



**RWE Renewables UK Dogger Bank
South (West) Limited**

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Dogger Bank South Offshore Wind Farms

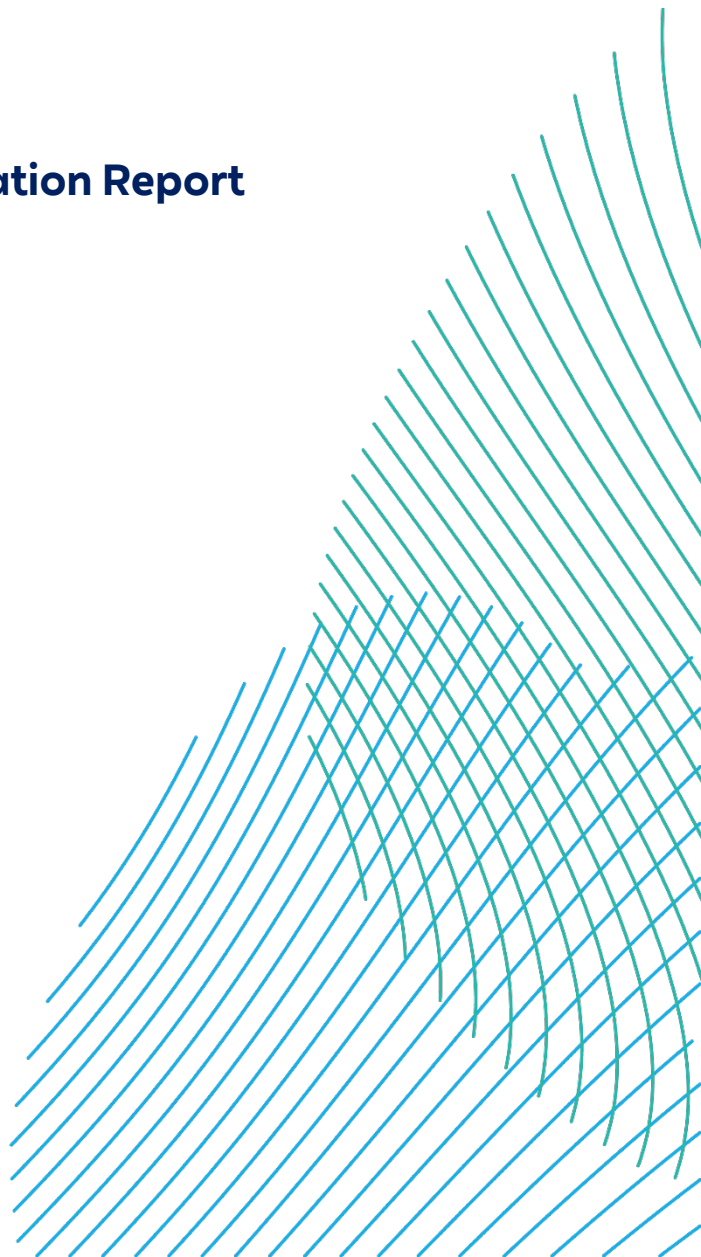
**Preliminary Environmental Information Report
Chapter 28 – Socio-Economics**

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Glossary

Term	Definition
Dogger Bank South (DBS) Offshore Wind Farms	The collective name for the two Projects, DBS East and DBS West.
Horizontal Directional Drill (HDD)	HDD is a trenchless technique to bring the offshore cables ashore at the landfall and can be used for crossing other obstacles such as roads, railways and watercourses onshore.
Onshore Development Area	The Onshore Development Area for PEIR is the boundary within which all onshore infrastructure required for the Projects will be located including landfall, onshore export cable route, accesses, construction compounds and onshore substations. The Onshore Development Area is to be refined through the consultation and engineering review process.
The Applicant	RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited as the owners of DBS West and DBS East respectively are the named undertakers that will have the benefit of the Development Consent Order. References in this document to obligations on, or commitments by, 'the Applicant' are given on behalf of RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited.
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South offshore wind farms).

Acronyms

Term	Definition
BEIS	Department for Business, Energy, and Industrial Strategy
CEA	Cumulative Effect Assessment
DCO	Development Consent Order
DBS	Dogger Bank South
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
ETG	Expert Topic Group
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GP	General Practitioner
GVA	Gross Value Added
GW	Gigawatt
HDD	Horizontal Direction Drill
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
LEP	Local Enterprise Partnership
LSOA	Lower-layer Super Output Areas
MW	Megawatt
NHS	National Health Service

Term	Definition
NPS	National Policy Statement
NPV	Net Present Value
NVQ	National Vocational Qualifications
ONS	Office for National Statistics
PEIR	Preliminary Environmental Information Report
SIC	Standard Industrial Classification
TTWA	Travel to Work Area
UK	United Kingdom

28 Socio-Economics

28.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) considers the likely significant effects of the Projects on socio-economics. The chapter provides an overview of the existing environment for the proposed Onshore and Offshore Development Area, followed by an assessment of likely significant effects for the construction, operation, and decommissioning phases of the Projects.
2. The assessment should be read in conjunction with the following linked chapters:
 - **Chapter 13 Commercial Fisheries;**
 - **Chapter 14 Shipping and Navigation;**
 - **Chapter 21 Land Use;**
 - **Chapter 23 Landscape and Visual Impact Assessment;**
 - **Chapter 24 Traffic and Transport;**
 - **Chapter 25 Noise;** and
 - **Chapter 26 Air Quality.**

28.2 Consultation

3. Consultation with regard to socio-economics has been undertaken in line with the general process described in **Chapter 6 EIA Methodology**. The key elements of consultation to date have included scoping. The feedback received has been considered in preparing the PEIR. **Table 28-1** provides a summary of how the consultation responses received to date have influenced the approach that has been taken.
4. This chapter will be updated following consultation on PEIR in order to produce the final assessment that will be submitted with the Development Consent Order (DCO) application. Full details of the consultation process will also be presented in the Consultation Report alongside the DCO application.

Table 28-1 Consultation Responses

Comment	Project Response
The Planning Inspectorate: Scoping Opinion 02/09/2022	
The Scoping Report states in Paragraph 913 that the operational impacts associated with these matters will be negligible. On the basis of the information provided on the nature and characteristics of the proposals, the Inspectorate agrees that significant effects in operation are unlikely in relation to buried infrastructure. However, consideration should be given in the ES to potential effects of the presence of the substation(s), and an assessment made of any likely significant effects where these could occur.	The tourism and recreation assessment, including the operational impacts are covered in Chapter 29 Tourism and Recreation
It is also noted that 'disturbance to social infrastructure' is not scoped out in Table 4-1 which contradicts Paragraph 913, and it is not clear if the impacts identified in Table 4-2 are related to construction, as if not there is also a discrepancy with Table 4-1 and Paragraph 913. The potential impacts for each project phase should be clearly set out in the ES. The Inspectorate does not agree that these matters can be scoped out in relation to the substations.	The disturbance to social infrastructure as a result of noise, visual and traffic impacts, including from the onshore substations, is considered in sections 28.6.1.6 and 28.6.2.4.

Comment	Project Response
The Scoping Report states that the socio-economics chapter covers both offshore and onshore matters, but refers to commercial fishing being addressed in Section 2.9, commercial shipping in Section 2.10, and dredging operations in Section 2.12. However, these Sections do not provide information on potential socio-economic effects or the intended approach to assessment in the ES, aside from 2.9 which identifies potential impacts to fishing supply chains. Offshore socio-economic matters should be assessed in the ES where significant effects are likely. The ES must clearly explain which matters are included in each assessment and the inter-relationships between them, to avoid duplication or omission.	Reference to economic impacts from commercial fishing and commercial shipping is made in sections 28.6.2.1, 28.6.3.1 and 28.6.2.1.
The ES should assess the impacts during construction and operation of potential severance issues resulting from the onshore cable corridor and other infrastructure, for farmers and other landowners. Measures should be included within the DCO to ensure farmers and other landowners' ability to access and move their livestock and ability to access their land is not hindered. The ES should assess severance issues as a result of the onshore elements of the Proposed Development on the function of local settlements and their ability to act as cohesive communities.	The social and economic impacts of the potential significant effects on agricultural land use is considered in sections 28.6.1.2, 28.6.2.1 and 28.6.3.1. For details can also be found in Chapter 21 Land Use. The impact of severance on community amenity is considered in Chapter 24 Traffic and Transport.

28.3 Scope

28.3.1 Study Area

5. The Projects are located in a shallow area of the North Sea known as Dogger Bank. The Projects are around 100km from the north-east coast of England.
6. The study areas considered in the assessment are based on BiGGAR Economics' guidance on the definition of local areas in the context of offshore renewable projects, as drafted on behalf of Marine Scotland (Scottish Government, 2022). The process provides a set of principles that can be applied to projects across the UK.
7. The guidance identified six principles for the identification of local areas through a consultation programme and case study analysis. These can be used to define local areas based on pre-existing geographies that contain the epicentres of impact. The principles are:
 - Principle 1 (Dual Geographies) - The local area for the supply chain and investment impacts should be separate from the local area(s) for wider socio-economic impacts, including tourism and recreation;
 - Principle 2 (Appropriate Impacts) - The appropriate impacts to be considered for assessments should be identified before defining the local areas;
 - Principle 3 (Epicentres) - The local areas should include all the epicentres of the appropriate impacts;
 - Principle 4 (Accountability) - The local areas used in the assessment should comprise of pre-existing economic or political geographies (community councils, local authorities, development agencies) to enhance accountability;
 - Principle 5 (Understandable) - The local areas should be defined in such a way that they are understandable to the communities they describe; and
 - Principle 6 (Connected Geography) - The local area for the supply chain and investment impacts should consist of connected (including coastal) pre-existing economic or political geographies.

8. The study area for the economic and demographic impacts is the smallest that will include all likely epicentres of impact, namely (**Figure 28-1**):
- Humberside – defined as the combined local authorities of:
 - East Riding of Yorkshire;
 - City of Hull;
 - North East Lincolnshire; and
 - North Lincolnshire.
9. This study area was considered as appropriate in relation to the impacts associated with the construction and operations of the Projects, including any knock-on effects on infrastructure and demographics.

Figure 28-1 Map of Economic and Demographic Study Areas in Assessment



10. In addition, given the scale of the Projects, the assessment of impacts will be carried out at UK level. This will provide additional evidence on the role the Projects could have towards the transition to net zero as a stimulus to economic activity.

28.3.2 Realistic Worst Case Scenario

28.3.2.1 General Approach

11. The socio-economic impact assessment is not sensitive to the design parameters outlined in other PEIR chapters. At this stage, the analysis of economic impacts relies on high level cost assumptions reflecting the MW capacity of the Projects. Those same assumptions affect impacts on demographics, which are directly driven by the creation of employment. Impacts on social assets and infrastructure are based on the interaction between socio-economics and the analysis from **Chapter 21 Land Use, Chapter 23 Landscape and Visual Impact Assessment, Chapter 24 Traffic and Transport, Chapter 25 Noise** and **Chapter 26 Air Quality**.

28.3.2.2 Development Scenarios

12. There are currently two possible electrical solutions being considered for DBS West, HVAC or HVDC. Due to the distance of the array area offshore DBS East will be an HVDC project. Therefore, there are two possible electrical solutions for the Projects:
 - One HVDC project and one HVAC project; or
 - Two HVDC projects.
13. The two possible electrical solutions do not influence the socio-economic impact assessment. The worst case scenario is determined by economic factors, such as the time that the supply chain has to develop, the estimates for the expenditure required to construct and operate the Projects and inter-related effects from other receptors, such as land use. The specific technologies used, such as HVAC or HVDC are not considered to be a determinant of these impacts because the expenditure assumptions used in this assessment are technology agnostic, and instead represent an average for all fixed offshore wind projects.

28.3.2.3 Construction Scenarios

14. The following principles set out the framework for how the Projects may be constructed (relating to both onshore and offshore works):
 - DBS East and DBS West may be constructed at the same time, or at different times;
 - If built concurrently, both Projects could be constructed in five years;
 - If built non-concurrently, either Project could be built first;
 - If built non-concurrently, each Project would require a five year period of construction;
 - If built non-concurrently, it is anticipated that there would be up to a two year lag between the start of construction for the first project and the start of construction for the second project; and
 - Assuming a maximum construction period per Project of five years, and taking the above into account, the maximum construction period over which the construction of both Projects could take place is seven years.
15. In order to determine which construction scenario presents the realistic worst case for each receptor and impact, the assessment considers both maximum duration effects and maximum peak effects, in addition to each Project being developed in isolation, drawing out any differences between each of the two Projects.
16. The three construction scenarios considered by the socio-economics assessment are therefore:
 - Build DBS East or build DBS West in isolation;
 - Build DBS East and DBS West concurrently – reflecting the maximum peak effects; and
 - Build the Projects sequentially with a lag of up to two years – reflecting the maximum duration of effects.
17. The individual, concurrent and sequential construction scenarios all allow for flexibility to build out the Projects using a phased approach. This will allow the Projects to adapt to National Grid Electricity Transmission Operator's development plans for the onshore grid connection points. Under a phased approach the maximum timescales for individual elements of the construction have been assessed.

18. Any differences between the Projects, or differences that could result from the manner in which the first and the second Projects are built (concurrent or sequential and the length of any gap) are identified and discussed where relevant in section 28.6. For each potential impact, only the worst case construction scenario for two Projects is presented, i.e. either concurrent or sequential. The justification for what constitutes the worst case is provided, where necessary, in section 28.6.
19. The socio-economic assessment assumes the construction period starts in 2026, which will result in a smaller supply chain capacity within the UK than if the construction started in subsequent years. This will reduce the level of UK content, and therefore, beneficial economic impacts. UK supply chain spend is therefore assumed to be in line with typical spend on projects to date.

28.3.2.4 Operation Scenarios

20. Operation scenarios are described in detail in **Chapter 5 Project Description**. The assessment considers the following scenarios:
 - Only DBS East in operation;
 - Only DBS West in operation; and
 - The two Projects operating concurrently, with or without a lag of up to two years between each Project commencing operation.
21. If the Projects are built out using a phased approach, there would also be a phased approach to starting the operational stage. The worst case scenario for the operational phases for the Projects have been assessed. See section 5.1.1 of **Chapter 5 Project Description** for further information on phasing scenarios for the Projects.
22. The operations lifetime of each Project is expected to be 30 years.

28.3.2.5 Decommissioning Scenarios

23. Decommissioning scenarios are described in **Chapter 5 Project Description**. Decommissioning arrangements will be agreed through the submission of a Decommissioning Programme prior to construction, however for the purpose of this assessment it is assumed that decommissioning of the Projects could be conducted separately, or at the same time.

28.3.3 Mitigation Embedded in the Design

24. No embedded mitigation measures have been incorporated into the design of the Projects that are relevant to the socio-economic assessment. However, the Applicant will pursue activities to maximise the potential beneficial effects. In particular, this will include actions to support UK organisations to participate in the supply chain. This will include the development of a Supply Chain Plan, that will outline in more detail how the Applicant will work with the supply chain and boost opportunities for UK suppliers.

28.4 Assessment Methodology

28.4.1 Policy, Legislation and Guidance

28.4.1.1 National Policy Statements

25. The assessment of potential impacts upon socio-economics has been made with specific reference to the relevant National Policy Statements (NPS). The specific assessment requirements for socio-economics, as detailed in the NPS, are summarised in **Table 28-2** together with an indication of the section of this chapter where each is addressed.
26. It is noted that the NPS for Energy (EN-1) and the NPS for Renewable Infrastructure (EN-3) are in the process of being revised. Draft versions were published for consultation in September 2021 (Department for Business Energy and Industrial Strategy (BEIS), 2021a and 2021b respectively). A review of these draft versions has been undertaken in the context of this PEIR chapter.
27. Following the consultation in 2021 on the draft energy NPS, a new consultation opened on the 30th March 2023 on revised drafts of the energy NPSs, including EN1, EN3 and EN5. Due to the timing of this consultation, and finalisation of this PEIR we have been unable to review and take these revised draft NPS into account within these documents. However, these will be reviewed and incorporated into the final ES where relevant.

Table 28-2 NPS Assessment Requirements

NPS Requirement	NPS Reference	PEIR Section Reference
EN-1 NPS for Energy		
Where the project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts.	EN-1 paragraph 5.2.12	This chapter considers the impacts on socio-economics from the construction, operations and decommissioning of the Projects at local, regional and national level.
The assessment should include the creation of jobs and training opportunities.	EN-1 paragraph 5.2.13	Impacts on employment are considered in section 28.6.

NPS Requirement	NPS Reference	PEIR Section Reference
The assessment should include the provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities.	EN-1 paragraph 5.2.13	Impacts on local infrastructure, such as schools and hospitals, are considered in section 28.6.
The assessment should include the impact of a changing influx of workers during the different construction, operation and decommissioning phases of the energy infrastructure.	EN-1 paragraph 5.2.13	Impacts on demographics from the influx of workers and their implications are considered in section 28.6.
The assessment should include cumulative effects.	EN-1 paragraph 5.2.13	Cumulative effects are considered in section 28.6.
Applicants should describe the existing socio-economic conditions in the areas surrounding the proposed development and should also refer to how the development's socio-economic impacts correlate with local planning policies.	EN-1 paragraph 5.12.4	A baseline of existing socio-economic conditions is provided in section 28.5.
Consideration of any impacts that are linked to socio-economic impacts.	EN-1 paragraph 5.12.5	Links with other impacts are considered in section 28.11.
EN-3 NPS for Renewable Energy Infrastructure		
No specific guidance on the assessment of socio-economic, tourism and recreation impacts from offshore wind installations is provided.	N/A	N/A

NPS Requirement	NPS Reference	PEIR Section Reference
Potential economic impacts on recreational and commercial users of the sea.	EN-3 paragraph 2.33.1	The economic impacts from areas assessed in other chapters are considered in Chapter 13 Commercial Fisheries and Chapter 29 Tourism and Recreation .
Site selection is made with a view to avoiding or minimising disruption or economic loss to other offshore industries.	EN-3 paragraph 2.34.11	Chapter 16 Infrastructure and Other Users considers the potential effect on other marine users and potential mitigation measures.
Draft EN-1 NPS for Energy		
Applicants may wish to provide information on the sustainability of the jobs created, including where they will help to develop the skills needed for the UK's transition to Net Zero.	Draft EN-1 paragraph 5.13.3	Sustainability of jobs is considered alongside the impact on employment from the Projects in section 28.6
The assessment should consider the contribution to the development of low-carbon industries at the local and regional level as well as nationally.	Draft EN-1 paragraph 5.13.3	The contribution to the development of low-carbon industries is considered in section 28.6. The key port locations have not been determined at this stage and socio-economic impacts are assessed at the level of Local Economic Area, which covers multiple local authorities in the North West of England and Wales. Tourism and recreation impacts are assessed at a more local level.
The assessment should consider any indirect beneficial impacts for the region hosting the infrastructure, in particular in relation to use of local support services and supply chains.	Draft EN-1 paragraph 5.13.3	The impacts on Gross Value Added (GVA) and employment include indirect/supply chain impacts, as considered in section 28.6

NPS Requirement	NPS Reference	PEIR Section Reference
Applicants are encouraged, where possible, to ensure local suppliers are considered in any supply chain.	Draft EN-1 paragraph 5.13.5	Ways for maximising supply chain benefits will be considered following project development work in the ES.
Draft EN-3 NPS for Renewable Energy Infrastructure		
No new guidance is provided with regards to socio-economics, tourism and recreation in the assessment of offshore wind developments		

28.4.1.2 Strategic Context and Policy

28. The study areas for the socio-economic assessment are also covered by various local and industrial strategies that are relevant to this assessment.

28.4.1.2.1 Humber Local Energy Strategy

29. Published in 2019, the Humber Local Energy Strategy (Humber Local Enterprise Partnership, 2019) outlines two key objectives for the region:
- To ensure the Humber region plays a leading role in the UK's decarbonisation efforts by making targeted interventions to reduce emissions in the electricity, heat and transport sectors; and
 - To foster clean energy growth by supporting public and private sector investments in novel low carbon technologies to take advantage of the opportunities presented by the emerging low carbon economy.

30. The strategy highlights the Humber's pivotal role in the transition from fossil fuels to renewables, with the natural resources of the area already supporting the Hornsea offshore wind farm projects located 120 km off the coast. The document emphasises, that while the offshore wind sector already plays a significant role in the economy of the Humber, taking advantage of the possible benefits of the sector requires support by business-friendly policies and investment from local municipalities and central government. The strategy outlines four activities for the Local Enterprise Partnership (LEP) with the aim of supporting the expansion of the offshore wind cluster and maintaining the Humber as a key national hub for offshore wind manufacture and operations:
- To facilitate skill development, job security and creation through the existing supply chain, higher education and training providers;
 - To build on existing capabilities, competencies, and infrastructure to ensure the offshore wind ecosystem becomes more efficient;
 - To undertake campaigns aimed at attracting new inward investment into the sector and investment in innovation; and
 - To offer services and expertise to other regions in the UK and internationally.

28.4.1.2.2 *Hull and East Yorkshire Economic Strategy*

31. Hull and East Yorkshire LEP (HEY LEP) published its Economic Growth and Workforce Wellbeing Strategy for 2021 to 2026 (HEY LEP, 2021). The strategy considers some of the challenges that the region has faced regarding the impact of the Covid-19 pandemic and the implications of the UK leaving the EU on the maritime and trading activities. This strategy outlines four priorities for the area, namely;
 - A productive and innovative economy;
 - Clean growth economy;
 - Skilled and inclusive economy; and
 - Competitive and resilient local.
32. Offshore wind is discussed as an important development sector throughout the strategy. This includes;
 - The sector is discussed within the UK context, in particular the Sixth Carbon Budget, which highlights the connecting of economic and environmental policy. ;
 - The reputation and skills. that already exist in the area as a result of the development of offshore wind to date are considered a strength of the area, with opportunities to export both goods and services to a growing global market;
 - Innovation in the offshore wind sector, particularly during the operations and maintenance phase, is being driven by developments in the area, including the Aura Innovation Centre and the wider conglomeration of offshore operations and maintenance facilities in the area; and
 - The location of the Humber and its ports area a comparative advantage for the development of both manufacturing facilities and further installation activity as the whole southern North Sea is within easy reach.
33. The economic opportunities from the development of the offshore wind sector, and the wider Net Zero ambitions, are considered to be critical for the economic future of the area. To support this, the LEP will be progressing actions within the skills and employment strategies and the industrial cluster plan so that organisation and individuals are able to benefit from these opportunities.

28.4.1.2.3 *Greater Lincolnshire LEP Local Industrial Strategy*

34. In January 2021, Greater Lincolnshire LEP published a draft Local Industrial Strategy (Greater Lincolnshire LEP, 2021) which sets out the opportunities for growth within the LEP area and how the LEP plans to maximise the benefits of these opportunities. The strategy highlights the region's established and emerging clusters in:
- Agri-food;
 - Ports;
 - Logistics and defence; and
 - Energy and new fuels.
35. These clusters present opportunities for Greater Lincolnshire to build on the area's manufacturing and engineering base.
36. The strategy highlights that, as a result of the existing offshore wind clusters in proximity to the area, offshore wind manufacturing, installation, operations and maintenance businesses now have established businesses in the region, enabling the expansion of the offshore wind sector in the area to continue to support creation of local sustainable jobs and the development of the local economy. Offshore wind developments are creating sustainable jobs in the area and supporting the local economy as the offshore wind sector grows.
37. The strategy highlights opportunities the offshore wind sector presents for Greater Grimsby, which currently has low wages and productivity, as well as high unemployment and challenges retaining businesses and skilled workers in the area. The strategy highlights how the development of the offshore wind sector could support the economic development through establishing offshore wind operations and maintenance businesses in the area.

28.4.1.2.4 *UK Offshore Wind Sector Deal*

38. The Offshore Wind Sector Deal (UK Government, 2019), updated by the UK government in 2020, sets out the government's aim to support the development of offshore wind energy generation in the UK, making the sector a significant part of a low-cost, low-carbon flexible grid system. The Sector Deal also emphasises how UK companies can benefit from the opportunities presented by the expansion of the offshore wind sector, enhancing the competitiveness of UK firms internationally and sustaining the UK's role as a global leader in offshore wind generation.

39. The Sector Deal highlights that some estimates suggest that offshore wind capacity globally will grow by 17% annually from 22GW to 154GW in 2030, which could mean the UK contributing up to 40GW of generating capacity. The government aims to reach this capacity in a sustainable, timely way, and commits to working with the offshore wind sector and wider stakeholders to deliver the expansion of the sector, addressing strategic deployment issues, transmission issues and environmental impacts. Reaching this level of capacity could support up to 27,000 jobs in the UK, while the sector will work with government, existing institutions, and universities to increase job mobility between energy sectors, increase apprenticeship opportunities and coordinate local efforts, further developing the benefits to the UK economy.
40. The Sector Deal emphasises the Humber as a majorly significant region to the development of the sector in the UK, as the region already supports a windfarm cluster with a pre-existing manufacturing base, enabling economies of scale and increased productivity which could drive innovation and improve competitiveness in the sector

28.4.1.3 Other

41. Further detail is provided in **Chapter 3 Policy and Legislative Context**.

28.4.2 Impact Assessment Methodology

42. **Chapter 6 EIA Methodology** provides a summary of the general impact assessment methodology applied. The following sections describe the methods used to assess the likely significant effects on socio-economics.

28.4.2.1 Magnitude of Impact

43. The magnitude of an impact is determined by assessing the following sorts of considerations:
- Spatial extent - the geographical area over which an impact occurs;
 - Temporal extent - the duration over which the impact occurs;
 - Frequency of occurrence - how often the impact occurs; and
 - Severity - the degree of change relative to the baseline level.
44. The socio-economic impacts are considered over distinct study areas to capture the spatial extent of any impact. The magnitude and significance of any impact are then considered in relation to the baseline conditions within those study areas.

45. The frequency and temporal extent of any impact will be considered and those which occur over a short period of time will be described as temporary and those which occur over a longer period of time will be described as permanent.
46. The approach to determining the severity, and therefore magnitude, of any socio-economic impacts is outlined below and includes:
 - Changes in economic activity; and
 - Demographic and service demand impacts.
47. Between 2000 and 2019, the average level of Gross Domestic Product (GDP) per capita growth in the UK was 1% per annum (IMF, 2022). Similarly, between 2000 and 2019 the number of jobs has grown by 1% per annum (ONS, 2022). The magnitude of any change in an economy should be considered within this context.
48. The magnitude of employment impacts should be considered in relation to the levels of economic activity within a study area. The magnitude should be relative to the number of people in employment, rather than the unemployed. The geographic split of impact analysis should consider workplaces (jobs) rather than residents (employment rate) to be consistent with the approach we have to distribute contracts between study areas which is based on the locations of the companies.
49. In addition to the change in the overall impact in the GVA or employment of an area, consideration should also be made for the sectors of the economy which are considered to contribute to the economic sensitivity of the area. For example, if there is a high level of concentration of employment in the tourism trade, particular attention should be given to the magnitude of change within these sectors. Similarly, sectors may contribute to the economic sensitivity of an area because of their relationship to the Projects. For example, in the context of the Projects and offshore wind, then the construction, manufacturing and professional services sectors present in an area are likely to contribute towards its sensitivity.
50. The definitions used in this approach are outlined in **Table 28-3**

Table 28-3 Definitions of Magnitude for Economic Impacts, including sector specific impacts

Magnitude	Definition
High	An effect would be considered to have a high magnitude if it was equivalent to all of the typical economic growth per capita. Specifically, for each study area: • Peak annual GVA impact is greater than, or equal to, 1% of the economy; or • Peak employment supported is greater than, or equal to, 1% of the total number of jobs.
Medium	An effect would be considered to have a medium magnitude if it was equivalent to half of the typical economic growth per capita. Specifically, for each study area: • Peak annual GVA impact is greater than, or equal to, 0.5% and less than 1% of the economy, or a given sector; or • Peak employment supported is greater than, or equal to, 0.5% and less than 1% of the total number of jobs, or jobs in a given sector .
Low	An effect would be considered to have a low magnitude if it was equivalent to a quarter of the typical economic growth per capita. Specifically, for each study area: • Peak annual GVA impact is greater than, or equal to, 0.25%, and less than 0.5% of the economy, or a given sector; or • Peak employment supported is greater than, or equal to, 0.25%, and less than 0.5% of the total number of jobs, or jobs in a given sector.
Negligible	An effect would be considered to have a negligible magnitude if it was equivalent to less than a quarter of the typical economic growth per capita. Therefore, for each study area: • Peak annual GVA impact is less than 0.25% of the economy, or a given sector; or • Peak employment supported is less than 0.25% of the total number of jobs, or jobs in a given sector.

28.4.2.1.1 Magnitude of Demographic and Service Demand Impacts

51. The magnitude of impacts on the social or community assets is dependent on the demographic changes that will occur in each of the study areas because of the Projects.
52. The severity of any change in demographics is measured against the level of annual change that is typical in the study area that it serves. This will be in line with the change a community or social asset will accommodate in a year.

Table 28-4 Definitions of Magnitude of Social and Community Asset Impacts

Magnitude	Definition
High	The effect on a social or community asset would be considered to have a high magnitude if the change in residual population was equivalent to 100% or more of the average annual growth rate for the study area.
Medium	The effect on a social or community asset would be considered to have a medium magnitude if the change in residual population was equivalent to between 50% and 100% of the average annual growth rate for the study area.
Low	The effect on a social or community asset would be considered to have a low magnitude if the change in residual population was equivalent to between 25% and 50% of the average annual growth rate for the study area.
Negligible	The effect on a social or community asset would be considered to have a negligible magnitude if the change in residual population was equivalent to less than 25% of the average annual growth rate for the study area.

28.4.2.2 Sensitivity of Economies

53. The sensitivity of an economy is linked to how well it is able to absorb change. To consider the sensitivity of an economy, or a sector within that economy, it is necessary to consider both the resilience and agility of the economy. There are several factors that contribute to an assessment of resilience and agility, these include:
- The scale of the economy;
 - The diversity of sectors in the economy;
 - The level of economic activity;
 - The level of skills and education; and
 - The level of economic potential from utilising capital (natural, human, social, economic).
54. The scale of an economy is particularly relevant in rural areas. An economy that is small in absolute terms may have less agility, particularly if the structure is well established. Demographic trends are also likely to be relevant.
55. The diversity of the economy, as defined by the spread of sectors, is a good indicator of resilience. If an economy is over reliant on one sector, then a shock that impacts on this sector could have a disproportionate impact on the economy as a whole.
56. The economic activity rate in an economy, particularly how this compares to the wider national economy and trends in this rate, is an indicator of economic resilience. A declining, either in absolute or relative terms, economically active population could indicate that the economy has been less able to accommodate changes. Conversely, an economically active population that is growing at a faster rate than the national average could indicate a greater level of agility.
57. The level of skill in an economy, as described by the level of qualifications and occupation level, indicate the ability of the workforce to react to new employment opportunities or find new work if there is a loss of employment.
58. The economic potential of an economy is linked to the natural, human, social and economic capital that is available.

Table 28-5 Definition of Sensitivity for an Economic Receptor

Sensitivity	Definition
High	A highly (major) sensitive economy will not be able to absorb changes without fundamentally altering its present character or value. Factors that would contribute to an economy being considered of high sensitivity include: • The economy is particularly reliant on a one single sector; • The number of jobs in the economy has been declining over multiple years; and • The share of people with no qualifications is significantly above the average for the wider economy.
Medium	An economic with medium sensitivity has a moderate capacity to absorb changes without fundamentally altering its present character or value, however it would be less resilient than the wider economy. Factors that would contribute to an economy being considered of medium sensitivity include: • The economy is particularly reliant on a small number of sectors; • The number of jobs in the economy has grown less than the wider economy; and • The share of people with no qualifications is above the average for the wider economy.
Low	A low (minor) sensitive economy is tolerant changes without fundamentally altering its present character or value. Factors that would contribute to an economy being considered of low sensitivity include: • Most sectors of the economy are well represented; • The number of jobs in the economy has grown in line with the wider economy; and • The level of educational attainment is in line with the wider economy.

Sensitivity	Definition
Negligible	An economy with negligible sensitivity is very agile and will be able to accommodate changes without affecting its character or overall value. Factors that would contribute to an economy having negligible sensitivity include: • The economy is well balanced between sectors; • The number of jobs in the economy has grown at a quicker rate than the wider UK economy; and • The share of people with no qualifications is below average for the wider economy.

28.4.2.2.1 Sensitivity of Community and Social Assets

59. The effect on the community and social assets is scoped into this assessment. This includes the demand for housing, health services and education services.
60. The adaptability and tolerance of the housing market to accommodate change in each study area is implied by the relative change in the price of housing stock compared to the wider economy. If prices have increased significantly more within a study area, this would suggest that the housing market has not been able to adapt to a change in demand.
61. In the long term, community and social assets will adapt to serve the communities they are in. Hospitals and education facilities are planned based on the demographic demands in a particular area. Therefore, these sensitivities are considered for short term impacts only and the long term sensitivities of these receptors will be negligible. As a result, the impacts on community and social assets are only considered during the development and construction phase.
62. The sensitivity of the public assets such as health services or schools will be dependent on the concentration of resources that are allocated to these assets. It is assumed that the ability of these assets to adapt to change will not vary by geography. Therefore, the key factor of sensitivity is tolerance to change. It is assumed that this is linked to the relative size of the community that is served by these assets. If a teacher or doctor has less students or patients than the national average, they are more likely to be able to tolerate changes, specifically increases, in these numbers. As a result, these assets will be less sensitive to change.

63. A summary of the definitions and contributing factors for the sensitivity of community and social assets are given in **Table 28-6**.

Table 28-6 Definition of Sensitivity for a Social and Community Asset Receptor

Sensitivity	Definition
High	A community or social asset with high sensitivity will not be able to tolerate or adapt to impacts as these will result in a fundamental change in the ability of these assets to meet the needs of the community. Factors that will contribute to a community or social asset being considered of high sensitivity include: • House prices have increased at a notably faster rate than the national average; • The number of General Practitioners (GPs) per capita is much lower than the national average; and • The number of pupils per teacher is much higher than the national average.
Medium	A community or social asset with medium sensitivity will have a limited capacity to tolerate or adapt to impacts as these will result in a moderate change in the ability of these assets to meet the needs of the community. Factors that will contribute to a community or social asset being considered of medium sensitivity include: • House prices have increased at a faster rate than the national average; • The number of GPs per capita is lower than the national average; and • The number of pupils per teacher is higher than the national average.
Low	A community or social asset with low sensitivity will be able to tolerate or adapt to impacts without a change in the ability of these assets to meet the needs of the community. Factors that will contribute to a community or social asset being considered of low sensitivity include: • House prices have increased at a similar rate than the national average; • The number of GPs per capita is similar to than the national average; and • The number of pupils per teacher is similar to the national average.

Sensitivity	Definition
Minor	A community or social asset with a negligible sensitivity will be resistant to change as they will have a greater capacity to tolerate changes than the wider country. Factors that will contribute to a community or social asset being considered of negligible sensitivity include: • House prices have increased at a slower rate than the national average; • The number of GPs per capita is higher than the national average; and • The number of pupils per teacher is lower than the national average.

28.4.2.3 Significance of Effect

64. The assessment of significance of an effect is informed by the sensitivity of the receptor and the magnitude of the impact. The determination of significance is guided by the use of an impact significance matrix presented in **Chapter 6 EIA Methodology**. Definitions of each level of significance are provided in **Table 28-7**. For the purposes of this assessment, any effect that is of major or moderate significance is considered to be significant in EIA terms, whether this be adverse or beneficial. Any effect that has a significance of minor or negligible is not significant.

Table 28-7 Definition of Effect Significance

Significance	Definition
Major	Very large or large change in receptor condition, which is likely to be an important consideration at a regional or district level because they contribute to achieving national, regional or local objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which is likely to be an important consideration at a local level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be an important consideration in the decision making process.
Negligible	No discernible change in receptor condition.

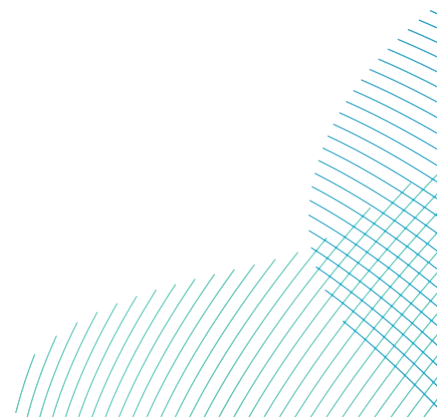
28.4.3 Cumulative Effect Assessment Methodology

65. The cumulative effect assessment (CEA) considers other plans and projects that may result in cumulation with the Projects. **Chapter 6 EIA Methodology** provides details of the general framework and approach to the CEA that will be undertaken for the Projects.
66. The final assessment of cumulative effects will be undertaken during the later stages of the EIA, once further information is available on a number of projects such as the Outer Dowsing Offshore Wind Farm, Hornsea Project Four decision and the Sheringham Shoal and Dudgeon Extension Projects examination. However, for the purposes of the PEIR, it is possible to identify a number of projects and plans which are likely to feature in that assessment and consider the extent to which cumulative effects might arise. Section 28.7 presents the following preliminary information regarding cumulative effects:
- Screening for cumulative effects; and
 - A preliminary short list of plans and projects considered for CEA, including a brief description as to how projects have been screened in and the initial tier level they have been assigned.

28.4.4 Assumptions and Limitations

67. This preliminary assessment is considered to be an interim stage in the EIA process. The results presented in the following sections are based on early design assumptions and initial assessments which will be refined and presented in the final ES to be submitted as part of the DCO application.
68. Data from official statistical sources, such as the surveys carried out by the Office for National Statistics (ONS), are generally published with a lag of between one and two years. This means that part of the information included in the baseline does not reflect current economic activity, while being based on the latest available data. Similarly, this means that as the PEIR is revised and the ES is drafted, some of the baseline information may change. To provide the most up to date information possible, the baseline assessment was carried out close to the submission of the PEIR.
69. The impact assessment is based on the latest information available regarding the generating capacity of the Projects. For the purposes of this assessment, it was assumed that the Projects will have a total generating capacity of 3GW, with each generating 1.5GW. The worst case scenarios were designed with this in mind and by making assumptions on when the Projects could take place.

70. The economic model estimating the economic impact from the Projects relies on an Input-Output Methodology. One of the main data sources associated with this document is the UK Input-Output Tables, which, while it was last published in 2022, refers to sectoral interactions as of 2018.
71. The analysis relies on the matching of economic activity and wind farm-related contracts to appropriate sectoral codes from the ONS Standard Industrial Classification (SIC) of Economic Activities. Data availability becomes limited the more detailed the assessment of contracts. For this reason, the economic model relies on a breakdown of economic activity by sector up to SIC level 2.
72. None of the assumptions and limitations listed above are likely to affect the overall assessment of effects from the development, construction, operations and decommissioning of the Projects.



28.5 Existing Environment

73. This section sets out the socio-economic baseline for the study areas considered in the assessment.

28.5.1 Current Demographics and Projections

74. Humberside has a population of 934,400, accounting for 1.4% of the UK's total population.

75. As shown in **Table 28-8**, around 60% of Humberside's total population is of working age (16-64 years old), a slightly lower share than that accounted for by this age group across the UK (62%). Conversely, Humberside has a higher share of the population aged 65 and over (21%) than the UK as whole, where 19% of the population falls within this group.

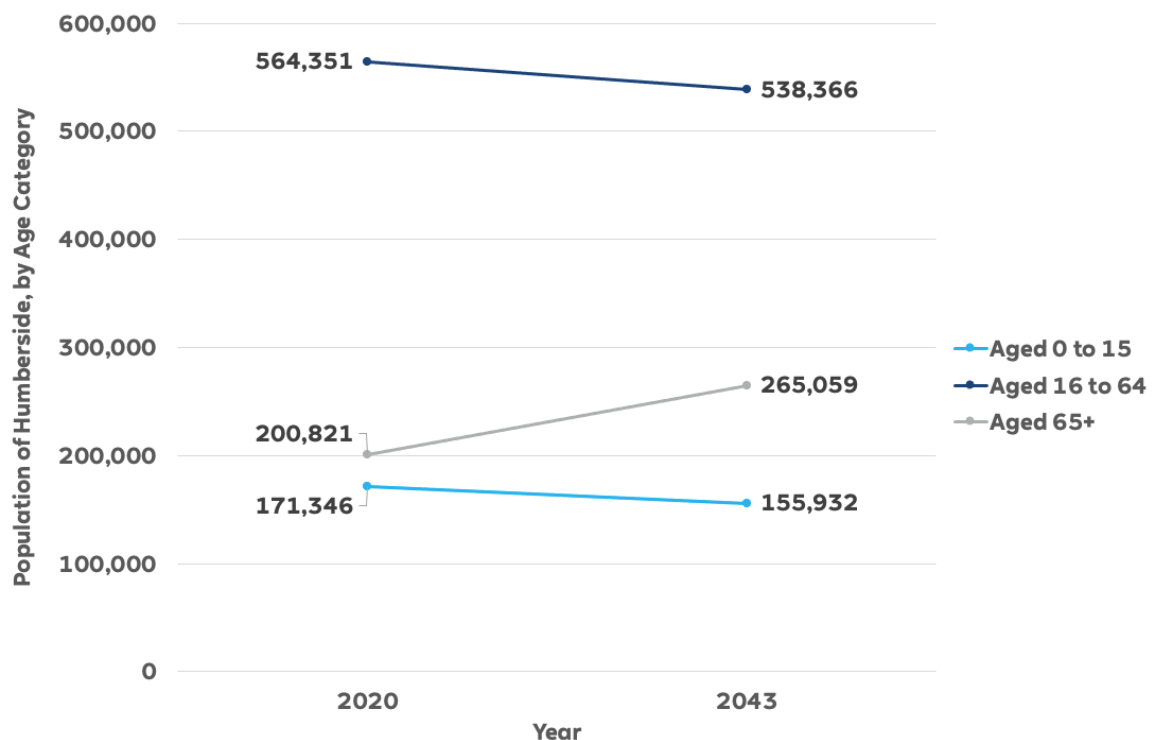
Table 28-8 Population Structure

	Humberside	UK	Humberside	UK
	2020		2043*	
Total	934,400	67,081,200	959,363	72,563,425
% under 16 years old	18%	19%	16%	17%
% aged 16-64 years old	60%	62%	56%	59%
% aged 65 years old and over	21%	19%	28%	24%

Source: ONS (2021), Population Estimates, * ONS (2020), Population Projections: local authority based by single year of age.

76. The population of Humberside is expected to increase by 2.7%, to 959,363, by 2043. However, as shown in **Figure 28-2**, this population increase is entirely driven by an increase in those aged 65 or over. By 2043, it is projected that the number of working age people in Humberside will decrease by 26,000. This is equivalent to a loss of 1,130 working age people every year. Similarly, there is projected to be 15,400 fewer children in Humberside in 2043 than in 2020.

Figure 28-2 Population projections by Age Category 2020 - 2043



Source: ONS (2020), Population Projections: local authority based by single year of age.

77. The projected population change in Humberside would increase the demographic differences between the area and the wider UK. In particular, the difference in the share of the population that is aged over 65 will increase from 2% in 2020 to 4% in 2043.

28.5.2 Labour Market Performance and Trends

78. The labour market in Humberside performed worse than the wider UK labour market across most measures, including economic activity, jobs growth and pay.
79. As shown in **Table 28-9**, in 2021 Humberside had a lower economic activity rate (76%) than the UK (78%). This was the largest gap between the two study areas over the past ten years, a period when the level of economic activity in Humberside was largely in line with that of the UK.
80. In 2021, the unemployment rate was slightly lower in Humberside (4%) than across the UK (5%). This is the lowest rate the region has experienced over the past ten years, falling from slightly over 9% in 2011.

81. In Humberside around 24% of those of working age were economically inactive, which is a larger share compared to the UK (22%). Of those who are economically inactive in Humberside, approximately 19% want a job, representing 24,200 residents seeking job opportunities in the area to re-join the labour market.
82. The level of employment growth in Humberside has been lower than the UK as a whole. Since 2010, the total number of jobs in Humberside has increased by 6.3%. This is less than half the growth rate for the UK as a whole.
83. Residents of Humberside have lower average earnings than those living in the UK, with the median annual gross income for full-time workers being £28,512 and £30,257 respectively.

Table 28-9 Labour Market Performance

	Humberside	UK
Economic Activity Rate	76%	78%
Economic Inactivity Rate	24%	22%
Economically Inactive seeking a Job	19%	19%
Unemployment Rate	4%	5%
Job Growth (2010-2020)	6.3%	13.3%
Median Annual Gross Income (Resident Analysis)*	£28,512	£30,257

Source: ONS (2021), Annual Population Survey. * ONS (2021), Annual Survey of Hours and Earnings.

28.5.3 Sectoral Employment

- 84. Almost a fifth (17%) of employment in Humberside is concentrated in the manufacturing sector. This is considerably larger than the relative employment supported by the sector across the UK economy (8%). In 2021, there were a total 2,460 manufacturing businesses in Humberside, accounting for 6.6% of businesses in the area.
- 85. Wholesale and retail trade (15%) and human health and social work activities (13%) are the second and third largest sectors of employment in Humberside, with retail businesses accounting for 18.3% of businesses in the region.
- 86. Employment in the construction industry in Humberside is above the UK average, at 6% compared to 5% respectively, and accounts for 12.2% of all businesses.
- 87. The Projects may result in opportunities for both the manufacturing and construction sectors and benefit from the relative strength of these sectors in Humberside.

Table 28-10 Share of Employment by Industrial Sector

	Humberside	UK
Manufacturing	17%	8%
Wholesale and retail trade; repair of motor vehicles and motorcycles	15%	15%
Human health and social work activities	13%	13%
Administrative and support service activities	9%	9%
Education	8%	9%
Construction	6%	5%
Accommodation and food service activities	6%	7%
Transportation and storage	6%	5%
Professional, scientific and technical activities	5%	9%
Public administration and defence; compulsory social security	4%	4%
Arts, entertainment and recreation	2%	2%
Agriculture, forestry and fishing	2%	2%
Information and communication	2%	4%
Real estate activities	2%	2%
Other service activities	1%	2%
Water supply; sewerage, waste management and remediation activities	1%	1%
Financial and insurance activities	1%	3%
Electricity, gas, steam and air conditioning supply	0%	0%
Mining and quarrying	0%	0%
Total	394,210	30,545,750

28.5.4 Gross Value Added (GVA)

88. In 2017, the GVA generated in Humberside totalled almost £19.4 billion. This is equivalent to a GVA per head of £20,730 in Humberside, which is considerably lower than the £27,125 GVA per head in the UK. This suggests that the region has a lower level of productivity than the UK.

Table 28-11 Gross Value Added (Balanced) at Current Prices (£ billion).

	Humberside	UK
2010	16.9	1,452.6
2020	20.6	1,949.6
Change (2010-2020)	22%	34%
GDP per head (£)	£25,140	£31,972

28.5.5 Deprivation

89. The Index of Multiple Deprivation considers seven different dimensions of deprivation related to income, crime, employment, education, health, housing and the living environment. These data are gathered for each of the Lower-layer Super Output Areas (LSOAs) of England.
90. Data from the Index of Multiple Deprivation suggest that Humberside is relatively more deprived than England as a whole. As shown in **Table 28-12** of the 569 LSOAs in Humberside, 29% fall within England's 20% most deprived areas. Almost 50% of LSOAs in Humberside are within the country's 40% most deprived areas. In comparison, 16% of LSOAs in Humberside are within the England's least 20% deprived areas.

Table 28-12 Index of Multiple Deprivation, Humberside

	Proportion of LSOAs
1 (most deprived quintile)	29%
2	19%
3	17%
4	20%
5 (least deprived quintile)	16%

28.5.6 Education and Skills

91. The working-age population of Humberside has achieved lower levels of educational qualifications than that of the UK. A total of 32% of the working age population of Humberside hold at least an NVQ4+ qualification (a bachelor's degree or equivalent), in comparison to 43% across the UK.
92. Lower educational attainment in Humberside is also captured by the lower shares of those holding at least an NVQ at levels 3, 2 and 1. The proportion of the working age population who do not hold any NVQs is also higher than that of the UK.

Table 28-13 Proportion of the Population aged 16 – 64 by Highest Level of Qualification

	Humberside	UK
NVQ4+	32%	43%
NVQ3+	52%	61%
NVQ2+	73%	78%
NVQ1+	85%	88%
Other qualifications	7%	6%
No qualifications	8%	7%

Source: ONS (2022), Annual Population Survey.

93. As shown in **Table 28-14**, in 2020/21 the pupil to teacher ratio across all types of schools in Yorkshire and the Humber was 18.6, slightly above the English average of 18.0. This ratio has remained relatively stable over the past five years, increasing from 18.2 in 2016/17.

Table 28-14 Pupil to Teacher Ratios by School Type

	Humberside	UK
Nursery	20.8	21.8
Primary	21.2	20.6
Secondary	17.1	16.6
Other	6.2	5.9
All Types of Schools	18.6	18.0

Source: Department for Education (2021), Education and Training Statistics for the UK.

94. There are slightly more pupils per teachers in both primary and secondary schools in Yorkshire and the Humber and slightly less across nurseries.

28.5.7 Health

95. Data on the GP Workforce in England, collected by the NHS, indicates that, as of July 2022, there are 492 GPs in Humberside.
96. Given that the population of Humberside is 934,400, dividing the population by the number of GPs estimates that there are approximately 1,900 patients per GP in the region. In comparison, there are 34,392 GPs across England, again dividing the population by this number, it is estimated that there are 1,627 patients per GP across the country. Based on this data, there is more pressure on GP services, in terms of the number of patients per GP, in Humberside than England.

Table 28-15 General Practitioners per Person, 2022

	Humberside	UK
People per GP	1,900	1,627

Source: NHS Digital, (2022). General Practice Workforce, England & ONS (2021), Population Estimates.

28.5.8 Housing Stock and Affordability

97. Total housing stock in Humberside is 438,561, of which the majority (84%) is private sector housing. The proportion of private housing in the region is broadly in line with the proportion for England as a whole, whilst the proportion of local authority housing is greater in Humberside (8%), compared to 6% across England.
98. In 2021, a total of 14,412 residential properties were sold in Humberside, an increase of 4,018 above the 2011 figure. Over the past ten years, 1,037 affordable homes have been built and bought in Humberside, with most of this activity occurring between 2018 and 2021. During the same period, 3,996 affordable rent housing has been built and 1,395 social rented homes. A total of 6,488 affordable housing units have been built between 2011/12 and 2020/21.
99. The average median house price paid in Humberside in 2021 was £171,000, considerably lower than the £275,000 for the UK. This equates to the average house price paid in Humberside being 6 times the average annual gross income of residents. This considerably lower than the average for the UK, where the average house price paid is 9 times the average annual income.
100. Between 2011 and 2021, house prices in Humberside have increased by 45%, compared to 56% across England and Wales.

Table 28-16 Median House Price Values and Changes, 2011 - 2021

	2011	2021	Change
Humberside	118,000	171,000	45%
England and Wales	176,000	275,000	56%

28.5.9 Summary of Socio-economic Baseline and Sensitivities

28.5.9.1 Economy of Humberside

101. The economy of Humberside is one of the receptors that has been scoped into the assessment. The socio-economic baseline has identified that in Humberside:
- The role of the manufacturing sector, which is also important to the offshore wind industry, is much greater than the UK as a whole;
 - The level of educational attainment is lower than the wider UK economy, in particular the share of the population with higher level qualifications is considerably lower than the UK average; and
- The level of jobs growth in Humberside is less than half that of the UK as a whole.
102. The sensitivity of the economy of Humberside has therefore been assessed as Medium, in line with the approach outlined in **Table 28-5**.

28.5.9.2 Economy of the UK

103. The economy of UK is one of the receptors that has been scoped into the assessment. The socio-economic baseline has identified that in the UK:
- The economy is well balanced between sectors; and
 - Educational attainment and jobs growth are, by definition, in line with the UK average.
104. The sensitivity of the economy of the UK has therefore been assessed as Low, in line with the approach outlined in **Table 28-5**.

28.5.9.3 Demographics of Humberside

105. The demographics of Humberside is one of the receptors that has been scoped into the assessment. The socio-economic baseline has identified that;
- The population of Humberside is just under 1 million and this is projected to grow over the coming decades;
 - The population within Humberside is older than the UK average; and
 - The working age population is projected to decline in coming decades.

106. The sensitivity of any receptor considers how well it is able to accommodate and react to changes in the environment. The population of Humberside is of a scale that it will be able to absorb many changes. However, the projected declining working age population, particularly relative to the UK growth in this demographic, would suggest that it may not be able to react to change as well as the wider UK. Therefore the sensitivity of the demographics of Humberside has been assessed as Medium.

28.5.9.4 Social and Community Assets in Humberside

107. The social and community assets in Humberside, such as housing education and health services and how current users of these assets are affected by new people moving in to the area, is one of the receptors that has been scoped into the assessment. The socio-economic baseline has identified that in Humberside;
- The value of house prices has increased at a similar rate to that of the UK as a whole;
 - Across nursery, primary and secondary education, the ratio of teachers to pupils is similar to that of the UK as a whole; and
 - The number of patients per GP is similar to that of England as a whole.
108. The sensitivity of the social and community assets in Humberside has therefore been assessed as Low, in line with the approach outlined in **Table 28-6**.

28.5.10 Future Trends

109. In the event that the Projects are not developed, an assessment of future conditions for socio-economics has been carried out and is described within this section.
110. In the context of the Projects not being constructed, the future socio-economic conditions would likely to continue on current trajectories. This will include a decline in the working age population over the coming decades.
111. Within Humberside, the relevant economic strategies consider the development of the offshore wind sector to be a core opportunity for growth as it will enable the area to maximise on its comparative advantages of port infrastructure, manufacturing skillsets and proximity to offshore wind development sites. Each Project represents a significant near future North Sea construction project. If both Projects are constructed this would be one of the largest offshore wind projects to be constructed in the North Sea. If not developed, these Projects would reduce the ability of Humberside to realise the economic potential of the offshore wind sector, as described in the local economic strategies.

28.6 Assessment of Significance

28.6.1 Potential Effects During Construction

112. This section considers the potential impacts arising during the construction of the Projects, namely:
- Impact from economic expenditure;
 - Impact from increased employment;
 - Impact from change in demographics due to immigration;
 - Impact from loss of, disruption to or pressure on local infrastructure; and
 - Impact from disturbance (noise, air quality, visual and traffic) to social infrastructure.
113. The analysis covers these impacts and their effects on receptors across two scenarios:
- Either one of DBS East or DBS West are built in isolation; and
 - DBS East and DBS West are built together.
114. For the latter scenario, a decision is made for each impact on whether sequential or concurrent construction represents the worst case scenario.

28.6.1.1 Estimating Construction Expenditure

115. The assessment of construction-related impacts is driven by the level of spending and economic activity associated with the construction of the Projects.
116. Construction and development expenditure was based on the following assumptions regarding generating capacity:
- DBS East or DBS West are built in isolation: a total generating capacity of 1.5 GW ; and
 - DBS East and DBS West are built together: a total generating capacity of 3.0 GW.
117. It is expected that a fixed offshore wind farm project in the UK would spend around £2.3 billion per GW installed (BVG Associates, 2021). It is therefore estimated that the spending on the development and construction of this project will be:
- £3.5 billion if DBS East or DBS West are built in isolation; and
 - £7.0 billion if DBS East and DBS West are built together.

118. The capital investment will be split between primary contract areas. The estimated distribution of this spend by contract area is based on the distribution in industry cost guides (BVG Associates, 2019) and is shown in **Table 28-17**.

Table 28-17 Construction and Development: Potential Expenditure by Category

	Value (£m) – one project	Value (£m) – both projects	Share of Spend
Wind Turbine	1,575	3,150	45.2%
Foundations	465	930	13.3%
Offshore Cable Installation	330	660	9.5%
Cable Supply	251	501	7.2%
Offshore Substation	240	480	6.9%
Financial/Insurance Costs	232	463	6.6%
Foundations Installation	188	375	5.4%
Development and Consenting	99	198	2.8%
Onshore Substation	83	165	2.4%
Enabling Infrastructure	15	30	0.4%
Onshore Cable Installation	8	15	0.2%
Operations and Maintenance Base	5	9	0.1%
Total	3,488	6,976	100%

Source: BiGGAR Economics analysis of Applicant data and BVG Associates

119. The economic impacts from development and construction activity have been estimated for both Humberside and the UK.
120. The UK Government's (2019) Offshore Wind Sector Deal has the target that projects constructed in 2030 will achieve 60% of UK content during their lifetime. This includes the capital investment and the ongoing operations and maintenance expenditure. To meet this target, there will need to be significant investment in the manufacturing capabilities of the UK offshore wind supply chain.

121. In line with the worst case scenario analysis, it has been assumed the Projects will not achieve this target but shall achieve the level of UK content that is typical of offshore wind projects in the UK that have been built to date. This is equivalent to 48% of total spend and 19% of development and construction spend (BVG Associates, 2021).
122. The distribution of UK content by category is shown in **Table 28-18**. The distribution of contracts within Humberside is based on current industrial capabilities and the assumption that the primary construction port will be in the region. This is not based on any commitments to date.

Table 28-18 Construction and Development: Potential Expenditure by Category and Study Area

	Humberside	UK	Imports
Wind Turbine	7%	7%	93%
Foundations	0%	7%	93%
Offshore Cable Installation	3%	7%	93%
Cable Supply	0%	7%	93%
Offshore Substation	11%	19%	81%
Financial/Insurance Costs	0%	76%	24%
Foundations Installation	26%	36%	64%
Development and Consenting	25%	86%	14%
Onshore Substation	64%	90%	10%
Enabling Infrastructure	100%	100%	0%
Onshore Cable Installation	100%	100%	0%
Operations and Maintenance Base	100%	100%	0%
Total	9%	19%	81%

Source: BiGGAR Economics analysis of capacity in Humberside and BVG Associates, 2021

123. Most of the spending on the wind turbines is expected to benefit businesses outside the UK.

28.6.1.2 Impact 1: Economic Expenditure

124. The first round of expenditure and economic impact will occur within the Applicant organisation and through its directly procured contractors. For the purposes of the assessment both the Applicant and its directly procured contractors are considered as one group within the direct impact analysis. This expenditure will generate GVA within these companies, which is measured by the sum of the profits and staff costs that will be stimulated by construction and development spending.
125. The level of GVA that is supported by a given amount of turnover is dependent on the sector that the company is operating in. To estimate the direct GVA from each of the main contract categories, each contract was split into sub-contracts. Using industry-specific data on turnover and GVA from the Annual Business Survey (ONS, 2022), turnover/GVA ratios were applied to each specific sub-contract to estimate GVA.
126. There would also be knock on effects in the supply chain as these directly procured companies purchase goods and services to support their activities. These effects are estimated by applying Type 1 (Indirect) GVA multipliers, which are sourced from the ONS (ONS, 2022), to the direct GVA impacts.
127. Those who are directly employed on the Project, or through the supply chain, will also have an impact through the spending of their salaries across the economy. This is the induced impact, and it is calculated using the Type 2 multipliers, that are based on the Input – Output Tables produced by the ONS.
128. The ONS provide estimates of both the Type 1 (indirect) and Type 2 (induced) multipliers for the UK economy. These have been adjusted to account for differences in scale and characteristics, when considering impacts on the Humberside economy.

28.6.1.2.1 Magnitude of Impact

129. The magnitude of the economic impact from the expenditure during the development (consenting, design and procurement) and construction phase has been estimated in line with the methodology outlined in section 4.1. For the purposes of this assessment, only the direct and indirect economic impacts are considered when determining the magnitude of the impact. These describe the economic activity required to realise the Projects and are the focus of other economic assessments associated with offshore wind projects.
130. The induced impacts are quantified and presented for completeness but are not used in the assessment of magnitude.

28.6.1.2.1.1 Magnitude of Impact - DBS East or DBS West in Isolation

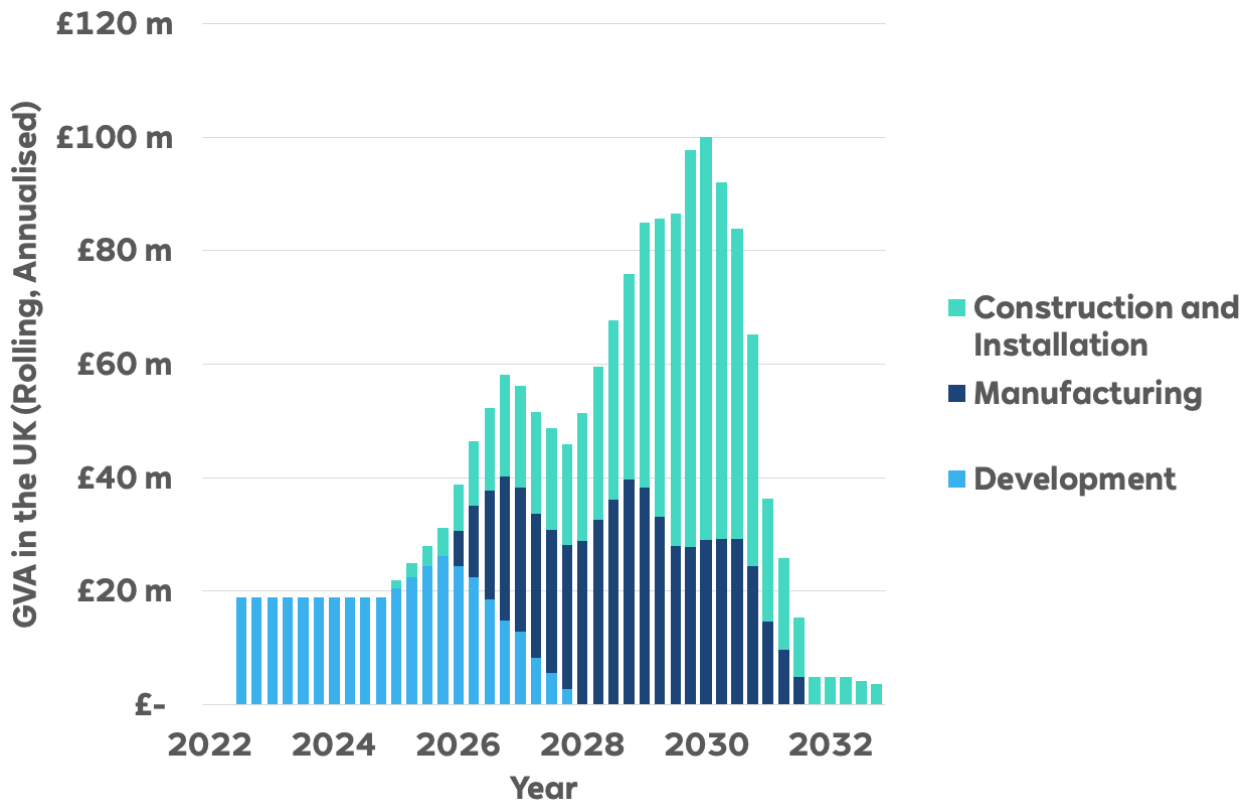
131. As set out in **Table 28-19**, the spending associated with the construction of DBS East or DBS West in isolation is expected to generate a total (direct and indirect) impact of:
- £200 million GVA in Humberside; and
 - £488 million GVA across the UK.

Table 28-19 Construction and Development: Total GVA – DBS East or DBS West in Isolation

	Humberside	UK
Direct GVA (£m)	117	266
Indirect GVA (£m)	83	222
Total GVA (£m)	200	488
Induced GVA (£m)	54	216
Total GVA Including Induced (£m)	254	705

132. An indicative programme for the construction of the Project is described in **Chapter 5 Project Description**. For the purposes of the assessment, it is assumed that the construction period will start in 2026. The development and construction of the DBS East or DBS West in isolation is expected to cover the period of 2022 to 2031. The majority of this activity will occur during the construction phase between 2027 and 2030. It is at this point that the economic activity supported by the Project will peak. It is assumed that the manufacturing of components, including jackets and wind turbine components, will occur in the year prior to their installation.
133. Based on the indicative construction programme, at its peak (Q4 2029-Q2 2030, **Figure 28-3**) the construction of the development and construction of DBS East or DBS West in isolation is expected to support the equivalent of £55 million GVA in the Humberside and £100 million GVA in the UK.

Figure 28-3 Indicative GVA (direct and indirect) in the UK by year (rolling, annualised)



134. At its peak, the construction of the DBS East or DBS West in isolation will contribute 0.27% of the GVA generated across Humberside and less than 0.01% of UK GVA. Based on the methodology set out in **Table 28-20** the magnitude of impact is assessed as low (beneficial) with respect to the Humberside economy and as negligible (beneficial) with respect to the UK economy.

Table 28-20 Construction and Development: Magnitude of GVA impact - DBS East and DBS West in Isolation

	Humberside	UK
Peak GVA (£m)	55	100
Current GVA of Study Area (2020, £m)	20,600	1,949,600
Peak GVA as % Current GVA	0.27%	<0.01%
Magnitude of Impact	Low (Beneficial)	Negligible (Beneficial)

135. In addition to the impacts on GVA from the construction of the Projects, the analysis has considered the potential for impacts on economic activity linked to the findings of other PEIR chapters. This included a review of **Chapter 13 Commercial Fisheries, Chapter 14 Shipping and Navigation** and **Chapter 21 Land Use**.
136. **Chapter 13 Commercial Fisheries** found that there may be moderate adverse effects on commercial fisheries, in particular inshore static gear during the construction phase. To mitigate against this, the Applicant will enter cooperation agreements and associated payments. On this basis, no economic impact is expected to occur.
137. **Chapter 14 Shipping and Navigation** did not find any significant effects from the construction of the Projects. On this basis, the implications from that assessment and their interaction with socio-economics have not been investigated further.
138. **Chapter 21 Land Use** found that there may be a moderate adverse effect on agricultural land from temporary loss of over 20 hectares of agricultural land. To mitigate against this, the Applicant will enter private agreements for compensation with local landowners. On this basis, no economic impact is expected to occur.

28.6.1.2.1.2 Magnitude of Impact - DBS East or DBS West in Isolation

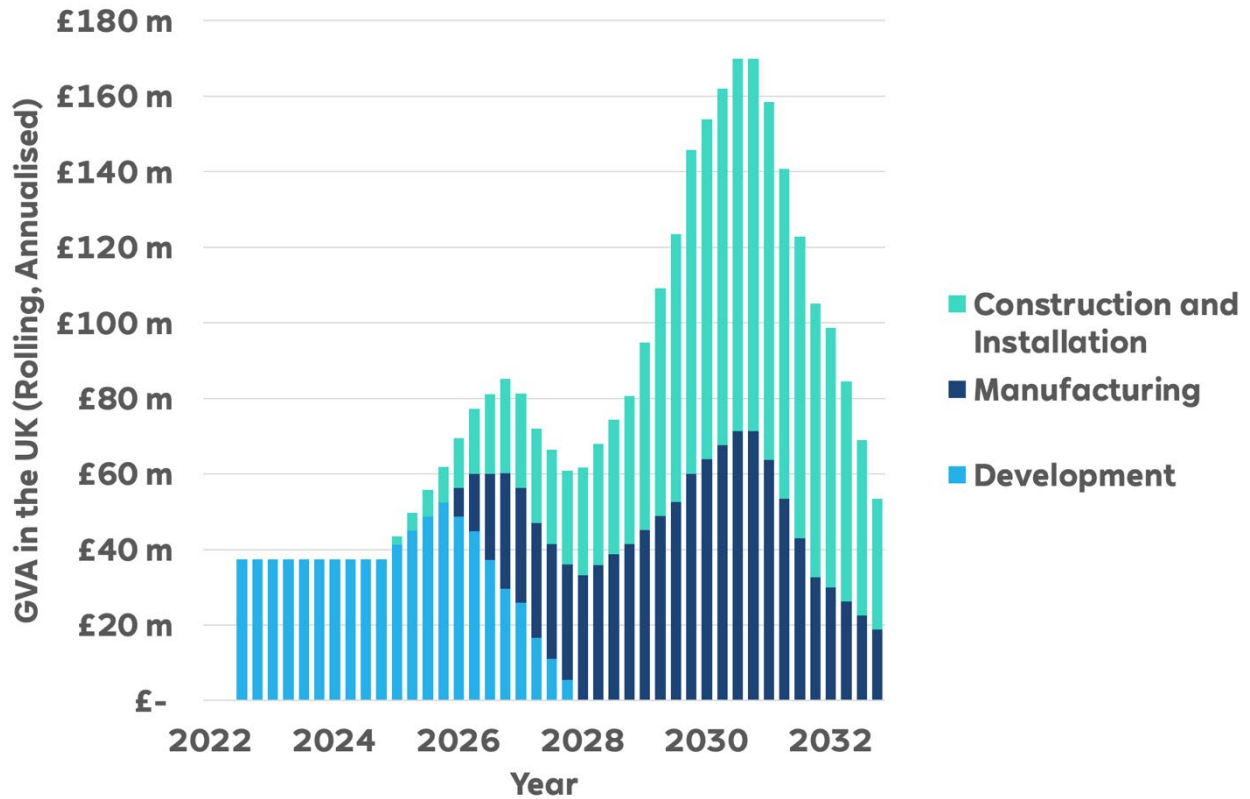
139. As set out in **Table 28-21**, the spending associated with the construction of DBS East and DBS West together is expected to generate a total (direct and indirect) impact of:
 - £400 million GVA in Humberside; and
 - £976 million GVA across the UK.

Table 28-21 Construction and Development: Total GVA – DBS East and DBS West Together

	Humberside	UK
Direct GVA (£m)	235	533
Indirect GVA (£m)	165	444
Total GVA (£m)	400	976
Induced GVA (£m)	108	433
Total GVA Including Induced (£m)	508	1,409

140. An indicative programme for the construction of the Project is described in **Chapter 5 Project Description**. For the purposes of the assessment, it is assumed that the construction period will start in 2026. The development and construction of the DBS East and DBS West together is expected to cover the period of 2022 to 2032. The majority of this activity will occur during the construction phase between 2027 and 2032. It is at this point that the economic activity supported by the Project will peak. It is assumed that the manufacturing of components, including jackets and wind turbine components, will occur in the year prior to their installation.
141. Based on the indicative construction programme, at its peak the construction of the development and construction of DBS East and DBS West sequentially is expected to support the equivalent of £90 million GVA in the Humberside and £170 million GVA in the UK. the analysis used in this assessment considered the level of activity in each quarter, however GVA values are normally reported on an annual basis. Therefore, to estimate the equivalent peak value of GVA, a rolling average of annual equivalent GVA was estimated for each quarter. This is shown in **Figure 28-4**. The peak is expected to occur at the end of 2029 and into 2030, to reflect the overlap of manufacturing and installation activities.

Figure 28-4 Indicative GVA (direct and indirect) in the UK by year (rolling, annualised)



142. Construction activity is expected to peak in 2030, when it is expected to generate the annualised equivalent of:
 - £90 million GVA in Humberside; and
 - £170 million GVA across the UK.
143. At its peak, the construction of the Projects will contribute around 0.47% of the GVA generated across Humberside and 0.01% of UK GVA. Based on the methodology set out in **Table 28-3**, the magnitude of impact is assessed as low with respects to the Humberside economy and as negligible with respects to the UK economy. In both study areas the impact will be beneficial.

Table 28-22 Construction and Development: Magnitude of GVA Impact - DBS East and DBS West Together

	Humberside	UK
Peak GVA (£m)	90	170
Current GVA of Study Area (2020, £m)	20,600	1,949,600
Peak GVA as % Current GVA	0.44%	0.01%
Magnitude of Effect	Low (Beneficial)	Negligible (Beneficial)

144. No impact on economic activity is expected as a result of construction activity interacting with commercial fisheries, fishing and navigation and land use.

28.6.1.2.2 Sensitivity of Receptor

145. The relative sensitivity of the two study areas to socio-economic changes is assessed as:

- medium for Humberside; and
- low for the UK.

28.6.1.2.3 Significance of Effect

28.6.1.2.3.1 Significance of Effect - DBS East and DBS West in Isolation

146. Based on the assessments of magnitude and sensitivity summarised in **Table 28-23**, the effect of expenditure from the construction of DBS East or DBS West in isolation is assessed as **minor (beneficial)** with regards to the Humberside economy and as **negligible (beneficial)** for the UK economy.

Table 28-23 Significance of Expenditure Effect - DBS East and DBS West in Isolation

	Humberside	UK
Magnitude of Impact	Low (Beneficial)	Negligible (Beneficial)
Sensitivity of Receptor	Medium	Low
Significance of Effect	Minor (Beneficial)	Negligible (Beneficial)

28.6.1.2.3.2 Significance of Effect – DBS East and DBS West Together

147. Based on the assessments of magnitude and sensitivity, the effect of expenditure resulting from the construction of DBS East and DBS West together is assessed as **minor (beneficial)** with regards to the Humberside economy and as **negligible (beneficial)** for the UK economy.

Table 28-24 Significance of Expenditure Effect - DBS East and DBS West Together

	Humberside	UK
Magnitude of Impact	Low (Beneficial)	Negligible (Beneficial)
Sensitivity of Receptor	Medium	Low
Significance	Minor (Beneficial)	Negligible (Beneficial)

28.6.1.2.4 Mitigation and Residual Significance of Effect

148. Since construction spending is expected to result in a beneficial impact on GVA, no mitigation measures are envisaged.

28.6.1.3 Impact 2: Employment

149. The construction of the Projects will also result in the creation of temporary employment. The estimation of employment impacts relied on the same methodology and assumptions adopted to estimate the impact on GVA.
150. As the construction of the Projects will generate short term employment, impacts on employment are estimated in terms of 'years of employment'. This is a measure of temporary employment, whereby a job lasting for 18 months is to be interpreted as 1.5 years of employment.

28.6.1.3.1 Magnitude of Impact

28.6.1.3.1.1 Magnitude of Impact – DBS East or DBS West in Isolation

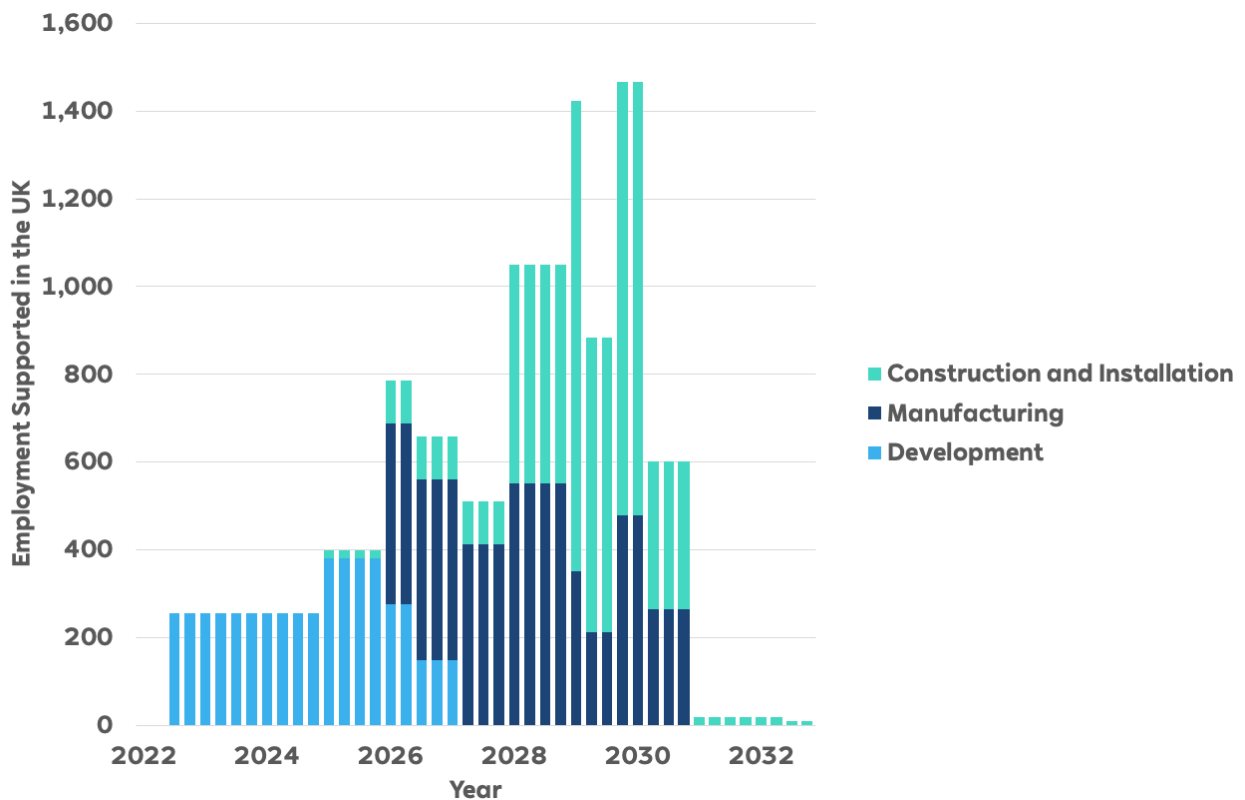
151. Based on the methodology set out above, it was estimated that the construction and development of DBS East or DBS West in isolation could support a total (direct and indirect):
- 2,700 years of employment in Humberside; and
 - 5,570 years of employment across the UK.

Table 28-25 Construction and Development: Employment (Years of Employment) – DBS East or DBS West in Isolation

	Humberside	UK
Direct Employment	1,500	2,870
Indirect Employment	1,200	2,700
Total Employment	2,700	5,570
Induced Employment	730	2,340
Total Employment including Induced (Years of Employment)	3,430	7,910

152. The spending of those working towards the delivery of DBS East or DBS West (induced impact) is expected to support a further 730 years of employment across Humberside and 2,360 years of employment in the UK.
153. An indicative programme for the construction of the Project is described in **Chapter 5 Project Description**. For the purposes of the assessment, it is assumed that the construction period will start in 2026. The development and construction of the Project is expected to cover the period of 2022 to 2031. The majority of this activity will occur during the construction phase between 2027 and 2030. It is at this point that the economic activity supported by the Project will peak. An indicative programme for the construction of the Project is described in **Chapter 5 Project Description**. It is assumed that the manufacturing of components, including jackets and wind turbine components, will occur in the year prior to their installation.
154. Based on the indicative construction programme, at its peak the construction of the Project is expected to support 900 jobs in Humberside and 1,470 jobs across the UK. This peak is expected to occur at the end of 2029 and first half of 2030, to reflect the overlap of manufacturing and installation activities. An indicative employment profile is shown in **Figure 28-5**.

Figure 28-5 Indicative employment profile (direct and indirect) in the UK, by year



155. In line with the approach set out in section 41, when construction activity peaks, DBS East or DBS West will support the equivalent of 0.21% of current employment in Humberside and less than 0.01% of current employment across the UK. On this basis, the magnitude of impact on employment is assessed as negligible for both the Humberside and the UK economy. Both impacts will be beneficial.

Table 28-26 Construction and Development: Magnitude of Employment Impact – DBS East or DBS West in Isolation

	Humberside	UK
Peak Employment (Jobs)	900	1,470
Current Jobs	437,000	35,231,000
Peak Jobs as % Current Jobs	0.21%	< 0.01%
Magnitude of Impact	Negligible (beneficial)	Negligible (beneficial)

28.6.1.3.1.2 Magnitude of Impact – DBS East or DBS West Together

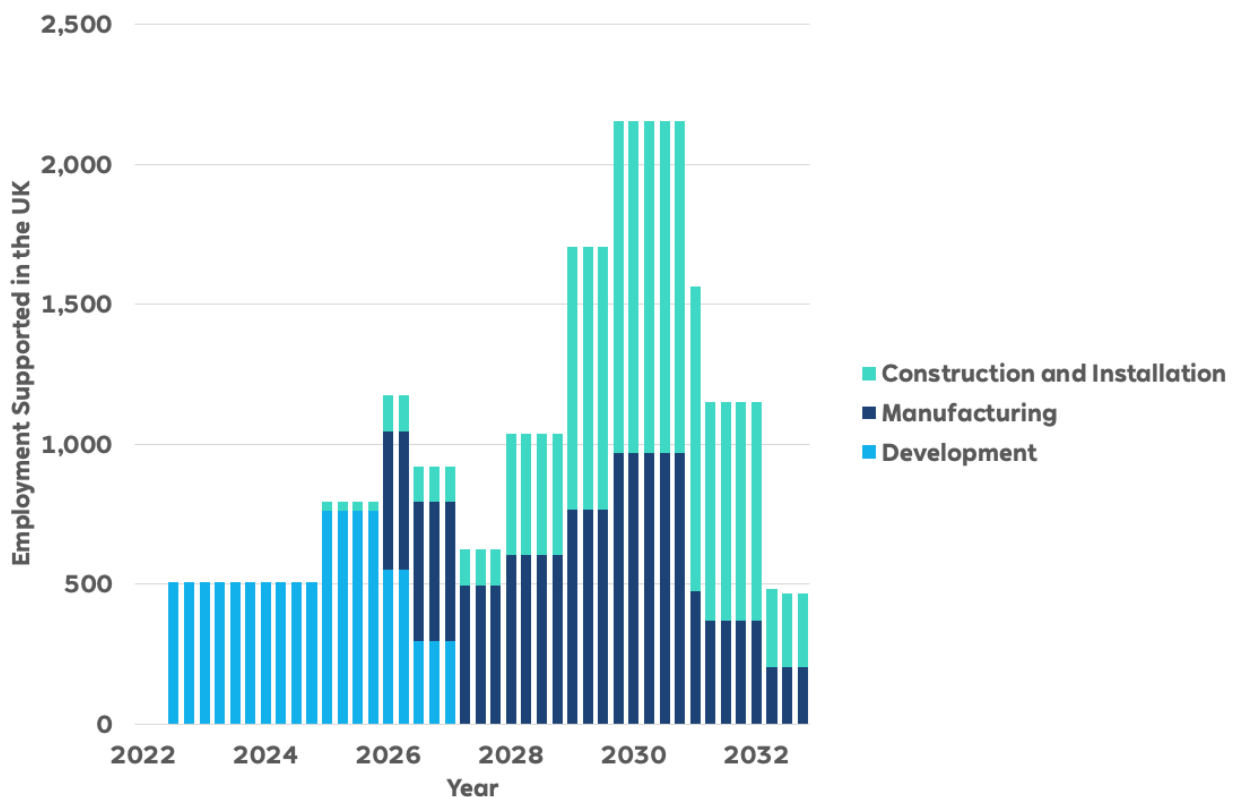
156. If DBS East and DBS West are constructed together, it was estimated that the construction and development of the Projects could support a total (direct and indirect):
- 5,410 years of employment in Humberside; and
 - 11,150 years of employment across the UK.

Table 28-27 Construction and Development: Employment (Years of Employment – DBS East and DBS West Together)

	Humberside	UK
Direct Employment	3,000	5,750
Indirect Employment	2,410	5,400
Total Employment	5,410	11,150
Induced Employment	1,460	4,670
Total Employment including Induced (Years of Employment)	6,870	15,820

157. The spending of those working towards the delivery of the Projects (induced impact) is expected to support a further 1,460 years of employment across Humberside and 4,670 years of employment in the UK.
158. An indicative programme for the construction of the Project is described in **Chapter 5 Project Description**. For the purposes of the assessment, it is assumed that the construction period will start in 2026. The development and construction of the DBS East and DBS West in isolation is expected to cover the period of 2022 to 2032. The majority of this activity will occur during the construction phase between 2027 and 2032. It is at this point that the economic activity supported by the Projects will peak. It is assumed that the manufacturing of components, including jackets and wind turbine components, will occur in the year prior to their installation.
159. Based on the indicative construction programme, at its peak the construction of the Project is expected to support 1,240 jobs in Humberside and 2,150 jobs across the UK. This peak is expected to occur at the end of 2029 and first half of 2030, to reflect the overlap of manufacturing and installation activities. An indicative employment profile is shown in **Figure 28-6**.

Figure 28-6 Indicative employment profile (direct and indirect) in the UK, by year



160. At its peak, the Projects are expected to support a total:
 - 1,240 jobs across Humberside; and
 - 2,150 jobs across the UK.
161. In line with the approach set out in section 41, when construction activity peaks, the Projects will support the equivalent of 0.28% of current employment in Humberside and 0.01% of current employment across the UK. On this basis, the magnitude of impact on employment is assessed as low for the Humberside economy and as negligible for the UK economy. The impact in both areas is considered to be beneficial.

Table 28-28 Construction and Development: Magnitude of Employment Impact - DBS East and DBS West Together

	Humberside	UK
Peak Employment (Jobs)	1,240	2,150
Current Jobs	437,000	35,231,000
Peak Jobs as % Current Jobs	0.28%	0.01%
Magnitude of Impact	Low (beneficial)	Negligible (beneficial)

28.6.1.3.2 Sensitivity of Receptor

162. The relative sensitivity of the two study areas to socio-economic changes is assessed as:

- Medium for Humberside; and
- Low for the UK.

28.6.1.3.3 Significance of Effect

28.6.1.3.3.1 Significance of Effect – DBS East or DBS West in Isolation

163. Based on the assessment of sensitivity and magnitude, the effect associated with the employment supported by the construction of DBS East or DBS West in isolation is assessed as **minor** with respects to the Humberside economy and as **negligible** with respects to the UK economy.

Table 28-29 Significance of Employment Effect - DBS East or DBS West in Isolation

	Humberside	UK
Magnitude of Impact	Negligible (beneficial)	Negligible (beneficial)
Sensitivity of Receptor	Medium	Low
Significance of Effect	Minor (beneficial)	Negligible (beneficial)

28.6.1.3.3.2 Significance of Effect – DBS East and DBS West Together

164. Based on the assessments of magnitude and sensitivity, the effect of employment resulting from the operations and maintenance of DBS East and DBS West together is assessed as **minor** with regards to the Humberside economy and as **negligible** for the UK economy.

Table 28-30 Significance of Employment Effect - DBS East and DBS West Together

	Humberside	UK
Magnitude of Impact	Negligible (beneficial)	Negligible (beneficial)
Sensitivity of Receptor	Medium	Low
Significance of Effect	Minor (beneficial)	Negligible (beneficial)

28.6.1.3.4 Mitigation and Residual Significance of Effect

165. Since construction spending is expected to result in a beneficial impact on employment, no mitigation measures are envisaged.
166. Monitoring requirements with regards to regional and national content are set out in section 28.8.

28.6.1.4 Impact 3: Change in Demographics Due to Immigration

167. By creating employment opportunities in Humberside, the development and construction of the Projects may result in immigration and demographic changes.

28.6.1.4.1.1 Magnitude of Impact – All Scenarios

168. The potential change in demographics from the development and construction of the Project is linked to the number of jobs that are supported.
169. The distribution of economic activity during the development and construction of DBS East or DBS West in isolation is determined by the location of the directly contracted and supply chain companies.
170. On average the population of Humberside is projected to grow by 993 per year over the period 2020-2043. However, this growth is driven by those aged 65 or over. The working age population is projected to decrease by an average of 1,130 per year. Reductions in the working age population will have an adverse effect on the economy, therefore any impacts that will increase the working age population are considered to be beneficial.

171. The peak employment supported in Humberside during the development and construction of DBS East or DBS West in isolation is estimated to be 900 jobs. This is equivalent to 98% of the projected annual population growth for Humberside.
172. The majority of the economic activity within Humberside will be focused around the activities of the construction port and on the construction of the onshore infrastructure, such as the cable route and substation. Offshore wind has been identified at local level as providing a long term opportunity for the area. This is based on a pipeline of offshore wind energy projects in the North Sea that will have demand for construction and manufacturing facilities in the Humber area. It would therefore be expected that most of the employment supported in the area will use a workforce that is based in the area (assumed to be 75%).
173. The peak employment supported in Humberside during the development and construction of DBS East or DBS West in isolation is estimated to be 900 jobs. This is equivalent to 98% of the projected annual population growth for Humberside. If both the Projects were development and constructed together, the peak employment supported is estimated to be 1,240, equivalent to 125% of the projected annual population growth for Humberside.
174. If it was assumed that 25% of the workforce employed during the peak activity came from outside Humberside, this would be equivalent to 23% of annual population growth if DBS East or DBS West were developed and constructed in isolation. If DBS East and DBS West were constructed together, this would be equivalent to 33% of the annual population growth.
175. In line with the approach to determining the magnitude of demographic impacts, the magnitude of this impact has been assessed as negligible and low respectively. In both scenarios, the impact is beneficial because it will contribute to the declining working age population in Humberside.

Table 28-31 Construction and Development: Magnitude of Demographic Impacts in Humberside

	DBS East or DBS West in Isolation	DBS East and DBS West Together
Peak population increase	225	328
Average population increase (2020-2043)	994	994
Peak population increase as % Normal population growth	23%	33%
Magnitude of Impact	Negligible (Beneficial)	Low (Beneficial)

28.6.1.4.1.2 Sensitivity of Receptor – All Scenarios

176. The sensitivity of Humberside to changes in its demographics is assessed as medium.

28.6.1.4.1.3 Significance of Effect – All Scenarios

177. Based on the assessments of magnitude and sensitivity, the effect of changes in demographics on the population structure of Humberside is assessed as **minor (beneficial)** in both scenarios.

Table 28-32 Significance of Population Effect – in Humberside

	DBS East or DBS West in Isolation	DBS East and DBS West Together
Magnitude of Impact	Negligible (Beneficial)	Low (Beneficial)
Sensitivity of Receptor	Medium	Medium
Significance of Effect	Minor (Beneficial)	Minor (Beneficial)

28.6.1.4.1.4 Mitigation and Residual Significance of Effect – All Scenarios

- 178. Given the effect associated with demographic changes is beneficial, no mitigation will be required.
- 179. Monitoring requirements with regards to regional and national content are set out in section 28.8.

28.6.1.5 Impact 4: Loss of, Disruption to or Pressure on Local Infrastructure

- 180. The potential for a significant influx of transient workers having an impact on community and social assets has been scoped into this assessment. This section considers the potential impacts associated with a change in demand for housing, educational and healthcare facilities.

28.6.1.5.1 Magnitude of Impact – All Scenarios

- 181. The magnitude from any loss of, disruption to or pressure on local infrastructure will depend on temporary changes in the population of Humberside associated with the construction and development of the Projects. These impacts will occur if the infrastructure is not able to adapt to meet the demands of the changing demographics, and will therefore be adverse.
- 182. As set out in section 28.6.1.4, the population of Humberside at the peak of construction activity is estimated to increase by between 225 and 328 people. Since the magnitude of impact on population is assessed as either negligible or low, it is unlikely to lead to result in any significant pressures on housing.
- 183. Similarly, given the temporary nature of construction and development activity and its involvement of people of working age, any impacts on educational provision are likely limited in scale.
- 184. Temporary migration of the scale required to fulfil the contracts for the construction of the Projects is also unlikely to result in additional pressures on local health provision.
- 185. For all these reasons, the magnitude of impact from loss of, disruption to or pressure on local infrastructure is assessed as negligible (adverse).

28.6.1.5.2 Sensitivity of Receptor – All Scenarios

- 186. The sensitivity of Humberside to changes in its local infrastructure is assessed as low.

28.6.1.5.3 Significance of Effect – All Scenarios

187. Based on the assessments of magnitude and sensitivity, the effect from loss of, disruption to or pressure on local infrastructure is assessed as **negligible (adverse)** during the development and construction of the projects.

Table 28-33 Significance of Effect from Loss of, Disruption to or Pressure on Local Infrastructure

	Humberside
Magnitude of Impact	Negligible (Adverse)
Sensitivity of Receptor	Low
Significance of Effect	Negligible (Adverse)

28.6.1.5.4 Mitigation and Residual Significance of Effect – All Scenarios

188. Given the negligible effect associated with loss of, disruption to or pressure on local infrastructure, no mitigation will be required.

28.6.1.6 Impact 5: Disturbance (Noise, Air Quality, Visual and Traffic) to Social Infrastructure

189. In addition to potential disruption and pressure on social infrastructure, the construction of the Projects may result in disturbance, including because of noise, air quality, visual and traffic impacts. The analysis in this section is carried out with reference to the findings from the following chapters:

- **Chapter 23 Landscape and Visual Impact Assessment;**
- **Chapter 24 Traffic and Transport;**
- **Chapter 25 Noise;** and
- **Chapter 26 Air Quality.**

28.6.1.6.1 Magnitude of Impact – All Scenarios

190. The review of other chapters focuses on those assets experiencing significant effects. Air quality, and traffic and transport are not considered since **Chapter 24 Traffic and Transport** and **Chapter 26 Air Quality** did not find any significant residual effects during the construction of the Projects.

191. Any visual impacts on recreational users from **Chapter 23 Landscape and Visual Impact Assessment** are considered as part of **Chapter 29 Tourism and Recreation**. This is because views and their amenity value are one of several aspects with the potential to affect visitor behaviour. Any changes to visitor decision-making may then result in impacts on spending and on the tourism economy.
192. In addition to impacts on recreational users, **Chapter 23 Landscape and Visual** finds significant effects on residential receptors associated with subarea 5 (Substation Zones) during the construction phase. It is not expected that visual changes to residential receptors will affect the overall quality and provision of social infrastructure.
193. **Chapter 25 Noise** found moderate adverse effects on one residential receptor from on-site construction noise and potential Horizontal Directional Drilling (HDD). This is only the case if HDD works were required to take place at night. Following mitigations, it is expected the impact on socio-economics will be negligible.
194. Similarly, **Chapter 25 Noise** found a moderate adverse effect on two residential properties at Eske Lane due to the increase in traffic volume and its associated impact because of off-site construction traffic. The same considerations as for visual impacts on residential assets apply here, with no expected changes in the overall quality and provision of social infrastructure.
195. On this basis, the magnitude of impact on social infrastructure from noise, traffic and transport, air quality and landscape is assessed as negligible (adverse).

28.6.1.6.2 Sensitivity of Receptor - All Scenarios

196. As set out in 28.5.9.4, the sensitivity of local social infrastructure within Humberside is assessed as low.

28.6.1.6.3 Significance of Effect - All Scenarios

197. Based on the assessments of magnitude and sensitivity, the effect of the construction of the Projects on noise, air quality, visual and traffic is assessed as **negligible (adverse)**.

Table 28-34 Significance of Effect from Disturbance (Noise, Air Quality, Visual and Traffic) to Social Infrastructure

	Humberside
Magnitude of Impact	Negligible (Adverse)
Sensitivity of Receptor	Low
Significance of Effect	Negligible (Adverse)

28.6.1.6.4 Mitigation and Residual Significance of Effect – All Scenarios

198. Given the negligible effect associated with disturbance (noise, air quality, visual and traffic) to social infrastructure, no mitigation will be required, beyond the mitigation measures proposed in the relevant chapters.

28.6.2 Potential Effects During Operation

199. In a similar way as for impacts associated with construction activity, impacts associated with the operation and maintenance phase are considered under each scenario in turn.
200. Based on the Scoping Report, the following impacts were scoped into the assessment:
- Impact from expenditure associated with the Projects;
 - Impact from increased employment;
 - Impact from a change in demographics due to immigration; and
 - Impact from disturbance (noise, air quality, visual and traffic) to social infrastructure.

28.6.2.1 Impact 6: Expenditure

201. The operation and maintenance of the Project will generate economic impacts through the expenditure that will be required throughout their lifetime.
202. It is expected that a fixed offshore wind farm project in the UK would spend around £59 million per GW installed (BVG Associates, 2019) each year on operations and maintenance activities.
203. Total operations and maintenance spending is expected to vary depending on the development's size and could be up to:
- £2.6 billion if DBS East or DBS West are built in isolation; and
 - £5.3 billion if DBS East and DBS West are built together.

204. This expenditure will include logistics costs, operational management, grid charges and the maintenance and service of both the wind turbines and the wider balance of plant. The largest component of this will be the costs associated with the maintenance and service of the wind turbines. It is expected that this activity will increase over time.
205. In a typical year, it is estimated that:
- £77 million will be spent on maintenance and £12 million will be spent on operations, if DBS East or DBS West are built in Isolation; and
 - £153 million will be spent on maintenance and £24 million will be spent on operations if DBS East and DBS West are built together.

Table 28-35 Operations and Maintenance: Potential Expenditure by Category

	Annual Spend per GW	Total Annual Spend	Lifetime Spend
DBS East or West in Isolation			
Operations	£8m	£12m	£358m
Maintenance	£51m	£77m	£2,295m
Total	£59m	£88m	£2,653m
DBS East and West Together			
Operations	£8m	£24m	£716m
Maintenance	£51m	£153m	£4,590m
Total	£59m	£177m	£5,306m

206. The economic impacts from the operation and maintenance of the Projects have been estimated for Humberside and the UK.
207. Under the UK Offshore Wind Sector Deal (UK Government, 2019), there is a target that projects constructed in 2030 will achieve 60% of UK content during their lifetime. The majority of the UK expenditure is expected to occur during the operation and maintenance stage.

208. In line with the worst case scenario analysis, it has been assumed that the Projects will not achieve this target but shall achieve the level of UK content that is typical of offshore wind projects in the UK that have been built to date. Analysis by BVG Associates (BVG Associates, 2021) has found that on average 81% of total operation and maintenance spending for UK offshore wind projects is sourced domestically. The distribution of UK content by category is shown in **Table 28-36**.
209. The distribution of contracts within Humberside is based on current industrial capabilities. The Humberside study area has also been defined based on the assumption that the primary operations and maintenance port will be within the region.

Table 28-36 Operations and Maintenance: Potential Expenditure by Category and Study Area

	Humberside	UK	Imports
Operations	35%	98%	2%
Maintenance	72%	79%	21%
Total	67%	81%	19%

210. On this basis across the two scenarios, the following annual average spending was estimated:
- £59 million in Humberside and £72 million in the UK if DBS East or DBS West are built in Isolation; and
 - £118 million in Humberside and £144 million in the UK if DBS East and DBS West are built together.
211. The increased turnover in these companies will support employment and generate GVA within these economies.

28.6.2.1.1 Magnitude of Impact

212. For the purposes of assessment, only the direct and indirect economic impacts are considered when determining the magnitude of the impact from operations and maintenance spending. These describe the economic activity required to realise the Projects and are the focus of other economic assessments associated with offshore wind projects.
213. The induced impacts are quantified and presented for completeness but are not used in the assessment of magnitude.

28.6.2.1.1.1 Magnitude of Impact – DBS East or DBS West in Isolation

214. As set out in **Table 28-37**, the operations and maintenance of DBS East and DBS West in isolation could result each year in a total (direct and indirect) impact of:

- £37 million GVA in Humberside; and
- £51 million GVA across the UK.

Table 28-37 Operations and Maintenance: Total GVA – DBS East or DBS West in Isolation

	Humberside	UK
Direct GVA (£m)	23	28
Indirect GVA (£m)	14	24
Total GVA (£m)	37	51
Induced GVA (£m)	11	22
Total GVA Including Induced (£m)	48	73

215. The total GVA supported each year by the operations and maintenance of DBS East or DBS West in isolation is equivalent to 0.18% of the annual GVA generated across Humberside and less than 0.01% of the UK economy. On this basis, the magnitude of operations and maintenance activity is assessed as negligible with respects to both the Humberside and the UK economy.

Table 28-38 Operations and Maintenance: Magnitude of GVA impact - DBS East and DBS West in Isolation

	Humberside	UK
Peak GVA (£m)	37	51
Current GVA of Study Area (2020, £m)	20,600	1,949,600
Peak GVA as % Current GVA	0.18%	<0.01%
Magnitude of Impact	Negligible	Negligible

216. No impact on economic activity is expected as a result of operational activity interacting with commercial fisheries, fishing and navigation and land use.

28.6.2.1.1.2 Magnitude of Impact – DBS East and DBS West Together

217. The magnitude of the GVA impact will be greater if DBS East and DBS West are built together.
218. As set out in **Table 28-39**, the operations and maintenance of the Projects could result each year in a total (direct and indirect) impact of:
- £74 million GVA in Humberside; and
 - £103 million GVA across the UK.

Table 28-39 Operations and Maintenance: Total GVA – DBS East and DBS West Together

	Humberside	UK
Direct GVA (£m)	46	55
Indirect GVA (£m)	28	48
Total GVA (£m)	74	103
Induced GVA (£m)	21	43
Total GVA Including Induced (£m)	95	146

219. The total GVA supported each year by the operations and maintenance of the Projects is equivalent to 0.36% of the annual GVA generated across Humberside and 0.01% of the UK economy. The magnitude of operations and maintenance activity is assessed as low (beneficial) with respects to the Humberside economy and as negligible (beneficial) with respects to the UK economy.

Table 28-40 Operations and Maintenance: Magnitude of GVA impact - DBS East and DBS West Together.

	Humberside	UK
Peak GVA (£m)	£74	£103
Current GVA of Study Area (2020, £m)	£20,600	£1,949,600
Peak GVA as % Current GVA	0.36%	0.01%
Magnitude of Impact	Low (Beneficial)	Negligible (Beneficial)

220. A review of **Chapter 13 Commercial Fisheries**, **Chapter 14 Shipping and Navigation** and **Chapter 21 Land Use** confirms that no impact on economic activity is expected as a result of operational activity interacting with commercial fisheries, fishing and navigation and land use.

28.6.2.1.2 Sensitivity of Receptor – Both Scenarios

221. The relative sensitivity of the two study areas to socio-economic changes is assessed as:
- medium for Humberside; and
 - low for the UK.

28.6.2.1.3 Significance of Effect

28.6.2.1.3.1 Significance of Effect – DBS East or DBS West in Isolation

222. Based on the assessments of magnitude and sensitivity, the effect of expenditure resulting from the construction of DBS East or DBS West in isolation is assessed as **minor (beneficial)** with regards to the Humberside economy and as **negligible (beneficial)** for the UK economy.

Table 28-41 Significance of Expenditure Effect - DBS East or DBS West in Isolation

	Humberside	UK
Magnitude of Impact	Negligible (Beneficial)	Negligible (Beneficial)
Sensitivity of Receptor	Medium	Low
Significance	Minor (Beneficial)	Negligible (Beneficial)

28.6.2.1.3.2 Significance of Effect – DBS East and DBS West together

223. Based on the assessments of magnitude and sensitivity, the effect of expenditure resulting from the construction of DBS East and West together is assessed as **minor (beneficial)** with regards to the Humberside economy and as **negligible (beneficial)** for the UK economy.

Table 28-42 Significance of Expenditure Effect - DBS East and DBS West Together

	Humberside	UK
Magnitude of Impact	Low (Beneficial)	Negligible (Beneficial)
Sensitivity of Receptor	Medium	Low
Significance	Minor (Beneficial)	Negligible (Beneficial)

28.6.2.1.4 Mitigation and Residual Significance of Effect – All Scenarios

224. Since operations and maintenance spending is expected to result in a beneficial impact on GVA, no mitigation measures are envisaged.

28.6.2.2 Impact 7: Employment

28.6.2.2.1 Magnitude of Impact

225. The operations and maintenance of the Projects will result in an increase in the turnover of those businesses supporting operational activities. Changes in turnover will support the jobs required to fulfil contracts.
226. The assessment of impacts on employment relies on the same assumptions that were adopted in the estimation of GVA impacts occurring during the operations and maintenance period.
227. For the purposes of assessment, only the direct and indirect economic impacts are considered when determining the magnitude of the impact. These describe the economic activity required and are the focus of other economic assessments associated with offshore wind projects.
228. The induced impacts are quantified and presented for completeness but are not used in the assessment of magnitude.

28.6.2.2.1.1 Magnitude of Impact – DBS East or DBS West in Isolation

229. As set out in **Table 28-43**, the operations and maintenance of DBS East or DBS West in isolation is expected to support each year a total:

- 400 jobs in Humberside; and
- 580 jobs across the UK.

Table 28-43 Operations and Maintenance: Employment – DBS East or DBS West in Isolation

	Humberside	UK
Direct Employment	230	290
Indirect Employment	170	290
Total Employment	400	580
Induced Employment	110	210
Total Employment including Induced	510	790

230. The annual employment supported by DBS East or DBS West is equivalent to 0.09% of total employment in Humberside and less than 0.01% of total employment across the UK. On this basis, the magnitude of the impact on employment is assessed as negligible for both the Humberside and the UK economy. The impact is beneficial.

Table 28-44 Operations and Maintenance: Magnitude of Employment Impact – DBS East or DBS West in Isolation

	Humberside	UK
Peak Employment (Jobs)	400	580
Current Jobs	437,000	35,231,000
Peak Jobs as % Current Jobs	0.09%	<0.01%
Magnitude of Impact	Negligible (Beneficial)	Negligible (Beneficial)

28.6.2.2.1.2 Magnitude of Impact – DBS East and DBS West Together

231. The magnitude of the employment impacts will be greater if DBS East and DBS West are built together.
232. As set out in **Table 28-45**, the operations and maintenance of the Projects is expected to support each year a total:
- 810 jobs in Humberside; and
 - 1,120 jobs across the UK.

Table 28-45 Operations and Maintenance: Total GVA – DBS East and DBS West Together

	Humberside	UK
Direct Employment	470	560
Indirect Employment	340	560
Total Employment	810	1,120
Induced Employment	220	430
Total Employment including Induced	1,030	1,550

233. The annual employment supported by the Projects is equivalent to 0.19% of total employment in Humberside and less than 0.01% of total employment across the UK. On this basis, the magnitude of the impact on employment is assessed as negligible (beneficial) for both the Humberside and UK economy.

Table 28-46 Operations and Maintenance: Magnitude of Employment Impact - DBS East and DBS West Together

	Humberside	UK
Peak Employment (Jobs)	810	1,120
Current Jobs	437,000	35,231,000
Peak Jobs as % Current Jobs	0.19%	<0.01%
Magnitude of Impact	Negligible (Beneficial)	Negligible (Beneficial)

28.6.2.2.2 Sensitivity of Receptor – All Scenarios

234. The relative sensitivity of the two study areas to socio-economic changes is assessed as:
- medium for Humberside; and
 - low for the UK.

28.6.2.2.3 Significance of Effect – All Scenarios

235. Based on the assessments of magnitude and sensitivity, the effect of employment resulting from the operations and maintenance of the Projects is assessed as **minor** with regards to the Humberside economy and as **negligible** for the UK economy.

Table 28-47 Significance of Employment Effect - DBS East and DBS West in Isolation

	Humberside	UK
Magnitude of Impact	Negligible (Beneficial)	Negligible (Beneficial)
Sensitivity of Receptor	Medium	Low
Significance of Effect	Minor (Beneficial)	Negligible (Beneficial)

28.6.2.2.4 Mitigation and Residual Significance of Effect – All Scenarios

236. Since the employment supported during operations and maintenance is expected to result in a beneficial impact, no mitigation measures are envisaged.

28.6.2.3 Impact 8: Change in Demographics Due to Immigration

28.6.2.3.1 Magnitude of Impact

28.6.2.3.1.1 Magnitude of Impact – All Scenarios

237. On average the population of Humberside is projected to grow by 993 per year over the period 2020-2043. The annual employment that will be supported in Humberside during the operations and maintenance of DBS East or DBS West in isolation is estimated to be 400 jobs. This is equivalent to 40% of the projected annual population growth for Humberside.
238. If it further assumed that most jobs (75%) may be carried out by people who are already living in Humberside, around 10% of population growth in Humberside will be associated with activity associated with the operations and maintenance of DBS East or DBS West in isolation.

239. Similarly, the population increase if DBS East and DBS West are constructed together is expected to be equivalent to a 20% increase in normal population growth for Humberside.
240. On this basis, the magnitude of impact from changes in demographics resulting from operations and maintenance activity is assessed as negligible (beneficial).

Table 28-48 Operations and Maintenance: Magnitude of Demographic Impacts in Humberside

	DBS East or DBS West in Isolation	DBS East and DBS West Together
Population increase	100	203
Average population increase (2020-2043)	994	994
Population increase as % Normal population growth	10%	20%
Magnitude of Impact	Negligible (Beneficial)	Negligible (Beneficial)

28.6.2.3.2 Sensitivity of Receptor - All Scenarios

241. The sensitivity of Humberside to changes in demographics is assessed as Medium.

28.6.2.3.3 Significance of Effect - All Scenarios

242. Based on the assessments of magnitude and sensitivity, the effect of changes in demographics on the population structure of Humberside is assessed as **Minor (beneficial)** in both scenarios.

Table 28-49 Significance of Population Effect - in Humberside

	DBS East or DBS West in Isolation	DBS East and DBS West Together
Magnitude of Impact	Negligible (Beneficial)	Negligible (Beneficial)
Sensitivity of Receptor	Medium	Medium
Significance	Minor (Beneficial)	Minor (Beneficial)

28.6.2.3.4 Mitigation and Residual Significance of Effect

243. No mitigation measure is expected as the effect associated with the demographic changes is beneficial.

28.6.2.4 Impact 9: Disturbance (Noise, Air Quality, Visual and Traffic) to Social Infrastructure

28.6.2.4.1 Magnitude of Impact – All Scenarios

244. A similar approach is followed in assessing impacts on social infrastructure during the operations and maintenance phase as for those arising during the construction of the Projects. In particular, the assessment is based upon review of the following chapters:

- **Chapter 23 Landscape and Visual Impact Assessment;**
- **Chapter 24 Traffic and Transport;**
- **Chapter 25 Noise;** and
- **Chapter 26 Air Quality.**

245. The assessment focuses on those chapters where significant effects were found. No significant effects during the operational period were identified with respects to **Chapter 24 Traffic and Transport, Chapter 25 Noise** and **Chapter 26 Air Quality.**

246. **Chapter 23 Landscape and Visual Impact Assessment** found a series of significant effects on visual amenity during the operational phase. While a discussion of effects on recreational receptors is provided in **Chapter 29 Tourism and Recreation**, significant effects on residential receptors included:

- Moderate effect on Viewpoint 1: Shepherd Lane (substation zone 1);
- Moderate effect on Viewpoint 2: Beverley 20 near Jillywood Farm (substation zone 1);
- Major effect on Viewpoint 4: Butt Farm (substation zone 4); and
- Major effect on Viewpoint 5: Coppleflat Lane, Bentley (substation zone 4).

247. Residual effect significance is not available at this stage and will be confirmed in the ES, following the preparation of an outline mitigation scheme. However, **Chapter 23 Landscape and Visual Impact Assessment** acknowledges that residual effects are expected to reduce following successful implementation of the mitigation scheme, once proposed planting and vegetation matures. In addition, it is not expected that visual impacts on residential receptors will affect the overall quality and provision of social infrastructure.

248. Based on the analysis in this section, the magnitude of impact on social infrastructure from disturbance associated with noise, air quality, visual and traffic is assessed as negligible (adverse).

28.6.2.4.2 Sensitivity of Receptor - All Scenarios

249. As set out in 28.5.9.4, the sensitivity of local social infrastructure within Humberside is assessed as low.

28.6.2.4.3 Significance of Effect - All Scenarios

250. Based on the assessments of magnitude and sensitivity, the effect on social infrastructure from noise, air quality, visual and traffic associated with the operation of the Projects is assessed as **negligible (adverse)**.

Table 28-50 Significance of Effect From Disturbance (Noise, Air Quality, Visual and Traffic) to Social Infrastructure

	Humberside
Magnitude of Impact	Negligible (Adverse)
Sensitivity of Receptor	Low
Significance of Effect	Negligible (Adverse)

28.6.2.4.4 Mitigation and Residual Significance of Effect - All Scenarios

251. As no significant effects from loss of, disruption to or pressure to local infrastructure are expected, no mitigation measures are envisaged.

28.6.3 Potential Effects During Decommissioning

28.6.3.1 Impact 10: Economic Activity

252. The decommissioning of the Projects will also generate economic activity. The number of offshore wind developments that have undergone decommissioning to date is limited, therefore estimates of the costs and activities associated with decommissioning an offshore wind farm of this scale are based on projections from sectoral research (BVG Associates, 2019), rather than experience.
253. The costs associated with decommissioning will depend on the number of turbines to decommission and were estimated as:
- £455 million if DBS East and DBS West are decommissioned in isolation; and
 - £909 million if DBS East and DBS West are decommissioned concurrently.
254. Decommissioning activity will require the removal of the wind turbines, foundations, cables, and the substation. The split of decommissioning costs is outlined in **Table 28-51** and the works will be completed by companies that are currently involved in the installation of these assets.

Table 28-51 Decommissioning: Potential Expenditure by Category

	Value (£m, 2022 Prices) - DBS East or DBS West in Isolation	Value (£m, 2022 Prices) - DBS East and DBS West Together	Share
Wind Turbine Decommissioning	60	120	13%
Foundation Decommissioning	105	210	23%
Cable Decommissioning	210	420	46%
Substation Decommissioning	75	150	17%
Decommissioning Port	5	9	1%
Total Decommissioning Spend	455	909	100%

Note: BiGGAR Economics Analysis of (BVG Associates, 2019). Totals may not sum due to rounding.

255. The operational life of the Projects is expected to be 30 years and therefore any decommissioning impacts will occur in the 2060s. At this stage, there is the potential for significant supply chain development within the UK to meet the installation and decommissioning demands of the offshore wind sector.

28.6.3.1.1 Magnitude of Impact – All Scenarios

256. As highlighted in **Table 28-51** the economic activity associated with the decommissioning of DBS East and DBS West Together will be approximately double the level of activity of either DBS East or DBS West in isolation.
257. Based on a similar methodology as for the previous section, it was estimated that decommissioning activity for DBS East and DBS West Together could support a total:
- £112 million GVA and 540 years of employment in Humberside; and
 - £138 million GVA and 680 years of employment across the UK.
258. The decommissioning of the Projects was assumed to last four years. As such, at its peak this activity will support 135 jobs in Humberside and 170 jobs across the UK.

Table 28-52 Decommissioning: Economic Impacts

	Humberside	UK
Total Decommissioning Impact		
Total GVA Impact (£m)	112	138
Total Jobs Impact (Years of Employment)	540	680
Peak Decommissioning Economic Impact		
Peak GVA Impact (£m)	28	35
Peak Jobs Impact (Jobs)	135	170

Note: Totals may not sum due to rounding.

259. Discounted peak values of GVA are shown in **Table 28-53**.

Table 28-53 Decommissioning: Discounted GVA Impacts

	Humberside	UK
Peak GVA Impact (£m)	28	35
Peak GVA Impact Discounted (£m)	6	8

Note: totals may not sum due to rounding.

260. The magnitude of the economic impacts associated with the decommissioning of DBS East and DBS West Together is determined based on the change in GVA or employment, relative to the current GVA or employment levels. The value of GVA and the number of jobs in each of the study areas in the 2060s is not known and so current values are used to give an indicative measure of magnitude.
261. As shown in **Table 28-54** the change in employment and GVA is equivalent to less than 0.1% of the current GVA and jobs in each of the study areas. The magnitude of all economic impacts during the decommissioning phase has therefore been assessed as negligible (beneficial).

Table 28-54 Decommissioning: Magnitude of Economic (Employment and GVA) Impacts

	Humberside	UK
Magnitude of employment impacts		
Peak Employment (Jobs)	135	170
Current Jobs	437,000	35,231,000
Peak Jobs as % Current Jobs	0.03%	0.00%
Magnitude of Effect	Negligible (Beneficial)	Negligible (Beneficial)
Magnitude of GVA Impacts		
Peak GVA Impact Discounted (£m)	6	8
Current GVA of Study Area (2020, £m)	20,600	1,949,600
Peak GVA as % Current GVA	0.03%	0.00%
Magnitude of Effect	Negligible (Beneficial)	Negligible (Beneficial)

262. The magnitude of the impact associated with the decommissioning of either DBS East or DBS West in isolation would therefore also be negligible (beneficial) across all areas.
263. No impact on economic activity is expected as a result of decommissioning activity interacting with commercial fisheries, fishing and navigation and land use.

28.6.3.1.2 Sensitivity of Receptor – All Scenarios

264. Based on existing data, it was not possible to predict the sensitivity of the two study areas in the 2060s. For the purposes of this assessment, the sensitivity of the two study areas is assessed as:
- Medium for the Humberside economy; and
 - Low for the UK economy.

28.6.3.1.3 Significance of Effect - All Scenarios

265. Based on the assessments of magnitude and sensitivity, the effect of the Projects' decommissioning on the economy of Humberside is assessed as **minor** and the effect on the economy of the UK is assessed as **negligible**.

Table 28-55 Decommissioning: Significance of Economic Assets Impacts

	Humberside	UK
Magnitude of Impact	Negligible (Beneficial)	Negligible (Beneficial)
Sensitivity of Receptor	Medium	Low
Significance	Minor (Beneficial)	Negligible (Beneficial)

28.6.3.1.4 Mitigation and Residual Significance of Effect - All Scenarios

266. Since the economic activity supported during decommissioning is expected to result in a beneficial impact on GVA and employment, no mitigation measures are envisaged.

28.6.3.2 Impact 11: Population and Social Infrastructure

267. As with the construction period, the potential for a significant influx of transient workers having an impact of community and social assets has been scoped into this assessment. This assessment considers the potential impacts associated with a change in demand for housing, educational and healthcare facilities because of this workforce.

28.6.3.2.1 Magnitude of Impact - All Scenarios

268. On average the population of Humberside is projected to grow by 993 per year between 2020 and 2043. The ONS does not publish population projections beyond the 2040s and therefore, it has been assumed that this growth will continue and form the basis of the assessment for the 2060s. The peak employment that will be supported in Humberside during the decommissioning of the Projects is estimated to be 135 jobs. This is equivalent to 14% of the projected annual population growth for Humberside.

269. The majority of the economic activity within Humberside will be focused around the activities of the decommissioning port and on the decommissioning of offshore infrastructure, such as the wind turbines. As discussed earlier in the chapter, the offshore wind sector has been identified as a long-term opportunity for the area. This is based on a pipeline of offshore wind energy projects in the North Sea that will have demand for installation and decommissioning facilities in the Humber area. It would therefore be expected that most of the employment supported in the area will use a workforce that is based in the area.
270. If it was assumed that 25% of the workforce that was employed during the peak activity came from outside Humberside, this would be equivalent to 3% of average annual population growth. In line with the approach to determining the magnitude of social and community asset impacts, the magnitude of this impact has been assessed as negligible.
271. The impact has been assessed as beneficial, on the assumption that trends in a declining working age population continue up to the period of decommissioning.

Table 28-56 Decommissioning: Magnitude of Social and Community Asset Impacts

	Humberside
Peak Population Increase	34
Average Population Increase (2018 – 2043)	993
Peak Population Increase as % Normal Population growth	3%
Magnitude of Impact	Negligible (Beneficial)

272. The magnitude of the impact associated with the decommissioning of either DBS East or DBS West in isolation or together would therefore also be negligible (beneficial) in Humberside.

28.6.3.2.2 Sensitivity of Receptor – All Scenarios

273. The sensitivity of the social and community assets within Humberside have been identified as low, based on data to 2022. The relative performance of the housing market, healthcare provision and education facilities in Humberside in the 2060s is not possible to predict. Over the long term, all these assets, in theory, have a high level of adaptability and will adjust to meet the needs of the community in Humberside. For example, the allocation of public funding for healthcare and education is linked to the demographic needs of communities. No changes have been made to the sensitivity of the community and social assets within Humberside for the decommissioning period.

28.6.3.2.3 Significance of Effect – All Scenarios

274. Based on the assessments of sensitivity and magnitude, the effect of decommissioning on the social and community assets of Humberside is assessed as **negligible**.

Table 28-57 Decommissioning: Significance of Social and Community Asset Impacts

	Humberside
Sensitivity of Receptor	Low
Magnitude of Impact	Negligible
Significance	Negligible

28.6.3.2.4 Mitigation and Residual Significance of Effect – All Scenarios

275. No mitigation measure is expected with regards to demographic changes and impacts on social and community assets.

28.7 Preliminary Assessment of Cumulative Effects

276. As detailed in section 28.4.3 this section presents a preliminary assessment of cumulative effects in relation to Socio-economics. The final CEA will be undertaken within the ES chapter.

28.7.1 Initial Screening for Cumulative Effects

277. **Table 28-58** details the potential cumulative effects that may occur between the Projects and other plans, projects and activities. Where the potential for cumulative effects has been identified (minor, moderate or major), this will be taken forward to the full CEA (i.e. those assessed as 'no impact' are not taken forward as there is no potential for them to contribute to a cumulative impact).

Table 28-58 Potential Cumulative Effects

Impact	Potential for Cumulative Effects	Data Confidence	Rationale
Construction			
Economic Activity	Yes	High	Multiple construction projects have the potential to lead to the attraction of investment and to strengthen local supply chains, with implications on the level of GVA supported by each project.
Employment	Yes	High	Multiple construction projects have the potential to lead to the attraction of investment and to strengthen local supply chains, with implications on the level of employment supported by the construction of each project.
Demographics	Yes	High	The wider development of offshore wind in the North sea and other energy projects have the potential to have longer term effects on the demographic issues in Humberside.

Impact	Potential for Cumulative Effects	Data Confidence	Rationale
Loss of, Disruption to or pressure on social assets	No	Low	Impacts are specific to communities living in proximity of the onshore infrastructure and construction port. At this stage, based on a review of Chapter 23 Landscape and Visual Impact Assessment, Chapter 24 Traffic and Transport, Chapter 25 Noise and Chapter 26 Air Quality , it was not possible to identify any specific cumulative impacts for the other projects identified.
Disturbance to social infrastructure	No	Low	Impacts are specific to communities living in proximity of the onshore infrastructure and construction port. At this stage, based on a review of Chapter 23 Landscape and Visual Impact Assessment, Chapter 24 Traffic and Transport, Chapter 25 Noise and Chapter 26 Air Quality , it was not possible to identify any specific cumulative impacts for the other projects identified.
Operation & Maintenance			
As with construction			
Decommissioning			
As with construction			

28.7.2 Plans/Projects Considered for Cumulative Impacts

278. A high-level list of plans/projects that may result in cumulative effects with the Projects is detailed in **Table 28-59** and **Table 28-60**. For Socio-economics, a search distance is not appropriate as the determination of interaction between projects is the potential to compete for, or support the development of, supply chain companies and associated infrastructure. **Table 28-59** outlines the substantial marine engineering and energy projects in the North Sea is used to determine the initial list of projects considered for the CEA. **Table 28-60** details the onshore infrastructure projects considered for the CEA.
279. Plans / projects have been assigned a tier level between 1 and 7, based on the most recent guidance (see **Chapter 6 EIA Methodology**). For the final CEA at ES, this high-level list will be reviewed and screened to ensure all relevant plans / projects are considered in the final assessment. All listed plans / projects will be re-examined at ES to ensure each assigned tier remains accurate at the time of writing.

Table 28-59 High-Level List of Offshore Plans/Projects Screened for Further Assessment in the Final CEA

Tier	Plan / Project	Distance to Offshore Development Area (km)
Strategic Plans		
7	East Inshore, North East Inshore, East Offshore and North East Offshore Marine Plans	Within offshore development area
Offshore Wind Farms		
2	Dogger Bank A	7
2	Dogger Bank B	17
Carbon Capture and Storage		
3	Northern Endurance CCS	2
7	CCS North Sea Leasing Round – SNS Areas 1 & 3	Within array areas
Subsea Cables		
2	Viking Link Interconnector	29
6	Eastern Link 2	2
7	Third Eastern Link HVDC cable (TGDC)	Crosses offshore export cable corridor
7	Fourth Eastern Link HVDC cable (E4L5)	Crosses offshore export cable corridor

Table 28-60 High-Level List of Onshore Plans/Projects Screened for Further Assessment in the Final CEA

Tier	Plan / Project	Distance to Onshore Development Area (km)
2	Dogger Bank A & B Offshore Wind Farm	Crosses onshore export cable corridor
3	A164 and Jock Lodge Junction Improvement Scheme	Crosses onshore export cable corridor
3	Solar Farm – Land south of Creyke Beck Substation, 4875 Park Lane, Cottingham	Within Onshore Development Area
3	Solar Farm – Land east and west of West of Tickton Bridge Plantation, Main Road, Routh	Adjacent to the Onshore Development Area
4	Hornsea Project Four Offshore Wind Farm	Adjacent to onshore export cable corridor
4	Scotland England Green Link 2	3.5
4	Solar Farm – Land north east and west of Carr Plantation, Ferry Road, Wawne	1.5
4	Household Recycling Centre – Land north west of Ings Road Picnic Site, Molescroft	Within Onshore Development Area
6	Solar Farm – Robson & Co, White Hall, Shepard Lane, Woodmansey	Within Onshore Development Area
7	New National Grid Substation	Within Onshore Development Area
7	New National Grid Substation (Birkill Wood)	Within Onshore Development Area
7	North Humber to High Marnham	Within Onshore Development Area
7	Creyke Beck Substation Extension	400m from Onshore Development Area

28.8 Potential Monitoring Requirements

281. Monitoring requirements will be described in the In-Principal Monitoring Plan (IPMP) submitted alongside the DCO application and further developed and agreed with stakeholders prior to construction based on the IPMP and taking account of the final detailed design of the Projects.
282. Since the analysis identified positive benefits from the spending and employment supported by the Projects' construction, and operations and maintenance, no mitigations measures were identified.
283. However, as part of the application for the Fifth Contracts for Difference Allocation Round, there will be a requirement to produce a supply chain plan, setting out the supply chain content associated with the Projects. Any commitments made under the supply chain plan will be monitored through evaluation of activity, including local and national content achieved.
284. Based on the non significant effects associated with impacts on demographics, local and social infrastructure, no monitoring requirements have been identified.

28.9 Transboundary Effects

285. There are no transboundary effects with regard to socio-economics as the Offshore Development Area would not be sited in proximity to any international boundaries. Transboundary effects are therefore scoped out of this assessment and not considered further.

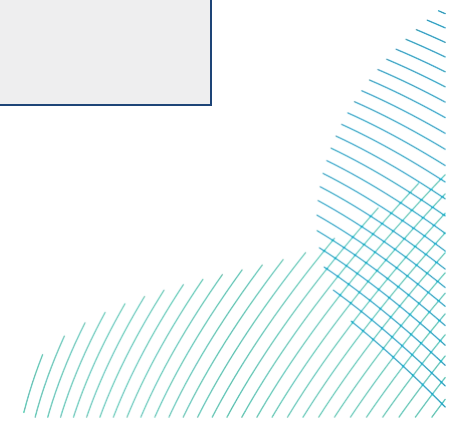
28.10 Interactions

286. The effects identified and assessed in this chapter have the potential to interact with each other. The areas of potential interaction between effects are presented in **Table 28-61**. This provides a screening tool for which effects have the potential to interact. **Table 28-62** and **Table 28-63** provide an assessment for each receptor (or receptor group) as related to these impacts. This is done with reference to the two scenarios considered.
287. Within **Table 28-62** the effects are assessed relative to each development phase to see if multiple effects could increase the significance of the effect upon a receptor. Following this a lifetime assessment is undertaken which considers the potential for effect to affect receptors across all development phases.
288. As the analysis in the chapter already took account of the relationship between the level of economic activity associated with the Projects and all these receptors, consideration of inter-relationships did not result in different findings.

Table 28-61 Interactions Between Impacts - Screening

Potential Interactions between Impacts					
Construction					
	Impact 1: Expenditure	Impact 2: Employment	Impact 3: Change in Demographics	Impact 4: Disturbance to social infrastructure	Impact 5: Loss of, disruption to or pressure on local infrastructure
Impact 1: Expenditure		Yes	Yes	Yes	Yes
Impact 2: Employment	Yes		Yes	Yes	Yes
Impact 3: Change in Demographics	Yes	Yes		Yes	Yes
Impact 4: Disturbance to social infrastructure	Yes	Yes	Yes		Yes

Potential Interactions between Impacts					
Impact 5: Loss of, disruption to or pressure on local infrastructure	Yes	Yes	Yes	Yes	
Operation					
	Impact 6: Expenditure	Impact 7: Employment	Impact 8: Change in Demographics	Impact 9: Disturbance to social infrastructure	
Impact 6: Expenditure		Yes	Yes	Yes	
Impact 7: Employment	Yes		Yes	Yes	
Impact 8: Change in Demographics	Yes	Yes		Yes	
Impact 9: Disturbance to social infrastructure	Yes	Yes	Yes		



Potential Interactions between Impacts		
Decommissioning		
	Impact 10: Economic Impact of Decommissioning	Impact 11: Population and Social Infrastructure
Impact 10: Economic Impact of Decommissioning		Yes
Impact 11: Population and Social Infrastructure	Yes	

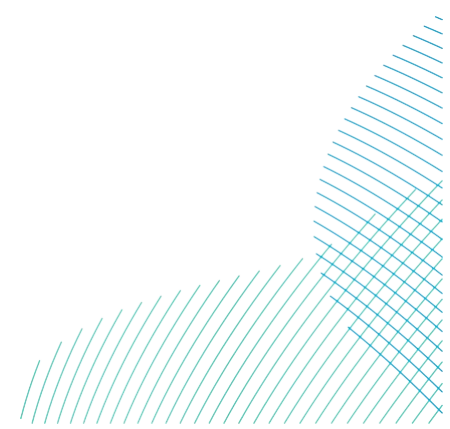


Table 28-62 Interaction Between Impacts - Phase and Lifetime Assessment, DBS East and DBS West in Isolation

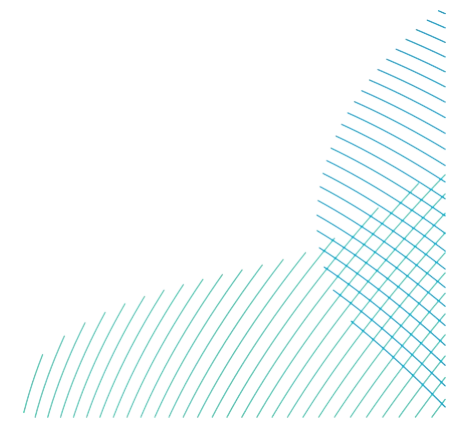
Receptor	Highest Significance Level				
	Construction	Operation	Decommissioning	Phase Assessment	Lifetime Assessment
Economy of Humberside - GVA	Minor	Minor	Minor	Minor	Minor
Economy of the UK - GVA	Negligible	Negligible	Negligible	Negligible	Negligible
Economy of Humberside - Employment	Minor	Minor	Minor	Minor	Minor
Economy of the UK - Employment	Negligible	Negligible	Negligible	Negligible	Negligible
Demographics of Humberside	Minor	Minor	Minor	Minor	Minor

Receptor	Highest Significance Level				
	Construction	Operation	Decommissioning	Phase Assessment	Lifetime Assessment
Social Infrastructure of Humberside	Negligible	N/A	Negligible	Negligible	Negligible
Local Infrastructure of Humberside	Negligible	Negligible	N/A	Negligible	Negligible

Table 28-63 Interaction Between Impacts - Phase and Lifetime Assessment, DBS East and DBS West Together

Receptor	Highest Significance Level				
	Construction	Operation	Decommissioning	Phase Assessment	Lifetime Assessment
Economy of Humberside - GVA	Minor	Minor	Minor	Minor	Minor
Economy of the UK - GVA	Negligible	Negligible	Negligible	Negligible	Negligible

Receptor	Highest Significance Level				
	Construction	Operation	Decommissioning	Phase Assessment	Lifetime Assessment
Economy of Humberside - Employment	Minor	Minor	Minor	Minor	Minor
Economy of the UK - Employment	Negligible	Negligible	Negligible	Negligible	Negligible
Demographics of Humberside	Minor	Minor	Minor	Minor	Minor
Social Infrastructure of Humberside	Minor	Negligible	Negligible	Negligible	Negligible
Local Infrastructure of Humberside	Negligible	Negligible	N/A	Negligible	Negligible



28.11 Inter-relationships

289. For socio-economics potential inter-relationships between other topics assessed within this PEIR including socio-economics. A summary of the potential inter-relationships between socio-economics and other disciplines is provided in **Table 28-64**.

Table 28-64 Socio-economics Inter-relationships

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Construction			
Fisheries	Chapter 13 Commercial Fisheries	28.6.1.2.1 and 28.6.1.3.1	Economic impact on fisheries from activity associated with the construction of the Projects.
Commercial Shipping	Chapter 14 Shipping and Navigation	28.6.1.2.1 and 28.6.1.3.1	Economic impact on commercial shipping from activity associated with the construction of the Projects.
Land Use	Chapter 21 Land Use	28.6.1.2.1 and 28.6.1.3.1	Economic impact on land use associated with construction activity.
Traffic and Transport	Chapter 24 Traffic and Transport	28.6.1.2.5 and 28.6.1.3.5	Impact from any disturbance on social infrastructure because of construction activity.
Landscape and Visual	Chapter 23 Landscape and Visual Impact Assessment	28.6.1.2.5 and 28.6.1.3.5	Impact from any disturbance on social infrastructure because of construction activity.
Noise and Vibration	Chapter 25 Noise	28.6.1.2.5 and 28.6.1.3.5	Impact from any disturbance on social infrastructure because of construction activity.
Air Quality	Chapter 26 Air Quality	28.6.1.2.5 and 28.6.1.3.5	Impact from any disturbance on social infrastructure because of construction activity.

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Operation			
Fisheries	Chapter 13 Commercial Fisheries	28.6.2.1.1 and 28.6.2.2.1	Economic impact on fisheries from activity associated with the operations of the Projects.
Commercial Shipping	Chapter 14 Shipping and Navigation	28.6.2.1.1 and 28.6.2.2.1	Economic impact on commercial shipping from activity associated with the operations of the Projects.
Land Use	Chapter 21 Land Use	28.6.2.1.1 and 28.6.2.2.1	Economic impact on land use associated with the operations of the Projects.
Landscape and Visual	Chapter 23 Landscape and Visual Impact Assessment	28.6.2.1.4 and 28.6.2.2.4	Impact from any disturbance on social infrastructure because of the operations and maintenance of the Projects.
Traffic and Transport	Chapter 24 Traffic and Transport	28.6.2.1.4 and 28.6.2.2.4	Impact from any disturbance on social infrastructure because of the operations and maintenance of the Projects.
Noise and Vibration	Chapter 25 Noise	28.6.2.1.4 and 28.6.2.2.4	Impact from any disturbance on social infrastructure because of the operations and maintenance of the Projects.
Air Quality	Chapter 26 Air Quality	28.6.2.1.4 and 28.6.2.2.4	Impact from any disturbance on social infrastructure because of the operations and maintenance of the Projects.
Decommissioning			

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Fisheries	Chapter 13 Commercial Fisheries	28.6.2.1.1 and 28.6.3.3.1	Economic impact on fisheries from activity associated with the decommissioning of the Projects.
Commercial Shipping	Chapter 14 Shipping and Navigation	28.6.2.1.1 and 28.6.3.3.1	Economic impact on commercial shipping from activity associated with the decommissioning of the Projects.
Land Use	Chapter 21 Land Use	28.6.2.1.1 and 28.6.3.3.1	Economic impact on land use associated with the decommissioning of the Projects.

28.12 Summary

290. This chapter has provided a characterisation of the existing environment for socio-economics based on publicly available data. It has considered evidence on demography, the economy, and the social infrastructure of Humberside, and compared it against UK-level performance.
291. The analysis was based on sectoral evidence and industry best practice. No data limitations with the potential to affect the findings from the assessment were identified.
292. The chapter has then considered the socio-economic impacts associated with the construction, operations and decommissioning of DBS East and DBS West. This was done under two scenarios – one involving the construction of a single development; the other involving the construction of both DBS East and DBS West.
293. In both scenarios, the assessment identified multiple beneficial, but not significant effects for both Humberside and the UK. These included:
 - Either DBS East or DBS West in isolation will support;
 - up to 1,470 jobs supported across the UK, including 900 jobs supported across Humberside during the development and construction;
 - £488 million GVA in the UK, including £200 million GVA in Humberside during the development and construction;
 - 580 jobs in the UK, including 400 in Humberside during the operations and maintenance phase;
 - Both DBS East and DBS West Together will support;
 - up to 2,150 jobs supported across the UK, including 1,240 jobs supported across Humberside during the development and construction;
 - Almost £1 billion GVA in the UK, including £400 million GVA in Humberside during the development and construction;
 - 1,120 jobs in the UK, including 810 in Humberside during the operations and maintenance phase; and
 - In both scenarios the job creation will have a beneficial impact on the projected declining working age population in Humberside.
294. **Table 28-65** and **Table 28-66** provide a summary of the assessment across the two scenarios considered.

Table 28-65 Summary of Potential Likely Significant Effects on Socio-economics, DBS East or DBS West in Isolation

Potential Impact	Receptor	Sensitivity	Magnitude of Impact	Pre-mitigation Effect	Mitigation Measures Proposed	Residual Effect
Construction						
Expenditure	Humberside	Medium	Minor (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Expenditure	UK	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)
Employment	Humberside	Medium	Negligible (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Employment	UK	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)
Change in demographics	Humberside	Medium	Negligible (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Loss of, disruption to or pressure on local infrastructure	Humberside	Low	Negligible (Adverse)	Negligible (Adverse)	N/A	Negligible (Adverse)
Disturbance (noise, air quality, visual and traffic) to social infrastructure	Humberside	Low	Negligible (Adverse)	Negligible (Adverse)	N/A	Negligible (Adverse)
Operation						
Expenditure	Humberside	Medium	Negligible (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Expenditure	UK	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)
Employment	Humberside	Medium	Negligible (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Employment	UK	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)
Change in demographics	Humberside	Medium	Negligible (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)

Potential Impact	Receptor	Sensitivity	Magnitude of Impact	Pre-mitigation Effect	Mitigation Measures Proposed	Residual Effect
Disturbance (noise, air quality, visual and traffic) to social infrastructure	Humberside	Low	Negligible (Adverse)	Negligible (Adverse)	N/A	Negligible (Adverse)
Decommissioning						
Economic Activity	Humberside	Medium	Negligible (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Economic Activity	UK	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)
Population and Social Infrastructure	Humberside	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)

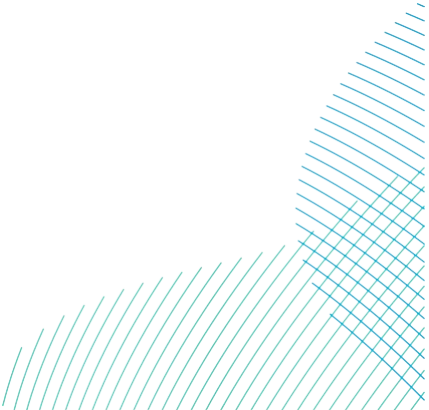


Table 28-66 Summary of Potential Likely Significant Effects on Socio-economics, DBS East and DBS West Together

Potential Impact	Receptor	Sensitivity	Magnitude of Impact	Pre-mitigation Effect	Mitigation Measures Proposed	Residual Effect
Construction						
Expenditure	Humberside	Medium	Low (Beneficial)	Minor (Beneficial)	N/A	Minor(Beneficial)
Expenditure	UK	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)
Employment	Humberside	Medium	Low (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Employment	UK	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)
Change in demographics	Humberside	Medium	Low (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Loss of, disruption to or pressure on local infrastructure	Humberside	Low	Negligible (Adverse)	Negligible (Adverse)	N/A	Negligible (Adverse)
Disturbance (noise, air quality, visual and traffic) to social infrastructure	Humberside	Low	Negligible (Adverse)	Negligible (Adverse)	N/A	Negligible (Adverse)
Operation						
Expenditure	Humberside	Medium	Low (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Expenditure	UK	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)
Employment	Humberside	Medium	Low (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Employment	UK	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)
Change in demographics	Humberside	Medium	Negligible (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Disturbance (noise, air quality, visual and traffic) to social infrastructure	Humberside	Low	Negligible (Adverse)	Negligible (Adverse)	N/A	Negligible (Adverse)
Decommissioning						
Economic Activity	Humberside	Medium	Negligible (Beneficial)	Minor (Beneficial)	N/A	Minor (Beneficial)
Economic Activity	UK	Low	Negligible (Beneficial)	Negligible (Beneficial)	N/A	Negligible (Beneficial)
Population and Social Infrastructure	Humberside	Low	Negligible	Negligible	N/A	Negligible

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**RWE Renewables UK Dogger
Bank South (West) Limited**

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Bank South (East) Limited**

**Windmill Hill Business Park
Whitehill Way
Swindon
Wiltshire, SN5 6PB**

