Partners in UK offshore wind

MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Environmental Statement

Volume 4, Annex 13.1: Socio-economics technical impact report

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Glossary

Term	Meaning
CAPEX	Capital expenditure.
DECEX	Decommissioning expenditure.
DEVEX	Development (and project management) expenditure.
Epicentres of impact	Locations from where impacts 'radiate'.
Gross Value Added	Gross Value Added is the measure of the value of goods and services produced by a business, area, industry, or sector of an economy.
OPEX	Operational expenditure.
Outline Skills and Employment Plan	A plan identifying opportunities for the employment and skills development of local people in relation to the Morgan Generation Assets.
Sub-national	An area that exists below a national level. The term sub-national has been used in this study in place of 'regional' to label areas which are not statistical regions.
Tier 1 Suppliers and Contractors	Tier 1 suppliers and contractors are companies that have a direct contract with the ultimate developer. Tier 1 contractors are hired by a developer and are responsible for most aspects of the project from start to finish. This includes coordinating subcontractors, scheduling inspections, obtaining permits, managing budgets and timelines, and ensuring all safety protocols are adhered to.

Acronyms

Acronym	Description
FTE	Full time equivalent
GVA	Gross Value Added
ONS	Office for National Statistics
ORE	Offshore Renewable Energy
RGU	Robert Gordon University
UK	United Kingdom

Units

Unit	Description
£ bn	billion
GW	Gigawatt
MW	Megawatt
£ m	million
%	Percentage

1 Socio-economics technical impact report

1.1 Introduction

1.1.1.1 This technical report provides supplementary information regarding the methodology and outputs which inform the assessment of economic and social impacts within Volume 2, Chapter 13: Socio-economics of the Environmental Statement.

1.1.1.2 Specifically, this technical impact report considers the potential impact of expenditure associated with the Morgan Generation Assets on employment and Gross Value Added (GVA), and the related potential workforce impacts on housing, accommodation, and population.

1.1.1.3 This report considers the potential economic and social impacts of the Morgan Generation Assets within the following categories:

- PART 1 – Economic impacts: covering the employment and Gross Value Added (GVA) impacts associated with the Morgan Generation Assets
- PART 2 – Social impacts: covering the impacts of the workforce associated with the Morgan Generation Assets on housing, accommodation and population.

1.1.1.4 The approach to separating potential economic and social impacts is consistent with the best available and non-binding industry guidance, Glasson *et al.* (2020) Guidance on assessing the socio-economic impacts of offshore wind farms, and Marine Scotland (2022) guidance Defining 'Local Area' for assessing impact of offshore renewables and other marine developments.

1.1.1.5 Potential tourism impacts are considered fully within Volume 2, Chapter 13: Socio-economics of the Environmental Statement, and are not considered within this report[1].

1.1.1.6 Potential socio-economics impacts on the Isle of Man associated with lifeline ferry services are considered fully within Volume 2, Chapter 13: Socio-economics of the Environmental Statement and are not considered within this report[2].

1.1.1.7 This technical report considers the potential impact of the Morgan Offshore Wind Project Generation Assets, hereafter referred to as the Morgan Generation Assets, during the construction, operations and maintenance and decommissioning phases. The Project is located seaward of Mean High Water Springs (MHWS).

1.1.1.8 With respect to consideration of potential offshore impacts, the approach of this assessment is focused on the 'source' of a potential impact, rather than the ultimate location where the impact occurs. This is consistent with the broader approach to separating onshore and offshore effects. If physical infrastructure and civil works are located offshore, any resulting impacts are categorised as offshore. As outlined in Volume 1, Chapter 3: Project description, Morgan Generation Assets are entirely within the offshore environment so all impacts are assessed as such.

[1] The effect-receptor pathways between the Morgan Generation Assets and tourism conditions include visual amenity, temporary overnight accommodation, and recreation – there is limited effect-receptor linkages between project expenditure and this receptor. Where linkages do exist – specifically by way of temporary overnight accommodation impacts – this relationship is explored fully within Volume 2, Chapter 13: Socio-economics of the Environmental Statement.

[2] The effect-receptor pathways between the Morgan Generation Assets and socio-economic conditions on the Isle of Man include lifeline ferry services and visual amenity – there is limited effect-receptor pathway between project expenditure and this receptor.

PART 1 – Economic Impacts

1.2 Economic study areas

1.2.1 National economic study areas

1.2.1.1 National economic study areas are defined to reflect the wider reach of employment and GVA impacts that may materialise through the supply chain and demand for labour. As such, the following national economic study area has been identified:

- UK: understanding the UK content of potential economic impacts associated with offshore wind farm developments is an important aspect of considering a project's potential benefits. It is recognised, therefore, that assessing the potential impacts of the Morgan Generation Assets at the UK level will assist the Planning Inspectorate in its examination of the project application.

1.2.1.2 Given the extensive range of goods and services required for the delivery of the Morgan Generation Assets, it is likely that project expenditure will deliver impacts of varying magnitude in different locations.

1.2.2 Sub-national economic study areas

1.2.2.1 To ensure the assessment of impacts is proportionate, the sub-national study area definition concentrates on locations within England and Wales in proximity to the Irish Sea which could play a supporting role during the construction and decommissioning phases, or be the primary operations and maintenance port. Therefore, locations in North Wales and North West England are considered as part of this assessment[3,4].

1.2.2.2 The various components which contribute to the delivery of the Morgan Generation Assets will have different 'epicentres of impact' – locations from where the potential impacts 'radiate'. Industry best practice guidance 'Defining 'Local Area' for assessing impact of offshore renewables and other marine developments' (Marine Scotland 2022) sets out that economic impacts can be geographically linked to a range of epicentres, including construction and operations and maintenance ports involved in the delivery of offshore infrastructure.

1.2.2.3 In this assessment the sub-national economic study areas are linked to the selection of potential construction, operations and maintenance, and decommissioning ports within North Wales and North West England that have the capability to support the associated supply of inputs and services for the Morgan Generation Assets. These ports, and their socio-economic catchment areas, are potential epicentres of impact on economic receptors.

[3] The selection process associated with the identification of ports, inputs, and services will not conclude until the post-consent phase for the Morgan Generation Assets, which is typical for offshore wind farms. It is likely that fabrication and marshalling ports elsewhere in the UK and internationally will be utilised for the delivery of components.

[4] Douglas Harbour, on the Isle of Man, is in proximity to the Morgan Array Area. There is evidence this location has previously supported offshore wind operation and maintenance activity in the Irish Sea. Douglas may, therefore, play a limited supporting role during the operations and maintenance phase with regards to crew transfer activity. Douglas Harbour is not currently considered to have the capacity or infrastructure to be a suitable location for the primary operation and maintenance port and is therefore not assessed. However, an Outline Skills and Employment Plan (OSEP) is submitted as part of the Morgan Generation Assets Application, which provides insight into the Applicant's proposed approach to working with local stakeholders and engaging with local residents to maximise employment opportunities and access to skills training and employment. The Isle of Man has been identified as a location in which labour market engagement should be considered. Regarding the Isle of Man, the OSEP raises wider awareness of skills employment opportunities relating to offshore wind across stakeholders and the Island's population. The Applicant's engagement with Isle of Man communities and businesses can help to deliver greater understanding of opportunities that will arise.

1.2.2.4 Due to the infrastructure requirements of large components (e.g. laydown and storage areas), it is likely that multiple fabrication and marshalling ports will be utilised during project delivery. This is highly likely to include ports outside North Wales and North West England given the port capabilities set out within Appendix A. The assessment also considers a situation where no Tier 1 port contracts are secured within North Wales or North West England.

1.2.2.5 The following approach has been followed to define potential sub-national study areas:

- Step 1: identification of port facilities that are potential options for construction, operations and maintenance, or decommissioning bases
- Step 2: assessment of economic study areas associated with potential port facilities, determined on the basis of labour catchment areas using a 60-minute drive time catchment as a proxy.

1.2.2.6 The approach to considering these steps is set out in more detail in Appendix A.

1.2.2.7 The following sub-national economic study areas have been defined for the purposes of assessing potential impacts:

- North Wales sub-national economic study area[5] (hereafter referred to as 'North Wales')
- North West England sub-national economic study area[6] (hereafter referred to as 'North West England').

1.2.2.8 The economic study areas for the socio-economics assessment are shown below in Figure 1.1

[5] Does not meet the statistical definition of a UK region.

[6] Does meet the statistical definition of a UK region.

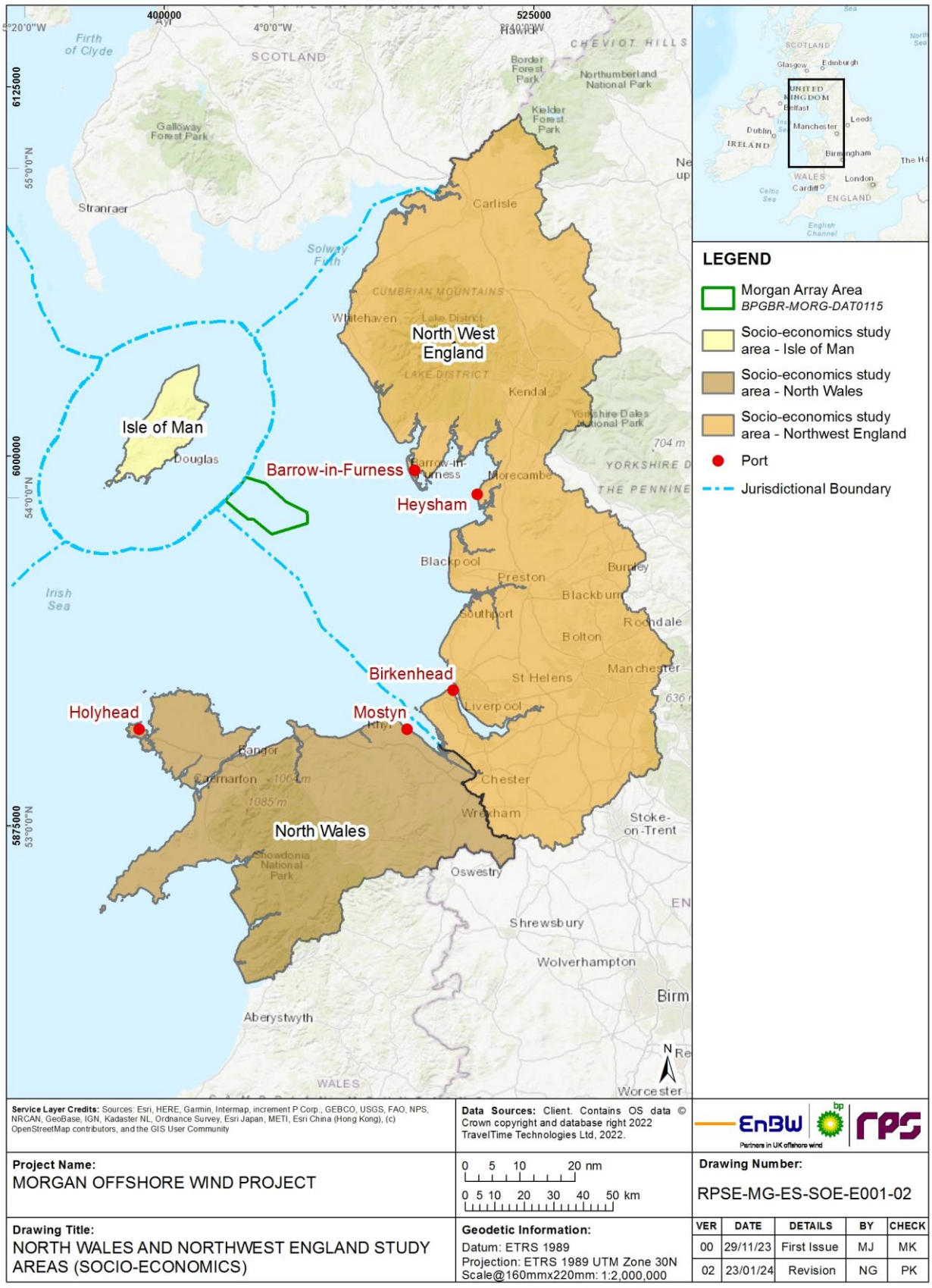

Figure 1.1: North Wales and North West England study areas.

Note: Isle of Man is displayed in Figure 1.1 to show the extent of the study areas assessed within Volume 2, Chapter 13: Socio-economics of the Environmental Statement. There is limited effect-receptor pathway between project expenditure and socio-economic conditions on the Isle of Man, therefore the Isle of Man is not considered within this report.

1.3 Methodology

1.3.1.1 The methodology adopted for estimating potential economic impacts as part of this assessment is set out in Figure 1.2.

1.3.1.2 There is no formal guidance or standard approach for assessing the potential economic impacts of an offshore wind farm. However, this methodology reflects industry best practice for delivering a robust estimate of economic impacts, as summarised by the best available and non-binding industry guidance document Glasson *et al.* (2020).

1.3.1.3 This methodology also utilises the following industry guidance documentation to underpin headline assumptions:

- Crown Estate and Offshore Renewable Energy (ORE) Catapult (2019) Guide to an offshore wind farm
- BVG Associates (2023) Guide to an offshore wind farm: online interactive tool.

1.3.1.4 Project expenditure estimates consider development expenditure (DEVEX), construction expenditure (CAPEX), operations expenditure (OPEX) and decommissioning expenditure (DECEX).

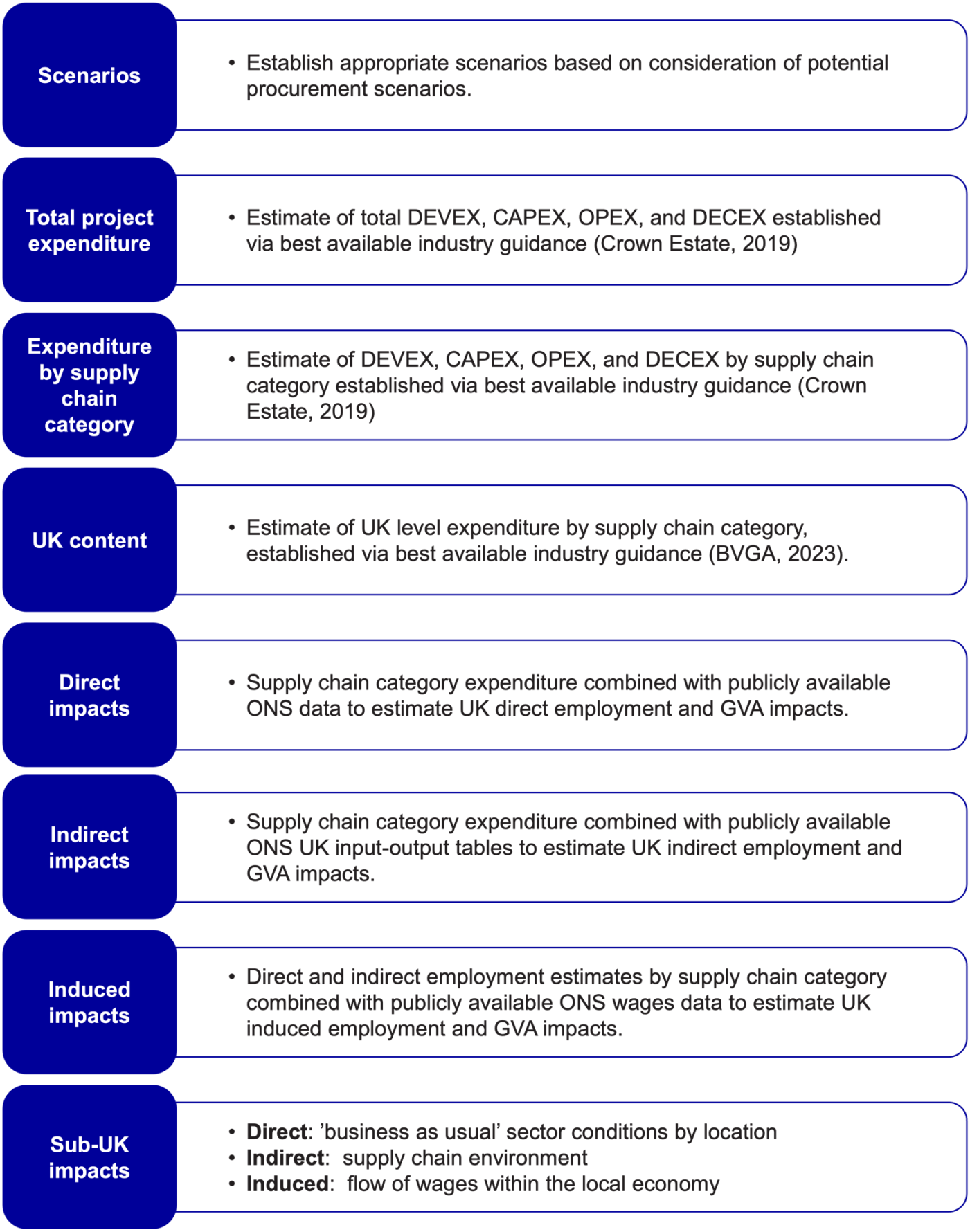

Figure 1.2: Technical impact assessment methodology.

1.3.1 Assessment scenarios

1.3.1.1 A scenario represents a potential future outcome based on a set of assumptions. A range of scenarios are developed by changing the assumptions. Socio-economics looks at different scenarios to identify potential impacts and outcomes associated with various assumptions that may come about relating to economic and social factors.

Most likely – 'current capability' scenario

1.3.1.2 This assessment considers a 'current capability' scenario to represent the 'most likely' potential economic and social impacts.

1.3.1.3 The current capability scenario is based on a set of assumptions derived from evidence of impacts associated with existing conditions and capabilities in the offshore wind sector, and typical expenditure levels.

1.3.1.4 The current capability scenario assumes that where the capability already exists within the sector to deliver a certain supply chain category (as set out in Appendix B), the associated impacts are captured within national and sub-national content figures, where relevant.

1.3.1.5 The current capability scenario has been quantitatively assessed to represent the 'most likely' economic and social impacts associated with the Morgan Generation Assets under current sector conditions[7].

1.3.1.6 This approach is consistent with Glasson et al. (2020), which recommends specifying the 'more likely' scenario in order to avoid wide ranges of economic impact estimates which can 'make life very difficult for decision makers and host authorities'.

Minimum – 'low' scenario

1.3.1.7 Within Volume 2, Chapter 13: Socio-economics of the Environmental Statement the assessment considers a 'low' scenario to represent the 'worst case' potential economic impacts. The low scenario considers a situation where no contracts are secured with a Tier 1 supplier (a direct supplier of a product or service) within North Wales and North West England for the delivery of development, fabrication, or marshalling activities.

1.3.1.8 In North Wales and North West England, the low scenario has been qualitatively assessed to represent the 'minimum' – or 'worst case' – economic impact associated with the Morgan Generation Assets.

1.3.1.9 A low scenario in the UK would cover a situation where all Tier 1 contracts are secured by companies based outside the UK – this would mean performance well below typical UK content. Given increasing UK capability in the offshore wind sector, a low scenario is not considered likely at a national level, and is therefore not assessed. The current capability scenario already assumes some non-UK expenditure across all supply chain categories.

1.3.1.10 As it would result in no change to the receiving environment, the low scenario is not assessed for social impacts.

Maximum scenario

1.3.1.11 A 'maximum' scenario would cover a situation where greater sector investment would lead to an increase in national and regional content.

[7] UK and sub-national content could vary based on procurement decisions, and impact estimates would vary accordingly.

1.3.1.12 There is no information available at this stage to provide a basis for the assumptions that would be required to define a 'maximum' scenario.

1.3.1.13 Assessing a maximum scenario would provide a set of impact estimates above the current capability scenario. There is a risk that assessing a 'maximum' scenario could overstate potentially beneficial economic impacts.

1.3.1.14 In addition, assessing a maximum scenario would introduce a wide range of potential economic impacts. According to Glasson et al. (2020) this would be unhelpful and would present difficulties for decision makers.

1.3.1.15 In the case of socio-economics, the maximum scenario can therefore be considered an unhelpful scenario upon which to base an EIA. For this reason, the maximum scenario has not been assessed within this technical report.

1.3.2 Total project expenditure

1.3.2.1 Project specific expenditure information is not currently available for the Morgan Generation Assets due to the early stage of the project development cycle.

1.3.2.2 The Crown Estate and ORE Catapult (2019) Guide to an offshore wind farm establishes project expenditure estimates based on typical costs associated with offshore wind farm components. This guidance has been utilised to provide expenditure estimates of recently consented offshore wind farm projects.

1.3.2.3 The Crown Estate and ORE Catapult component-based expenditure figures are provided on the basis of a 1 GW capacity project, using 10 MW wind turbine generators. To ensure the assessment is project-specific, the Crown Estate and ORE Catapult expenditure estimates have been adapted according to the potential project and wind turbine capacity of the Morgan Generation Assets. Assumptions regarding project and wind turbine capacity refer to the maximum design scenario in Volume 2, Chapter 13: Socio-economics of the Environmental Statement.

1.3.2.4 To focus the assessment, the option delivering the highest expenditure estimates has been taken forward to represent the 'maximum' economic impacts associated with the Morgan Generation Assets.

1.3.2.5 Expenditure by component estimates have been inflated to 2023 prices using Office for National Statistics (ONS, 2023g) data on inflation rates of input and output producer price inflation and are aggregated by project phase to establish the project expenditure estimates set out in Table 1.1.

1.3.3 Expenditure by supply chain category

1.3.3.1 The Crown Estate and ORE Catapult (2019) guidance sets out very detailed indicative costs by component of a typical offshore wind farm. The supply chain framework upon which these indicative costs are based is set out in Appendix B.

1.3.3.2 The next step is to establish a detailed estimate of project expenditure by component based on the key stages of:

- Development and project management
- Construction
- Operations and maintenance
- Decommissioning.

1.3.3.3 Each stage involves inputs from a wide variety of industries throughout the supply chain. Different industries are subject to varying assumptions in relation to how expenditure translates into the number of jobs supported and the level of GVA output (i.e. the value of goods and services) that flows back into the economy. The more detailed the breakdown of expenditure by component, the more reliable the estimate of impacts is likely to be.

1.3.4 UK content

1.3.4.1 The next step is to establish an estimate of UK content. 'UK content' is a measure of the proportion of materials, labour, and services sourced domestically in the development, construction, operations and maintenance, and decommissioning of offshore wind farms. Quantifying the UK content of offshore wind investment is an important measure in assessing the impact of the offshore wind sector on the national economy.

1.3.4.2 Measurement of the UK content in offshore wind investment relies on detailed supply chain analysis. This involves tracking the origin of components, assessing the location of fabrication facilities, and analysing the utilisation of local labour and services. Accurate measurement requires a comprehensive data collection system, collaboration between industry stakeholders and transparent reporting standards. Developers agreed via the Offshore Wind Industry Council that from 2015 all UK offshore wind farms would report their UK content data for aggregation by RenewableUK (BVG Associates, 2023).

1.3.4.3 The BVG Associates (2023) guide to an offshore wind farm online interactive tool provides an estimate of UK content by project expenditure category, which is set out in Table 1.2.

1.3.4.4 The BVG Associates UK content estimates for each expenditure category have been applied to supply chain categories to estimate UK expenditure.

1.3.5 UK impacts

1.3.5.1 Best practice principles involve assessing the direct, indirect, and induced economic impacts of an offshore wind farm in terms of employment and GVA.

1.3.5.2 **Direct** economic impacts are directly attributable to a development. For example, the direct employment impacts are the jobs supported by activities associated with delivering each phase of a project.

1.3.5.3 **Indirect** economic impacts are secondary impacts that occur as a result of the interactions between a development and other parts of the economy. For example, the project will require fabrication of components and subcomponents, and supply of equipment and transportation, all of which increases sector demand leading to economic impacts throughout the supply chain.

1.3.5.4 **Induced** economic impacts result from changes in household spending patterns as a consequence of direct and indirect economic impacts. For example, the employment opportunities supported by the project (including those throughout the supply chain) result in workers having income to spend, leading to further economic impacts in other parts of the economy.

Employment

Direct

1.3.5.5 UK expenditure estimates have been combined with turnover per full time equivalent (FTE) data to provide an estimate of direct employment[8] for each supply chain category at the UK level.

Indirect

1.3.5.6 UK supply chain expenditure data from the ONS United Kingdom Input-Output Analytical Tables (ONS, 2023a) has been combined with turnover per FTE data to provide an estimate of indirect employment for each supply chain category at the UK level.

Induced

1.3.5.7 Induced employment impacts supported by both direct and indirect wage impacts have been combined with detailed household expenditure to estimate overall induced employment impacts.

GVA

Direct

1.3.5.8 Direct employment estimates have been combined with GVA per FTE data to provide an estimate of direct GVA for each supply chain category at the UK level.

Indirect

1.3.5.9 UK level indirect GVA impacts have been estimated on the basis of GVA coefficients within the ONS United Kingdom Input-Output Analytical Tables (ONS, 2023a).

Induced

1.3.5.10 Induced employment estimates have been combined with GVA per worker data to provide an estimate of induced GVA impacts.

Sub-national impacts

Direct

1.3.5.11 The current capability scenario (see section 1.3.1) has been estimated based on the potential level of expenditure in each sub-national socio economic study area under ‘business as usual’ circumstances.

1.3.5.12 The BVG Associates (2023) Guide to an offshore wind farm online interactive tool provides an indicative list of companies and suppliers with proven capabilities of operating within the UK offshore wind supply chain. This list correlates with the supply chain framework set out in Appendix B.

[8] All impact estimates are workplace-based.

1.3.5.13 This list has been analysed to identify the supply chain capabilities of each sub-national economic study area – North West England and North Wales.

Indirect

1.3.5.14 It is assumed that competitive UK contracting would distribute indirect impacts according to existing sectoral profiling. UK indirect employment and GVA impacts have been distributed within sub-national study areas according to their existing shares of UK activity.

Induced

1.3.5.15 Induced impacts supported by both direct and indirect wage impacts have been combined with detailed household expenditure to estimate overall induced impacts in each sub-national economic study area.

1.4 Results

1.4.1 Total project expenditure

1.4.1.1 Expenditure by supply chain category estimates have been inflated to 2023 prices and aggregated to development expenditure (DEVEX), construction expenditure (CAPEX), operations expenditure (OPEX), and decommissioning expenditure (DECEX) to establish the project expenditure estimates set out in Table 1.1.

Table 1.1: Total project expenditure estimates[9], 2023 prices.

Source: HJA analysis following Crown Estate and ORE Catapult (2019) guidance.

Phase	Expenditure category	Expenditure estimate
Development and project management	DEVEX	£0.1 bn
Construction	CAPEX	£3.9 bn
Operations and maintenance	OPEX	£3.5 bn
Decommissioning	DECEX	£0.3 bn
Total	**TOTEX**	**£7.7 bn**

1.4.2 National and sub-national content

1.4.2.1 As per 1.3.4.3, the BVG Associates (2023) guide to an offshore wind farm online interactive tool provides an estimate of UK content by project expenditure category. These estimates are presented in Table 1.2, along with the content estimates for each economic study area. Given that UK and local/regional/national content can only be accurately measured post-contracting, these figures should be treated as estimates only, and are based on assumptions which draw on previously delivered offshore windfarms in the UK.

[9] Total expenditure is not location specific.

Table 1.2: Content estimates, 2023 prices.

Source: HJA analysis, partly adapted from BVGA (2023).

Note: Figures may not sum due to rounding.

Expenditure category	North Wales	North West England	UK
DEVEX	8%	3%	72%
CAPEX	1%	3%	25%
OPEX	76%	76%	77%
DECEX	0%	0%	29%
TOTEX	**35%**	**36%**	**49%**

1.4.3 Potential impacts

1.4.3.1 As per 1.1.1.8, if physical and supporting infrastructure are located offshore, any resulting impacts are categorised as offshore.

Construction

1.4.3.2 Construction phase economic impacts reflect both DEVEX and CAPEX project expenditure categories and are summarised in Table 1.3. The inclusion of expenditure associated with project development and management captures the impacts on employment and GVA during the earliest stages of the Morgan Generation Assets.

Table 1.3: Construction phase economic impacts.

	North Wales	North West England	UK
Employment (FTE years)			
Direct	85	350	4,200
Indirect	30	240	2,200
Induced	25	95	1,200
Total	**140**	**680**	**7,600**
GVA			
Direct	£10 m	£35 m	£290 m
Indirect	£2 m	£20 m	£180 m
Induced	£1 m	£5 m	£70 m
Total	**£15 m**	**£60 m**	**£540 m**

Operations and maintenance

1.4.3.3 Operations and maintenance phase economic impacts reflect the OPEX project expenditure category and are summarised in Table 1.4.

Table 1.4: Operations and maintenance phase economic impacts (per annum).

	North Wales	North West England	UK
Employment (FTE years)			
Direct	160	160	160
Indirect	2	25	220
Induced	30	35	70
Total	**190**	**210**	**450**
GVA			
Direct	£20 m	£20 m	£20 m
Indirect	£0.2 m	£2.1 m	£20 m
Induced	£1.7 m	£1.9 m	£3.9 m
Total	**£20 m**	**£25 m**	**£45 m**

Decommissioning

1.4.3.4 Decommissioning phase economic impacts reflect the DECEX project expenditure category and are summarised in Table 1.5.

Table 1.5: Decommissioning phase economic impacts.

	North Wales	North West England	UK
Employment (FTE years)			
Direct	-	-	460
Indirect	6	65	570
Induced	1	15	200
Total	**7**	**80**	**1,200**
GVA			
Direct	-	-	£30 m
Indirect	£0.4 m	£4 m	£40 m
Induced	£0.1 m	£1 m	£10 m
Total	**£0.5 m**	**£5 m**	**£85 m**

PART 2 – Social Impacts

1.5 Social impact study areas

1.5.1.1 Social impacts can be understood as how certain activities and actions affect surrounding people and communities.

1.5.1.2 The most likely cause of social impacts are related to the implications of economic impacts, (i.e. the movement of labour). The theoretical underpinnings of the economic study areas – with a focus on epicentres of impact by way of potential ports – are applicable in defining suitable social study areas.

1.5.1.3 Social impacts are not assessed at a national level, therefore Wales and UK study areas are not considered within the social impact assessment.

1.5.1 Sub-national social study areas

1.5.1.1 The identified potential port capabilities in Appendix A have been utilised in determining appropriate sub-national social study areas. The extent of the economic study areas has been determined on the basis of labour catchment areas using a 60-minute drive time catchment as a proxy.

1.5.1.2 Therefore, the same 60-minute drive catchments for the same long list of port facilities results in the same best fit sub-national social study areas, as follows:

- North Wales
- North West England.

1.6 Methodology

1.6.1 Construction phase

1.6.1.1 Potential primary construction port facilities could support the following activities:

- Wind turbine staging and installation
- Foundation staging and installation
- Offshore substation platform staging and installation
- Inter-array and interconnector cable staging and installation.

1.6.1.2 During the construction phase the majority of roles associated with these activities are anticipated to be based largely offshore, with workers accommodated within vessels. However, these workers have the potential to give rise to demand for temporary accommodation at the start and end of typical shift periods at sea within the catchments of the relevant transfer ports before or after spending time at their home location. Some roles e.g. assembly or management, will be based onshore, and have the potential to give rise to further demand for temporary accommodation, and possibly short-term rented accommodation.

1.6.1.3 Construction phase social impacts are therefore assessed in terms of the maximum number of temporary overnight stays arising within the social impact study areas.

1.6.1.4 Potential workforce impacts associated with the Morgan Generation Assets have been estimated based on assumptions relating to the following variables:

- Maximum activities within a single socio-economics social study area
- Maximum vessel numbers

- Vessel crew size
- Share of non-local workers
- Shift arrangements
- Shifts per annum
- Nights of accommodation required per shift.

1.6.1.5 The assumptions underlying each variable are set out below.

Maximum activities within a single sub-national social study area

1.6.1.6 In line with the assessment of economic impacts, the assessment of social impacts adopts a current capability impact scenario (see paragraph **Error! Reference source not found.–Error! Reference source not found.**). This assumes that no single port can deliver all activities associated with the construction phase of the Morgan Generation Assets. Port capacity and capabilities determine the facilities at which the installation of individual components can take place. The capabilities of the ports within the social study areas are set out within Appendix A.

1.6.1.7 The current capability scenario assumes the maximum activity that could occur within a single sub-national social study area is the marshalling of the inter-array and interconnector cables. Further workforce impacts will be created in other areas of the UK depending on selection of support ports for other construction activities.

1.6.1.8 Under the current capability impact scenario it is assumed that procurement and contracting decisions are taken in line with the current competitiveness of the UK offshore wind sector. Employment related to fabrication is assumed to draw on the standing workforces of existing enterprises. This will not have any impact on the demand for housing, accommodation, and local services above current baseline activity.

1.6.1.9 No permanent (i.e. long term), relocation of workers is anticipated during the offshore construction phase based on the mobile nature of large parts of the offshore workforce.

Maximum vessel numbers, vessel crew size, shift arrangements, and accommodation requirements

1.6.1.10 The maximum vessel numbers associated with delivery of the inter array cables refers to the maximum design scenario set out in Volume 2, Chapter 13: Socio-economics of the Environmental Statement.

1.6.1.11 Typical vessel crew sizes have been estimated on the basis of industry guidance and advice from project engineers.

1.6.1.12 Based on standard industry practice, it is assumed that vessel crews will work according to four week on/off shift patterns. On this basis, it is assumed each construction vessel will support 13 shifts per annum.

1.6.1.13 It is assumed that roles associated with these activities will be based offshore, with workers accommodated within vessels.

1.6.1.14 It is assumed each crew member will require a maximum of two nights of overnight accommodation per shift in proximity to the port (i.e. in the social impact study area). This consists of one night before and one night after a shift period. It is assumed crew members will stay at their permanent residence elsewhere for the remainder of their ‘off shift’ period.

1.6.1.15 It is assumed that a minimum of one third of workers would not require local overnight accommodation, on the basis these workers are permanently based close enough to the relevant ports as to remove the need for overnight accommodation.

1.6.2 Operations and maintenance phase

1.6.2.1 Potential operations and maintenance port facilities are expected to support the following activities:

- Wind turbine operations and maintenance
- Foundation operations and maintenance
- Offshore substation platforms operations and maintenance
- Inter-array and interconnector operations and maintenance.

1.6.2.2 It is assumed that a small operational base will be located at the selected operations and maintenance port, whilst operational headquarters will be located elsewhere in the UK, as this activity is not geographically dependant on port selection.

1.6.2.3 The Morgan Generation Assets is likely to directly create new roles within operation and maintenance activities. It is assumed that indirect and induced employment impacts will draw on the existing resident workforce in each area. Given these impacts are expected to take place in the wider economy, the contribution of these impacts to labour migration is expected to reflect typical migration patterns associated with economic growth. Indirect and induced employment impacts are therefore expected to have a negligible impact on population, housing and accommodation.

1.6.2.4 Direct roles could be filled through a number of routes including:

- Local workers transitioning from the offshore oil and gas sector
- Local resident entrants to the sector resulting from training activities
- Non-local commuting to the selected locality
- Non-local worker relocation to the selected locality.

1.6.2.5 Operation and maintenance phase social impacts are assessed in terms of the number of workers relocating to the social study areas and its associated impact on the population size.

Local workers transitioning from the offshore oil and gas sector

1.6.2.6 To estimate the number of workers transitioning from the oil and gas sector, the following steps have been undertaken:

1. Estimate the number of oil and gas industry jobs currently based in each social study area from OEUK (2022) research
2. Estimate the number of transitioning oil and gas workers in each social study area based on forecast job losses in related sectors from Robert Gordon University (RGU) (2023) research.

1.6.2.7 This adjustment has been applied to the estimated operational phase employment impacts.

Local resident entrants to the sector resulting from training activities

1.6.2.8 There is no established benchmark for assuming the contribution of local residents to the operations and maintenance workforce of an offshore energy scheme. This figure may vary between projects depending on several factors, including the project characteristics, location, local labour market conditions, developer approach, and government policy.

1.6.2.9 With a lead time of approximately four years before commencement of operations there is time to train a substantial part of the remaining workforce from the local labour market. The Applicant has committed to an Skills and Employment Plan which will set out an action plan to increase the level of new local entrants to the sector. An outline of this plan is included with the Application (Document Reference J.8.)

1.6.2.10 In the absence of an industry standard benchmark, in this assessment it is assumed that 50% of the remaining workforce will be sourced locally through new entrants to the sector resulting from training activities.

Non-local worker relocation – household population increase

1.6.2.11 The proportion of the operations and maintenance workforce commuting from outside the project locality for their shifts can vary significantly depending on various factors, including the project characteristics, location, accessibility, housing market conditions, and developer approach.

1.6.2.12 In the absence of an industry standard benchmark, in this assessment it is assumed a maximum of 50% of the remaining workforce will be recruited from outside the relevant social impact study area, and will choose to permanently relocate to the locality. This assumption is conservative so that the number of relocations is not under-estimated. It is assumed that any migrating workers would also relocate their families. The assessment of household population impacts assumes an average household size of 2.4 persons (ONS, 2022).

Non-local commuting to the selected locality

1.6.2.13 The remaining 50% of non-local workers are assumed to travel from outside the relevant social study area for their shift. Workers in this category will either require overnight accommodation for one night before and after their shift in proximity to the port (i.e. within the social impact study area), or their commute will be sufficiently short as to not require overnight accommodation. Overnight accommodation demand in this category is considered negligible relative to the scale of existing overnight stays in any of the social study areas and does not warrant further consideration.

1.7 Results

1.7.1 Potential impacts identified

Construction

1.7.1.1 Based on the methodology set out in section 1.6, the potential social impacts during the construction phase of the Morgan Generation Assets under a current capability impact scenario are set out in Table 1.6.

Table 1.6: Construction phase social impacts.

	North Wales	North West England
Maximum temporary overnight stays (nights per annum)	15,900	15,900

Operations and maintenance

1.7.1.2 As per the detailed methodology set out in section 1.6.2, (specially 1.6.2.5), operation and maintenance phase social impacts are assessed in terms of the number of workers relocating to the social study areas and its associated impact on the population size. The potential social impacts during the operations and maintenance phase of the Morgan Generation Assets are set out in Table 1.7.

Table 1.7: Operations and maintenance phase social impacts.

	North Wales	North West England
Non-local worker relocation to the selected locality (number of people)	25	6
Estimated household population increase (number of people)	65	15

1.7.1.3 The estimated household population increase is higher in North Wales (65) than in North West England (15) because there are higher numbers of people employed in the oil and gas sector in North West England than in North Wales[10] with more workers anticipated to transition to the offshore wind sector in North West England. The resulting number of workers and their families relocating to North Wales to fill job roles is, therefore, higher.

1.8 Summary

1.8.1.1 This technical impact report summarises the potential socio-economic impacts of the Morgan Generation Assets within the following categories:

- Economic impacts: covering employment and GVA impacts
- Social impacts: covering the impacts of the workforce on housing, accommodation, and population.

1.8.1.2 The impacts assessed within this technical report are the basis for an assessment of socio-economic effects of the Morgan Generation Assets, which can be found in Volume 2, Chapter 13: Socio-economics of the Environmental Statement.

1.8.1.3 Potential tourism impacts are considered within Volume 2, Chapter 13: Socio-economics of the Environmental Statement.

1.8.1.4 Potential socio-economics impacts on the Isle of Man linked to lifeline ferry services are considered within Volume 2, Chapter 13: Socio-economics of the Environmental Statement.

[10] As set out in OEUK (2022) Workforce Insight 2022: The people powering the energy transition offshore.

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Appendix A: Economic impact study area definition

A.1.1.1.1 This appendix sets out the approach to defining economic study areas.

A.1. Step 1: Identify potential port capabilities

A.1.1.1.1 Assumptions adopted as part of this analysis are to inform the assessment alone and have been determined based on a consideration of ports within the defined study area that have the potential to service offshore developments in the Irish Sea. The final selection of ports, potential manufacturing and fabrication facilities, and delivery models required for the Morgan Generation Assets has not been determined at the point of application. The Applicant will explore ports, supporting infrastructure and labour markets to understand the potential capabilities, capacities and availability that exists – this will be carried out post-consent. Subject to these findings, it is likely that more than one port will be used to support elements of the construction, operations and maintenance, and decommissioning phases of the Morgan Generation Assets as part of a wider supply chain.

A.1.1.1.2 Final selection of ports, potential manufacturing and fabrication facilities, and delivery models will be subject to ongoing engineering and procurement considerations – the use of assumptions for the purposes of this assessment does not indicate any commercial preference or imply any decision.

A.1.1.1.3 The ports involved in the project lifetime of an offshore wind farm can vary depending on the size and location of the project. Typically, an offshore wind farm project will require multiple ports throughout its lifetime, broadly covering the following:

- Fabrication port (construction phase) (more than one port of this type is likely to be required): as technology develops and the size of offshore wind farm components continues to increase, the need to manufacture components in close proximity to the waterside also grows due to the challenges of transporting large components by road or rail. Components such as blades, towers, foundations, cables, and offshore substations will therefore typically require fabrication at a port, within reasonable proximity of the waterside. Components are typically built at the fabrication port(s) and can subsequently be transferred directly to the offshore site, or to an intermediate marshalling port(s). Due to the infrastructure requirements of large components (e.g. laydown and storage areas), it is likely that multiple fabrication ports will be utilised during project delivery. The fabrication port(s) manufacturing and delivering any component can be based anywhere in the world
- Marshalling port (construction phase) (more than one port of this type is likely to be required): this facility serves as a hub for the coordination of components, equipment, and workforce during the construction phase, including storage and distribution. The marshalling port(s) will also serve as the staging area for installation and support vessels. Due to the infrastructure requirements of large components, it is likely that multiple marshalling ports will be utilised during project delivery. Where marshalling ports are required, these will typically be located within reasonable proximity of the offshore site
- Operations and maintenance port: when an offshore wind farm has been commissioned, a port is selected as the primary hub for ongoing maintenance of components, along with other operational requirements. The operations and maintenance port will typically be located within close proximity of the offshore site.

A.1.1.1.4 There are a number of considerations when identifying ports that have the potential to support fabrication and/or marshalling activities during the construction phase. It is possible that some ports will be better suited to the fabrication and marshalling requirements of certain components, whilst being unsuitable for other components. Considerations regarding port suitability include:

- Water depth: as the size of offshore wind farm components increases, so does the size of the associated transportation and installation vessels. A port should have adequate water depth to accommodate vessels and equipment
- Infrastructure: a port should have the necessary infrastructure and facilities, including laydown areas, cranes capable of lifting and moving equipment and components, storage areas (indoor and outdoor), workshops, and offices
- Transport links: a port should have suitable road and rail connectivity to allow for the efficient transfer of smaller components/subcomponents, equipment, and workforce
- Labour market: consideration can also be given to the availability of skilled labour within the labour market catchment of the port.

A.1.1.1.5 Given the many variables associated with port(s) selection during the construction phase, typical delivery models incorporate multiple ports which will each deliver the fabrication and/or marshalling needs of specific components, depending on requirements (e.g. foundations, offshore substations, or inter array etc).

A.1.1.1.6 A long list of ports located in North Wales and North West England, and their potential to support each of the various activities associated with delivery of the Morgan Generation Assets is set out in Table A.1. Assumptions regarding port capabilities are based on non-statutory consultation responses from industry experts within the Offshore Energy Alliance region – the offshore energy industry cluster for the North Wales and North West England Region.

Table A.1: Long list of potential construction, operations and maintenance, and decommissioning port capabilities in North Wales and North West England.

	Holyhead	Mostyn	Birkenhead	Heysham	Barrow-in-Furness
Construction					
Wind turbine					
Fabrication	X	X	X	X	X
Marshalling	X	X	X	X	X
Foundations					
Fabrication	X	X	X	X	X
Marshalling	X	X	X	X	X
Offshore substations					
Fabrication	X	X	X	X	X
Marshalling	X	X	X	X	X
Array and interconnector cables					
Fabrication	X	X	X	X	X
Marshalling	✓	✓	✓	✓	✓
Operations and maintenance					
Operations base	✓	✓	✓	✓	✓
Decommissioning					
Wind turbine	X	X	X	X	X
Foundations	X	X	X	X	X
Offshore substations	X	X	X	X	X
Array and interconnector cables	✓	✓	✓	✓	✓

A.1.1.1.7 Boxes with a cross indicate that the port is not deemed a suitable base for the associated activity and boxes with a tick indicate that the port is deemed a suitable base for the associated activity.

A.1.1.1.8 Identified potential port facilities deemed to be suitable bases for components of the construction phase are also assumed to be suitable for the decommissioning phase, given the similarities between activities associated with both phases.

A.2. Step 2: Assess economic study area(s) associated with potential port facilities

A.2.1.1.1 Labour catchment areas[11] associated with each long listed port facility have been defined using a 60 minute drive time catchment as a proxy[12].

A.2.1.1.2 As per Glasson *et al.* (2020) and Marine Scotland (2022), adopting a methodology which defines economic study area(s) associated with offshore wind farm projects on the basis of local authority areas is necessary given that government data sources are structured to reflect conditions at local authority level. Below this level of governance, data becomes increasingly scarce and can be less reliable when dealing with survey based data, for example. It is also necessary to take account of wider policy and administrative designations in determining appropriate areas for consideration.

A.2.1.1.3 Therefore, 60 minute drive time catchments for each facility have been converted to the following best fit sub-national economic study areas:

- North Wales: together, the Holyhead and Mostyn ports' 60 minute drive time catchments cover (at least partially) the six local authorities which de facto constitute 'North Wales'. As per the Welsh Government's National Development Framework (Welsh Government, 2021), these local authorities constitute the 'North' strategic planning region. North Wales is therefore an appropriate definition for a sub-national economic study area. Since this assessment defines Wales as a nation, it is appropriate to define North Wales as a 'region' of Wales (although it should be noted that 'North Wales' does not meet the statistical definition of a UK region)
- North West England: together, the Barrow-in-Furness, Heysham, and Birkenhead ports' 60 minute drive time catchments cover (at least partially) 37 of 39 local authorities in the North West region – the two exclusions being Allerdale and the City of Carlisle in north Cumbria. Levelling Up the United Kingdom (Department for Levelling Up, Housing and Communities, 2022) – the UK government's social and economic programme for government – utilises regional definitions for the purposes of identifying the next steps the Government will take to deliver its programme. North West England is therefore an appropriate definition for a sub-national economic study area (note: North West England does meet the statistical definition of a UK region).

[11] Labour catchment areas are commonly defined based on the locations from which people are typically drawn to an employment location such as a business, an employment centre (such as a port), or an entire town or city.

[12] As per non-statutory guidance in Glasson, J. et al. (2020).

Appendix B: Expenditure by component – supply chain framework

Table B. 1: Offshore wind farm supply chain categories (Crown Estate and ORE Catapult, 2019).

Level 1	Level 2	Level 3
(P) Development and project management	(P.1) Development and consenting services	(P1.1) Environmental impact assessments
	(P.2) Environmental surveys	Benthic environmental surveys
		(P.2.2) Fish and shellfish surveys
		(P.2.3) Ornithological environmental surveys
		(P.2.4) Marine mammal environmental surveys
		(P.2.5) Onshore environmental surveys
		(P.2.6) Human impact studies
	(P.3) Resource and metocean assessment	(P.3.1) Structure
		(P.3.2) Sensors
		(P.3.3) Maintenance
	(P.4) Geological and hydrographical surveys	(P.4.1) Geophysical surveys
		(P.4.2) Geotechnical surveys
		(P.4.3) Hydrographic surveys
	(P.5) Engineering and consultancy	(P.5) Engineering and consultancy
(T) Wind turbine	(T.1) Nacelle	(T.1.1) Bedplate
		(T.1.2) Main bearing
		(T.1.3) Main shaft
		(T.1.4) Gearbox
		(T.1.5) Generator
		(T.1.6) Power take-off

Level 1	Level 2	Level 3
		(T.1.7) Control system
		(T.1.8) Yaw system
		(T.1.9) Yaw bearing
		(T.1.10) Nacelle auxiliary systems
		(T.1.11) Nacelle cover
		(T.1.12) Small engineering components
		(T.1.13) Structural fasteners
		(T.1.14) Condition monitoring system
	(T.2) Rotor	(T.2.1) Blades
		(T.2.2) Hub casting
		(T.2.3) Blade bearings
		(T.2.4) Pitch system
		(T.2.5) Spinner
		(T.2.6) Rotor auxiliary systems
		(T.2.7) Fabricated steel components
	(T.3) Tower	(T.3.1) Steel
		(T.3.2) Tower internals
(B) Balance of plant	(B.1) Cables	(B.1.1) Export cable
		(B.1.2) Array cable
		(B.1.3) Cable protection
	(B.2) Turbine foundation	(B.2.1) Monopile[13]

[13] Not included as an option within project design envelope – excluded from the assessment.

Level 1	Level 2	Level 3
		(B.2.2) Jacket
		(B.2.3) Transition piece[14]
		(B.2.4) Corrosion protection
		(B.2.5) Scour protection
	(B.3) Offshore substation	(B.3.1) Electrical system
		(B.3.2) Facilities
		(B.3.3) Structure
	(B.4) Onshore substation	(B.4.1) Buildings, access and security
	(B.5) Operations base	
(I) Installation and commissioning	(I.1) Foundation installation	(I.1.1) Foundation installation vessel
	(I.2) Offshore substation installation	(I.2.1) Substation installation vessel
	(I.3) Onshore substation installation	
	(I.4) Onshore export cable installation	
	(I.5) Offshore cable installation[15]	(I.5.1) Cable-laying vessel
		(I.5.2) Cable burial
		(I.5.3) Cable pull-in
		(I.5.4) Electrical testing and termination
	(I.6) Turbine installation	(I.6.1) Turbine installation vessel
		(I.6.2) Commissioning

[14] Since monopile foundations option is excluded, transition piece is also excluded from the assessment.

[15] Offshore cable installation costs are not provided separately for export and array cables. These costs have therefore been split on the basis of the equivalent share of each in terms of balance of plant cost estimates.

Level 1	Level 2	Level 3
	(I.7) Construction port[16]	
	(I.8) Offshore logistics	(I.8.1) Sea-based support
		(I.8.2) Marine coordination
		(I.8.3) Weather forecasting and metocean data
(O) Operation, maintenance and service	(O.1) Operations	(O.1.1) Training
		(O.1.2) Onshore logistics
		(O.1.3) Offshore logistics
		(O.1.4) Health and safety inspections
	(O.2) Maintenance and service	(O.2.1) Turbine maintenance and service
		(O.2.2) Balance of plant maintenance and service
(D) Decommissioning	(D.1) Turbine decommissioning	
	(D.2) Foundation decommissioning	
	(D.3) Cable decommissioning	
	(D.4) Substation decommissioning	

[16] Construction port cost estimates are not provided and have therefore been excluded from the assessment.