- Assessment of impacts: confirms the project design parameters to be assessed (the Worst-Case Scenario [WCS]) and presents the impact assessment for socio-economics throughout the construction, operation and decommissioning phases and concludes on the likely significance of impacts. The assessment includes the consideration of any mitigation measures (both embedded and additional) and sets out any monitoring proposals for potentially significant impacts, if required;
- Cumulative impact assessment: presents the cumulative impact assessment for socio-economics throughout the construction, operation and decommissioning phases and concludes on the likely significance of impacts with consideration of mitigation measures;
- Interrelationships: assesses the potential interrelated impacts on any given receptor scoped into the assessment;
- Transboundary impacts: Considers the potential for any transboundary impacts in relation to socio-economics; and
- Assessment summary: provides a summary of the impact assessment undertaken.

15.7. All figures supporting this chapter can be found in Volume II: Figures.

15.8. This chapter was produced by BiGGAR Economics Limited.

15.9. Potential socio-economic impacts on other commercial sectors, such as commercial fishing, are covered within the relevant topic specific chapters of this EIA Report, as stated in the Scoping Report (Seagreen, 2017) and therefore are not assessed within this chapter.

LEGISLATION, POLICY AND GUIDANCE

15.10. There is no specific statutory guidance for the assessment of socio-economic impacts with the EIA regulations, however the following non-statutory documents and guidance have been considered in undertaking this assessment:

- Environmental Impact Assessment Guide: to Delivering Quality Development (IEMA, 2016); and
- Environmental Impact Assessment Handbook (Scottish Natural Heritage, 2018)

15.11. The relevant UK and Scottish Government policies and action plans have been highlighted below.

Policy Context

15.12. This section considers UK and Scottish policy with regards to offshore wind and explains the consideration that each government gives to the potential for offshore wind to contribute to increasing sustainability of energy production and generating economic benefits (Table 15.1).

Table 15.1 Policy context

Policy	Description	Relevance to assessment
UK Government		
The Clean Growth Strategy (UK Government, 2017)	Released in 2017, the Strategy outlines Britain's progress in delivering clean growth and how this progress can be furthered. This involves: • Increasing the proportion of electricity coming from renewable sources; • Transitioning away from polluting power sources where possible; and • Increasing the efficiency of homes, businesses and the public sector.	Offshore wind is featured prominently in the strategy (a picture of offshore turbines directly precedes the executive summary) and noted as an area where government commitment has resulted in major innovation and cost reductions. It is also highlighted as an area of opportunity for the UK
Scottish Government		
Climate Change Plan: The Third Report on Proposal and Policies 2018 to 2032 (Scottish Government, 2018)	Released in 2018, the plan sets out Scotland's path to a sustainable, inclusive low carbon society, its statutory duties and the pathway to achieving the Scottish Government's ambitious target. The sector pathways that are focused in are: • electricity; • buildings; • transport; • industry; • waste; • land use; and • agriculture.	Scotland aims to generate 50% of all energy from renewable sources by 2032, and offshore wind is identified as an area where future growth is expected
Scotland's Offshore Wind Route Map (Scottish Government, 2013)	The Route Map was released in 2013, updating the original undertaken in 2010. It sets out the progress that has been made from the original route map, as well as the next steps to be taken and how the Scottish Government can support these. Areas under consideration were: • Investment in infrastructure; • Appropriate supply chain; • Ongoing innovation of technology and practices • Regulation of and access to the electricity grid; • Managing the marine environment; • Skills; • Finance; and • Securing support of local communities and existing users of the sea.	The route map sets out the Scottish Government's commitment to offshore wind as an important component of future energy production. It also states that by focussing on the recommendations outlined in this document it creates a path to ensure that Scotland captures the biggest sustainable economic growth opportunity for a generation.'

Policy	Description	Relevance to assessment
Scotland's Third National Planning Framework (Scottish Government, 2014)	The National Planning Framework (NPF), released in 2014, sets out the framework to achieve the Scottish Government's central purpose of creating a more successful country, and highlights were there are opportunities in Scotland. This NPF is organised around making Scotland: • a successful, sustainable place; • a low carbon place; • a natural, resilient place; and a • a connected place.	The NPF highlights the aims of increasing and diversifying Scotland's renewable energy supplies and 'continuing to capitalise on our wind resources and for Scotland to be a world leader in offshore renewable energy. The NPF also highlights that Dundee, Methil, Montrose, Rosyth and Burntisland are National Renewable Infrastructure Plan sites.
Scottish Planning Policy (Scottish Government, 2014)	The Scottish Planning Policy 2014 is a statement of the Scottish Government's policy on land use planning including, amongst other things, purpose of planning, core principles and objectives of the system, sustainable development and planning policies on the implications for development planning and development management.	It is recognised within the plan that Scotland has substantial onshore and offshore renewable energy resources. It is also noted that renewable energy 'presents a significant opportunity for associated development, investment and growth of the supply chain, particularly for ports and harbours identified in the National Renewables Infrastructure Plan.

CONSULTATION

15.13. It is noted that socio-economics was originally scoped out of the EIA Report as set out within the 2017 Scoping Opinion. Therefore, no consultation responses were received for this topic. However, following further consideration Seagreen decided to provide an up to date assessment of the potential socio-economic impacts of the optimised Seagreen project.

15.14. Consultation undertaken in the 2012 Offshore ES asked that the economic benefit be assessed with relation to construction and operation, and this should include relevant economic information such as economic activity and jobs supported. Assessment of the economic benefit in relation to construction and operation of the optimised Seagreen project has been undertaken within this chapter.

SCOPE OF ASSESSMENT

15.15. The scope of the assessment for socio-economics considers the following potential impacts, which were also considered in the 2012 Offshore ES;

- Economic impacts associated with the development and construction of the optimised Seagreen Project;
- Economic impacts associated with the operations and maintenance of the optimised Seagreen Project; and
- The effect of cumulative offshore wind farm developments on these economic impacts.

15.16. The 2017 Scoping Report considered the changes to the Seascape, Landscape and Visual Amenity. This concluded that the changes in design will not change these effects. Therefore, the scope of this assessment does not include the tourism and recreation impacts considered in the 2012 Offshore ES for the originally consented project and the impact assessment conclusions remain unchanged for these aspects.

15.17. The economic impacts associated with the decommissioning of the optimised Seagreen Project have not been quantified in this assessment. The expenditure on decommissioning is currently unknown, although it is likely to be comparable to, but lower than, that for the construction phase. However, this expenditure will occur beyond the 25-year operational lifetime of the optimised Seagreen Project and therefore any quantifiable impacts would be severely discounted through application of standard discount rates. Therefore, the scope of this assessment does not include the economic impacts associated with decommissioning.

15.18. The assessment presented within this chapter is based on the optimised Seagreen project design set out in Chapter 5 (Project Description) and with the assumption that mitigation measures and consent conditions as set out in Chapter 7 (Scope of EIA Report) will be applied. The transmission asset is not included in the scope of this EIA Report; however, it is included in this assessment for completeness.

METHODOLOGY

15.19. This section presents the impact assessment methodology applied to assess the potential socio-economic impacts associated with the construction, operation and decommissioning phases of the optimised Seagreen Project. This includes an overview of the study areas used for the assessment, the sources of data used for each assessment and the methods of impact assessment.

Study Area

15.20. With regard to the economic assessment of expenditure and supply chain associated with the optimised Seagreen Project, the potential impacts may influence a wide area. A proportion of the expenditure may add to local, regional and UK-wide income during all phases. Expenditure on key elements of the wind farms, such as wind turbines, will result in further expenditure throughout the supply chain for component parts (e.g., foundation and tower manufacture) and other services (e.g., engineering, legal, accommodation provision). As such, direct expenditure will be re-circulated as indirect and induced expenditure to other companies; this is commonly referred to as the multiplier effect.

15.21. In line with the approach taken in the 2012 Offshore ES for the originally consented project this assessment considers the potential quantifiable impacts on the economies of the following study areas:

- Scotland; and
- the UK.

15.22. In addition, specific consideration is given to the Local Authority areas in the vicinity of the optimised Seagreen Project namely Fife, Angus, Dundee and East Lothian.

15.23. While it is considered that there will be some procurement of goods and services from overseas which will also result in beneficial impacts at the international level, these were not within the scope of this assessment in accordance with the approach agreed with Marine Scotland for the 2012 Offshore ES.

Data Collection

15.24. Baseline characterisation for socio-economics has been undertaken using desk-based research. The sources used are summarised below:

- Annual Population Survey 2017 (Office for National Statistics, 2018);
- Business Register and Employment Survey 2016 (Office for National Statistics, 2017);
- Population Estimates (Current Geographic Boundaries) 2017 (National Records of Scotland, 2018); and
- Population Projections 2016-2041 (National Records of Scotland, 2017).

Impact Assessment

15.25. The impact assessment follows the principles of the approach set out within Chapter 6 (EIA Process). This includes consideration of the optimised Seagreen Project which would allow fewer, larger turbines to be installed. At the time of writing the final installed capacity and number of turbines has not been decided. Therefore, this analysis considers an indicative development scenario that highlights the scale of the potential economic impacts. Consideration is therefore undertaken of Project Alpha alone with 70 turbines; Project Bravo alone with 70 turbines; Project Alpha and Project Bravo combined with 120 turbines; and the optimised Seagreen Project cumulatively with other developments. The consideration of Project Alpha and Project Bravo together with 120 turbines represents the highest possible level of impact as the consent will limit the overall number of turbines which can be installed across both Project Alpha and Project Bravo sites and would not allow a scenario where 140 turbines are installed.

15.26. The economic impacts are quantified in terms of value added and employment. In particular:

- Gross Value Added (GVA) – this is a measure of the economic value added by an organisation or industry and is typically estimated by subtracting the non-staff operational costs from the revenues of an organisation;
- Job years – this is a measure of employment which is equivalent to one person being employed for an entire year and is typically used when considering short term employment impacts, such as those associated with construction; and
- Jobs – this is a measure of employment which considers the headcount employment in an organisation or industry.

15.27. The significance of potential impacts has been evaluated using a systematic approach, based upon identification of the importance/value of receptors and their sensitivity to the project activity, together with the predicted magnitude of the impact.

15.28. The extent of project expenditure is not yet known accurately, and hence this has been estimated based on published sources applicable to the offshore wind industry and BiGGAR Economics experience of the offshore wind energy sector. Studies on the current and future expected levels of Capital Expenditure (CAPEX) per MW give a range of values for the UK. A study by ARUP for the Department of Energy and Climate Change (ARUP, 2016) estimated that CAPEX costs for offshore wind farms in 2020 would range from £2.3 million per MW to £3.2 million per MW. Across Europe, costs are expected to reach £2.6 million per MW (Offshore Renewable Energy Catapult, 2017) in the medium to long term. This analysis uses an indicative assumption that the capital expenditure costs of developing and constructing the optimised Seagreen Project will be in line with the average for UK short term projections, for the individual Alpha and Bravo projects in isolation.

15.29. There is assumed to be some economies of scales for Project Alpha and Project Bravo combined, particularly through the electrical works, for example in the inter array cables and substation construction, and therefore the cost per MW for the assessment of the optimised Seagreen Project lower than that used in the assessment of the individual Project Alpha and Project Bravo assessments. These estimates describe the lower end of the potential investment spectrum, in line with the Worst Case Scenario approach defined below.

15.30. The total estimated capital expenditure (CAPEX) for both Project Alpha and Project Bravo is £2.4 billion for each project in isolation. Project Alpha and Project Bravo combined is assessed based on an estimated CAPEX for the project of £3.8 billion.

15.31. The split of CAPEX by contract component has been estimated using publications applicable to the offshore wind industry. In particular, studies undertaken by BVG Associates (BVG Associates, 2014).

15.32. With regard to the employment supported and GVA generated during the development and construction phases of each project, this assessment utilises statistics from the Office of National Statistics. In particular, it applies the turnover, employment and GVA of the appropriate industries in the Annual Business Survey (ONS, 2017) to the sectors described in the CAPEX Contract components.

15.33. This assessment also considers the indirect and induced employment and GVA that this generates. These are referred to as the 'Multiplier Impacts'. These multipliers are calculated using the Type 2 multipliers by industry, produced by the Scottish Government (Scottish Government, 2017).

15.34. For example, if the assessment considered the economic impact of a contract value of £1 million in Sector X in Scotland, which had a turnover to GVA ratio of two and turnover per employee ratio of £100,000. This would result in 10 job years being directly supported in the sector and £500,000 GVA being generated. To capture the multiplier effects on employment and GVA the Type 2 Multipliers for Sector X in Scotland would be applied. If these were 1.4 and 1.5 respectively, this would imply that the indirect and induced effects associated with this increase in turnover would result in an additional 4 job years and £250,000 GVA being supported across Scotland. Therefore, the total economic impact associated with the initial £1 million contract value would be 14 job years and £750,000 GVA.

15.35. The Operating Expenditure (OPEX) per MW is assumed to be in line with the average across the industry (BVG Associates, 2016). Therefore, the annual OPEX for Project Alpha and Project Bravo in isolation is estimated to be £44.6 million. The annual OPEX for Project Alpha and Project Bravo combined is estimated to be £76.5 million.

15.36. The split of OPEX by contract type was estimated through publications regarding similar offshore wind energy projects in the UK (BVG Associates, 2012).

15.37. The direct and multiplier employment and GVA that will be supported during the operations and maintenance phase of the development is calculated in line with the approach taken to the development and construction phase.

15.38. This analysis provides a single scenario for economic impact for each of the development options for the optimised Seagreen Project. The location and expenditure of employment has been estimated using the analysis of the location economic conditions and the current and expected UK share of particular contracts associated with the offshore wind sector, as per industry studies (BVG Associates, 2014).

Developments in Assessment Methods

15.39. There have been a number of developments in the assessment approach from the original 2012 Offshore ES. In particular, the development of the offshore wind energy sector in the UK during this time period has resulted in a development of the supply chain and a greater understanding of the potential economic impacts associated with the development of the offshore wind sector supply chain. This growth has been substantial and rapid. It was estimated that offshore wind projects secured 29% of construction and 73% of development contracts from the UK. This is an increase from projects in 2015 which secured 57% of development and 18% of construction contracts from the UK (RenewableUK, 2017). This share is expected to grow as the supply chain in the UK develops (Offshore Renewable Energy Catapult, 2017) and the proportion of total expenditure procured in the UK is expected to double from 32% in 2016 to 65% by 2030.

15.40. Additional studies on the future supply chain potential (BVG Associates, 2014) and analysis of the supply chain of existing offshore wind farms such as Robin Rigg (BVG Associates, 2012) have created a substantial evidence base that allows estimates to be made regarding the potential location of supply chain contractors.

15.41. Similarly, additional evidence on the typical components of both CAPEX and OPEX contracts (BVG Associates, 2016) allow for a more detailed and accurate industrial analysis of the supply chain to be made. This ensures that the economic impact analysis is a better reflection of the industries and organisations that would be involved.

Significance Criteria

15.42. For the purposes of this assessment the definitions which are used for assessing the magnitude of impacts on socio-economic are set out in Table 15.2 below.

Table 15.2 Definition of terms relating to the magnitude of socio-economic impacts

Magnitude	Definition
Major	A fundamental change to a location, environment or sensitive receptor or in breach of recognised legislation, policy or standards.
Moderate	A material, but non-fundamental change to a location, environment or sensitive receptor.
Minor	A detectable but non-material change to a location, environment or sensitive receptor.
Negligible	Either no change or no detectable change to a location, environment or sensitive receptor.

15.43. In assessing significance, consideration is given to the national, regional and local baseline situation. The magnitude of the impact is determined in the proportion to the area of impact relevant to each receptor.

15.44. For this socio-economic impact analysis, the receptors considered are the economies of Scotland and the UK.

15.45. As set out in Chapter 6 (EIA Process), for the purposes of this EIA Report, potential impacts identified as major or moderate are generally considered to be significant in EIA terms and mitigation may be required, while impacts identified as minor or negligible are generally considered to be not significant in EIA terms.

Assessment Limitations and Uncertainty

15.46. The assessment of the economic impacts described in this chapter are based on assumptions concerning the level of expenditure and the geographic distribution of this procurement. This reliance on assumptions is a limitation on the assessment. In particular, the optimised Seagreen Project could be developed in such a way that either:

- CAPEX per MW deviates considerably from the figures described in this analysis;
- The proportion of contracts that are secured in either Scotland or the UK are deviates considerably to those secured by similar projects in the UK;
- The breakdown of contract expenditure by category deviates considerably from similar projects in the UK; or
- The companies that are involved in the supply chain are considerably different from others in their industry in terms of the ratio between turnover, GVA and employment.

15.47. In order to reflect these assessment limitations and uncertainties, the assessment considered in this analysis is considered to be indicative of the economic impact that the optimised Seagreen Project could have if it was developed, constructed, operated and maintained in a way that is typical for the industry.

15.48. In order to minimise these assessment limitations and uncertainties, the assessment is based on the most up-to-date industrial evidence and direct conversations with the developer.

BASELINE CONDITIONS

15.49. This section provides an overview of key socio-economic indicators for Scotland, with a particular focus on the local authority areas in the vicinity of the proposed site. These are Angus, Dundee City, Fife and East Lothian. The indicators considered are those previously considered in the 2012 Offshore ES:

- Demographics;
- Employment and industrial structure;
- Education; and
- Supply chain opportunities.

Demographics

Current baseline

15.50. The population figures presented in Table 15.3 show that the largest of the local authorities are Dundee and Fife (National Records of Scotland, 2018). There is some variation in the working age share of the population, with Dundee having 66.4% aged 16-64, but all the other areas having a lower proportion than Scotland, where it is 64.4%. If Dundee had the same proportion as Scotland, this would represent about 3,000 fewer working age adults.

15.51. In Angus this is a result of a higher than average proportion aged over 65 (23.1%), compared to the Scottish average of 18.7%. While both East Lothian and Fife have a higher proportion aged 65 and over than Scotland as a whole, they also have higher proportions of the population aged under 16.

Table 15.3 Population, 2017

	Angus	Dundee	East Lothian	Fife	Scotland
Total	116,280	148,710	104,840	371,410	5,424,800
Under 16	16.6%	16.1%	18.2%	17.3%	16.9%
16 to 64	60.4%	66.4%	61.9%	62.6%	64.4%
65 and over	23.1%	17.4%	19.9%	20.1%	18.7%

Source: National Records of Scotland (2018), Population Estimates (Current Geographic Boundaries)

Future baseline

15.52. Table 15.4 below shows how the populations are expected to change from 2016 to 2041 (National Records of Scotland, 2017). The Scottish population is expected to grow by 5.3%, with much of the growth driven by growth in Edinburgh, Glasgow and their surrounding areas, such as East Lothian, which is expected to grow by 18.4%. In contrast, Dundee and Fife are expected to grow by 1.4% and 2.6% respectively, well below the Scottish average.

15.53. Each of the local authorities, except Dundee, is expected to grow. The proportion of working age employees is expected to stay below the Scottish average of 58.9%, while the proportion aged 65 and over will remain higher than the Scottish average of 25.3%. In particular, Angus will see its population aged 65 and over increase to 29.9%.

Table 15.4 Population Projections, 2041

	Angus	Dundee	East Lothian	Fife	Scotland
Total	119,104	150,357	123,245	379,788	5,693,201
Under 16	15.6%	15.5%	16.8%	16.1%	15.8%
16 to 64	54.5%	63.2%	55.9%	56.3%	58.9%
65 and over	29.9%	21.3%	27.3%	27.6%	25.3%
Growth from 2016	5.8%	1.4%	18.4%	2.6%	5.3%

Source: National Records of Scotland (2018), Population Projection 2016 to 2041

Employment and Industrial Structure

Current baseline

15.54. The split of employment by occupation gives an indication of the quality of employment in a given geography. Table 15.5 shows that the main source of occupation in Scotland is professional occupations, accounting for a fifth of employment (20.7%) (Office for National Statistics, 2018). Fife (which has the highest number of workers), and East Lothian have higher proportions of employment in these occupations compared to the Scottish average, while Angus and Dundee have lower proportions.

15.55. However, East Lothian and Fife have lower proportions of the workers in processing and machine operative occupations than the Scottish average of 6.6%, while Dundee has a similar level and Angus has a higher level. All of the study areas, except Dundee, have a higher level of employment in skilled trades and occupations than the Scottish average of 10.9%.

15.56. Table 15.6 shows employment by sector in each of the areas (Office for National Statistics, 2017). In each area, the biggest employer is health, representing over a fifth of employment in Dundee (21.3%) compared to 15.9% in Scotland as a whole.

Table 15.5 Employment by Occupation

	Angus	Dundee	East Lothian	Fife	Scotland
Manager, directors and senior officials	9.2%	6.5%	9.5%	5.7%	8.5%
Professional occupations	15.9%	18.8%	21.9%	22.0%	20.7%
Associate professional and technical	11.1%	11.6%	12.8%	13.9%	13.6%
Administrative and secretarial	9.1%	12.1%	9.0%	7.7%	10.2%
Skilled trades and occupations	15.6%	7.7%	12.2%	11.4%	10.9%
Caring, leisure and other services	11.0%	10.1%	13.6%	11.3%	9.8%
Sales and customer services	7.3%	12.7%	7.0%	8.2%	8.2%
Processing and machine operatives	8.9%	6.4%	5.1%	5.1%	6.6%
Elementary occupations	11.7%	13.8%	8.9%	14.0%	11.0%
Total	**54,900**	**65,200**	**50,600**	**172,300**	**2,618,100**

Source: ONS (2018), Annual Population Survey Jan 2017-Dec 2017

15.57. Manufacturing represents an important sector of employment in Angus and Fife, much higher than the Scottish average of 7.0%, although the level is about the same in East Lothian and below average in Dundee. Similarly, construction is above the Scottish average of 5.4% in each study area, with the exception of Dundee.

15.58. In contrast, in none of the local authorities are the proportion employed in transport and storage above the Scottish average of 4.2%. Similarly, the proportion employed in professional, scientific and technical services is below the Scottish average of 6.9% in each study area.

Table 15.6 Employment by Industry

	Angus	Dundee	East Lothian	Fife	Scotland
Agriculture, forestry and fishing*	1.1%	0.0%	0.4%	0.2%	3.0%
Mining, quarrying and utilities	1.6%	0.8%	3.1%	1.6%	2.6%
Manufacturing	14.5%	6.1%	7.2%	11.0%	7.0%
Construction	6.2%	4.2%	6.4%	6.2%	5.4%
Motor trades	2.5%	1.9%	1.5%	2.0%	1.9%
Wholesale	3.3%	2.7%	2.5%	3.1%	3.0%
Retail	12.3%	12.3%	9.3%	10.3%	9.5%
Transport and storage	4.0%	2.3%	2.9%	3.7%	4.2%
Accommodation and food services	7.2%	9.7%	8.5%	7.0%	7.3%
Information and communication	0.9%	3.9%	1.6%	2.9%	2.9%
Financial and insurance	0.8%	1.6%	1.0%	2.9%	3.3%
Property	1.3%	1.8%	1.4%	0.9%	1.5%
Professional, scientific and technical	6.5%	4.8%	6.8%	5.5%	6.9%
Business administration and support	4.3%	4.2%	3.8%	4.8%	7.3%
Public administration and defence	4.0%	7.1%	5.5%	9.5%	5.9%
Education	7.2%	10.3%	11.0%	7.7%	7.3%
Health	15.9%	21.3%	16.9%	14.3%	15.9%
Arts, entertainment, recreation and other services	7.2%	5.2%	8.5%	6.2%	5.2%
Total**	**34,500**	**77,500**	**29,500**	**136,500**	**2,587,500**

Source: ONS (2017), Business Register and Employment Survey 2016. *Excludes farm agriculture.
**Note that the total refers to workplace employment, including those that commute into each study area

Education

Current baseline

15.59. Table 15.7 provides the working age population educational level for each of the study areas (Office for National Statistics, 2018). As can be seen, each of the study areas has a lower proportion with no qualifications than the Scottish average of 8.7%, except Dundee where the figure is 12.7%. Similarly, Dundee, along with Angus, has a lower proportion of the population educated to NVQ4+ compared to the Scottish average, while East Lothian and Fife have a higher proportion.

Table 15.7 Working Age Population by Education

	Angus	Dundee	East Lothian	Fife	Scotland
NVQ4+	40.2%	38.4%	46.1%	45.0%	43.9%
NVQ3+	57.4%	56.4%	64.0%	61.7%	59.8%
NVQ2+	75.6%	72.9%	80.7%	77.7%	75.9%
NVQ1+	87.3%	81.6%	88.9%	87.0%	84.9%
Other qualifications	4.8%	5.7%	4.8%	5.7%	6.4%
No qualifications	7.9%	12.7%	6.3%	7.3%	8.7%
Total	**69,400**	**96,600**	**63,800**	**225,500**	**3,399,500**

Source: ONS (2018), Annual Population Survey Jan 2017-Dec 2017

Supply Chain Opportunities

15.60. There are several locations within the local authorities that have been identified as key locations for supporting the offshore renewable supply chain. These have been identified in the Scottish Energy Ports Capability Directory and the Scottish National Renewables Infrastructure Plan. These include, but are not limited to port facilities such as:

- Montrose Port in Angus – primarily focused on the oil and gas sector, Montrose Port has recently upgraded berths and facilities;
- Port of Dundee – this currently offers offshore wind services and plans to develop a 20 acre offshore wind marshalling yard in the future. A Memorandum of Understanding was signed between Seagreen and Dundee City Council with the goal of supporting the offshore wind supply chain;
- Port of Methil – this site is co-located with the Energy Park Fife and has facilities to repair and supply offshore drilling rigs, and could serve the emerging renewable energy sector. Burntisland Harbour is located nearby with Bi-Fab, a jacket substructure manufacturer; and
- Port of Rosyth in Fife – provides logistical support and fabrications services to the energy sector, particularly subsea support, and has recently undergone a major expansion.

15.61. There are also key offshore wind manufacturers based within Scotland which have developed to take advantage of the supply chain opportunities within the offshore wind supply chain. These include:

- CS Wind in Machrihanish, Kintyre – formally known as Wind Towers Scotland Ltd, this manufacturer has expanded its operations to include manufacturing the towers for offshore wind turbines and has supplied to sites including Beatrice Wind Farm and Walney Extension; and
- BiFab in Methil, Burntisland and Arnish – a large scale manufacturer for the offshore wind energy sector with a particular focus on jacket sub-structures and supplied these to Beatrice Wind Farm, Greater Gabbard and Gwynt T Mor.

15.62. In addition to the opportunities associated with the above organisations, the Scottish Government strategy for the Offshore Wind Sector (Scottish Government, 2013) also highlights the substantial opportunities associated with growing the supply chain in offshore wind and the potential synergies between other industries and areas of expertise, such as Oil and Gas.

15.63. In addition to existing technologies, there is a current drive in Scotland to be at the forefront of innovation within the offshore renewable energy sector. This is highlighted through the development of the Offshore Renewable Energy Catapult in Glasgow, the operation of three test sites for offshore wind turbines in Fife and Ayrshire, and the deployment of the world's largest offshore wind turbines off the coast of Aberdeenshire. The result of this investment will see new skills, technologies and innovations develop within the offshore wind energy supply chain in Scotland which will enable it to compete for both domestic projects, such as the optimised Seagreen Project, and internationally.

Summary

15.64. The populations of study areas considered are generally older than the Scottish average, with a low proportion of working age adults, except Dundee. They also have higher than average proportions of workers in skilled trades, and East Lothian and Fife have high proportions of workers in professional occupations. Manufacturing and construction are important industries, though transport and professional services are under-represented in employment.

15.65. There are supply chain opportunities on several ports in the study areas, including Montrose, Port of Dundee, Port of Rosyth and Port of Methil, which is co-located with Bi-Fab, a jacket substructure manufacturer. In addition, the development of the offshore wind energy supply chain is a policy priority across Scotland and the industrial synergies and innovation support in this area have resulted in an increase in both the capacity and competitiveness of the supply chain.

ASSESSMENT OF IMPACTS – WORST CASE SCENARIO

15.66. As identified within the 'Scope of Assessment' the impact assessment for socio-economics considers the potential impacts of the optimised Seagreen project on:

- Economic impacts associated with the development and construction of the optimised Seagreen Project;
- Economic impacts associated with the operations and maintenance of the optimised Seagreen Project; and
- The effect of cumulative offshore wind farm developments on these economic impacts.

15.67. The assessment considers the potential impacts of Project Alpha in isolation; Project Bravo in isolation; Project Alpha and Project Bravo combined and the impacts of cumulative offshore wind farm developments. The following sections set out the assessment of potential impacts during development, construction, operation and decommissioning phases of the Project. As set out in Chapter 6 (EIA Process), impacts reported are adverse unless stated otherwise.

Worst Case Scenario

15.68. To inform the impact assessment on socio-economics a 'worst case scenario' (WCS) has been defined using the information contained within the design envelope for the optimised Seagreen Project, Chapter 5 (Project Description). This case represents, for most given impacts, the scenario within the range of options in the design envelope that would result in the greatest potential for change to the receptors assessed (**Error! Reference source not found.**). However, in the socio-economic case, whereby the change described is in job creation and GVA generation, the WCS is that with the lowest level of investment.

15.69. The proportion of contracts which are secured in either Scotland or the UK is a variable that determines the level of GVA and employment supported. The most recent studies and projections by industry experts anticipate a growth in this proportion as the offshore wind supply chain develops in the UK in response to the increased activity in the sector. However, in the WCS the proportions of contracts secured in each study area are based on current levels of domestic contract procurement.

Table 15.8 Worst-case Scenario Justification

Type of Impact	Worst Case Scenario	Justification/Rationale of Selected Design Envelope Parameter
Construction		
Jobs and GVA generated during the development and construction	CAPEX investment of £2.4 billion for either Project Alpha or Project Bravo CAPEX investment of £3.8 billion for Project Alpha and Project Bravo combined	Lower end of the spectrum for investment in an offshore wind energy project and therefore the lowest level of job creation
Operation		
Jobs and GVA generated during the operational lifetime of the optimised Seagreen Project	Annual OPEX investment of £45 million for either Project Alpha or Project Bravo Annual OPEX investment of £76 million for Project Alpha and Project Bravo combined	Lower end of the spectrum for investment in an offshore wind energy project and therefore the lowest level of job creation
Cumulative		
n/a		

Environmental Measures Incorporated into the Project

15.70. There is no requirement for environmental measures to be incorporated into the Project in order to mitigate significant adverse socio-economic impacts because there are no significant adverse impacts.

IMPACT ASSESSMENT – CONSTRUCTION PHASE

15.71. The following sections assess the potential impacts of the optimised Seagreen Project on the key socio-economic receptors:

- Employment in study areas; and
- GVA within study areas.

Project Alpha

15.72. As stated in the Impact Assessment section this assessment considers a capital expenditure associated with Project Alpha of £2.4 billion.

15.73. The CAPEX is associated with the various pre-operational costs of an offshore wind farm, this includes:

- Project Development: includes all the development and consenting actions up to the point of placing an order for the wind farm construction. This includes project management and other technical services such as legal advice and engineering. The majority of this spend is related to the supply of highly skilled professionals from across Scotland and the UK, with some spend in overseas markets for specific expertise;
- Turbine: this is a supply cost associated with the purchase of the turbine up to the point of connection to the array cables. This does not include the transportation or installation of the turbines. This portion of the CAPEX will be allocated directly to the turbine manufacturer. There are both offshore turbine tower and blade manufacturers in the UK;
- Foundation: the cost relates to the supply costs of the manufacture of the foundation and does not include transportation and installation. Dependent on the foundation type decided upon in the final design, there is potential for the foundations to be manufactured in Scotland, or the UK;
- Electrical (OFTO): this includes supply costs of the OSPs and substations foundations, array cable, off and onshore export cables and onshore electrical infrastructure. Although the transmission asset is not included in the scope of this EIA Report it is included in this assessment for completeness; and
- Installation: this includes the transportation of the wind farm components to a port, onshore preparatory works and offshore installation costs. This element of the CAPEX includes construction vessels and employee costs and hence accounts for the primary portion of the CAPEX for which there is the highest potential for direct benefit to local and regional economies.

15.74. The proportion of contracts that could be awarded across each of the study areas and the industries that would be involved in these projects is dependent on the categories above.

Potential Impacts

15.75. The capital expenditure will have an impact on the economies of Scotland and the UK, by supporting employment and generating GVA.

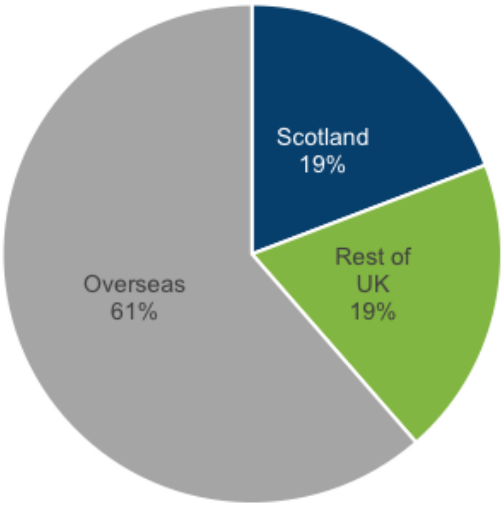
15.76. The magnitude of this impact in these economies is dependent on the level of contract expenditure that is secured in both Scotland and the wider UK. The proportion of each contract that could be secured in each area was estimated using an analysis of the industries in each study area and the findings of industry reports which have considered the potential for domestic suppliers to the offshore wind energy market.

15.77. The largest opportunity for companies in Scotland will be contracts associated with Electrical (OFTO), of which Scottish companies could secure 35% of the total value. These contracts will include the construction of substations and other electrical works. This will provide an opportunity for companies in the manufacturing and construction sectors in Scotland.

15.78. Project Development is the contract component in which the largest share of contracts could be secured within Scotland, with the potential for over 50% of contracts in Scotland. These contracts will provide opportunities for companies in the professional, technical and scientific services industries and will utilise the expertise in offshore and energy sectors within these industries in Scotland.

15.79. This analysis suggested that 19% of the CAPEX could be secured by companies in Scotland and a further 19% could be secured by companies elsewhere in the UK. These figures are in line with the current proportions of CAPEX spend secured in the UK (RenewableUK, 2017) and assume a minimal level of growth in the offshore wind supply chain capacity and capability as projected by industry experts (Offshore Renewable Energy Catapult, 2017) (Plate 15.1).

Plate 15.1 Estimate of CAPEX contracts secured by study area – Project Alpha



Source: BiGGAR Economics Analysis, figures may not sum to 100% due to rounding

15.80. In total, this analysis estimates that companies in Scotland could secure contracts valued at £450 million during the CAPEX phase of Project Alpha. Across the UK this value could be £910 million.

15.81. The economic impact of the contract values, in terms of employment and GVA, has been estimated in line with the methodology described. The employment impacts are reported in 'Job Years' to reflect the short-term nature of the employment that would be supported during these projects.

15.82. The estimated economic impacts for each of the contract areas and the multiplier impacts are given in Table 15.9 below. This shows that in total, the capital investment, will support 5,480 job years across the Scottish economy and generate £358 million GVA. The impact across the UK will be an estimated £769 million GVA and 11,710 job years.

Table 15.9 Economic Impacts of CAPEX – Project Alpha

	Scotland		UK	
	Job Years	**GVA (£m)**	**Job Years**	**GVA (£m)**
Project Development	930	£56 m	1,280	£77 m
Turbine	240	£12 m	1,210	£66 m
Foundations	900	£46 m	2,240	£116 m
Electrical (OFTO)	1,110	£77 m	1,590	£110 m
Installation	130	£9 m	630	£37 m
Multiplier Impacts	2,170	£158 m	4,760	£364 m
Total Impacts	**5,480**	**£358 m**	**11,710**	**£769 m**

Source: BiGGAR Economics Analysis. Note totals may not sum due to rounding

15.83. The receptors in this analysis are the economies of Scotland and the UK. The Scottish economy is smaller and therefore more sensitive than the UK economy. The growth rates of both economies in the previous few years has been low and therefore economic impacts of this size could make a measurable difference to the growth rates of the Scottish economy, but not those of the UK economy. For example, between 2016 and 2017 the onshore GDP of Scotland increased by £4.0 billion (Scottish Government, 2018). Therefore, the estimated GVA contribution of the CAPEX of Project Alpha is the equivalent to 10% of the annual growth in the Scottish economy between 2016 and 2017.

15.84. The CAPEX would be spent over the development and construction period and hence would have a direct, short term impact. The impact of 5,480 job years and £358 million GVA on the Scottish economy is predicted to be **moderate beneficial** and therefore **significant** in EIA terms. The impact of 11,710 job years and £769 million GVA on the UK economy is predicted to be **minor beneficial** and therefore **not significant** in EIA terms.

Additional Mitigation

15.85. No additional mitigation is either required or proposed in relation to the effect of the CAPEX Expenditure as no adverse significant impacts are predicted.

Project Bravo

15.86. The proposals for Project Bravo are identical to those of Project Alpha. Therefore, the impacts during the construction phase for Project Bravo will be identical to those described for Project Alpha.

Project Alpha and Project Bravo combined

15.87. As stated in the Impact Assessment section the anticipated capital expenditure per MW associated with Project Alpha and Project Bravo combined is expected to be slightly lower than the individual projects due to the economies of scale with the Electrical (OFTO) works. Therefore it is estimated to require an investment of £3.8 billion.

15.88. The CAPEX is associated with the same pre-operational costs of an offshore wind farm that are described in the Project Alpha analysis. These are:

- Project development;
- Turbine;
- Foundations;
- Electrical (OFTO); and
- Installation.

15.89. The proportion of contracts that could be awarded across each of the study areas and the industries that would be involved in the optimised Seagreen Project is dependent on these categories.

Potential Impacts

15.90. The capital expenditure will have a positive impact on the economies of Scotland and the UK, by supporting employment and generating GVA.

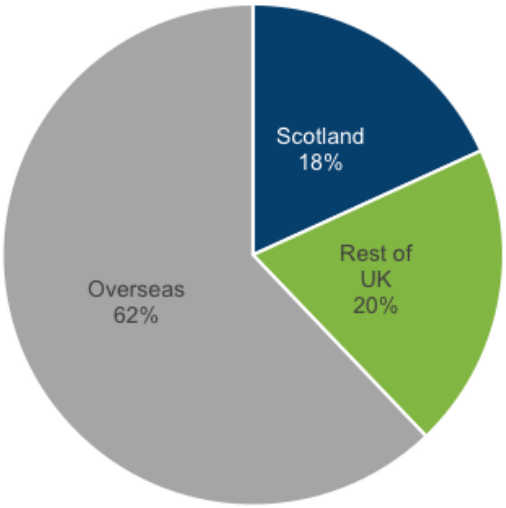
15.91. The magnitude of this impact in these economies is dependent on the level of contract expenditure that is secured in both Scotland and the wider UK. The proportion of each contract that could be secured in each area was estimated using an analysis of the industries in each study area and the findings of industry reports which have considered the potential for domestic suppliers to the offshore wind energy market.

15.92. The largest opportunity for companies in Scotland will be contracts associated with Electrical (OFTO), of which Scottish companies could secure 35% of the total value. These contracts will include the construction of substations and other electrical works. This will provide an opportunity for companies in the manufacturing and construction sectors in Scotland.

15.93. Project Development is the contract component in which the largest share of contracts could be secured within Scotland, with the potential for over 50% of contracts in Scotland. These contracts will provide opportunities for companies in the professional, technical and scientific services industries and will utilise the expertise in offshore and energy sectors within these industries in Scotland.

15.94. This analysis suggested that 18% of the CAPEX could be secured by companies in Scotland and a further 20% could be secured by companies elsewhere in the UK. These figures are in line with the current proportions of CAPEX spend secured in the UK (RenewableUK, 2017) and assume a minimal level of growth in the offshore wind supply chain capacity and capability as projected by industry experts (Offshore Renewable Energy Catapult, 2017) (Plate 15.2)

Plate 15.2 Estimate of CAPEX contracts secured by study area – Project Alpha and Project Bravo Combined



Source: BiGGAR Economics Analysis, numbers may not sum due to rounding

15.95. In total, this analysis estimates that companies in Scotland could secure contracts valued at £690 million during the CAPEX phase of Project Alpha and Project Bravo combined. Across the UK this value could be £1,430 million.

15.96. The economic impact of the contract values, in terms of employment and GVA, has been estimated in line with the methodology described. The employment impacts are reported in 'Job Years' to reflect the short-term nature of the employment that would be supported during these projects.

15.97. The estimated economic impacts for each of the contract areas and the multiplier impacts are given in Table 15.10 below. This shows that in total, the capital investment, will support 8,540 job years across the Scottish economy and generate £549 million GVA. The impact across the UK will be an estimated £1.2 billion GVA and 18,770 job years.

Table 15.10 Economic Impacts of CAPEX – Project Alpha and Project Bravo Combined

	Scotland		UK	
	Job Years	**GVA (£m)**	**Job Years**	**GVA (£m)**
Project Development	1,600	£96 m	2,200	£132 m
Turbine	410	£21 m	2,070	£113 m
Foundations	1,540	£79 m	3,850	£198 m
Electrical (OFTO)	1,430	£99 m	2,050	£142 m
Installation	230	£15 m	1,090	£63 m
Multiplier Impacts	3,330	£238 m	7,510	£569 m
Total Impacts	**8,540**	**£549 m**	**18,770**	**£1,216 m**

Source: BiGGAR Economics Analysis. Note totals may not sum due to rounding

15.98. The receptors in this analysis are the economies of Scotland and the UK. The Scottish economy is smaller and therefore more sensitive than the UK economy. The growth rates of both economies in the previous few years has been low and therefore economic impacts of this size could make a measurable difference to the growth rates of the Scottish economy but not those of the UK economy. For example, between 2016 and 2017 the onshore GDP of Scotland increased by £4.0 billion (Scottish Government, 2018). Therefore, the estimated GVA contribution of the CAPEX of Project Alpha and Project Bravo combined is the equivalent to 14% of the annual growth in the Scottish economy between 2016 and 2017.

15.99. The CAPEX would be spent over the development and construction period and hence would have a direct, short term impact. The impact of 8,540 job years and £549 million GVA on the Scottish economy is predicted to be **moderate beneficial** and therefore **significant** in EIA terms. The impact of 18,770 job years and £1.2 billion GVA on the UK economy is predicted to be **minor beneficial** and therefore **not significant** in EIA terms.

Additional Mitigation

15.100. No additional mitigation is either required or proposed in relation to the effect of the CAPEX expenditure as not adverse significant impacts are predicted.

IMPACT ASSESSMENT – OPERATIONAL PHASE

Project Alpha

15.101. As stated in the Impact Assessment section the annual operational expenditure associated with Project Alpha that is used in this analysis is £44.6 million.

15.102. The OPEX is associated with the various operational costs of an offshore wind farm, this includes:

- Fixed Costs and Overheads: includes areas of costs which are fixed and required for the production of energy and supply of this energy to the market. This covers, insurance payments, administrative costs and any rents or rates payable. These contracts are likely to be less flexible than others as they will be defined by regulation and geography. For example, the transmission costs will be payable to the grid and its operator at the point in which the networks join;
- Turbine Maintenance: this will include the services provided to maintain the turbines and the procurement of these services may be constrained for a time period through agreements such as warranties with the manufacturer;
- Marine Operations: this includes the charter of vessels and their fuel and maintenance, the energy sector is well served by dock and vessel services along the east coast of Scotland, although it is likely that there may need to be specialised maintenance vessels and services procured from further afield;
- Environmental Services: this will include ongoing professional services contracts of which there is expertise within the Scottish economy; and
- Balance of Plant Maintenance: this includes the maintenance of the cabling, foundations and other infrastructure. Similarly, the East coast of Scotland has expertise in offshore energy infrastructure maintenance.

15.103. The proportion of contracts that could be awarded across each of the study areas and the industries that would be involved in these projects is dependent on the categories above.

Potential Impacts

15.104. The operations and maintenance expenditure will have an impact on the economies of Scotland and the UK, by supporting employment and generating GVA throughout the lifetime of the project.

15.105. The magnitude of this impact in these economies is dependent on the level of contract expenditure that is secured in both Scotland and the wider UK. The proportion of each contract that could be secured in each area was estimated using an analysis of the industries in each study area and the findings of industry reports which have considered the potential for domestic suppliers to the offshore wind energy market, in particular studies on the Robin Rigg Wind Farm (BVG Associates, 2012).

15.106. This analysis suggested that 44% of the OPEX could be secured by companies in Scotland and a further 31% could be secured by companies elsewhere in the UK. These figures are in line with the current range of OPEX spend secured in the UK (RenewableUK, 2017) (Plate 15.3).

15.107. The largest opportunity for companies in Scotland will be contracts associated with Turbine Maintenance, of which Scottish companies could secure 50% of the total value, equivalent to over £7.6 million annually.

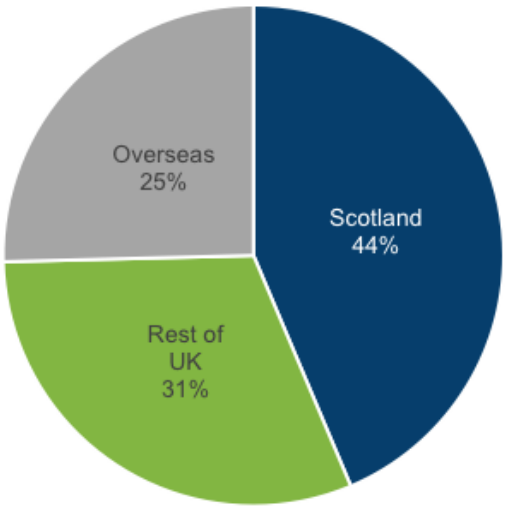
15.108. Marine is also a contract component in which substantial economic opportunities will exist for Scotland, with the potential for 75% of contracts in Scotland. These contracts will provide opportunities for companies involved in vessel charter and maintenance and will utilise the expertise in offshore and energy sectors within these industries in Scotland.

15.109. In total, this analysis estimates that companies in Scotland could secure contracts valued at £19 million annually during the operational lifetime of Project Alpha. Across the UK this value could be £33 million.

15.110. Over the 25-year operational life, these contracts could be worth £487 million in Scotland and £832 million across the UK.

15.111. The economic impact of the contract values, in terms of employment and GVA, has been estimated in line with the methodology described. The employment impacts are reported in headcount jobs to reflect the long-term nature of the employment that would be supported during these projects.

Plate 15.3 Estimate of OPEX contracts secured by study area – Project Alpha



Source: BiGGAR Economics Analysis

15.112. The estimated economic impacts for each of the contract areas and the multiplier impacts are given in Table 15.11 below. This shows that the operational investment will support 180 jobs each year across the Scottish economy and generate £11.2 million GVA. The impact across the UK will be an estimated £17.5 million GVA and 240 jobs each year.

Table 15.11 Economic Impacts of OPEX – Project Alpha

	Scotland		UK	
	Jobs	**GVA (£m)**	**Jobs**	**GVA (£m)**
Fixed Costs and Overheads	20	£1.6 m	40	£4.5 m
Turbine Maintenance	50	£2.9 m	50	£2.9 m
Marine Operations	10	£1.2 m	10	£1.3 m
Environmental Services	30	£1.5 m	30	£1.5 m
Balance of Plant Maintenance	-	£0.2 m	-	£0.3 m
Multiplier Impacts	70	£3.7 m	100	£7.0 m
Total Impacts	**180**	**£11.2 m**	**240**	**£17.5 m**

Source: BiGGAR Economics Analysis. Note totals may not sum due to rounding

15.113. The receptors in this analysis are the economies of Scotland and the UK. The Scottish economy is smaller and therefore more sensitive than the UK economy. However, the magnitude of the annual impacts during the operational phase of the project would not be sufficient to be measurable in the context of either economy as a whole.

15.114. The OPEX would be spent continuously over the 25-year operational lifetime of the project and hence would have a direct, long term impact. The impact of 180 jobs and £11.2 million GVA on the Scottish economy is predicted to be **minor beneficial** and therefore **not significant** in EIA terms. The impact of 240 jobs and £17.5 million GVA on the UK economy is predicted to be **minor beneficial** and therefore **not significant** in EIA terms.

Project Bravo

15.115. The proposals for Project Bravo are identical to those of Project Alpha. Therefore, the impacts during the operational phase for Project Bravo will be identical to those described for Project Alpha.

Project Alpha and Project Bravo combined

15.116. As stated in the Impact Assessment section the annual operational expenditure associated with Project Alpha that is used in this analysis is £76.5 million.

15.117. The OPEX is associated with the same operational costs off an offshore wind farm that are described in the analysis of Project Alpha. These include:

- Fixed Costs and Overheads;
- Turbine Maintenance;
- Marine Operations;
- Environmental Services; and
- Balance of Plant Maintenance.

15.118. The proportion of contracts that could be awarded across each of the study areas and the industries that would be involved in these projects is dependent on the categories above.

Potential Impacts

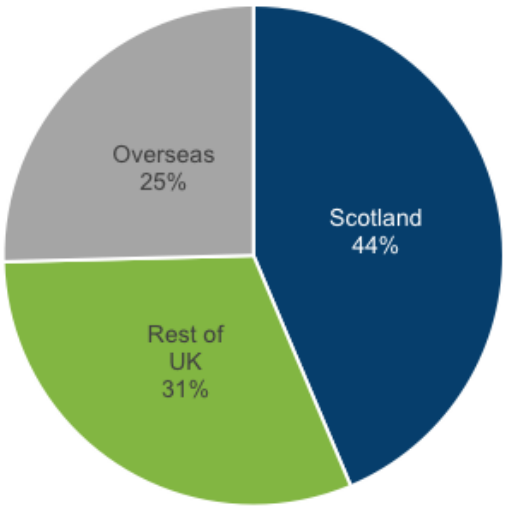
15.119. The operations and maintenance expenditure will have an impact on the economies of Scotland and the UK, by supporting employment and generating GVA throughout the lifetime of the project.

15.120. The magnitude of this impact in these economies is dependent on the level of contract expenditure that is secured in both Scotland and the wider UK. The proportion of each contract that could be secured in each area was estimated using an analysis of the industries in each study area and the findings of industry reports which have considered the potential for domestic suppliers to the offshore wind energy market, in particular studies on the Robin Rigg Wind Farm (BVG Associates, 2012).

15.121. This analysis suggested that 44% of the OPEX could be secured by companies in Scotland and a further 31% could be secured by companies elsewhere in the UK. These figures are in line with the current range of OPEX spend secured in the UK (RenewableUK, 2017) (Plate 15.4).

15.122. The largest opportunity for companies in Scotland will be contracts associated with Turbine Maintenance, of which Scottish companies could secure 50% of the total value, equivalent to over £13.0 million annually.

Plate 15.4 Estimate of OPEX contracts secured by study area – Project Alpha and Project Bravo combined



Source: BiGGAR Economics Analysis

15.123. In total, this analysis estimates that companies in Scotland could secure contracts valued at £33.4 million annually during the operational lifetime of Project Alpha and Project Bravo combined. Across the UK this value could be £57.0 million.

15.124. Over the 25 year operational life, these contracts could be worth £834 million in Scotland and £1.4 billion across the UK.

15.125. The economic impact of the contract values, in terms of employment and GVA, has been estimated in line with the methodology described. The employment impacts are reported in headcount jobs to reflect the long-term nature of the employment that would be supported during these projects.

15.126. The estimated economic impacts for each of the contract areas and the multiplier impacts are given in Table 15.12 below. This shows that the operational investment will support 320 jobs each year across the Scottish economy and will generate £19.1 million GVA. The impact across the UK will be an estimated £30.0 million GVA and 410 jobs each year.

Table 15.12 Economic Impacts of OPEX – Project Alpha and Project Bravo combined

	Scotland		UK	
	Jobs	**GVA (£m)**	**Jobs**	**GVA (£m)**
Fixed Costs and Overheads	40	£2.8 m	70	£7.7 m
Turbine Maintenance	90	£5.0 m	90	£5.0 m
Marine Operations	20	£2.1 m	20	£2.2 m
Environmental Services	40	£2.5 m	40	£2.5 m
Balance of Plant Maintenance	-	£0.4 m	10	£0.5 m
Multiplier Impacts	110	£6.3 m	170	£12.1 m
Total Impacts	**320**	**£19.1 m**	**410**	**£30.0 m**

Source: BiGGAR Economics Analysis. Note totals may not sum due to rounding

15.127. The receptors in this analysis are the economies of Scotland and the UK. The Scottish economy is smaller and therefore more sensitive than the UK economy. However, the magnitude of the annual impacts during the operational phase of the project would not be sufficient to be measurable in the context of either economy as a whole.

15.128. The OPEX would be spent continuously over the 25-year operational lifetime of the project and hence would have a direct, long term impact. The impact of 320 jobs and £19.1 million GVA on the Scottish economy is predicted to be **minor beneficial** and therefore **not significant** in EIA terms. The impact of 410 jobs and £30.0 million GVA on the UK economy is predicted to be **minor beneficial** and therefore **not significant** in EIA terms.

Additional Mitigation

15.129. No additional mitigation is either required or proposed in relation to the effect of the OPEX Expenditure as no adverse significant impacts are predicted.

IMPACT ASSESSMENT: CUMULATIVE

15.130. The EIA Regulations require the assessment of cumulative impacts. This requires consideration and assessment of existing projects, projects under construction and consented or proposed projects identified in relevant development plans and programmes that have the potential to impact cumulatively with the optimised Seagreen Project.

15.131. Cumulative impacts can occur when the impacts from one project on an identified receptor combine (through either spatial or temporal overlap) with similar impacts from other projects on the same receptor. The purpose of considering cumulative impacts is to understand if the impacts from the optimised Seagreen Project when considered together (combined), or cumulatively with other plans and projects are different, or more significant than from the projects in isolation. This enables additional mitigation to be identified, as appropriate.

15.132. Cumulative impacts are considered for all phases of the optimised Seagreen Project. It should be noted that the Offshore Transmission Asset is already licenced and is unchanged, therefore this is considered alongside the other identified projects and plans.

15.133. The following Projects have been identified with which there may be cumulative impacts:

- Neart na Gaoithe Offshore Wind Farm, a 450MW offshore wind farm in the Firth of Forth, is currently being considered by the Scottish Government, following an application in 2018. This follows a successful 2012 application, which consisted of a similar capacity but smaller, and therefore more, wind turbines; and
- Inch Cape Offshore Wind Farm, which was granted consent in 2014 to develop up to 1,050MW of capacity and is located 15km off the coast of Angus. A subsequent application with larger turbines was made in 2018 and is still under review.

15.134. As with the optimised Seagreen Project, each of these projects will represent a substantial investment in the Scottish economy, supporting economic activity and employment. Neart na Gaoithe was estimated to support up to 8,000 job years of employment in Scotland during its four year construction phase and 236 jobs in each year of its operational phase (Fraser of Allander Institute, 2017). Figures are not available for Inch Cape's most recent application, but in its original application, it was estimated that it could create up 1,600 jobs during its construction phase and up to 170 jobs each year during the operational phase (Inch Cape Offshore Limited, 2013).

15.135. It is likely that many of the contracts, e.g., substructure jackets, will be similar across the different projects and there is therefore a sizeable opportunity for an offshore wind supply chain to develop in Scotland, with specialised clusters developing around ports on the east coast, such as Port of Dundee and Port of Rosyth.

15.136. In addition, wider investment could be supported in the UK supply chain, such as through manufacturers developing facilities in the UK. For example, Siemens' £310 million factory in Hull, which produces large scale blades for offshore wind farms and employs 1,000 people directly (Green Port Hull, 2016).

15.137. The projects will also encourage the development of Scotland's wider offshore industry, which may lead to innovations and improvements that can reduce the cost of decommissioning or increase the feasibility of developing and pioneering large-scale wave or tidal power projects.

15.138. The cumulative impact of consecutive, longer term activity of the offshore wind energy sector in this area is likely to stimulate the location and creation of specialised offshore wind energy industries within Scotland, to take advantage of the opportunities on a more permanent basis. This will result in a greater proportion of the contracts being secured within Scotland and therefore a greater economic impact. The current investments being made in port facilities in Dundee, Leith and Aberdeen reflect the optimism in a long-term future for the offshore renewable energy sector in the North Sea.

15.139. The cumulative expenditure associated with the three projects is expected to be substantial, with associated increased economic activity and employment. However, if two or more of the projects were to occur concurrently it may result in an increase in demand that the supply chain does not have the capacity to meet. This may reduce the expected benefits associated with the development. Although it should be noted that the supply chain can increase its capacity, for example, the Port of Dundee recently completed a £10 million programme of investment spurred in part by offshore wind (GreenPort, 2018).

15.140. There may also be cumulative impacts associated with the sharing of operations and maintenance costs between the planned wind farms and Seagreen Wind Farm. While this could provide economies of scale, it would have the effect of reducing the overall expenditure on operations and maintenance. This would reduce the economic activity and employment associated with the proposed development.

15.141. Any cumulative impacts are likely to be similar for either Project Alpha or Project Bravo in isolation, or Project Alpha and Project Bravo combined.

15.142. The additional impact of encouraging supply chain development to take advantage of both CAPEX and OPEX phases of the Project on the Scottish economy is predicted to be **minor beneficial** and therefore **not significant** in EIA terms. The additional impact of encouraging supply chain development to take advantage of both CAPEX and OPEX phases of the Project on the UK economy is predicted to be **minor beneficial** and therefore **not significant** in EIA terms.

INTERRELATIONSHIPS

15.143. Interrelationships describe the potential interaction of multiple project impacts upon one receptor and have a spatial and/or temporal component. Impacts may occur throughout different phases of the project (construction, operation or decommissioning) and/or different project effects may have spatial overlap and may interact to create a more significant impact on a receptor than when considered in isolation. Interrelated impacts may be short term, temporary or longer term over the lifetime of the Project.

15.144. On review of potential impact pathways, no inter-relationships between socio-economics and any other topic considered were identified.

TRANSBOUNDARY IMPACTS

15.145. No transboundary impacts were identified in relation to socio-economic receptors.

MITIGATION AND MONITORING

15.146. No mitigation is proposed with respect to socio-economics, as no adverse impacts were identified, however, the developer can maximise the beneficial impacts in Scotland by ensuring that local suppliers are aware of potential contracts and able to easily bid for them.

IMPACT ASSESSMENT SUMMARY – THE OPTIMISED SEAGREEN PROJECT

15.147. This chapter has assessed the potential impact on socio-economics of the construction and operation phases of the optimised Seagreen Project, both in isolation and cumulatively. Only beneficial effects have been identified and therefore no mitigation is proposed. Table 15.13 summarises the impact assessment undertaken and the conclusion of residual impact significance.

15.148. This assessment considers the contracts that could be secured in both Scotland and the UK during the CAPEX and OPEX stages of the optimised Seagreen Project. These proportions are based on the current understanding of the UK Offshore Wind Energy supply chain and how this will develop in the future. For both Project Alpha and Project Bravo the assessment considers an expenditure of £3.5 billion over the lifetime of the project, 27% of is secured within Scotland and 50% is secured within the UK. For Project Alpha and Project Bravo combined the assessment considers a total expenditure of £5.7 billion, 27% of which is secured in Scotland and 50% is secured within the UK.

15.149. The conclusions in Table 15.13 are broadly similar to the overall conclusions in the 2012 Offshore ES. However, the magnitude of the impacts associated with construction and operation are overall higher than that concluded for the 2012 ES. This is as a result of a higher proposed level of expenditure and the availability of more up-to-date information on the types of contracts and the proportion that can be secured in each study area, as discussed in Development in Assessment Methods section.

Table 15.13 Summary of Predicted Impacts for the optimised Seagreen project

Receptor	Potential Impact	Phase (C or O)	Impact Significance	Additional Mitigation Measures	Residual Impact Significance
Project Alpha					
Scottish Economy	£0.4 billion GVA and 5,480 job years of employment	C	Moderate	n/a	Moderate
Scottish Economy	£11 million GVA and 190 jobs supported each year	O	Minor	n/a	Minor
UK Economy	£0.8 billion GVA and 11,710 job years of employment	C	Minor	n/a	Minor
UK Economy	£18 million GVA and 240 jobs supported each year	O	Minor	n/a	Minor
Project Bravo					
Scottish Economy	£0.4 billion GVA and 5,480 job years of employment	C	Moderate	n/a	Moderate
Scottish Economy	£11 million GVA and 190 jobs supported each year	O	Minor	n/a	Minor
UK Economy	£0.8 billion GVA and 11,710 job years of employment	C	Minor	n/a	Minor
UK Economy	£18 million GVA and 240 jobs supported each year	O	Minor	n/a	Minor
Project Alpha and Project Bravo combined					
Scottish Economy	£0.5 billion GVA and 8,540 job years of employment	C	Moderate	n/a	Moderate
Scottish Economy	£19 million GVA and 320 jobs supported each year	O	Minor	n/a	Minor
UK Economy	£1.2 billion GVA and 18,770 job years of employment	C	Minor	n/a	Minor
UK Economy	£30 million GVA and 410 jobs supported each year	O	Minor	n/a	Minor
Cumulative Impact Assessment					
CAPEX Supply Chain opportunities	Beneficial, short term, direct	C	Minor	n/a	Minor
OPEX Supply Chain opportunities	Beneficial, long term, direct	O	Minor	n/a	Minor
Key: C = Construction, O = Operational					

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