phase.

Decommissioning

We have assumed that no contracts are placed in the UK, Scotland or locally for decommissioning in the low UK content scenario.

Economic impacts

Table 11 to Table 14 show the combined direct, indirect, and induced GVA and FTE years delivered in the UK over the lifetime of the project for options 1 and 2. The split between direct, indirect and induced is shown in Appendix C: Additional data.

UK

Total GVA in the UK for option 1 was calculated to be £5.7 billion. The total number of FTE years created in the UK was calculated to be 60,880.

Total GVA in the UK for option 2 was calculated to be £5.7 billion. The total number of FTE years created in the UK was calculated to be 60,450.

Scotland

In Scotland, the total GVA for Berwick Bank in option 1 was calculated to be £3.2 billion. The total number of FTE years created in Scotland was calculated to be 32,730.

In option 2, the total GVA in Scotland was calculated to be £3.1 billion. The total number of FTE years created in Scotland was calculated to be 43,270.

Local

GVA locally for Berwick Bank in option 1 was calculated to be £1.3 billion. The total number of FTE years created locally was calculated to be 11,990.

In option 2 the local GVA was calculated to be £1.2 billion. The total number of FTE years created locally was calculated to be 11,730.

Workforce

In the low UK content scenario, fewer jobs are created locally, in Scotland or the rest of the UK than in the baseline. Where they are created, the workforce is as described under the baseline UK supply scenario.

Table 11 Employment created (FTE years) under the low UK content scenario for option 1.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	20	380	300	20	280	220	-	100	80
	Project management	60	280	80	40	220	60	20	80	20
Turbine	Blades	-	-	-	-	-	-	-	-	-
	Nacelle	-	-	-	-	-	-	-	-	-
	Tower	-	-	-	-	-	-	-	-	-
Balance of plant	Foundation supply	-	1,300	-	-	1,300	-	-	-	-
	Array cable supply	-	530	-	-	530	-	-	-	-
	Export cable supply	-	-	-	-	-	-	-	-	-
	Onshore and offshore substations	-	850	590	-	640	450	-	220	150
Installation and commissioning	Turbine installation	-	-	890	-	-	890	-	-	-
	Foundation installation	-	580	-	-	580	-	-	-	-
	Array cable installation	-	80	160	-	80	160	-	-	-
	Export cable installation	650	1,060	-	590	960	-	60	100	-
	Substation installation	-	-	1,700	-	-	1,700	-	-	-
	Other CAPEX	190	600	1,500	-	-	-	190	600	1,500
O&M	Wind farm operation	3,190	10,940	18,460	-	-	-	3,190	10,940	18,460
	Turbine maintenance and service	6,010	680	780	6,010	680	780	-	-	-
	Balance of plant OMS	170	930	2,100	170	930	2,100	-	-	-
	Transmission maintenance	70	380	850	50	290	640	20	100	220
	Vessels	1,640	2,130	660	1,640	2,130	660	-	-	-
Decommissioning	Decommissioning	-	-	-	-	-	-	-	-	-
	Total	12,000	20,720	28,080	8,520	8,610	7,660	3,480	12,110	20,420

Table 12 Employment created (FTE years) under the uncompetitive UK supply scenario for option 2.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	20	380	300	20	280	220	-	100	80
	Project management	60	280	80	40	220	60	20	80	20
Turbine	Blades	-	-	-	-	-	-	-	-	-
	Nacelle	-	-	-	-	-	-	-	-	-
	Tower	-	-	-	-	-	-	-	-	-
Balance of plant	Foundation supply	-	1,300	-	-	1,300	-	-	-	-
	Array cable supply	-	530	-	-	530	-	-	-	-
	Export cable supply	-	-	-	-	-	-	-	-	-
	Onshore and offshore substations	-	1,140	790	-	850	600	-	290	200
Installation and commissioning	Turbine installation	-	-	890	-	-	890	-	-	-
	Foundation installation	-	580	-	-	580	-	-	-	-
	Array cable installation	-	80	160	-	80	160	-	-	-
	Export cable installation	360	590	-	330	540	-	40	60	-
	Substation installation	-	-	1,680	-	-	1,680	-	-	-
	Other CAPEX	190	600	1,270	-	-	-	190	600	1,270
O&M	Wind farm operation	3,190	10,940	18,460	-	-	-	3,190	10,940	18,460
	Turbine maintenance and service	6,010	680	780	6,010	680	780	-	-	-
	Balance of plant OMS	170	930	2,100	170	930	2,100	-	-	-
	Transmission maintenance	80	410	900	60	310	670	20	100	230
	Vessels	1,640	2,130	660	1,640	2,130	660	-	-	-
Decommissioning	Decommissioning	-	-	-	-	-	-	-	-	-
	Total	11,720	20,570	28,070	8,260	8,420	7,820	3,460	12,150	20,250

Table 13 GVA (£million) created under the uncompetitive UK supply scenario for option 1.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	1.2	26.5	20.2	0.9	19.9	15.1	0.3	6.6	5.1
	Project management	5.6	22.1	6.1	4.2	16.6	4.6	1.4	5.5	1.5
Turbine	Blades	-	-	-	-	-	-	-	-	-
	Nacelle	-	-	-	-	-	-	-	-	-
	Tower	-	-	-	-	-	-	-	-	-
Balance of plant	Foundation supply	-	88.8	-	-	88.8	-	-	-	-
	Array cable supply	-	36.9	-	-	36.9	-	-	-	-
	Export cable supply	-	-	-	-	-	-	-	-	-
	Onshore and offshore substations	-	58.7	40.4	-	44.0	30.3	-	14.7	10.1
Installation and commissioning	Turbine installation	-	-	76.6	-	-	76.6	-	-	-
	Foundation installation	-	46.5	-	-	46.5	-	-	-	-
	Array cable installation	0.1	6.5	13.1	0.1	6.5	13.1	-	-	-
	Export cable installation	57.7	89.2	-	51.9	80.3	-	5.8	8.9	-
	Substation installation	-	-	122.5	-	-	122.5	-	-	-
	Other CAPEX	15.5	46.7	114.1	-	-	-	15.5	46.7	114.1
O&M	Wind farm operation	333.9	1,086.0	1,802.1	-	-	-	333.9	1,086.0	1,802.1
	Turbine maintenance and service	657.6	70.6	79.6	657.6	70.6	79.6	-	-	-
	Balance of plant OMS	16.6	85.6	189.1	16.6	85.6	189.1	-	-	-
	Transmission maintenance	7.4	38.1	84.2	5.6	28.6	63.2	1.9	9.5	21.1
	Vessels	158.5	195.9	60.1	158.5	195.9	60.1	-	-	-
Decommissioning	Decommissioning	-	-	-	-	-	-	-	-	-
	Total	1,254.0	1,898.0	2,608.2	895.3	720.0	654.3	358.7	1,178.0	1,953.9

Table 14 GVA (£million) created under the uncompetitive UK supply scenario for option 2.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	1.2	26.5	20.2	0.9	19.9	15.1	0.3	6.6	5.1
	Project management	5.6	22.1	6.1	4.2	16.6	4.6	1.4	5.5	1.5
Turbine	Blades	-	-	-	-	-	-	-	-	-
	Nacelle	-	-	-	-	-	-	-	-	-
	Tower	-	-	-	-	-	-	-	-	-
Balance of plant	Foundation supply	-	88.8	-	-	88.8	-	-	-	-
	Array cable supply	-	36.9	-	-	36.9	-	-	-	-
	Export cable supply	-	-	-	-	-	-	-	-	-
	Onshore and offshore substations	-	78.4	54.0	-	58.8	40.5	-	19.6	13.5
Installation and commissioning	Turbine installation	-	-	76.6	-	-	76.6	-	-	-
	Foundation installation	-	46.5	-	-	46.5	-	-	-	-
	Array cable installation	0.1	6.5	13.1	0.1	6.5	13.1	-	-	-
	Export cable installation	32.3	49.9	-	29.0	44.9	-	3.2	5.0	-
	Substation installation	-	-	120.3	-	-	120.3	-	-	-
	Other CAPEX	15.5	46.7	96.3	-	-	-	15.5	46.7	96.3
O&M	Wind farm operation	333.9	1,086.0	1,802.1	-	-	-	333.9	1,086.0	1,802.1
	Turbine maintenance and service	657.6	70.6	79.6	657.6	70.6	79.6	-	-	-
	Balance of plant OMS	16.6	85.6	189.1	16.6	85.6	189.1	-	-	-
	Transmission maintenance	7.8	40.3	89.2	5.9	30.3	66.9	2.0	10.1	22.3
	Vessels	158.5	195.9	60.1	158.5	195.9	60.1	-	-	-
Decommissioning	Decommissioning	-	-	-	-	-	-	-	-	-
	Total	1,229.0	1,880.6	2,606.7	872.8	701.1	666.0	356.2	1,179.5	1,940.7

3.4. 60% UK content scenario

Supply chain assumptions

The 60% UK content scenario considers what procurement decisions are needed to reach 60% UK content, as per the UK Sector Deal. Some of these decisions, including the manufacturing of the jacket foundations and the offshore substation in Scotland would require significant investment.

Development and project management

As the procurement decisions assumed in the baseline UK supply scenario uses UK, Scottish and local companies where possible in the development and project management phase, we have assumed that the same decisions would be made in the 60% UK content scenario.

Turbine

For the turbine supply we assume that the same procurement decisions are made as in the enhanced UK supply scenario.

Balance of plant

We have assumed that under the 60% UK content scenario the jacket foundations will be manufactured in Scotland. We have assumed that the offshore substation foundation and topside are manufactured in Scotland under both options, and that some contracts for electrical equipment and engineering are placed in the rest of the UK. For the onshore substation, the export cables and the array cables we assume that the same procurement decisions are made as in the enhanced UK supply scenario.

Installation and commissioning

For installation and commissioning we assume that the same procurement decisions are made as in the enhanced UK supply scenario.

Operations, maintenance and service

For operations and maintenance, we assume that the same procurement decisions are made as in the enhanced UK supply scenario.

Decommissioning

As the procurement decisions assumed in the baseline UK supply scenario uses UK, Scottish and local companies where possible in the decommissioning phase, we have assumed that the same decisions would be made in the 60% UK content scenario.

Economic impacts

Table 15 to Table 18 show the combined direct, indirect, and induced GVA and FTE years delivered in the UK over the lifetime of the project for options 1 and 2. The split between direct, indirect and induced is shown in Appendix C: Additional data.

UK

Total GVA in the UK for option 1 was calculated to be £10.7 billion. The total number of FTE years created in the UK was calculated to be 130,650.

Total GVA in the UK for option 2 was calculated to be £10.8 billion. The total number of FTE years created in the UK was calculated to be 132,410.

Scotland

In Scotland, the total GVA for Berwick Bank in option 1 was calculated to be £6.4 billion. The total number of FTE years created in Scotland was calculated to be 78,820.

In option 2, the total GVA in Scotland was calculated to be £6.4 billion. The total number of FTE years created in Scotland was calculated to be 78.510.

Local

GVA locally for Berwick Bank in option 1 was calculated to be £1.3 billion. The total number of FTE years created locally was calculated to be 12,150.

In option 2 the local GVA was calculated to be £1.2 billion. The total number of FTE years created locally was calculated to be 11,900,

Workforce

The section below describes the key differences to the baseline and enhanced UK supply scenarios.

Development and project management

No significant change from the baseline UK supply scenario.

Turbine

No significant change from the enhanced UK supply scenario.

Balance of plant

The balance of plant workforce in the 60% UK content scenario has two significant differences from the enhanced UK supply scenario – the supply of the substation platform and the turbine and substation foundations from Scotland.

For the substation platform, the workforce is not dissimilar to oil and gas platform construction or shipbuilding. Part of the workforce relates to the fabrication of the structure with the rest concerned with the installation of electrical equipment and facilities. The contract is typically delivered by a company that has worked in oil and gas or shipbuilding and as a result has a local workforce it can draw on. Because this kind of work has peaks for labour to meet client requirements on timing – often with gaps in between – a significant proportion of the workforce, is hired for the specific job. Depending on the labour market at the time, workers may be brought in from further afield as needed. Substation platform construction for a single HVDC platform would support about 400 direct hires with additional jobs in the local supply chain.

The turbine and substation foundation workforce is also hired to deliver the specific contract. The work is typically undertaken in industrial ports that have local labour force that has been in the area for some time. The direct peak workforce is likely to be about 500 and the work is likely to continue for at least three years for Berwick Bank. There will also be a significant number of jobs for companies supplying local services.

The enhance scenario also includes the supply of some electrical equipment from the UK but outside Scotland. This reflects the UK's historical strength in high and medium voltage components in the north and midlands of England. Suppliers would draw on a standing workforce.

Installation and commissioning

No significant change from the enhanced UK supply scenario.

Operations, maintenance and service

No significant change from the enhanced UK supply scenario.

Decommissioning

No significant change from the enhanced UK supply scenario.

Table 15 Employment created (FTE years) under the 60% UK content scenario for option 1.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	20	380	300	20	280	220	-	100	80
	Project management	60	280	80	40	220	60	20	80	20
Turbine	Blades	-	-	11,450	-	-	11,450	-	-	-
	Nacelle	-	-	6,270	-	-	6,270	-	-	-
	Tower	-	2,670	-	-	2,670	-	-	-	-
Balance of plant	Foundation supply	-	30,320	50	-	30,320	50	-	-	-
	Array cable supply	-	530	2,870	-	530	2,870	-	-	-
	Export cable supply	-	4,450	-	-	4,010	-	-	440	-
	Onshore and offshore substations	110	7,360	4,640	80	5,530	3,480	30	1,850	1,160
Installation and commissioning	Turbine installation	-	860	-	-	860	-	-	-	-
	Foundation installation	-	580	110	-	580	110	-	-	-
	Array cable installation	-	80	160	-	80	160	-	-	-
	Export cable installation	650	1,060	50	590	960	50	60	100	-
	Substation installation	40	950	1,090	40	950	1,090	-	-	-
	Other CAPEX	210	1,550	770	-	-	-	210	1,550	770
O&M	Wind farm operation	3,100	10,840	18,500	-	-	-	3,100	10,840	18,500
	Turbine maintenance and service	6,010	680	1,100	6,010	680	1,100	-	-	-
	Balance of plant OMS	170	930	2,100	170	930	2,100	-	-	-
	Transmission maintenance	70	380	850	50	290	640	20	100	220
	Vessels	1,690	2,180	720	1,690	2,180	720	-	-	-
Decommissioning	Decommissioning	-	590	690	-	590	690	-	-	-
	Total	12,130	66,670	51,800	8,690	51,620	31,060	3,440	15,050	20,740

Table 16 Employment created (FTE years) under the 60% UK content scenario for option 2.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	20	380	300	20	280	220	-	100	80
	Project management	60	280	80	40	220	60	20	80	20
Turbine	Blades	-	-	11,450	-	-	11,450	-	-	-
	Nacelle	-	-	6,270	-	-	6,270	-	-	-
	Tower	-	2,670	-	-	2,670	-	-	-	-
Balance of plant	Foundation supply	-	30,320	50	-	30,320	50	-	-	-
	Array cable supply	-	530	2,870	-	530	2,870	-	-	-
	Export cable supply	-	2,490	-	-	2,250	-	-	250	-
	Onshore and offshore substations	150	9,830	6,200	110	7,380	4,650	40	2,460	1,550
Installation and commissioning	Turbine installation	-	860	-	-	860	-	-	-	-
	Foundation installation	-	580	110	-	580	110	-	-	-
	Array cable installation	-	80	160	-	80	160	-	-	-
	Export cable installation	360	590	30	330	540	30	40	60	-
	Substation installation	40	930	1,560	40	930	1,560	-	-	-
	Other CAPEX	200	1,420	810	-	-	-	200	1,420	810
O&M	Wind farm operation	3,100	10,840	18,500	-	-	-	3,100	10,840	18,500
	Turbine maintenance and service	6,010	680	1,100	6,010	680	1,100	-	-	-
	Balance of plant OMS	170	930	2,100	170	930	2,100	-	-	-
	Transmission maintenance	80	410	900	60	310	670	20	100	230
	Vessels	1,690	2,180	720	1,690	2,180	720	-	-	-
Decommissioning	Decommissioning	-	590	690	-	590	690	-	-	-
	Total	11,880	66,590	53,900	8,460	51,290	32,720	3,420	15,300	21,180

Table 17 GVA (£million) created under the 60% UK content scenario for option 1.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	1.2	26.5	20.2	0.9	19.9	15.1	0.3	6.6	5.1
	Project management	5.6	22.1	6.1	4.2	16.6	4.6	1.4	5.5	1.5
Turbine	Blades	-	-	840.6	-	-	840.6	-	-	-
	Nacelle	-	-	437.1	-	-	437.1	-	-	-
	Tower	-	225.8	-	-	225.8	-	-	-	-
Balance of plant	Foundation supply	-	2,072.8	3.7	-	2,072.8	3.7	-	-	-
	Array cable supply	-	36.9	195.2	-	36.9	195.2	-	-	-
	Export cable supply	-	303.8	-	-	273.4	-	-	30.4	-
	Onshore and offshore substations	8.3	510.0	314.2	6.3	382.5	235.7	2.1	127.5	78.6
Installation and commissioning	Turbine installation	-	74.8	-	-	74.8	-	-	-	-
	Foundation installation	-	46.5	8.7	-	46.5	8.7	-	-	-
	Array cable installation	-	6.5	13.1	-	6.5	13.1	-	-	-
	Export cable installation	57.7	89.2	4.2	51.9	80.3	3.8	5.8	8.9	0.4
	Substation installation	3.2	70.0	78.9	3.2	70.0	78.9	-	-	-
	Other CAPEX	17.2	120.6	58.6	-	-	-	17.2	120.6	58.6
O&M	Wind farm operation	324.4	1,076.7	1,805.4	-	-	-	324.4	1,076.7	1,805.4
	Turbine maintenance and service	657.6	70.6	111.5	657.6	70.6	111.5	-	-	-
	Balance of plant OMS	16.6	85.6	189.1	16.6	85.6	189.1	-	-	-
	Transmission maintenance	7.4	38.1	84.2	5.6	28.6	63.2	1.9	9.5	21.1
	Vessels	163.0	200.6	65.7	163.0	200.6	65.7	-	-	-
Decommissioning	Decommissioning	-	61.5	69.0	-	61.5	69.0	-	-	-
	Total	1,262.3	5,138.4	4,305.5	909.2	3,752.7	2,335.0	353.1	1,385.8	1,970.6

Table 18 GVA (£million) created under the 60% UK content scenario for option 2.

		Total			Offshore			Onshore		
		Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK	Local	Rest of Scotland	Rest of UK
Development and project management	Developing and permitting	1.2	26.5	20.2	0.9	19.9	15.1	0.3	6.6	5.1
	Project management	5.6	22.1	6.1	4.2	16.6	4.6	1.4	5.5	1.5
Turbine	Blades	-	-	840.6	-	-	840.6	-	-	-
	Nacelle	-	-	437.1	-	-	437.1	-	-	-
	Tower	-	225.8	-	-	225.8	-	-	-	-
Balance of plant	Foundation supply	-	2,072.8	3.7	-	2,072.8	3.7	-	-	-
	Array cable supply	-	36.9	195.2	-	36.9	195.2	-	-	-
	Export cable supply	-	170.2	-	-	153.1	-	-	17.0	-
	Onshore and offshore substations	11.1	681.2	419.7	8.4	510.9	314.8	2.8	170.3	104.9
Installation and commissioning	Turbine installation	-	74.8	-	-	74.8	-	-	-	-
	Foundation installation	-	46.5	8.7	-	46.5	8.7	-	-	-
	Array cable installation	-	6.5	13.1	-	6.5	13.1	-	-	-
	Export cable installation	32.3	49.9	2.3	29.0	44.9	2.1	3.2	5.0	0.2
	Substation installation	3.1	68.7	112.0	3.1	68.7	112.0	-	-	-
	Other CAPEX	16.8	110.4	61.6	-	-	-	16.8	110.4	61.6
O&M	Wind farm operation	324.4	1,076.7	1,805.4	-	-	-	324.4	1,076.7	1,805.4
	Turbine maintenance and service	657.6	70.6	111.5	657.6	70.6	111.5	-	-	-
	Balance of plant OMS	16.6	85.6	189.1	16.6	85.6	189.1	-	-	-
	Transmission maintenance	7.8	40.3	89.2	5.9	30.3	66.9	2.0	10.1	22.3
	Vessels	163.0	200.6	65.7	163.0	200.6	65.7	-	-	-
Decommissioning	Decommissioning	-	61.5	69.0	-	61.5	69.0	-	-	-
	Total	1,239.6	5,127.5	4,450.2	888.7	3,725.9	2,449.2	350.9	1,401.7	2,001.0

Appendix A: Economic impacts methodology

Employment and GVA methodology

Conventional modeling of economic impacts for most industrial sectors relies on government statistics, for example those based on Standard Industry Classification codes and use input-output tables and other production and employment ratios, for example those produced by the Office for National Statistics. SIC code data can be appropriate for traditional industries at a national level. The development of new codes for a maturing sector, however, takes time. This means that conventional SIC analyses of offshore wind need to map existing SIC data onto offshore wind activities, which is not easy and a source of error. Analyses using SIC codes also rely on generalised data.

Offshore wind requires a more robust approach that considers current and future capability of local supply chains because:

- Projects tend be large and have distinct procurement processes, and
- Projects tend to use comparable technologies and share supply chains.

An offshore wind specific approach therefore enables a realistic analysis of the local and national content of projects, even if the data is incomplete.

In a conventional NACE-based analysis, successful contractors are categorised using SIC. Input-output tables created, for example, by the Office for National Statistics are then used to develop multipliers. These multipliers attempt to calculate how demand in each of the SIC sectors leads to direct, indirect and induced impacts. The multipliers used in conventional analysis ignore the specific offshore wind supply chain characteristics.

The BVGA method is based on the offshore wind UK content methodology. It uses understanding of the supply chain in the lower tiers to produce a figure that is equivalent to direct and indirect GVA. Calculating a local and national content figure, and understanding profit margins, costs of employment and salaries enables direct and indirect FTE years to be calculated. Induced impacts are calculated using conventional multipliers. The same methodology is followed for local content.

The remaining expenditure is analogous to the direct and indirect GVA created. GVA is the aggregate of labor costs and operational profits. We can therefore model FTE years from GVA, provided we understand some key variables. In our economic impact methodology, employment impacts are calculated using the following equation:

$$FTE_a = \frac{(GVA - M)}{Y_a + W_a}$$

Where:

FTE_a = Annual FTE employment

GVA = Gross value added (£)

M = Total operating margin (£)

Y_a = Average annual wage (£), and

W_a = Non-wage average annual cost of employment (£).

To make robust assessments, therefore, we considered each major component in the offshore wind supply chain and typical salary levels, costs of employment and profit margins, bringing together BVGA's specific sector knowledge and research into typical labor costs for the work undertaken in each part of the supply chain.

Appendix B: Assumptions

Spend category	Option 1	Option 2
DEVEX	£0.1 billion	£0.1 billion
CAPEX	£9.6 billion	£9.7 billion
OPEX	£6.0 billion	£6.0 billion
DECEX	£0.2 billion	£0.2 billion
TOTEX	£15.9 billion	£16 billion

	Seagreen	Berwick Bank
Expected year of commissioning	2023	2027/28
Size	1,075MW	4,100MW
Location	27km from Angus	49KM from East Lothian
Turbine size	9.5MW	Assumed 15MW and 18MW

BVGAssociates

Appendix C: Additional data

Baseline UK supply scenario

Table 19 Direct, indirect and induced full-time equivalent jobs created by Berwick Bank in the baseline UK supply scenario for each level 1 category for option 1.

Level1	Impacts	Rest of UK	Rest of Scotland	Local	Total
Development and project management	Direct	200	380	60	640
	Indirect	80	180	20	280
	Induced	100	100	-	200
	Total	380	660	80	1,120
Turbine	Direct	3,860	-	-	3,860
	Indirect	1,770	-	-	1,770
	Induced	1,900	-	-	1,900
	Total	7,530	-	-	7,530
Balance of plant	Direct	1,590	2,360	160	4,110
	Indirect	800	1,170	80	2,050
	Induced	810	600	10	1,420
	Total	3,200	4,130	250	7,580
Installation and commissioning	Direct	1,630	1,430	490	3,550
	Indirect	920	810	290	2,020
	Induced	860	370	40	1,270
	Total	3,410	2,610	820	6,840
Operations, maintenance and service	Direct	10,850	7,950	6,520	25,320
	Indirect	7,060	5,280	4,100	16,440
	Induced	5,120	1,880	560	7,560
	Total	23,030	15,110	11,180	49,320
Decommissioning	Direct	320	320	-	640
	Indirect	190	190	-	380
	Induced	170	80	-	250
	Total	680	590	-	1,270
Total	**Direct**	**18,450**	**12,440**	**7,230**	**38,120**
	Indirect	**10,820**	**7,630**	**4,490**	**22,940**
	Induced	**8,960**	**3,030**	**610**	**12,600**
	Total	**38,230**	**23,100**	**12,330**	**73,660**

Table 20 Direct, indirect and induced full-time equivalent jobs created by Berwick Bank in the baseline UK supply scenario for each level 1 category for option 2

Level1	Impacts	Rest of UK	Rest of Scotland	Local	Total
Development and project management	Direct	200	380	60	640
	Indirect	80	180	20	280
	Induced	100	100	-	200
	Total	380	660	80	1,120
Turbine	Direct	3,860	-	-	3,860
	Indirect	1,770	-	-	1,770
	Induced	1,900	-	-	1,900
	Total	7,530	-	-	7,530
Balance of plant	Direct	2,110	2,760	210	5,080
	Indirect	1,060	1,380	100	2,540
	Induced	1,080	700	20	1,800
	Total	4,250	4,840	330	9,420
Installation and commissioning	Direct	1,780	1,220	330	3,330
	Indirect	990	670	190	1,850
	Induced	930	320	30	1,280
	Total	3,700	2,210	550	6,460
Operations, maintenance and service	Direct	10,870	7,960	6,530	25,360
	Indirect	7,070	5,290	4,100	16,460
	Induced	5,130	1,880	560	7,570
	Total	23,070	15,130	11,190	49,390
Decommissioning	Direct	320	300	-	620
	Indirect	190	180	-	370
	Induced	170	80	-	250
	Total	680	560	-	1,240
Total	**Direct**	19,140	12,620	7,130	38,890
	Indirect	11,160	7,700	4,410	23,270
	Induced	9,310	3,080	610	13,000
	Total	39,610	23,400	12,150	75,160

Table 21 Direct, indirect and induced GVA (£million) created by Berwick Bank in the baseline UK supply scenario for each level 1 category for option 1

Level1	Impacts	Rest of UK	Rest of Scotland	Local	Total
Development and project management	Direct	£12.9	£25.1	£3.3	£41.3
	Indirect	£8.1	£18.0	£3.0	£29.1
	Induced	£5.3	£5.4	£0.5	£11.2
	Total	£26.3	£48.5	£6.8	£81.6
Turbine	Direct	£235.6	£-	£-	£235.6
	Indirect	£196.2	£-	£-	£196.2
	Induced	£117.8	£-	£-	£117.8
	Total	£549.6	£-	£-	£549.6
Balance of plant	Direct	£76.8	£118.7	£7.6	£203.1
	Indirect	£93.5	£131.6	£9.3	£234.4
	Induced	£46.4	£34.0	£1.7	£82.1
	Total	£216.7	£284.3	£18.6	£519.6
Installation and commissioning	Direct	£103.3	£89.1	£30.3	£222.7
	Indirect	£104.5	£97.6	£35.5	£237.6
	Induced	£57.1	£25.6	£6.8	£89.5
	Total	£264.9	£212.3	£72.6	£549.8
Operations, maintenance and service	Direct	£901.9	£662.6	£545.8	£2,110.3
	Indirect	£901.9	£662.6	£545.8	£2,110.3
	Induced	£423.9	£155.7	£92.8	£672.4
	Total	£2,227.7	£1,480.9	£1,184.4	£4,893.0
Decommissioning	Direct	£29.7	£29.7	£-	£59.4
	Indirect	£24.3	£24.3	£-	£48.6
	Induced	£15.0	£7.5	£-	£22.5
	Total	£69.0	£61.5	£-	£130.5
Total	**Direct**	£1,360.2	£925.2	£587.0	£2,872.4
	Indirect	£1,328.5	£934.1	£593.6	£2,856.2
	Induced	£665.5	£228.2	£101.8	£995.5
	Total	£3,354.2	£2,087.5	£1,282.4	£6,724.1

Table 22 Direct, indirect and induced GVA (£million) created by Berwick Bank in the baseline UK supply scenario for each level 1 category for option 2

Level1	Impacts	Rest of UK	Rest of Scotland	Local	Total
Development and project management	Direct	£12.9	£25.1	£3.3	£41.3
	Indirect	£8.1	£18.0	£3.0	£29.1
	Induced	£5.3	£5.4	£0.5	£11.2
	Total	£26.3	£48.5	£6.8	£81.6
Turbine	Direct	£235.6	£-	£-	£235.6
	Indirect	£196.2	£-	£-	£196.2
	Induced	£117.8	£-	£-	£117.8
	Total	£549.6	£-	£-	£549.6
Balance of plant	Direct	£101.9	£138.1	£10.1	£250.1
	Indirect	£124.1	£155.3	£12.4	£291.8
	Induced	£61.6	£39.9	£2.3	£103.8
	Total	£287.6	£333.3	£24.8	£645.7
Installation and commissioning	Direct	£111.9	£75.6	£20.1	£207.6
	Indirect	£113.1	£80.5	£23.0	£216.6
	Induced	£61.9	£21.4	£4.4	£87.7
	Total	£286.9	£177.5	£47.5	£511.9
Operations, maintenance and service	Direct	£903.9	£663.6	£546.0	£2,113.5
	Indirect	£903.9	£663.6	£546.0	£2,113.5
	Induced	£424.8	£155.9	£92.8	£673.5
	Total	£2,232.6	£1,483.1	£1,184.8	£4,900.5
Decommissioning	Direct	£29.7	£27.9	£-	£57.6
	Indirect	£24.3	£22.9	£-	£47.2
	Induced	£15.0	£7.0	£-	£22.0
	Total	£69.0	£57.8	£-	£126.8
Total	**Direct**	£1,395.9	£930.3	£579.5	£2,905.7
	Indirect	£1,369.7	£940.3	£584.4	£2,894.4
	Induced	£686.4	£229.6	£100.0	£1,016.0
	Total	£3,452.0	£2,100.2	£1,263.9	£6,816.1

About BVG Associates

BVG Associates is an independent renewable energy consultancy focussing on wind, wave and tidal, and energy systems. Our clients choose us when they want to do new things, think in new ways and solve tough problems. Our expertise covers the business, economics and technology of renewable energy generation systems. We're dedicated to helping our clients establish renewable energy generation as a major, responsible and cost-effective part of a sustainable global energy mix. Our knowledge, hands-on experience and industry understanding enables us to deliver you excellence in guiding your business and technologies to meet market needs.

- BVG Associates was formed in 2006 at the start of the offshore wind industry.
- We have a global client base, including customers of all sizes in Europe, North America, South America, Asia and Australia.
- Our highly experienced team has an average of over 10 years' experience in renewable energy.
- Most of our work is advising private clients investing in manufacturing, technology and renewable energy projects.
- We've also published many landmark reports on the future of the industry, cost of energy and supply chain.