



NORTH FALLS

Offshore Wind Farm

ENVIRONMENTAL STATEMENT

Appendix 31.1 Socio-Economics Technical Baseline

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Summary

SSE Renewables and RWE are developing the North Falls Offshore Wind Farm (North Falls) off the coast of East Anglia, England. With the final capacity of the project yet to be finalised, North Falls is an extension of the Greater Gabbard Offshore Wind Farm (GGOW). The project is currently in the early phases of development and is expected to be operational by 2030. Once constructed, North Falls will contribute towards UK's target to install 50 GW of offshore wind by 2030 and will help the UK reach its 2050 net zero emissions goal.

SSE Renewables and RWE engaged BVGA to establish the economic benefits of the project to the local and UK economy to inform project stakeholders. This analysis considered the gross value-added (GVA)ⁱ and full-time equivalent job years (FTE years)ⁱⁱ created from the wind farm both locally and nationally in the UK.

Assuming a project capacity of 504 MW, North Falls will produce around £1.16 billion GVA and 12,670 FTE years in the UK, over its project lifetime. Onshore impacts will create around £240 million GVA and 2,900 FTE years in the UK while offshore impacts will create around £922 million GVA and 9,790 FTE years in the UK. Most of the economic impacts created in the UK by North Falls will be created during operations, maintenance, and service of the project.

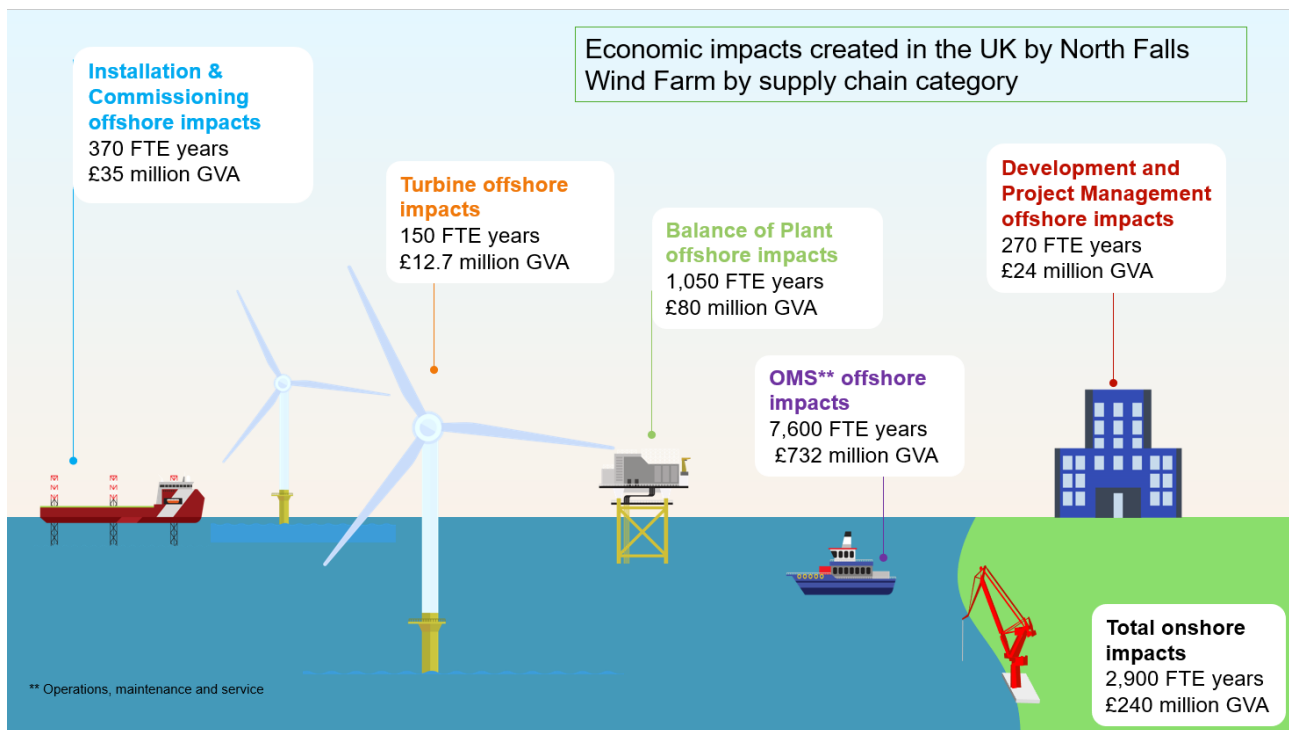


Figure 1 Summary of economic benefits produced by North Falls over its lifetime.

ⁱ Gross value-added is the value generated by any unit engaged in the production of goods and services (<https://www.ons.gov.uk/economy/grossvalueaddedgva>)

ⁱⁱ One full time equivalent job year is the same as one full-time job carried out for one year.

1. Introduction

North Falls Offshore Wind Farm Ltd (NFOWL) is a joint venture between SSE Renewables and RWE. It is an extension to the Greater Gabbard Offshore Wind Farm and is located off the coast of East Anglia, England.

In common with most offshore wind farms, there is significant interest in the economic impacts of North Falls. NFOWL wishes to understand and communicate the potential benefits of the project to the local and national economy to provide an evidence base for the project's environmental statement and its public consultations. It has commissioned this report from BVG Associates (BVGA) to assess the economic benefits of the North Falls project.

This report presents the economic impacts, measured using gross value-add (GVA) and full-time equivalent job years (FTE years), that North Falls will potentially generate during its development, construction, and lifetime operation. The analysis will form the basis of the environmental statement (ES) socioeconomic chapter, to be produced by Royal HaskoningDHV, and presentational material to be produced by the project team for communication with the wider public.

We calculated the economic impacts using BVGA's bespoke methodology created for the offshore wind industry. This methodology is described in more detail in section 2.

1.1. Project background

The North Falls project is an extension of the Greater Gabbard Offshore Wind Farm (GGOW) which is located off the coast of East Anglia, England, and was fully commissioned in 2012. In 2019, the North Falls project was awarded an Agreement for Lease by The Crown Estate. The project is now in development with the aim of submitting its application in 2023 and achieving a development consent order (DCO) in 2025. Construction would then take place in the latter part of the decade with a view to the project being operational by 2030, aligned to net zero targets.

The final capacity of the project is yet to be finalised. For the purpose of modelling the economic impacts we assumed a project capacity of 504 MW, which is the generating capacity of Greater Gabbard.

North Falls has an offshore array area of 150 km² split into two sections within the Outer Thames Estuary, in the southern North Sea. Its closest point to land is 22.5 km from the East Anglia coast near Oxford. It will have up to 72 wind turbines and will have one or two offshore substations. Subsea export cables will bring the power to shore, with underground cables carrying the power to a new onshore substation in Tendring, Essex alongside a National Grid substation.

NFOWL has carried out onshore and offshore surveys and continues to assess project constraints and engage with stakeholders. Once complete, the wind farm will significantly contribute to the UK's goal to install 50 GW of offshore wind by 2030 and will help the UK reach its 2050 net zero emissions target.

2. Methodology

The work was undertaken in the following four stages:

- Stage 1 - Building a supply chain narrative,
- Stage 2 – Undertaking local and UK content analysis,
- Stage 3 – Undertaking economic impact analysis, and
- Stage 4 – Verifying the results.

2.1. Supply chain narrative

We defined the supply chain categories in agreement with NFOWL. The list of categories is available in Appendix A, categorised by their onshore and offshore impacts.

We developed the supply chain narrative by assessing the local and national suppliers in each category. This assessment was based on:

- Technology requirements for North Falls
- The expected availability of capable local and national suppliers at the time when procurement for North Falls was underway
- North Falls supply chain strategy

- The logistical benefits of local and national supply, and
- Industry trends in other relevant offshore wind projects.

Based on our assessment we proposed three scenarios for the supply chain narrative:

- Scenario 1: A baseline scenario, representing the most likely outcome based on current information available,
- Scenario 2: An enhanced scenario, representing an optimistic but plausible outcome, and
- Scenario 3: A worst case scenario, representing an outcome where UK suppliers are uncompetitive.

2.2. Local and UK content assessment

Here we used the supply chain narrative as a basis for calculating the UK and local content for the three scenarios. We calculated this using the methodology developed by BVGA for the Offshore Wind Industry Council. In our approach, national impacts were assessed across the full level 1 supply chain while local impacts were assessed for a narrower set of level 2 categories.

2.2.1 Local impacts

In defining what constituted 'local' there were two considerations:

- The immediate economic sphere of influence of the project, and
- The jurisdictions of key stakeholders.

As an offshore wind farm, North Falls has no 'local' area defined yet, but its local economic footprint will mainly arise from:

- The construction and operation of the onshore grid infrastructure
- The construction of the operations base, and
- The operation and maintenance (O&M) of the wind farm, including the transmission system, over its lifetime.

The O&M base and the onshore grid connection for North Falls is yet to be confirmed but is expected to have the same impact across any given local area.

2.2.2 UK impacts

As planning consent for North Falls will be considered at a national level, we analysed the national impacts across the whole of the UK.

2.3. Economic impact analysis

Once content percentages were established, we carried out the economic modelling.

We calculated GVA and FTE years for the project. GVA is the value generated by any unit engaged in the production of goods and servicesⁱⁱⁱ, and one FTE job year is the same as one full-time job for one year.

The analysis distinguished between direct, indirect, and induced impacts, where:

- Direct impacts are associated with NFOFWL, and its major contractors,
- Indirect impacts are associated with the non-major suppliers to the project partners and the suppliers to the project's major contractors,
- Induced impacts are associated with the personal expenditure of workers employed as a result of North Falls activity, both direct and indirect.

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

The economic model uses the following key inputs:

- Budgetary expenditure data (provided by NFOFWL and finalised in discussion with BVGA)
- Content percentage estimates, and
- Salary and employment statistics.

Salaries and employment costs were researched from public sources and from data collected by BVGA during previous analyses. We also used relevant salary data collected by the Office for National Statistics. All costs and expenditure data are in 2022 prices.

ⁱⁱⁱ <https://www.ons.gov.uk/economy/grossvalueaddedgva>

Following discussion with NFOWFL team, we assumed that the wind farm will be fully commissioned in 2030, will have an installed capacity of 504MW and will operate for 30 years.

2.4. Result verification

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

3. Results

3.1. Supply chain narrative

The global offshore wind supply chain has been developing over the last decade. Based on previous experience of offshore wind farms, major packages

of work are likely to be awarded to established companies that have been active in Europe for many years. Despite this, there are opportunities for UK based companies and local companies. These opportunities currently are mainly in the development and project management, onshore construction, and operations and maintenance areas of the supply chain. The assumptions around supply chain narrative are built on the current supply chain availability and how they might evolve over time.

The overall picture for the baseline scenario is summarised in Table 1. Supply chain narratives for the enhanced and worst case scenarios are provided in Appendix C. The most significant opportunities for UK based and local suppliers are described below.

Table 1 Supply chain assessment for baseline scenario

Level 0	Level 1	Level 2	Local supply chain	Rest of UK supply chain
Development and project management	Onshore developing, engineering, and permitting		Services for stakeholder and supply chain engagement is done locally. Some local suppliers are used for site investigations. Local accommodation for project team and suppliers while they work in the areas.	Most consultancy-based work is led by UK based teams.
	Offshore developing, engineering, and permitting		Services for stakeholder and supply chain engagement is done locally. Some local suppliers are used for site investigations. Local accommodation for project team and suppliers while they work in the areas.	Most consultancy-based work is led by UK based teams.
	Project management (technical and non-technical)		To use local project management office with use of local services	Is led from SSE Renewables and RWE offices in England.
Turbine supply	Turbine nacelle and hub		Some support services delivered locally	No offshore wind turbine suppliers have nacelle or hub manufacturing facilities in the UK. These are imported.
	Turbine blades		Some support services delivered locally	Turbine blades are mostly imported. Some components will come from Hull or Isle of Wight.

	Turbine tower		Some support services delivered locally	Turbine towers are imported.	
	Turbine other		Some support services delivered locally	Some technical sales are done in the UK.	
Balance of plant supply	Foundation		Some support services delivered locally	Monopiles supplied by SeAH in Teesside. Transition pieces imported	
	Array cable		Some support services delivered locally	Array cables supplied by JDR cables from its Hartlepool factory	
	Onshore export cable		Some support services delivered locally	Land cable imported	
	Cable protection		Some support services delivered locally	Cable protection supplied by UK supplier such as Balmoral, CRP Subsea or Tekmar.	
	Offshore export cable		Some support services delivered locally	No available UK suppliers exist.	
	Onshore substation equipment and components	Onshore electricals		Local suppliers provide some support systems, such as low voltage electrical equipment, lighting, and security systems.	Engineering and project management in the UK, along with some low voltage systems. No UK supply for high voltage equipment.
		Buildings, access, and security		Some amount is carried out by local suppliers	Remainder carried out by rest of UK suppliers
	Offshore substation	Offshore electricals		Local suppliers provide some support systems, such as low voltage electrical equipment, lighting, and security systems.	Engineering and project management in the UK, along with some low voltage systems. No UK supply for high voltage equipment.
		Foundation		Some support services delivered locally	Jacket foundation imported
		Topside		Some support services delivered locally	Fabricated outside UK
Others (cables design)		Some support services delivered locally	These will be imported		
Installation and commissioning	Turbine installation and commissioning		Installation contractors not local but some support services are provided from the construction port, such as CTVs	UK suppliers provide some support services. UK marshalling Installation crew managed from UK. Maritime crew supplied with vessel	
	Foundation installation		Installation contractors not local but some support services provided from the construction port, such as CTVs	Overseas contractor UK marshalling Installation crew from across Europe.	
	Array cable installation		Installation contractors not local but some support	UK suppliers to provide support services.	

			services provided from the construction port, such as CTVs	Installation crew from across Europe.	
	Offshore export cable installation		Installation contractors not local but some support services provided from the construction port, such as CTVs	Most established offshore wind installation contractors are not based in the UK. UK suppliers provide some support services. Installation crew hired from across Europe.	
	Offshore substation installation		Installation contractors not local but some support services provided from the construction port, such as CTVs	Few offshore wind installation contractors are not based in the UK. UK suppliers provide support services. Installation crew from across Europe.	
	Onshore substation installation	Enabling works		Services including labour, plant hire, site security provided locally	Some contractor work led from the UK
		Buildings		Some building work carried out by local suppliers and labour force using local materials	Most building work led by UK suppliers and labour force
		Steel fabrications		Provided by local supplier (such as Oxborrow)	Some provided by UK suppliers
		Civil works		Services including labour, plant hire, site security provided locally	Some contractor work led from the UK
		Site management		Work such as site security, temporary offices and wheel washing carried out by local suppliers and labour force	Some contractor work led from the UK
		Electrical works		Some services provided locally	Some contractor work led from the UK
	Onshore export cable installation	Horizontal directional drilling		Some services provided locally	Some contractor work led from the UK
		Civil works		Services including labour, plant hire, site security provided locally	Some contractor work led from the UK
		Cable terminations		Some services provided locally	Some contractor work led from the UK
	Operations base construction	Operations base materials		Some aggregates and steelwork locally supplied	Some provided from the UK
		Operations base equipment		Plant locally supplied	Some provided from the UK
Operations base labour			Some services provided locally	Some contractor work led from the UK	
Operations	Wind farm administration		Undertaken locally at the OMS base	Some contractor work led from the UK	

Operations, maintenance, and service		Vessel operation	Dedicated vessels operated locally from the OMS base	Some contractor work led from the UK
		Training and health and safety	Some services provided locally	Provided from across UK
	Turbine maintenance	Routine and minor maintenance	Undertaken using labour local to the OMS base	Some contractor work led from the UK
		Major component maintenance	Some support service delivered locally	Spare parts, consumables and major unplanned maintenance use a mixture of UK and European companies.
	Balance of plant maintenance	Foundation maintenance	Some services provided locally	Some contractor work led from the UK
		Offshore cable maintenance	Some services provided locally	Some contractor work led from the UK
		Substation maintenance	Some services provided locally	Some contractor work led from the UK
		Transmission maintenance onshore	Some services provided locally	Some contractor work led from the UK
	Fees, rent and transmission charges	-	Business rates local, some local transmission maintenance	UK rent, insurance, and transmission maintenance
	Decommissioning	Decommissioning	-	Some support services provided locally

3.1.2 Development and project management

Development and project management include activities required to secure planning consents, such as the environmental impact assessment (EIA), as well as the design and engineering of the wind farm. This phase of wind farm development has the potential to be relatively high in local content.

For the project management and surveying work, we assumed that local contractors are used where possible. Engineering and design services, particularly those related to substations and onshore cable routing with associated transmission services, are delivered by UK-based suppliers.

The local content in development and project management was estimated to be 2%, and total UK was around 77%.

3.1.3 Turbine supply

Turbine supply includes the fabrication of towers, nacelles, rotor hubs, and blades.

The UK currently has no companies capable of manufacturing nacelles or towers. Based on the current supply chain information, these items will likely be manufactured by companies elsewhere in Europe.

Vestas and Siemens Gamesa have blade factories in the Isle of Wight and Hull respectively but for smaller sized turbines. They have plans to expand for larger blade production. Assuming North Falls will use 12 MW turbines, turbine blades will be imported with some components coming from the UK factories. Some technical sales will be done in the UK. In the future, these could be contracted to either company depending on availability.

The total UK content in turbine supply was estimated to be around 12%.

3.1.4 Balance of plant supply

The balance of plant includes the turbine foundations, array cables, export cables, onshore substations, and offshore substations.

Foundations

Based on the current supply chain information, SeAH supply monopiles while the transition pieces are imported from across Europe or Asia. The total

UK content in foundation was estimated to be around 40%.

Array cables

UK based JDR Cables supply array cables from its Hartlepool factory. There are no local companies. The total UK content in array cables was estimated to be around 45%.

Onshore export cables

The UK has no companies capable of manufacturing onshore export cables. They are therefore imported.

Cable protection

UK based CRP Subsea and Tekmar provide cable protection. The total UK content in cable protection was estimated to be around 70%.

Offshore export cables

The UK has no companies capable of manufacturing offshore export cables. It will be imported.

Onshore substation

Electricals

No high-voltage electrical equipment is supplied from the UK. Based on the current supply chain picture, these are supplied from established factories, across Europe.

Low voltage electrical equipment, batteries, and control systems are manufactured by UK suppliers. Local suppliers have some opportunities to provide support systems such as low voltage electrical equipment, lighting, and security systems.

The local content in electricals was estimated to be 2%, while total UK was around 12%.

Building, access, and security

Local companies with support from other UK based suppliers supply security systems, access and building materials. The local content was estimated to be 40%, while total UK was around 80%.

Offshore substation

Electricals, foundation and topside

None of the high-voltage electrical equipment, foundations or topside of an offshore substation are supplied from the UK. Based on the current supply

chain information, these are supplied from established factories, across Europe.

Low voltage electrical equipment, batteries and control systems are manufactured by UK suppliers. Local suppliers have some opportunities to provide support systems such as low voltage electrical equipment, lighting, and security systems.

The local content in offshore substation was estimated to be 2%, while total UK was around 12%.

3.1.5 Installation and commissioning

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

The installation and commissioning of North Falls uses experienced installation companies in the offshore wind industry across Europe. The greatest contribution of UK content in installation and commissioning is the provision of local crew to support marine activities and some support vessels.

There are opportunities for local companies in the installation of onshore cabling, substations, and the operations base. In these areas local contractors will be hired.

Turbine installation and commissioning

For turbine installation and commissioning, UK based Seajacks and MPI Offshore (Van Oord) provides vessel support. Marshalling support is provided from the UK. UK and local suppliers provide support services while installation crew is hired from across Europe. The local content was estimated to be 2%, while total UK was around 17%.

Foundation installation and commissioning

For foundation installation and commissioning, UK provides marshalling support. UK and local suppliers provide support services while installation crew is hired from across Europe. The local content was estimated to be 2%, while total UK was around 7%.

Array cables installation

No established array cable installation contractors are based in the UK. UK and local suppliers provide support services while installation crew is hired from across Europe. The local content was estimated to be 2%, while total UK was around 4%.

Offshore export cable installation

No established offshore export cable installation contractors are currently based in the UK. UK and local suppliers provide support services while installation crew is hired from across Europe.

For the offshore export cables there are opportunities to utilise local suppliers for onshore works. The local content was estimated to be 5%, while total UK was around 10%.

Offshore substation installation

No established offshore substation installation contractors are based in the UK. UK and local suppliers provide support services while installation crew is hired from across Europe. The local content was estimated to be 2%, while total UK was around 7%.

Onshore substation installation

Enabling works, buildings, steel fabrications, civil engineering works, and site management use local contractors. The lead contractual work is led by UK based suppliers. The local content was calculated to be 30%, while total UK was around 80% to 90% for each of these subcategories. For electrical works the local content was estimated to be 20%, while total UK was around 70%.

Onshore export cable

Horizontal drilling, civil works, and cable terminations

The installation of onshore export cables present opportunities for local companies. This involves excavating the cable route, performing horizontal directional drilling where excavation is not possible, and cable terminations. In addition, local contractors are subcontracted for civil works such as road cleaning, traffic management, signage and temporary bridges over rivers and ditches. The lead contractual work is led by UK based suppliers. The local content was estimated to be 20%, while total UK was around 60% to 80% for each these subcategories.

Operations base construction

Operations base materials, equipment, and labour

Local contractors supply base materials, equipment, and local labour for the installation of the operations base. The local content was estimated to be 40%, while total UK was around 80%.

3.1.6 Operations, maintenance, and service

The operation, maintenance, and service (OMS) support the ongoing operation of the wind turbines, balance of plant, and associated transmission assets. This area of the supply chain usually has a high level of local content, and the spending continues over the operational lifetime of the wind farm, which has been assumed to be 30 years.

Operations

Wind farm administration

There are local options available for OMS bases like Harwich, Lowestoft and Great Yarmouth from which wind farm administrative staff are based. Asset management is provided by NFOWFL from its UK based offices. The local content was estimated to be 40%, while total UK was around 80%.

Vessel operation

Crew transfer vessels (CTVs) is used to transfer technicians to the wind farm offshore. Local experience and knowledge built up from Greater Gabbard and from other maritime sectors is drawn upon for North Falls. The local content was estimated to be 60%, while total UK was around 65%.

Training, health, and safety

These are provided by UK based suppliers with some support from local suppliers. The local content was estimated to be 5%, while total UK was around 65%.

Turbine maintenance

Routine and minor maintenance

Scheduled minor maintenances is undertaken using the local labour force while some contractor work is led by UK suppliers. The local content was

estimated to be 30%, while total UK was around 70%.

Major component maintenance

No major component maintenance will be undertaken locally. Spare parts, consumables and major unplanned maintenance use a mixture of UK and European companies. The total UK content was estimated to be around 5%.

Balance of plant maintenance

Foundation, offshore cable, substation, and transmission maintenance

Maintenance of balance of plant components is led by UK based suppliers with opportunities for local support services. The local content was estimated to be 30%, while total UK was around 70% for each of the subcategories.

Fees, rent and transmission charges

This is a mix of local and UK based charges.

The local content in was estimated to be 30%, while total UK was around 70%.

3.1.7 Decommissioning

Decommissioning involves the removal or making safe of offshore infrastructure at the end of its life.

Decommissioning involves similar skills and contractors to those used in the installation and commissioning phase of the North Falls offshore wind farm. Because decommissioning practice could evolve over the operating life of the wind farm, it is possible that these numbers will change significantly. For this analysis it is been assumed that North Fall's decommissioning capability will be similar to that of its installation capability.

The local content in decommissioning was estimated to be 20%, while total UK was around 40%.

3.2. UK and local content

Table 2 shows the lifetime local content, and total UK content broken down by supply chain category for North Falls for the baseline scenario. Local content is 15%, while total UK content is 44%.

Figure 2 shows the local, rest of UK and non-UK content for North Falls for baseline scenario.

Table 2 Local and rest of UK content in North Falls by Level 0 category, baseline scenario.

Level 0 Category	% of lifetime spend	Territory	Percentage of level 0t	Percentage of total spend
Project development and management	4.5%	Local	2.0%	0.1%
		Total UK	77.0%	3.5%
Turbine supply	17.4%	Local	0.0%	0.0%
		Total UK	2.6%	0.5%
Balance of plant	16.3%	Local	0.5%	0.1%
		Total UK	19.7%	3.2%
Installation and commissioning	17.0%	Local	12.2%	2.2%
		Total UK	34.9%	6.3%
Operation, maintenance, and service	41.6%	Local	29.1%	12.1%
		Total UK	69.1%	28.8%
Decommissioning	2.3%	Local	20.0%	0.5%
		Total UK	60.0%	1.4%
Total	100%	Local		15%
		Total UK		44%

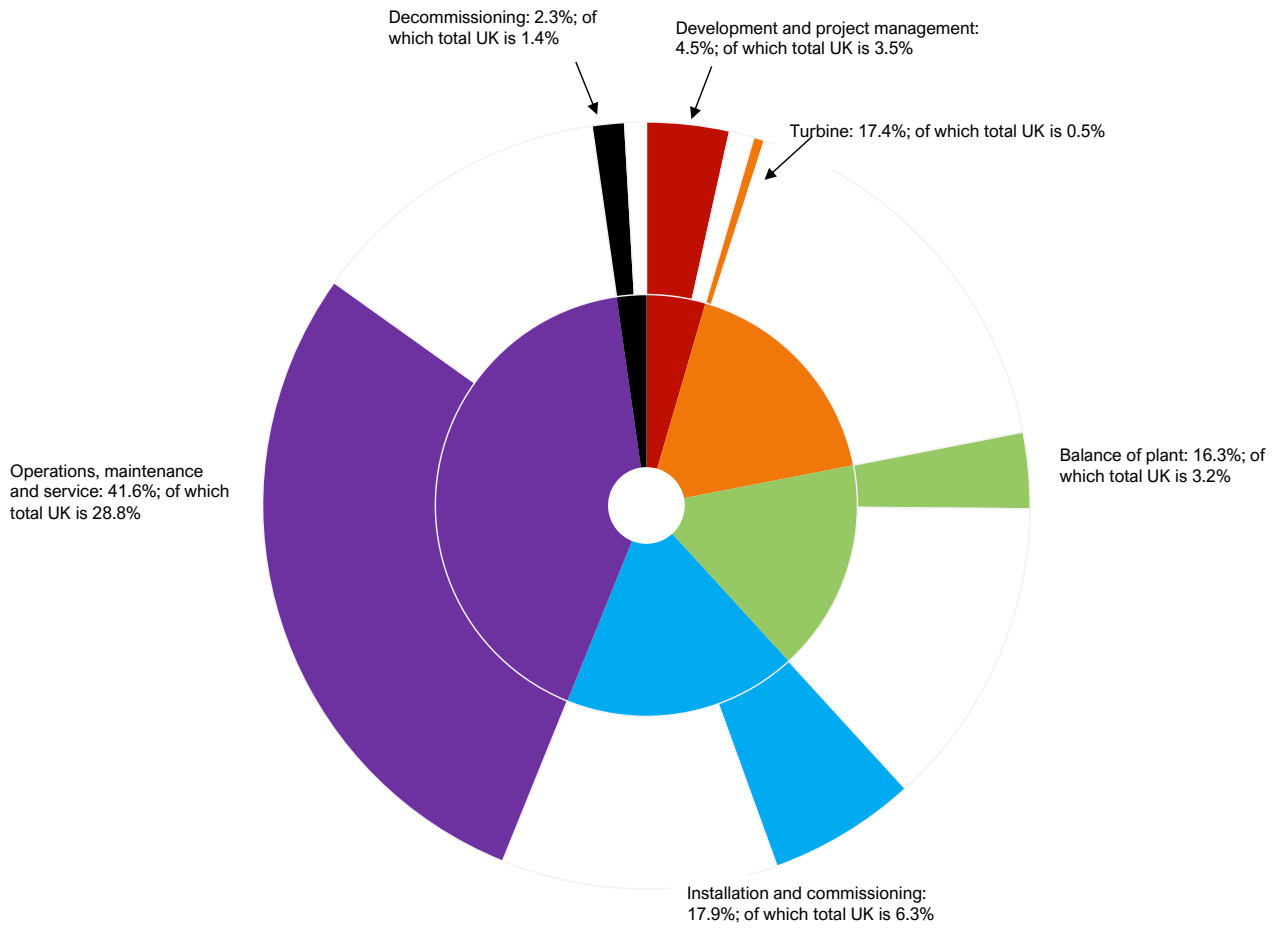


Figure 2 Total UK content in North Falls by level 0 category as percentages of lifetime spend, baseline scenario.

3.4. Economic impacts

Table 3 shows the direct, indirect, and induced GVA and FTE years delivered in the UK over the lifetime of the North Falls project.

For the baseline scenario, total UK GVA over the lifetime of the project is calculated to be around £1.16 billion, and the number of jobs produced is calculated to be around 12,670 FTE years.

Onshore impacts create around £240 million GVA and 2,900 FTE years in the UK while offshore impacts will create around £922 million GVA and 9,790 FTE years in the UK.

Figure 3 and Figure 5 present the total UK GVA and jobs produced. Figure 4 and Figure 6 presents the total UK GVA and jobs produced split by indirect, direct, and induced types. Most the economic benefits are accounted during the OMS of the project followed by installation and commissioning of the project.

Of the total UK impact, £413 million GVA and 4,300 FTE years are expected to be local. Figure 7 and Figure 9 presents the local GVA and jobs produced. Figure 8 and Figure 10 presents the breakdown of local GVA and jobs by indirect, direct, and induced types. Locally, the onshore impacts create around £60 million GVA and 750 FTE years while offshore

impacts create around £353 million GVA and 3,620 FTE years.

Table 3 Direct, indirect, and induced GVA and FTEs for the baseline scenario.

	Local		Total of UK	
	GVA (£million)	FTE years	GVA (£million)	FTE years
Direct	230	2,550	613	7,210
Indirect	96	650	303	2,210
Induced	87	1,100	246	3,250
Totals	413	4,300	1,162	12,670

For the enhanced scenario, total GVA increases to around £1.4 billion producing around 15,800 FTE years of jobs. For the worst-case scenario, total GVA comes down to around £990 million and would produce around 10,650 FTE years.

The detailed breakdown of total UK GVA and FTE years for each category of the supply chain under the three scenarios is provided under Appendix D. Appendix A presents the economic impacts in charts.

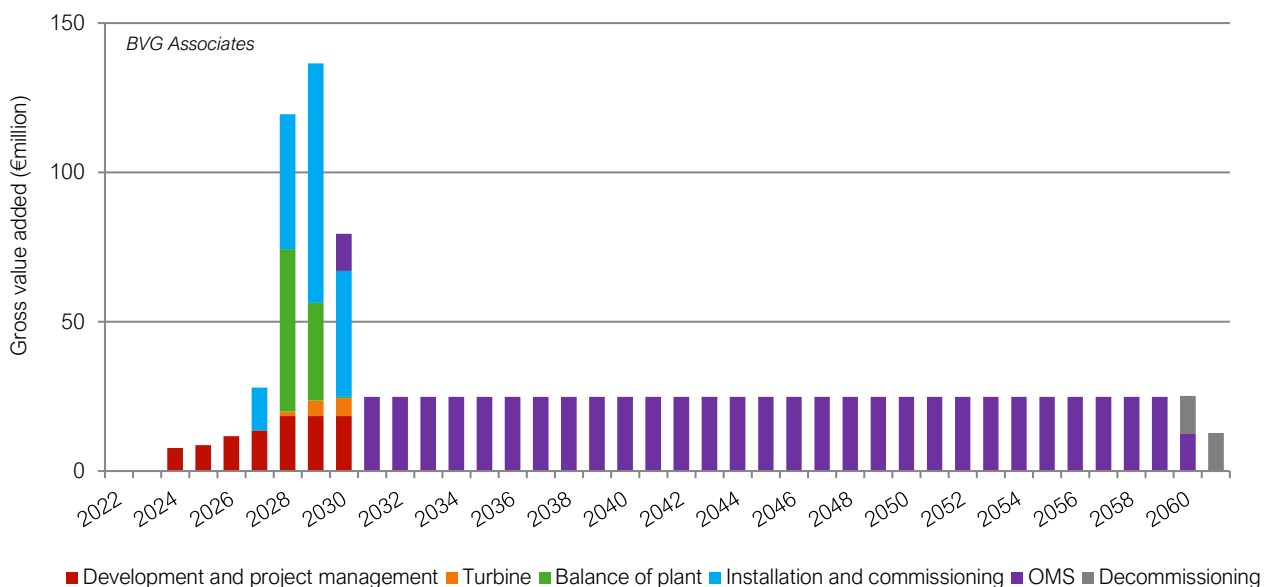


Figure 3 Total UK GVA created by North Falls over the lifetime of the wind farm for baseline scenario.

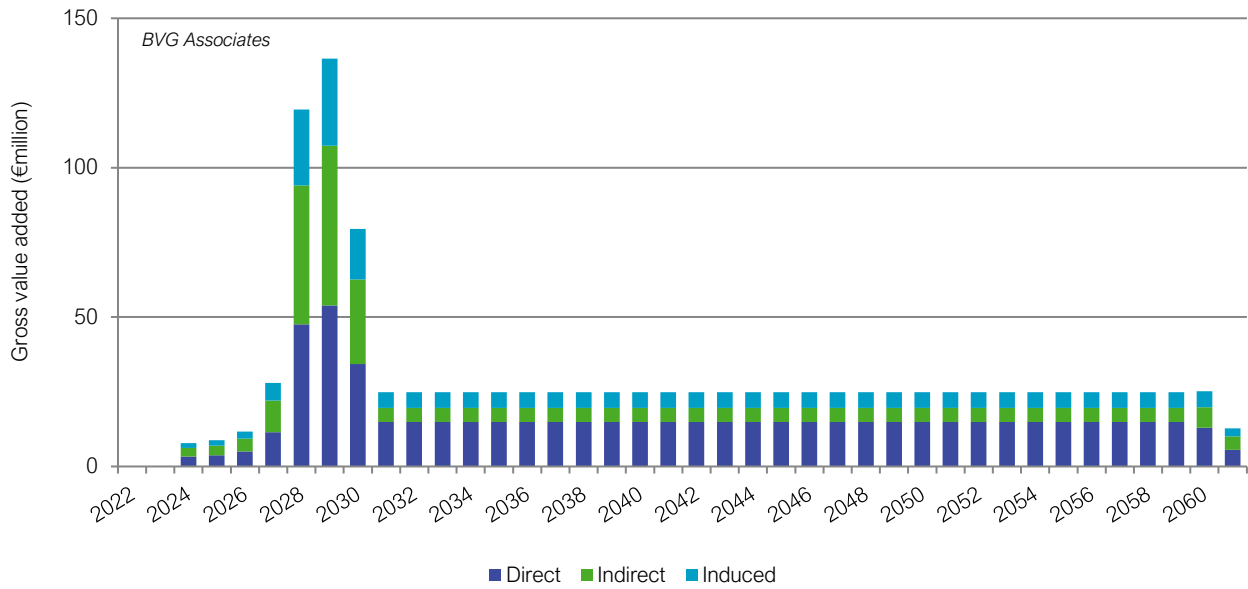


Figure 4 Total GVA created by North Falls over the lifetime of the wind farm split by direct, indirect, and induced job types, for baseline scenario.

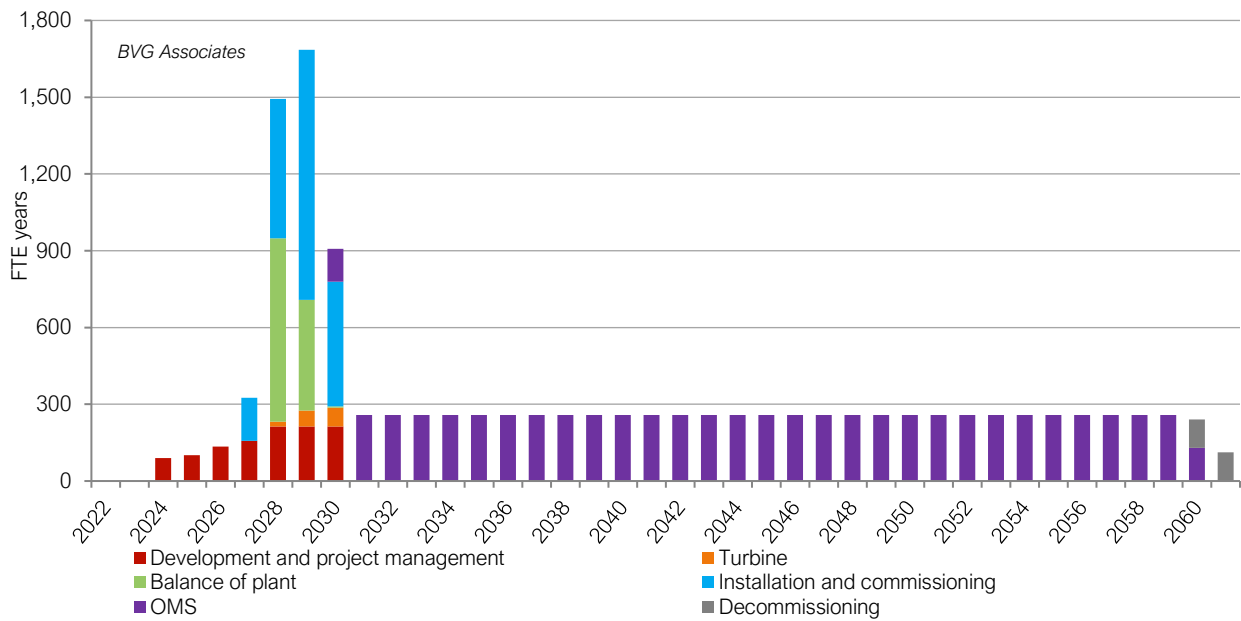


Figure 5 Total UK full time equivalent jobs created by North Falls over the lifetime of the wind farm for baseline scenario.

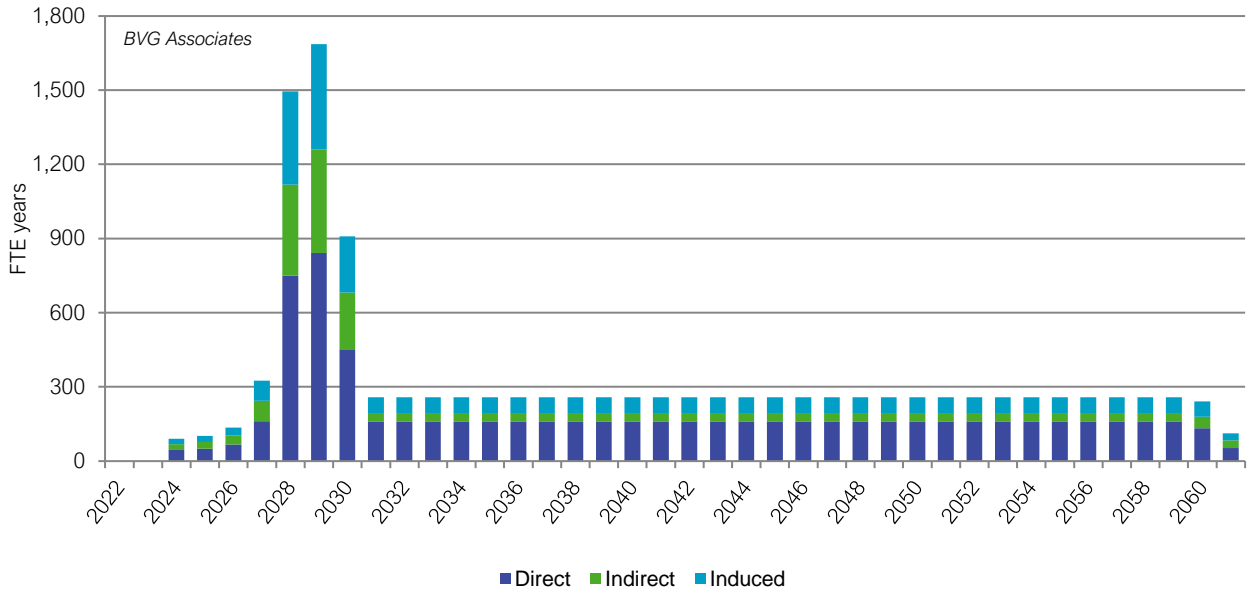


Figure 6 Total UK full-time equivalent jobs created by North Falls over the lifetime of the wind farm for baseline scenario.

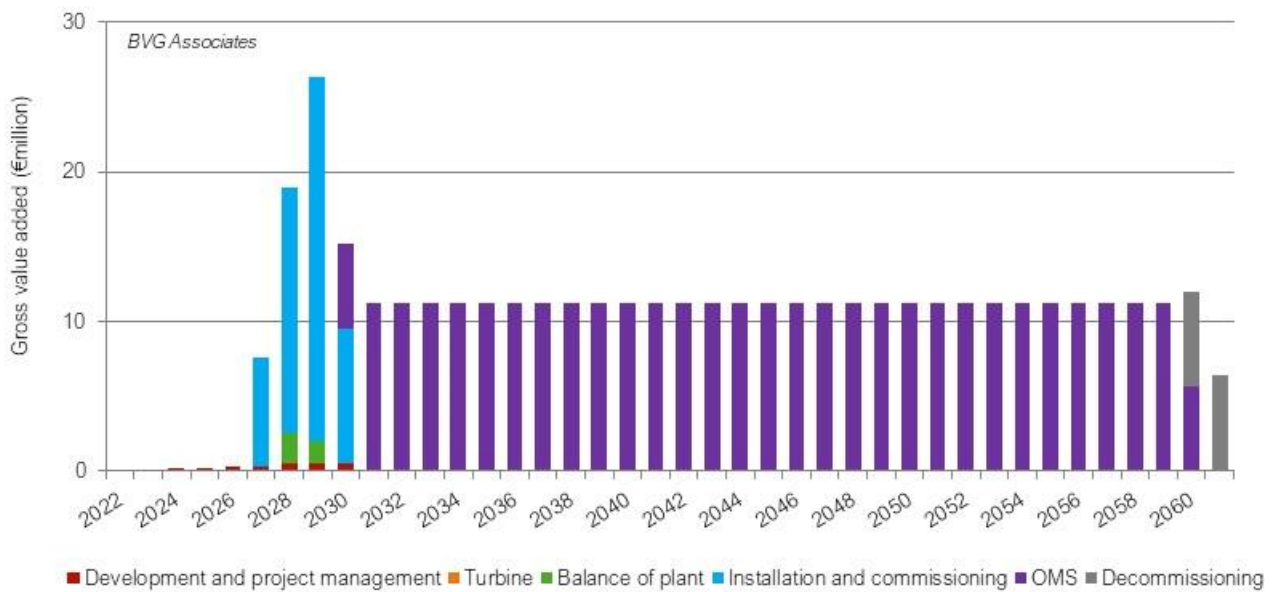


Figure 7 Local GVA created by North Falls over the lifetime of the wind farm for baseline scenario.

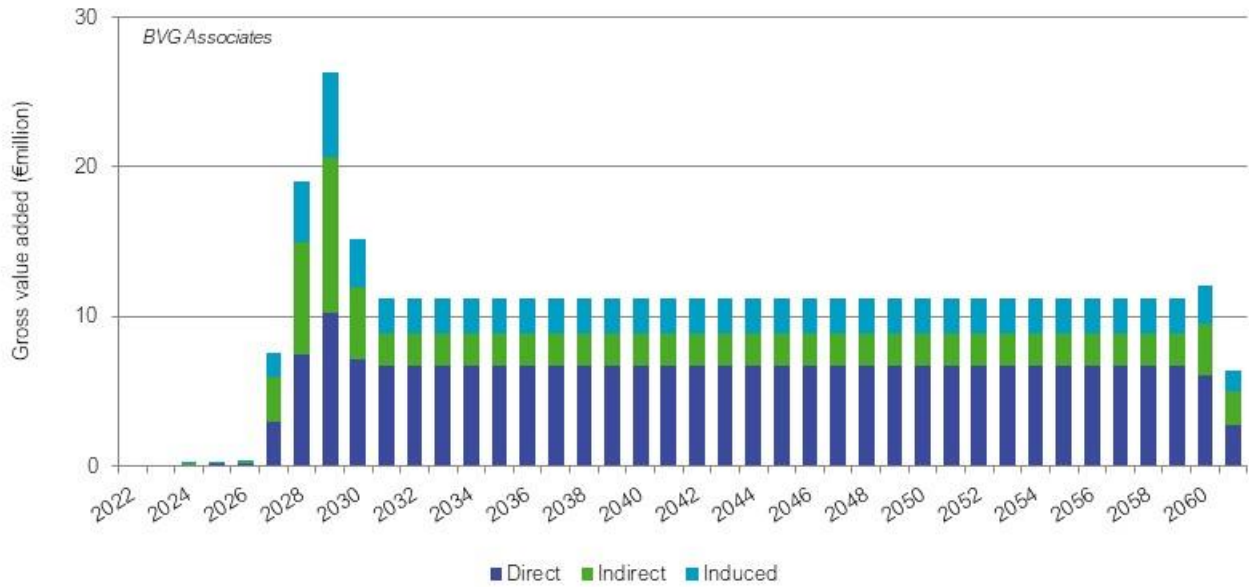


Figure 8 Local GVA created by North Falls over the lifetime of the wind farm split by direct, indirect, and induced job types, for baseline scenario.

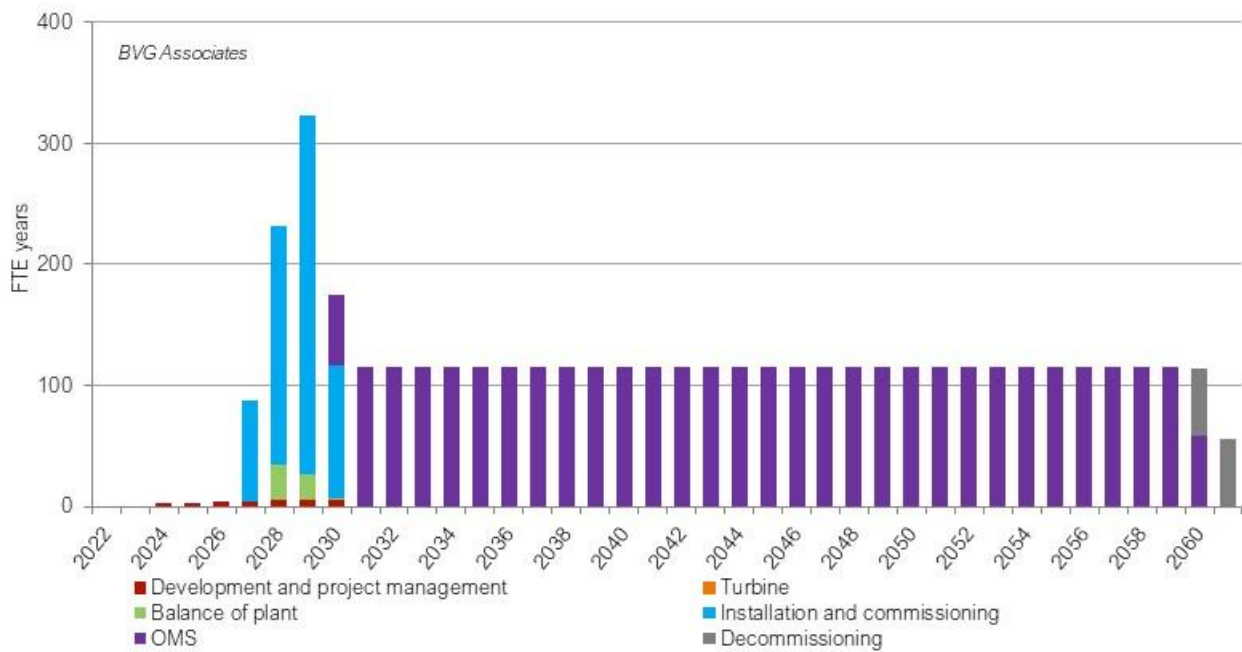


Figure 9 Local full time equivalent jobs created by North Falls over the lifetime of the wind farm for baseline scenario.

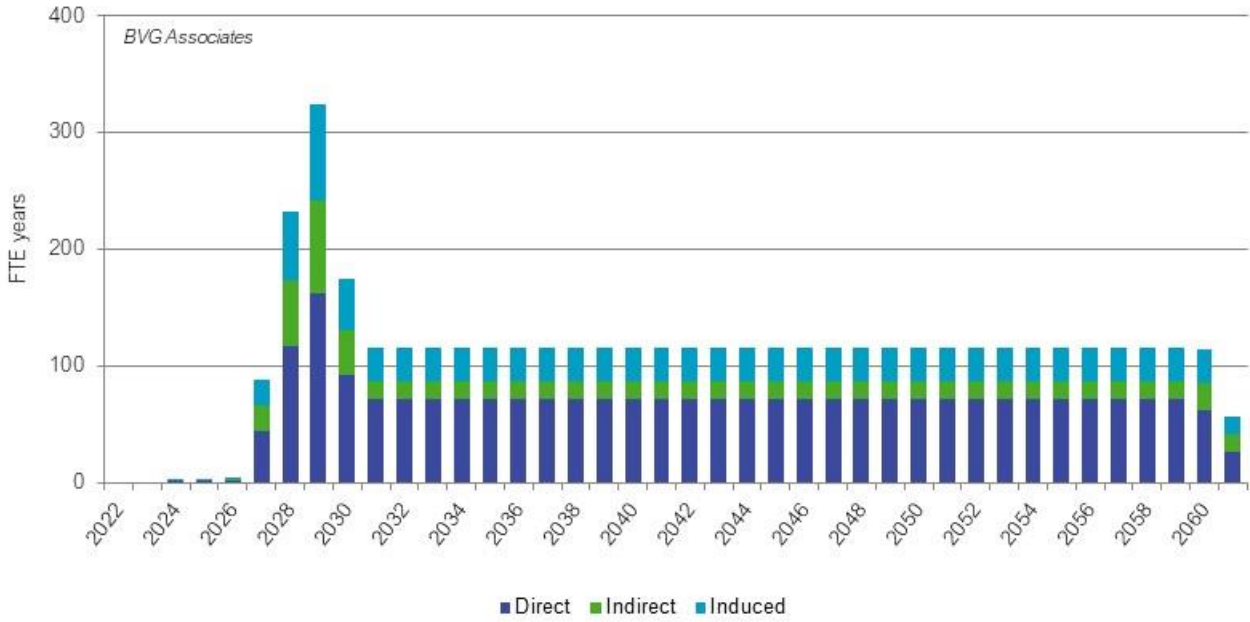


Figure 10 Local full-time equivalent jobs created by North Falls over the lifetime of the wind farm for baseline scenario.

Appendix A supply chain categories

Table 4 Supply chain categories.

Level 0	Level 1	Level 2	Onshore/offshore	
Development and project management	Onshore developing, engineering, and permitting		Onshore	
	Offshore developing, engineering, and permitting		Offshore	
	Project management (technical and non-technical)		Onshore	
Turbine supply	Turbine nacelle and hub		Offshore	
	Turbine blades		Offshore	
	Turbine tower		Offshore	
	Turbine other		Offshore	
Balance of plant supply	Foundation		Offshore	
	Array cable		Offshore	
	Onshore export cable		Onshore	
	Offshore export cable		Offshore	
	Cable protection		Offshore	
	Onshore substation equipment and components	Onshore electricals		Onshore
		Buildings, access, and security		Onshore
	Offshore substation	Offshore electricals		Offshore
		Foundation		Offshore
		Topside		Offshore
Others		Offshore		
Installation and commissioning	Turbine installation and commissioning		Offshore	
	Foundation installation		Offshore	
	Array cable installation		Offshore	
	Offshore export cable installation		Offshore	
	Offshore substation installation		Offshore	
	Onshore substation installation	Enabling works		Onshore
		Buildings		Onshore
		Steel fabrications		Onshore
		Civil works		Onshore
		Site management		Onshore
		Electrical works		Onshore
	Onshore export cable installation	Horizontal directional drilling		Onshore
		Civil works		Onshore
		Cable terminations		Onshore
	Operations base construction	Operations base materials		Onshore
		Operations base equipment		Onshore
Operations base labour			Onshore	
Operations, maintenance, and service	Operations	Wind farm administration	Offshore	
		Vessel operation	Offshore	
		Training and health and safety	Offshore	
	Turbine maintenance	Routine and minor maintenance		Offshore
		Major component maintenance		Offshore
	Balance of plant maintenance	Foundation maintenance		Offshore
		Offshore cable maintenance		Offshore
		Substation maintenance		Offshore

		Transmission maintenance onshore	Onshore
	Fees, rent and transmission charges	-	Offshore
Decommissioning	Decommissioning	-	Offshore

Appendix B Economic impacts methodology

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

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

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

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

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

The BVGA method is based on the offshore wind UK content methodology. It uses understanding of

the supply chain in the lower tiers to produce a figure that is equivalent to direct and indirect GVA. Calculating a local and national content figure, and understanding profit margins, costs of employment and salaries enables direct and indirect FTEs to be calculated. Induced impacts are calculated using conventional multipliers. The same methodology is followed for local content.

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

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

Where:

FTE_a = Annual FTE employment

GVA = Gross value added (£)

M = Total operating margin (£)

Y_a = Average annual wage (£), and

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

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

Appendix C Supply chain summary for enhanced and worst-case scenarios

Table 5 Supply chain assessment by Level 1 category for enhanced scenario.

Level 0	Level 1	Level 2	Local supply chain	Rest of UK supply chain
Development and project management	Onshore developing, engineering, and permitting		Services for stakeholder and supply chain engagement is done locally. Some local suppliers are used for site investigations. Local accommodation for project team and suppliers while they work in the areas.	Most consultancy-based work are led by UK based teams.
	Offshore developing, engineering, and permitting		Services for stakeholder and supply chain engagement is done locally. Some local suppliers are used for site investigations. Local accommodation for project team and suppliers while they work in the areas.	Most consultancy-based work are led by UK based teams.
	Project management (technical and non-technical)		To use local project management office with use of local services	Is led from SSE Renewables and RWE offices in England.
Turbine supply	Turbine nacelle and hub		Some support services delivered locally	No offshore wind turbine suppliers have nacelle or hub manufacturing facilities in the UK. These are imported.
	Turbine blades		Some support services delivered locally	All blades come from the Hull or Isle of Wight factories
	Turbine tower		Some support services delivered locally	All towers supplied from UK tower manufacturer
	Turbine other		Some support services delivered locally	Some technical sales done in the UK.
Balance of plant supply	Foundation		Some support services delivered locally	Monopiles supplied by SeAH in Teesside. Transition pieces from Smulders Wallsend
	Array cable		Some support services delivered locally	Array cables supplied by JDR Cables from its Hartlepool factory
	Onshore export cable		Some support services delivered locally	Supplied by Prysmian from its Wrexham factory.
	Cable protection		Some support services delivered locally	Cable protection is supplied by UK suppliers

				such as Balmoral, CRP Subsea or Tekmar.
	Offshore export cable		Some support services delivered locally	No available UK suppliers exist.
	Onshore substation equipment and components	Onshore electricals	Local suppliers provide some support systems, such as low voltage electrical equipment, lighting, and security systems.	Engineering and project management in the UK, along with some low voltage systems. No UK supply for high voltage equipment.
		Buildings, access, and security	Some amount carried out by local suppliers	Remainder carried out by rest of UK suppliers
	Offshore substation	Offshore electricals	Local suppliers provide some support systems, such as low voltage electrical equipment, lighting, and security systems.	Engineering and project management in the UK, along with some low voltage systems. No UK supply for high voltage equipment.
		Foundation	Some support services delivered locally	Jacket foundation imported
		Topside	Some support services delivered locally	Fabricated outside UK
Others (cables design)		Some support services delivered locally	These are imported	
Installation and commissioning	Turbine installation and commissioning		Installation contractors not local but some support services from the construction port, such as CTVs	Undertaken by UK contractor with UK marshalling
	Foundation installation		Installation contractors not local but some support services from the construction portsuch as, CTVs	UK project management and engineering but vessel operated from outside UK .UK marshalling Installation crew from across Europe.
	Array cable installation		Installation contractors not local but some support services from the construction port, such as, CTVs	UK project management and engineering but vessel operated from outside UK. Installation crew from across Europe.
	Offshore export cable installation		Installation contractors not local but some support services will be provided from the construction port, such as, CTVs	UK project management and engineering but vessel operated from outside UK. Installation crew from across Europe.
	Offshore substation installation		Installation contractors not local but some support services will be provided from the construction port, such as, CTVs	Most established offshore wind installation contractors are not based in the UK. UK suppliers to provide support services. Installation crew from across Europe.

	Onshore substation installation	Enabling works	Services including labour, plant hire, site security provided locally	Most contractor work led from the UK	
		Buildings	Most building work carried out by local suppliers and labour force using local materials	Most building work led by UK suppliers and labour force	
		Steel fabrications	Provided by local supplier (e.g., Oxborrow)	Some provided by UK suppliers	
		Civil works	Services including labour, plant hire, site security provided locally	Some contractor work led from the UK	
		Site management	Work such as site security, temporary offices and wheel washing carried out by local suppliers and labour force	Some contractor work led from the UK	
		Electrical works	Some support services provided locally	Some contractor work led from the UK	
	Onshore export cable installation	Horizontal directional drilling	Some support services provided locally	Some contractor work led from the UK	
		Civil works	Services including labour, plant hire, site security provided locally	Some contractor work led from the UK	
		Cable terminations	Some support services provided locally	Some contractor work led from the UK	
	Operations base construction	Operations base materials	Some aggregates and steelwork locally supplied	Some provided from the UK	
		Operations base equipment	Plant locally supplied	Some provided from the UK	
		Operations base labour	Some services provided locally	Some contractor work led from the UK	
	Operations, maintenance, and service	Operations	Wind farm administration	There are local options available for O&M bases	Some contractor work led from the UK
			Vessel operation	Dedicated vessels operated locally	Some contractor work led from the UK
			Training and health and safety	Some support services provided locally	Provided from across UK
Turbine maintenance		Routine and minor maintenance	Undertaken using local labour force	Some contractor work led from the UK	
		Major component maintenance	Some support services provided locally	Spare parts, consumables and major unplanned maintenance use UK companies.	
Balance of plant maintenance		Foundation maintenance	Some services provided locally	Most contractor work led from the UK	
		Offshore cable maintenance	Some services provided locally	Most contractor work led from the UK	
		Substation maintenance	Some services provided locally	Most contractor work led from the UK	
		Transmission maintenance onshore	Local contractors	Most contractor work led from the UK	

	Fees, rent and transmission charges	-	Business rates local, some local transmission maintenance	UK rent, insurance, and transmission maintenance
Decommissioning	Decommissioning	-	Some support services provided locally	Some contractor work led from the UK

Table 6 Supply chain assessment by Level 1 category for worst case scenario.

Level 0	Level 1	Level 2	Local supply chain	Rest of UK supply chain
Development and project management	Onshore developing, engineering, and permitting		Services for stakeholder and supply chain engagement done locally. Some local suppliers used for site investigations. Local accommodation for project team and suppliers while they work in the areas.	Most consultancy-based work led by UK based teams.
	Offshore developing, engineering, and permitting		Services for stakeholder and supply chain engagement done locally. Some local suppliers used for site investigations. Local accommodation for project team and suppliers while they work in the areas.	Most consultancy-based work led by UK based teams.
	Project management (technical and non-technical)		To use local project management office with use of local services	Led from SSE Renewables and RWE offices in England.
Turbine supply	Turbine nacelle and hub		Limited local support services provided	No offshore wind turbine suppliers have nacelle or hub manufacturing facilities in the UK. These are imported.
	Turbine blades		Limited local support services provided	Blades are imported.
	Turbine tower		Limited local support services provided	No turbine tower manufacturers in the UK. Turbine towers are imported.
	Turbine other		Limited local support services provided	Some technical sales are done in the UK.
Balance of plant supply	Foundation		Limited local support services provided	No current UK suppliers exist. These are imported.
	Array cable		Limited local support services provided	More competitive non-UK suppliers available.
	Onshore export cable		Limited local support services provided	More competitive non-UK suppliers available.

	Cable protection		Limited local support services provided	More competitive non-UK suppliers available.	
	Offshore export cable		Limited local support services provided	No current UK suppliers exist. These are imported.	
	Onshore substation equipment and components	Onshore electricals		No local suppliers used	UK project management only
		Buildings, access, and security		Carried out by local suppliers	Remainder carried out by rest of UK suppliers
	Offshore substation	Offshore electricals		Some opportunities for local suppliers provide support systems, such as low voltage electrical equipment, lighting, and security systems.	UK project management only
		Foundation		Limited local support services provided	No UK suppliers exist, everything imported
		Topside		Limited local support services provided	No UK suppliers exist, everything imported
Others (cables design)		Limited local support services provided	Limited design support provided by JDR cables.		
Installation and commissioning	Turbine installation and commissioning		Installation contractors not local with limited support services from the construction port, such as CTVs	UK suppliers to provide only some support services. Overseas marshalling	
	Foundation installation		Installation contractors not local with limited support services from the construction port, such as CTVs	Overseas contractor non-UK marshalling. Installation crew from across Europe.	
	Array cable installation		Installation contractors not local with limited support services from the construction port, such as CTVs	UK suppliers to provide support services. Installation crew from across Europe.	
	Offshore export cable installation		Installation contractors not local with limited support services from the construction port, such as CTVs	UK suppliers to provide support services. Installation crew from across Europe.	
	Offshore substation installation		Installation contractors not local with limited support services from the construction port, such as CTVs	No UK based installation contractors. UK suppliers to provide only some support services. Installation crew from across Europe.	
	Onshore substation installation	Enabling works		Local services, including labour, plant hire, site security	Most contractor work lead from the UK
		Buildings		Carried out by local suppliers and labour force and using local materials	Limited contractor work led from the UK

		Steel fabrications	Limited local support services provided	Imported steelwork
		Civil works	Local services, including labour, hotels, and plant hire	Most contractor work led from the UK
		Site management	Work such as site security, temporary offices and wheel washing carried out by local suppliers and labour force	Most contractor work led from the UK
		Electrical works	Some local services provided	Most contractor work led from the UK
	Onshore export cable installation	Horizontal directional drilling	Some local services provided	Most contractor work led from the UK
		Civil works	Local services, including labour, hotels and plant hire	Most contractor work led from the UK
		Cable terminations	Some local services provided	Most contractor work led from the UK
	Operations base construction	Operations base materials	Locally supplied aggregates and steelwork	Most contractor work led from the UK
		Operations base equipment	Locally supplied plant	Most contractor work led from the UK
		Operations base labour	Local labour provided	Limited contractor work led from the UK
Operations, maintenance, and service	Operations	Wind farm administration	There are local options available for O&M bases	Limited contractor work led from the UK
		Vessel operation	Dedicated vessels operated locally	Limited contractor work led from the UK
		Training and health and safety	Limited local support services provided	No UK suppliers
	Turbine maintenance	Routine and minor maintenance	Undertaken using local labour force	Limited contractor work led from the UK
		Major component maintenance	Limited local support services provided	Spare parts, consumables and major unplanned maintenance use few UK companies
	Balance of plant maintenance	Foundation maintenance	Limited local support services provided	Limited contractor work led from the UK
		Offshore cable maintenance	Limited local support services provided	Limited contractor work led from the UK
		Substation maintenance	Limited local support services provided	Limited contractor work led from the UK
		Transmission maintenance onshore	Local contractors	Most contractor work led from the UK
	Fees, rent and transmission charges	-	Business rates local, some local transmission maintenance	UK rent, insurance, and transmission maintenance
Decommissioning	Decommissioning	-	Limited local support services provided	Limited contractor work led from the UK

Appendix D Economic impacts tables

Table 7 GVA for North Falls supply chain categories for all three scenarios.

Level 0	Level 1	Level 2	Onshore/ offshore	GVA (£) Baseline scenario	GVA (£) Enhanced scenario	GVA (£) Worst case scenario	
Development and project management	Onshore developing, engineering, and permitting		Onshore	24,150,000	24,150,000	24,150,000	
	Offshore developing, engineering, and permitting		Offshore	24,060,000	24,060,000	24,060,000	
	Project management (technical and non-technical)		Onshore	48,900,000	48,900,000	48,900,000	
Turbine	Turbine nacelle and hub		Offshore				
	Turbine blades		Offshore	9,280,000	51,050,000		
	Turbine tower		Offshore		12,540,000		
	Turbine others		Offshore	3,400,000	16,990,000		
Balance of plant	Foundation		Offshore	63,090,000	126,190,000		
	Array cable		Offshore	12,060,000	13,400,000		
	Onshore export cable		Onshore		14,080,000		
	Offshore export cable		Offshore				
	Cable Protection		Offshore	1,090,000	1,240,000		
	Onshore substation equipment and components	Onshore electricals		Onshore	1,920,000	2,400,000	800,000
		Buildings, access, and security		Onshore	5,490,000	5,490,000	5,490,000
	Offshore substation	Offshore electricals		Offshore	3,840,000	4,800,000	1,600,000
		Foundation		Offshore			
		Topside		Offshore			
Others		Offshore					
Installation and commissioning	Turbine installation and commissioning		Offshore	24,030,000	87,650,000	9,900,000	
	Foundation installation		Offshore	4,770,000	18,390,000	4,770,000	
	Array cable installation		Offshore	2,210,000	14,890,000	2,210,000	
	Offshore export cable installation		Offshore	3,330,000	10,000,000	3,330,000	

	Offshore substation installation		Offshore	670,000	870,000	670,000
	Onshore substation installation	Enabling works	Onshore	2,810,000	2,810,000	2,810,000
		Buildings	Onshore	3,210,000	3,210,000	3,210,000
		Steel fabrications	Onshore	5,620,000	5,620,000	
		Onshore substation civil works	Onshore	3,210,000	3,210,000	3,210,000
		Site management	Onshore	3,610,000	3,610,000	4,620,000
		Electrical works	Onshore	39,360,000	39,360,000	39,360,000
	Onshore export cable installation	Horizontal directional drilling	Onshore	12,250,000	12,250,000	12,250,000
		Onshore export cable civil works	Onshore	41,520,000	41,520,000	36,330,000
		Cable terminations	Onshore	6,560,000	6,560,000	7,650,000
	Operations base construction	Operations base materials	Onshore	17,270,000	17,270,000	15,110,000
		Operations base equipment	Onshore	4,320,000	4,320,000	3,780,000
		Operations base labour	Onshore	7,200,000	7,200,000	7,200,000
	Operations, maintenance, and service	Operations	Wind farm administration	Offshore	30,350,000	30,350,000
Vessel operation			Offshore	61,650,000	61,650,000	61,650,000
Training and health and safety			Offshore	9,790,000	9,790,000	9,790,000
Turbine maintenance		Routine and minor maintenance	Offshore	315,700,000	315,700,000	315,700,000
		Major component maintenance	Offshore	4,200,000	4,200,000	4,200,000
Balance of plant maintenance		Foundation maintenance	Offshore	98,060,000	114,400,000	65,370,000
		Offshore cable maintenance	Offshore	13,350,000	13,350,000	9,530,000
		Substation maintenance	Offshore	38,130,000	38,130,000	27,240,000
		Transmission maintenance onshore	Onshore	12,710,000	12,710,000	12,710,000
Fees, rent and transmission charges			Offshore	160,520,000	160,520,000	160,520,000
Decommissioning		Decommissioning	Decommissioning	Offshore	38,330,000	44,710,000

Table 8 Jobs supported for North Falls supply chain categories for all three scenarios.

Level 0	Level 1	Level 2	Onshore/ offshore	FTE Years Baseline scenario	FTE Years - Enhanced scenario	FTE Years -Worst case scenario	
Development and project	Onshore developing, engineering, and permitting		Onshore	310	310	310	
	Offshore developing, engineering, and permitting		Offshore	270	270	270	
	Project management (technical and non-technical)		Onshore	550	550	550	
Turbine	Turbine nacelle and hub		Offshore				
	Turbine blades		Offshore	120	650		
	Turbine tower		Offshore		130		
	Turbine others		Offshore	40	180		
Balance of plant	Foundation		Offshore	830	1,660		
	Array cable		Offshore	160	170		
	Onshore export cable		Onshore		190		
	Offshore export cable		Offshore				
	Cable Protection		Offshore	10	20		
	Onshore substation equipment and components	Onshore electricals		Onshore	30	30	10
		Buildings, access, and security		Onshore	70	70	70
	Offshore substation	Offshore electricals		Offshore	50	70	20
		Foundation		Offshore			
		Topside		Offshore			
Others		Offshore					
Installation and commissioning	Turbine installation and commissioning		Offshore	250	910	100	
	Foundation installation		Offshore	50	210	50	
	Array cable installation		Offshore	20	160	20	
	Offshore export cable installation		Offshore	40	110	40	
	Offshore substation installation		Offshore	10	10	10	
	Onshore substation installation	Enabling works		Onshore	40	40	40
		Buildings		Onshore	40	40	40
		Steel fabrications		Onshore	70	70	
		Onshore substation civil works		Onshore	40	40	40
Site management			Onshore	50	50	60	

		Electrical works	Onshore	520	520	520	
	Onshore export cable installation	Horizontal directional drilling	Onshore	140	140	140	
		Onshore export cable civil works	Onshore	490	490	430	
		Cable terminations	Onshore	80	80	90	
	Operations base construction	Operations base materials	Onshore	200	200	180	
		Operations base equipment	Onshore	50	50	40	
		Operations base labour	Onshore	80	80	80	
	Operations, maintenance, and service	Operations	Wind farm administration	Offshore	300	300	300
			Vessel operation	Offshore	600	600	600
Training and health and safety			Offshore	100	100	100	
Turbine maintenance		Routine and minor maintenance	Offshore	3,250	3,250	3,250	
		Major component maintenance	Offshore	40	40	40	
Balance of plant maintenance		Foundation maintenance	Offshore	1,080	1,260	720	
		Offshore cable maintenance	Offshore	150	150	100	
		Substation maintenance	Offshore	420	420	300	
		Transmission maintenance onshore	Onshore	140	140	140	
Fees, rent and transmission charges			Offshore	1,660	1,660	1,660	
Decommissioning		Decommissioning	Decommissioning	Offshore	340	390	280

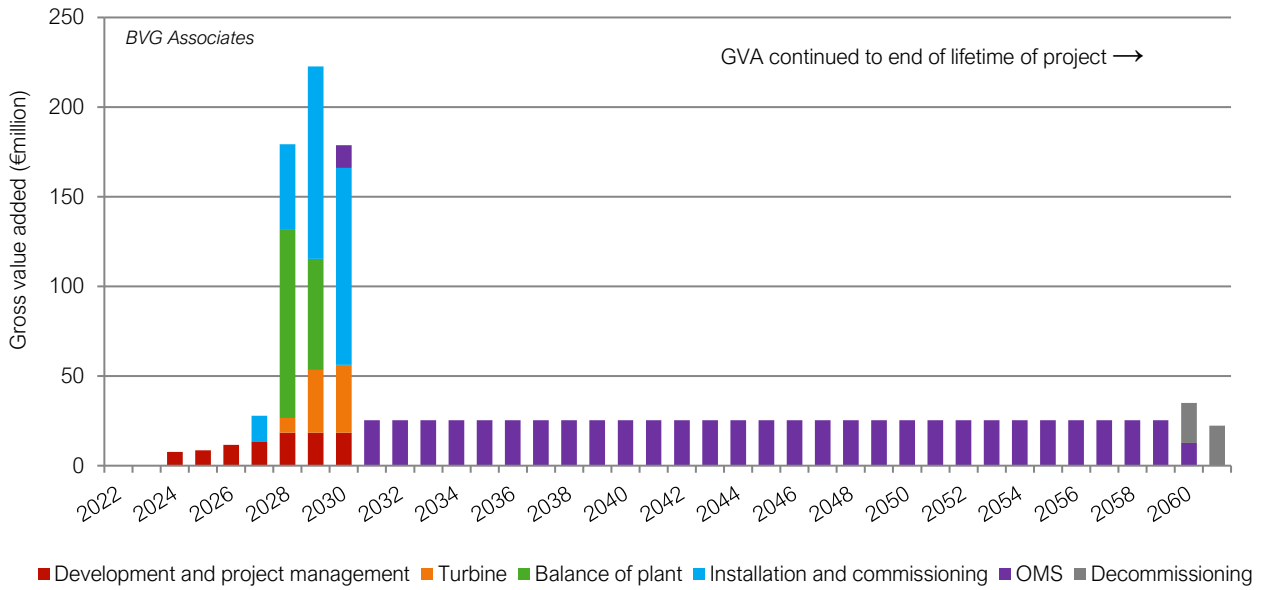


Figure 11 Total UK GVA created by North Falls over the lifetime of the wind farm for enhanced scenario.

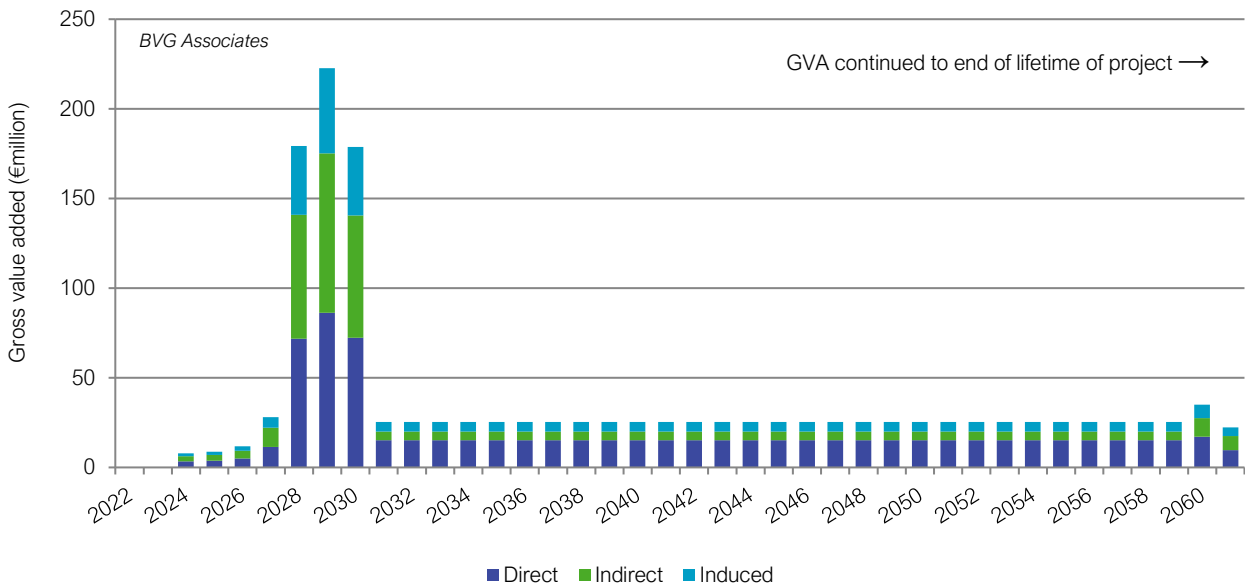


Figure 12 Total UK GVA created by North Falls split into direct, indirect, and induced impacts, over the lifetime of the wind farm for enhanced scenario.

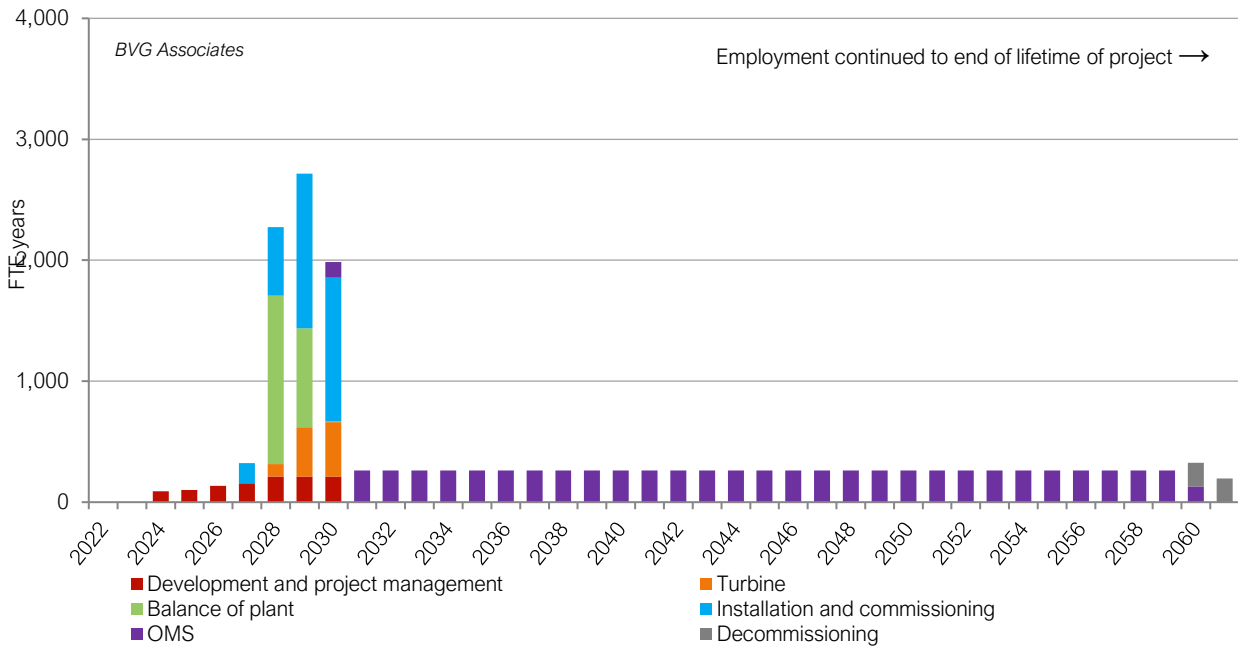


Figure 13 Total UK full time equivalent jobs created by North Falls over the lifetime of the wind farm for enhanced scenario.

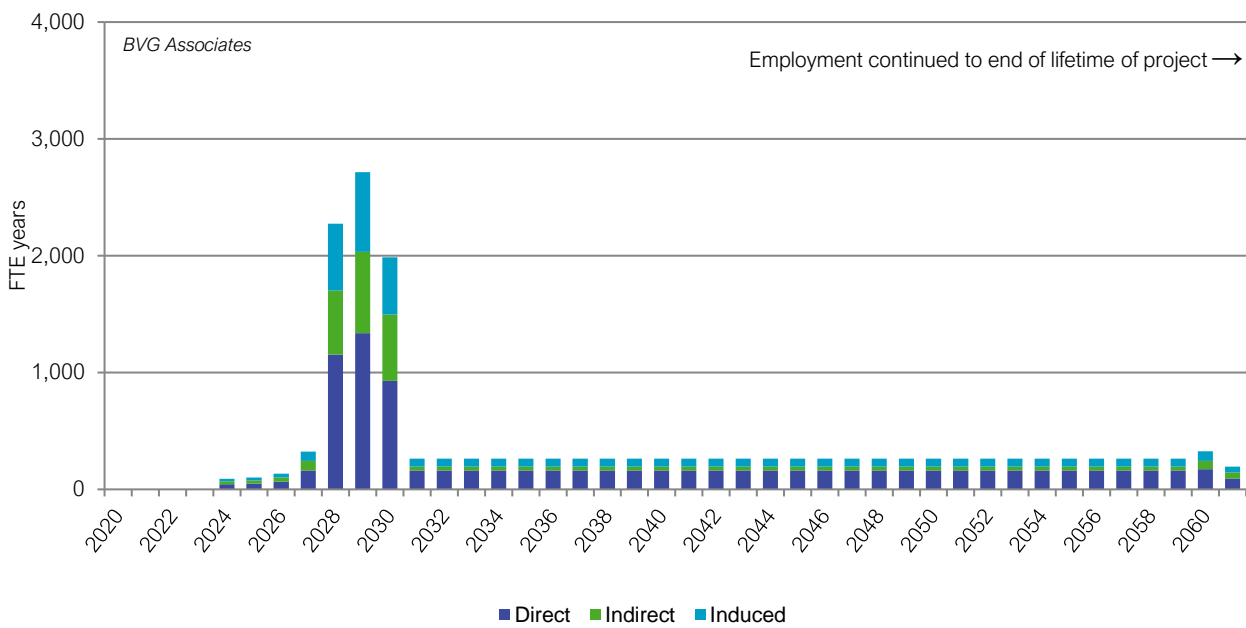


Figure 14 Total UK full time equivalent jobs created by North Falls split into direct, indirect, and induced impacts, over the lifetime of the wind farm for enhanced scenario.

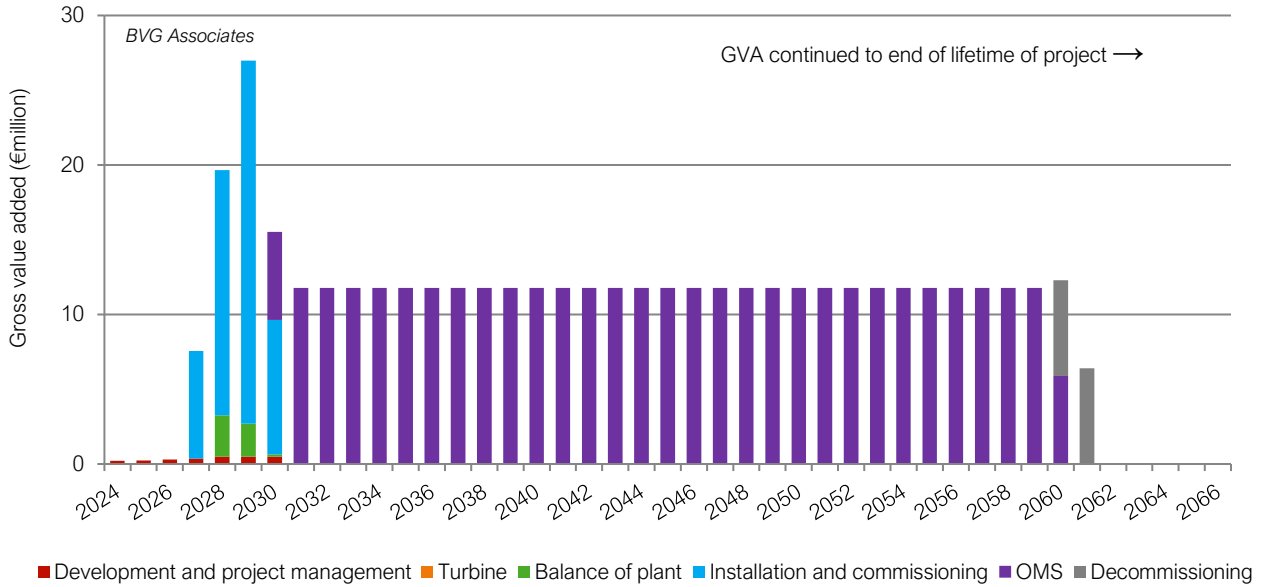


Figure 15 Local GVA created by North Falls over the lifetime of the wind farm for enhanced scenario.

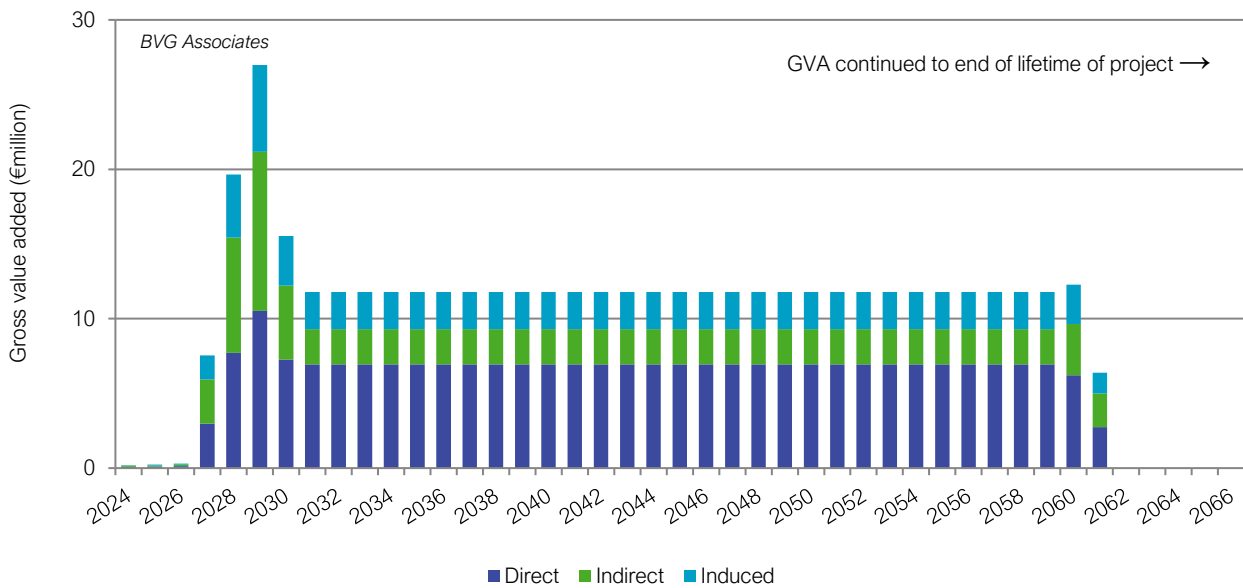


Figure 16 Local GVA created by North Falls split into direct, indirect, and induced impacts, over the lifetime of the wind farm for enhanced scenario.

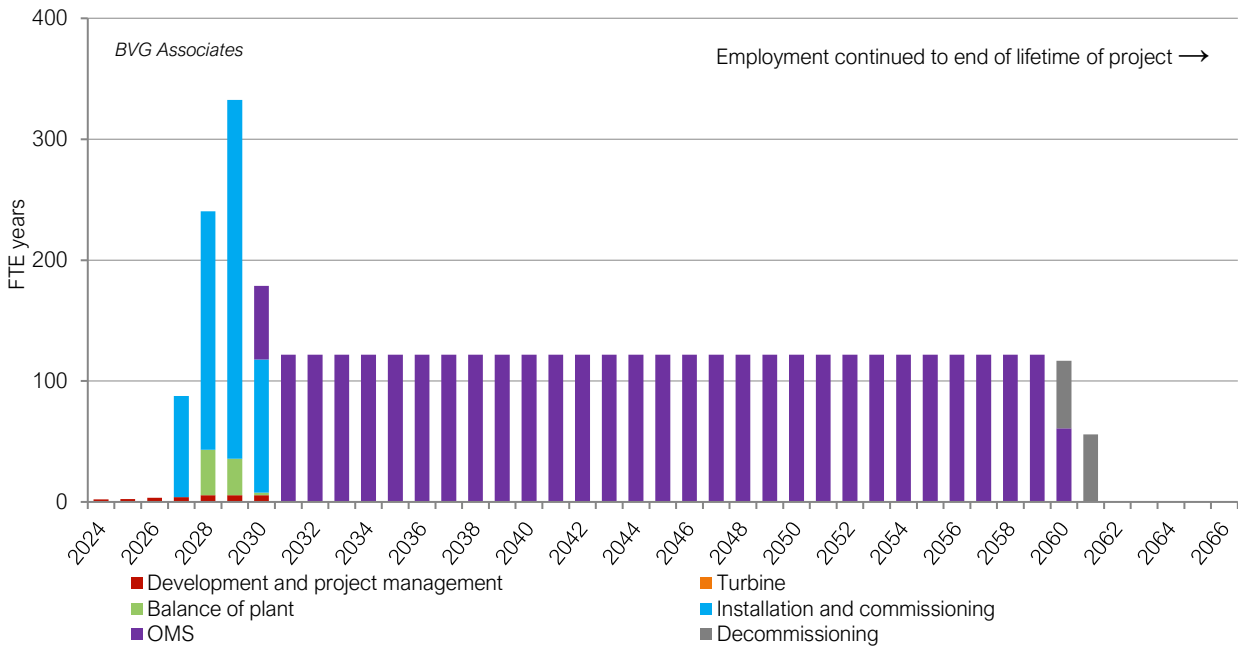


Figure 17 Local full time equivalent jobs created by North Falls over the lifetime of the wind farm for enhanced scenario.

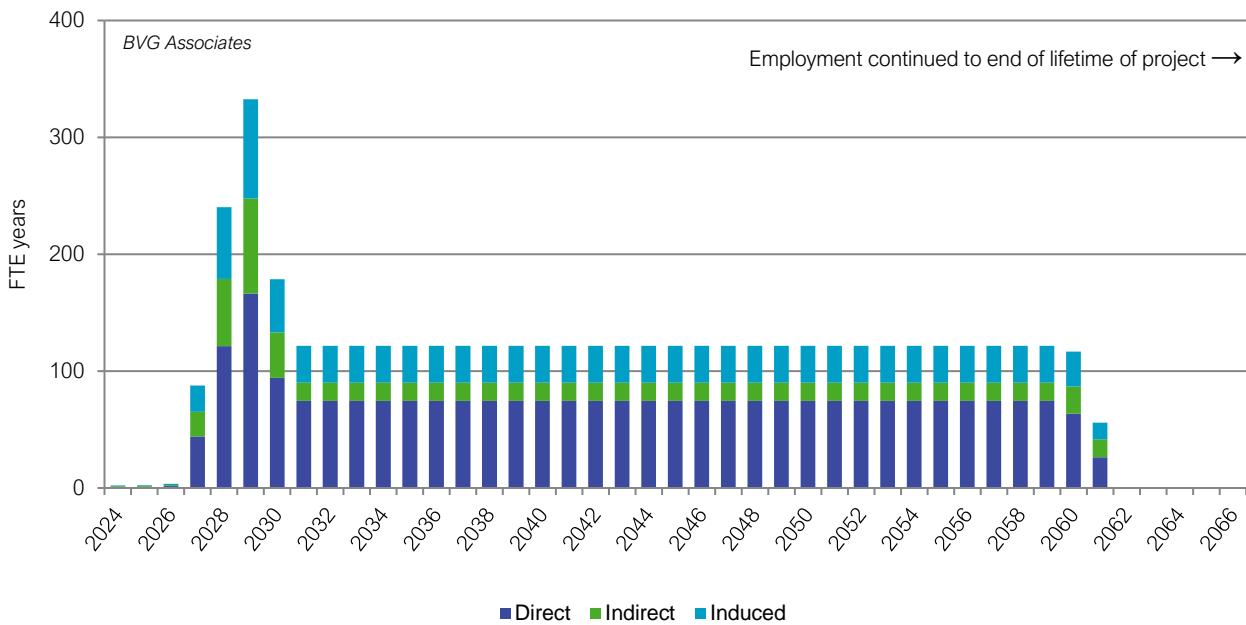


Figure 18 Local full time equivalent jobs created by North Falls split into direct, indirect, and induced impacts, over the lifetime of the wind farm for enhanced scenario.

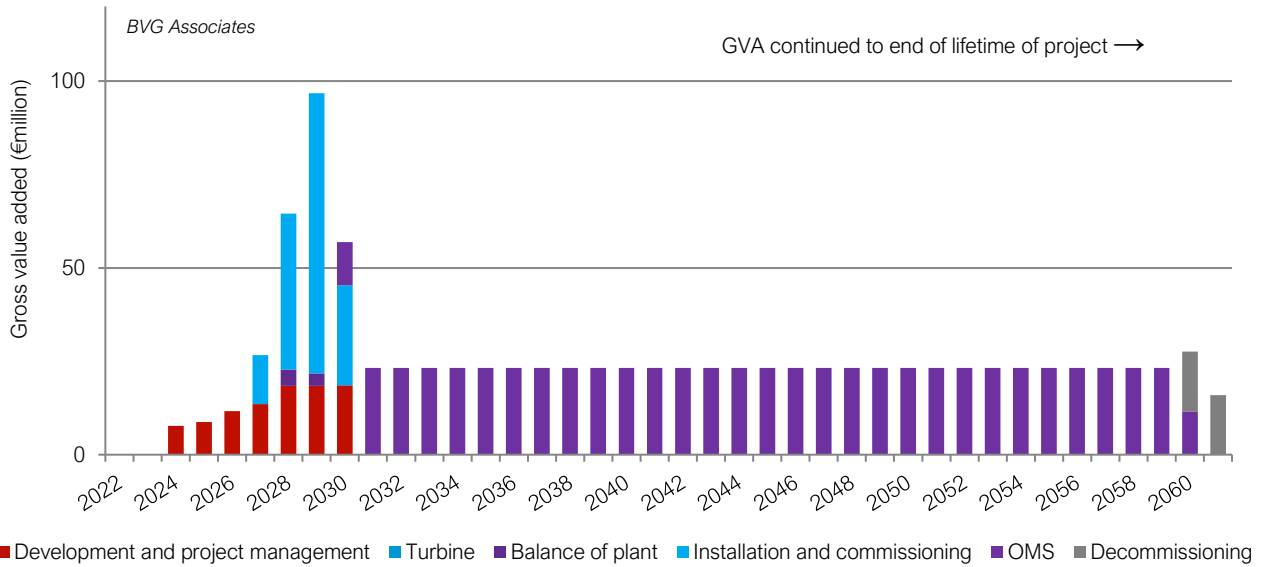


Figure 19 Total UK GVA created by North Falls over the lifetime of the wind farm for worst case scenario.

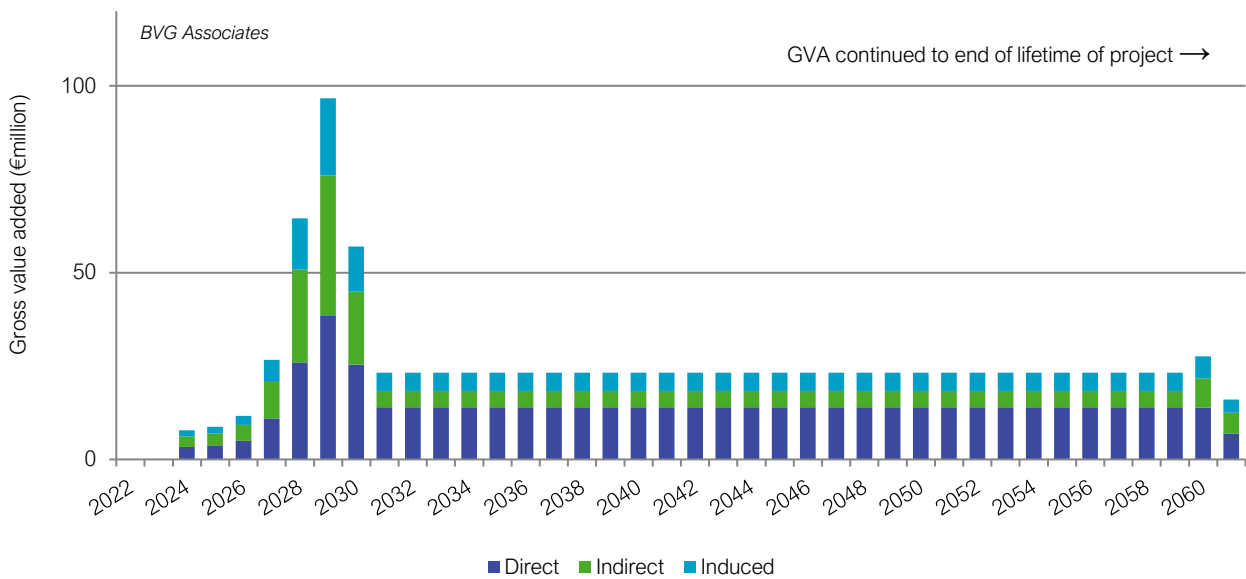


Figure 20 Total UK GVA created by North Falls split into direct, indirect, and induced impacts, over the lifetime of the wind farm for worst case scenario.

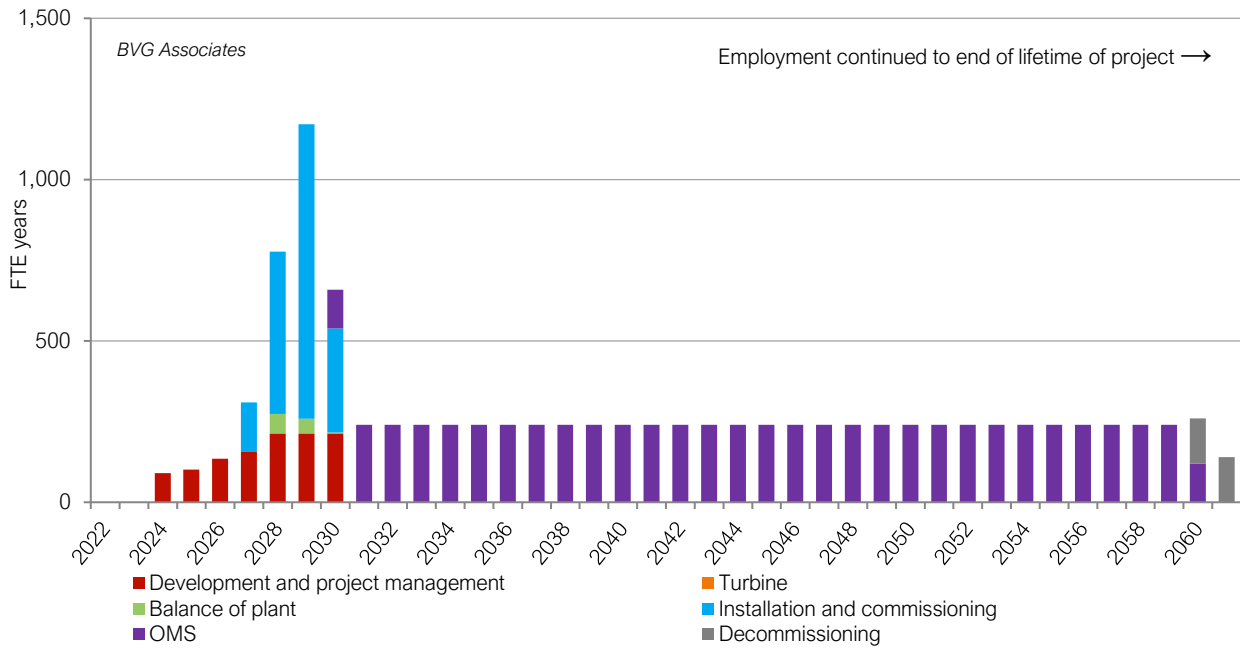


Figure 21 Total UK full time equivalent jobs created by North Falls over the lifetime of the wind farm for worst case scenario.

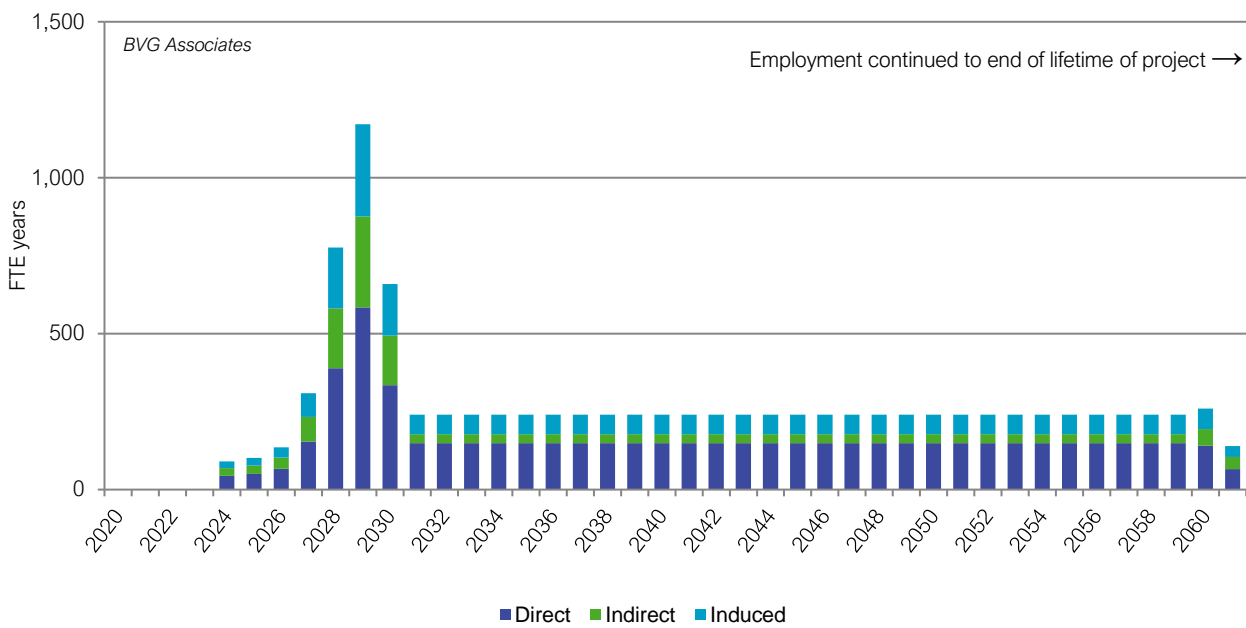


Figure 22 Total UK full time equivalent jobs created by North Falls split into direct, indirect, and induced impacts, over the lifetime of the wind farm for worst case scenario.

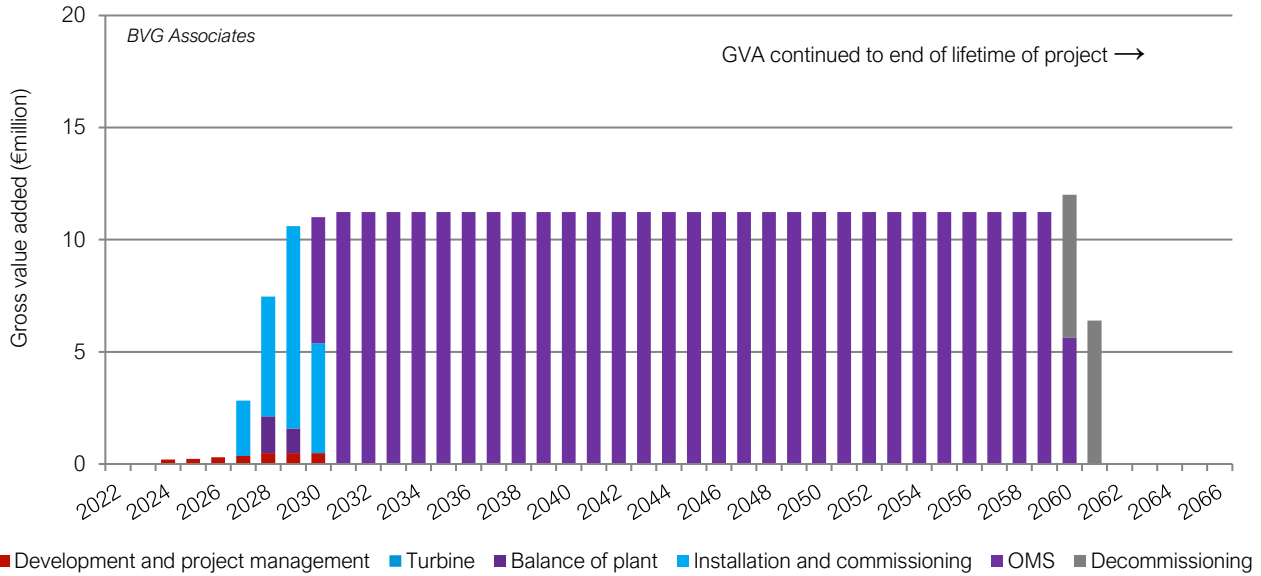


Figure 23 Local GVA created by North Falls over the lifetime of the wind farm for worst case scenario.

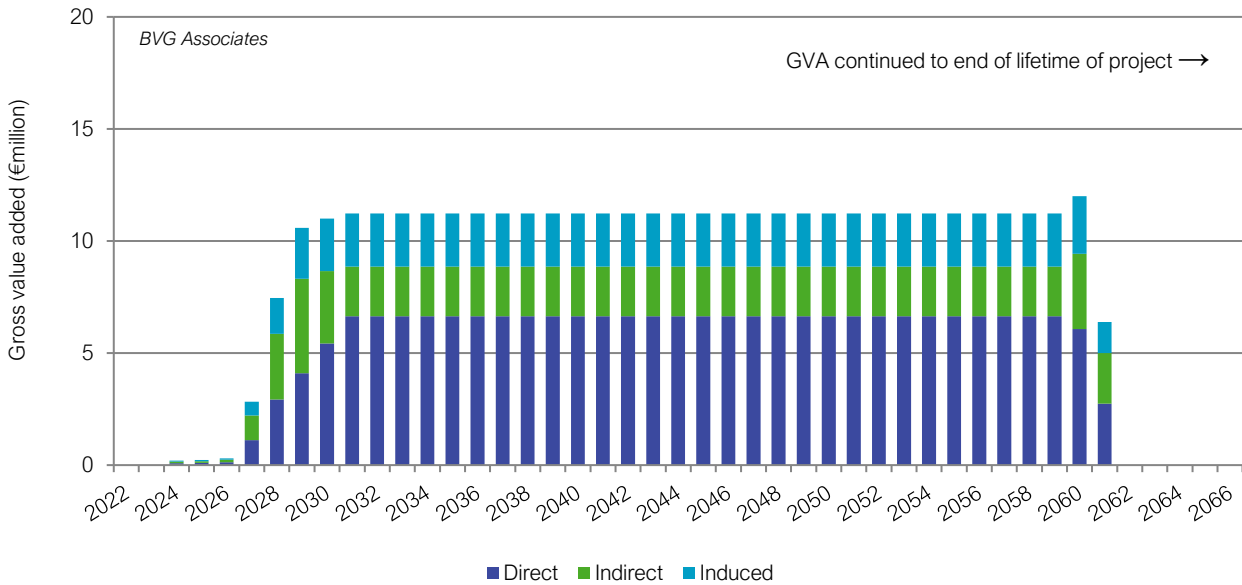


Figure 24 Local GVA created by North Falls split into direct, indirect, and induced impacts, over the lifetime of the wind farm for worst case scenario.

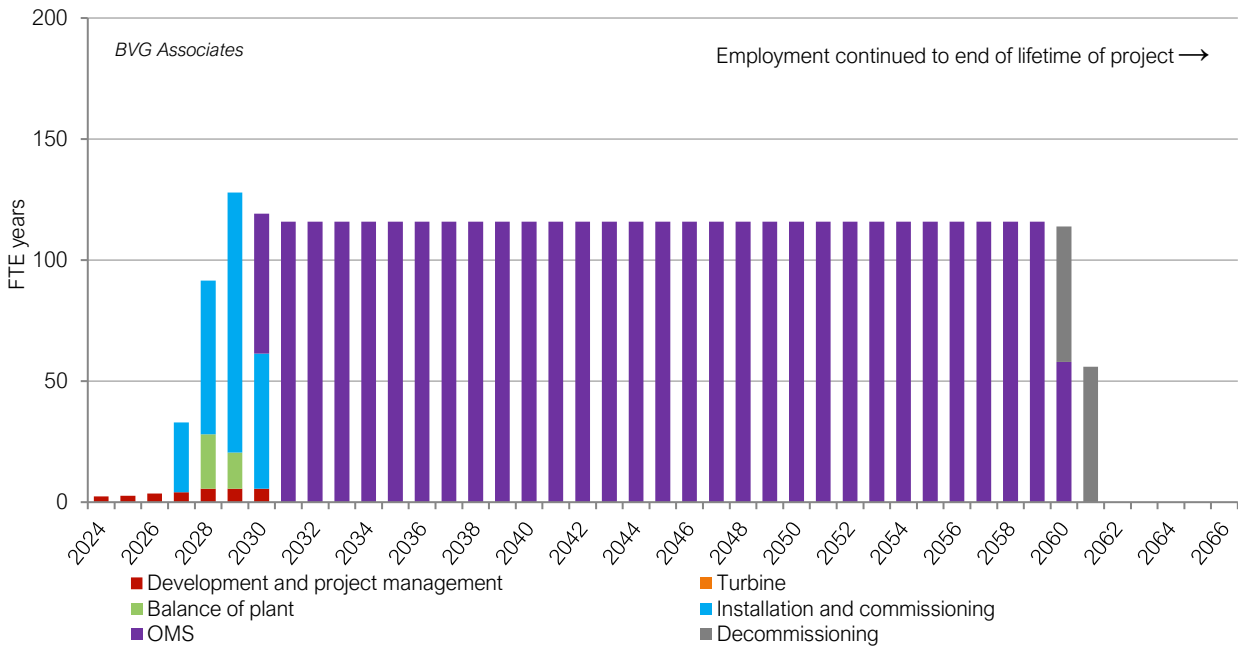


Figure 25 Local full time equivalent jobs created by North Falls over the lifetime of the wind farm for worst case scenario.

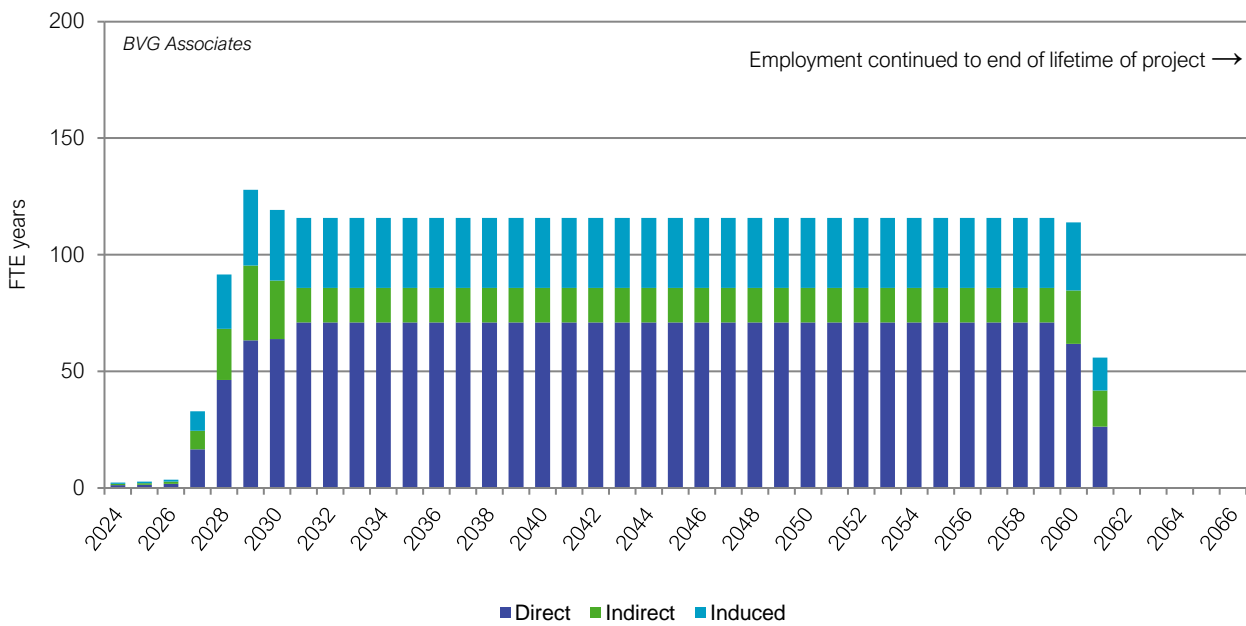
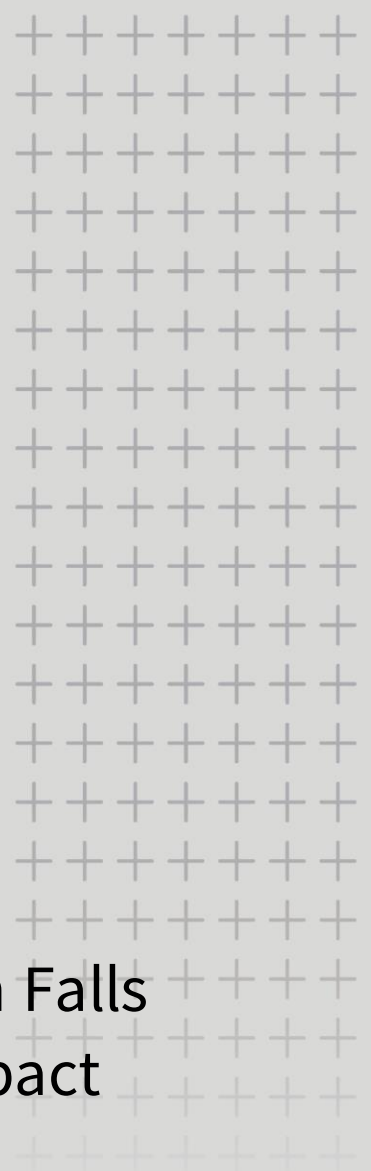


Figure 26 Local full time equivalent jobs created by North Falls split into direct, indirect, and induced impacts, over the lifetime of the wind farm for worst case scenario.

About BVG Associates

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

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



Addendum to Appendix 31.1 North Falls Offshore Wind Farm Economic Impact

A Report by Hatch
May 2024

Addendum to Appendix 31.1 North Falls Offshore Wind Farm Economic Impact

May 2024

www.hatch.co.uk

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Annex A - Option 2, Scenario 1: Breakdown of economic impacts by onshore and offshore activities

Annex B - Option 1, Scenario 2: Breakdown of economic impacts by onshore and offshore activities

Disclaimer & Limitations of Use

1. Introduction

1.1 Hatch Urban Solutions was commissioned to assess the economic impact of the North Falls Offshore Wind Farm project ('North Falls') for the Environment Statement (ES). Three project design configurations are being considered at this stage:

- **Option 1** – Onshore connection, North Falls alone.
- **Option 2** – Onshore connection, shared onshore cable route and onshore cable duct installation (but separate onshore export cables) and co-located but separate project onshore substation infrastructure with the Five Estuaries Offshore Wind Farm ('Five Estuaries').
- **Option 3** – Offshore electrical connection.

1.2 In addition to the options considered for North Falls, there are also 3 cumulative onshore build-out scenarios being considered with the Five Estuaries Offshore Wind Farm ('Five Estuaries') under Options 1 and 2. These are:

- **Option 1** –
 - **Scenario 2** (both projects are constructed separately but with overlapping timescales, ensuring reuse of shared enabling infrastructure (i.e. haul roads, temporary construction compounds (TCCs) and accesses)); or
 - **Scenario 3** (Five Estuaries is not constructed¹; or both projects are constructed separately and do not overlap with no shared enabling infrastructure²);
- **Option 2** –
 - **Scenario 1** (onshore cable trenching and ducting works for both projects undertaken as part of a single construction activity).

1.3 The Preliminary Environment Information Report (PEIR) considered the economic benefits of Option 1. Appendix 31.1 North Fall Offshore Wind Farm Economic Impact (BVG Associates, February 2023) outlines the economic impact methodology and results in full.

1.4 The economic impact estimates provided at the PEIR stage for Option 1 remain relevant at the ES stage. The purpose of this Addendum is to provide an assessment of the economic benefits expected under Option 2 and Option 3, and under the cumulative build out scenarios with Five Estuaries (Scenarios 1-3).

¹ In which case, please refer to Appendix 31.1 North Fall Offshore Wind Farm Economic Impact (BVG Associates, February 2023) for the assessment of the impacts of building North Falls alone.

² In which case, there is no reduction in overall impacts for the projects from the sharing of infrastructure. The impacts of each project have been assessed in Appendix 31.1 North Fall Offshore Wind Farm Economic Impact (BVG Associates, February 2023) and the Five Estuaries Offshore Wind Farm Environmental Statement Volume 6, Part 3, Chapter 3: Socio-economic, tourism and recreation, March 2024 (accessed here: [EN010115-000247-6.3.3 Socio-Economic, Tourism and Recreation.pdf](https://planninginspectorate.gov.uk/EN010115-000247-6.3.3 Socio-Economic, Tourism and Recreation.pdf)).

1.5 The Addendum is structured as follows:

- **Section 2 – Design Configurations**, provides a description of the specifications for Option 2 and Option 3.
- **Section 3 – Economic Impacts**, provides an outline of the economic impact estimation approach and summarises the results for Option 2 and Option 3.

2. Design configurations

- 2.1 This section describes the specification of the shared cable infrastructure with the Five Estuaries (Option 2) and offshore electrical connection (Option 3) scenarios, and the cumulative build out scenarios with Five Estuaries (Scenarios 1-3).

Option 1: Onshore connection, North Falls alone / Option 2: Onshore connection, shared onshore cable duct installation (but separate onshore export cables) and co-located but separate project onshore substation infrastructure with Five Estuaries

- 2.2 The North Falls and Five Estuaries projects are the subject of two separate Development Consent Order (DCO) applications. It is possible that either or both of the projects would be developed. If both projects are developed, construction may be undertaken concurrently or sequentially. Namely, the following construction scenarios for the two projects are being considered under Options 1 and 2:

If Option 2 is progressed:

- **Construction Scenario 1:** North Falls proceeds to construction and undertakes the additional onshore cable trenching and ducting works for Five Estuaries as part of a single construction activity (i.e. ducting for four electrical circuits). North Falls would undertake the cable installation and onshore substation construction for its project only (i.e. two electrical circuits). The two projects would share accesses from the public highway for onshore cable installation and substation construction. The projects would utilise and share the same TCCs for the cable installation works.

If Option 1 is progressed:

- **Construction Scenario 2:** Both North Falls and Five Estuaries projects proceed to construction on different but overlapping timescales (between 1 and 3 years apart), with onshore cable trenching and ducting works undertaken independently but opportunities for reuse of enabling infrastructure e.g. haul roads / site accesses etc., with the other project then reinstating once complete.
- **Construction Scenario 3:** Five Estuaries does not proceed to construction³; or both Five Estuaries and North Falls projects proceed to construction on significantly different programmes (over 3 years apart). In the latter case the significantly different programmes would mean that haul roads and TCCs are reinstated prior to the second project proceeding. In such case cumulative impacts are for a potential construction period of 6 years+. This scenario presents

³ In which case, please refer to Appendix 31.1 North Fall Offshore Wind Farm Economic Impact (BVG Associates, February 2023) for the assessment of the impacts of building North Falls alone.

no reduction in overall impacts for the projects from the sharing of infrastructure, and as such has not been assessed here⁴.

2.3 Table 2.1 sets out the additional works required under Construction Scenarios 1 and 2 compared to building out North Falls alone.

2.4 The economic impact assessment in Chapter 3 provides estimates for the following scenarios:

- **Option 2, Scenario 1** ('single construction activity') – onshore cable trenching and ducting works for both projects undertaken as part of a single construction activity, with separate onshore cable installation and co-located but separate onshore substation infrastructure;
- **Option 1, Scenario 2** ('separate construction') – onshore cable routes for both projects are constructed separately but with overlapping timescales, ensuring reuse of shared enabling infrastructure (i.e. haul roads, temporary construction compounds (TCCs) and accesses).

⁴ The impacts of each project have been assessed in Appendix 31.1 North Fall Offshore Wind Farm Economic Impact (BVG Associates, February 2023) and the Five Estuaries Offshore Wind Farm Environmental Statement Volume 6, Part 3, Chapter 3: Socio-economic, tourism and recreation, March 2024.

Table 2.1 Summary of key differences of the North Falls and Five Estuaries cumulative build out scenarios compared to North Falls alone

Construction Scenario 1	Construction Scenario 2
<ul style="list-style-type: none"> • 2 additional sets of ducts* 	<ul style="list-style-type: none"> • 2 additional sets of ducts, installed in a separate construction activity
<ul style="list-style-type: none"> • Additional joint bays and link boxes, crossing for the 2nd project* 	<ul style="list-style-type: none"> • Additional joint bays and link boxes, crossing for the 2nd project
<ul style="list-style-type: none"> • Cable pulling for 2nd project 	<ul style="list-style-type: none"> • Cable pulling for the 2nd project
<ul style="list-style-type: none"> • Co-located onshore substation and associated infrastructure for two projects 	<ul style="list-style-type: none"> • Co-located onshore substation and associated infrastructure for two projects
<ul style="list-style-type: none"> • 3 additional HDD at landfall 	<ul style="list-style-type: none"> • 3 additional HDD at landfall
<ul style="list-style-type: none"> • Additional 400kV cable route infrastructure for 2nd project 	<ul style="list-style-type: none"> • Additional 400kV cable route infrastructure for the 2nd project
<ul style="list-style-type: none"> • Additional National Grid substation connection works for 2nd project 	<ul style="list-style-type: none"> • Additional National Grid substation connection works for the 2nd project

*For Construction Scenarios 2 (and 3), the relevant reference case from the main assessment is 'North Falls Alone Built Out Option 1' (i.e. the worst case scenario considered in the socio-economic chapter). For Construction Scenario 1, the relevant reference case from the main assessment is 'North Falls Alone Built Out Option 2'. This includes all the elements of 'North Falls Alone Built Out Option 1' plus 2 additional sets of cable ducts to provide for the 2nd project and a number of joint bays which is representative of both North Falls and Five Estuaries. These differences are reflected in the table to facilitate comparison across construction scenarios.

Option 3: Offshore electrical connection

- 2.5 Option 3 – Offshore electrical connection does not require the delivery of any of the onshore elements typically associated with wind farm projects.
- 2.6 The main differences relative to the North Falls Alone (Option 1) offshore project specification are:
- Additional Offshore Coordination Support Scheme (OCSS) work will be required as part of project development and management.
 - An offshore converter station platform will be procured and installed. This is in addition to one offshore substation platform. Comparatively, North Falls Alone (Option 1) will procure and install two offshore substation platforms.
 - No offshore export cabling is required as part of North Falls.

3. Economic Impacts

- 3.1 This section provides an outline of the economic impact estimation approach. Then, it summarises the economic impact results for the shared cable infrastructure with the Five Estuaries under the concurrent (Option 2, Scenario 1) and sequential (Option 1, Scenario 2) construction scenarios, as well as the offshore electrical connection (Option 3) option.

Methodology

- 3.2 The economic impact estimation builds on the findings of the Appendix 31.1 North Fall Offshore Wind Farm Economic Impact (BVG Associates, February 2023). Economic impact estimates for Option 2, Scenario 1, Option 1, Scenario 2 and Option 3 have been adjusted to reflect the change in man hours required relative to Option 1 (North Falls Alone) across supply chain categories. Table 3.1 provides the assumptions that drive the economic impact calculations for Option 2, Scenario 1; Option 1 Scenario 2; and Option 3.

Table 3.1 Economic impact assumptions for Option 2 and Option 3

Option 2, Scenario 1: Shared onshore cable route with Five Estuaries, single construction activity		
Assumption/Justification	Source	
1 28% reduction in the indicative average daily personnel requirements for onshore cable, due to efficiencies from combining works	Onshore Cable Routing Construction Metrics for North Falls Alone and North Falls and Five Estuaries Combined, 20 July 2023	
2 No change in employment levels for substation construction, as minimal joint work required	Co-located Substations Early Design – Construction Methodologies and Parameters, 03 August 2023	
3 No change in construction management personnel, as each project requires their own representatives onsite	Discussion with NFOW, 16 October 2023	
4 50% reduction in onshore developing, engineering and permitting, due to the same number of engineers required across the two projects	Discussion with NFOW, 16 October 2023	
5 No change in personnel requirements during the operational phase of the project	Discussion with NFOW, 16 October 2023	
6 No change in construction timescales, as the two projects reach FID within a year of each other	EIA Scenario Descriptions, 18 October 2023	
Option 1, Scenario 2: Shared onshore cable route with Five Estuaries, separate construction		
Assumption/Justification	Source	
1 27% reduction in the indicative average daily personnel requirements for onshore cable, due to efficiencies from combining works	Onshore Cable Routing Construction Metrics for North Falls Alone and North Falls and Five Estuaries Combined, 20 July 2023	
2 No change in employment levels for substation construction, as minimal joint work required	Co-located Substations Early Design – Construction Methodologies and Parameters, 03 August 2023	
3 No change in construction management personnel, as each project requires their own representatives onsite	Discussion with NFOW, 16 October 2023	
4 50% reduction in onshore developing, engineering and permitting, due to the same number of engineers required across the two projects	Discussion with NFOW, 16 October 2023	
5 No change in personnel requirements during the operational phase of the project	Discussion with NFOW, 16 October 2023	
6 Three additional construction years, as the two projects reach FID between 1 and 3 years apart	EIA Scenario Descriptions, 18 October 2023	
Option 3: Offshore electrical connection		

Assumption/Justification	Source
1 There will be no GVA and employment impacts from onshore construction and operation activities under this option.	Discussion with NFOW, 16 October 2023
2 1% increase in impacts from offshore developing, engineering and permitting, based on the additional funding that will be channelled by North Falls towards UK based OCSS activities. The increase in locally based OCSS activities required are assumed to be negligible (0-5% of UK based activities).	Hatch estimate based on discussion with NFOW, 16 October 2023
3 There will be no GVA and employment impacts from procuring, installing and maintaining an offshore export cable because this is not required under this option.	Discussion with NFOW, 16 October 2023
4 No change in impacts from procuring and installing array cabling, as a negligible increase required	Discussion with NFOW, 16 October 2023
5 10% reduction in impacts from cable protection, due to an offshore export cable not being required	Email correspondence with NFOW, 09 November 23
6 No change in impacts from procuring an offshore substation, as HVDC platform is also manufactured outside UK	Discussion with NFOW, 16 October 2023
7 33% increase in impacts from offshore substation installation and maintenance. Due to limited information availability at this stage, these were proxied to increase in line with the total cost of an HVDC platform attributed to North Falls compared to two smaller HVAC platforms. A third of the total cost of an HVDC has been attributed to North Falls, as it will be connecting three projects.	Hatch estimate based on discussion with NFOW, 16 October 2023
8 20% reduction in impacts from offshore decommissioning activities. Due to limited information availability at this stage, this has been proxied as the cumulative reduction in construction/installation costs implied by the above changes.	Hatch estimate based on email correspondence with NFOW, 09 November 23

Economic Impacts

- 3.3 In line with the ES socio-economic assessment, the Addendum reports on the direct and indirect impacts generated by North Falls across all phases. The assessment excludes the induced impacts of the project as these are typically affected by greater uncertainty, and are more difficult to measure and defend robustly in terms of their scale and additionality. In line with Appendix 31.1 (Volume III), induced effects are predicted to account for around 21%-26% of total economic (jobs and GVA) impacts.

Option 2, Scenario 1: Shared onshore cable route with Five Estuaries, single construction activity

- 3.4 The tables below reflect the economic impact jointly supported by onshore and offshore activities across the development and construction, operational and decommissioning phases of the project. A breakdown of impacts across the onshore and offshore dimensions of the project can be found in Annex A.

Development and construction phase

- 3.5 Table 3.2 shows the annual average and peak GVA and employment impacts generated during the development and construction phase of the project. The central scenario indicates that annual average impacts are 8-11% lower compared to Option 1 (North Falls Alone). Peak impacts are 9-10% lower compared to Option 1 (North Falls Alone). This is due to development and construction efficiencies being achieved by concurrent delivery of onshore infrastructure jointly for North Falls and Five Estuaries.
- 3.6 Annex A provides the average GVA and employment impacts generated per annum during the development and construction phase for the onshore and offshore elements of the project respectively.

Table 3.2 Average and peak GVA and employment impacts generated per annum during the development and construction phase

	Worst Case Scenario		Baseline Scenario		Enhanced Scenario	
GVA impacts						
UK impact						
	Annual average impact	Peak annual impact	Annual average impact	Peak annual impact	Annual average impact	Peak annual impact
Direct GVA (£m)	17.7	33.5	26.0	39.5	41.9	80.7
Indirect GVA (£m)	8.0	32.8	12.8	39.2	23.7	83.1
Total GVA (£m)	25.6	66.3	38.7	78.6	65.7	163.8
Local impact (Essex & Suffolk)						
Direct GVA (£m)	2.1	5.5	4.5	9.2	4.6	9.5
Indirect GVA (£m)	0.8	3.5	1.9	9.3	1.9	9.6
Total GVA (£m)	2.8	8.9	6.4	18.5	6.5	19.1

Employment impacts						
UK impact						
Direct jobs (FTE)	220	510	340	760	490	1250
Indirect jobs (FTE)	60	250	100	380	190	650
Total jobs (FTE)	290	760	440	1,140	680	1,900
Local impact (Essex & Suffolk)						
Direct jobs (FTE)	30	70	60	150	60	150
Indirect jobs (FTE)	10	30	10	70	20	70
Total jobs (FTE)	30	100	70	220	80	220

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Operational phase

- 3.7 Table 3.3 shows the average GVA and employment impacts generated annually during the operational phase of the project. These have not changed relative to Option 1 (North Falls Alone) due to divestment post-construction, which will allow the two windfarms to be operated independently of each other.
- 3.8 Annex A provides the average GVA and employment impacts generated per annum from operational activity related to the onshore and offshore infrastructure respectively.

Table 3.3 Average GVA and employment impacts generated per annum during the operational phase

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£m)	12.6	13.1	12.8
Indirect GVA (£m)	5.7	6.4	7.2
Total GVA (£m)	18.3	19.6	20.0
Local impact (Essex & Suffolk)			
Direct GVA (£m)	6.4	6.3	6.5
Indirect GVA (£m)	2.4	2.6	2.7
Total GVA (£m)	8.9	8.9	9.3
Employment impacts			
UK impact			
Direct jobs (FTE)	70	150	150
Indirect jobs (FTE)	40	40	50
Total jobs (FTE)	110	190	200
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	70	70	70
Indirect jobs (FTE)	20	20	20
Total jobs (FTE)	90	90	90

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Decommissioning

- 3.9 Table 3.4 shows the annual average GVA and employment impacts generated as a result of decommissioning activities. These have not changed relative to Option 1 (North Falls Alone). This is because no decision has been made regarding the final decommissioning plan for the onshore project substation, as it is recognised that industry best practice, rules and legislation change over time. As such, the estimates below only pertain to offshore decommissioning activities.

Table 3.4 Average GVA and employment impacts generated per annum during the decommissioning phase			
	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£m)	8.7	10.4	11.2
Indirect GVA (£m)	3.9	4.7	6.4
Total GVA (£m)	12.6	15.1	17.6
Local impact (Essex & Suffolk)			
Direct GVA (£m)	3.7	3.7	3.5
Indirect GVA (£m)	1.4	1.4	1.5
Total GVA (£m)	5.0	5.0	5.0
GVA impacts			
UK impact			
Direct jobs (FTE)	80	100	110
Indirect jobs (FTE)	20	30	40
Total jobs (FTE)	100	120	150
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	30	30	30
Indirect jobs (FTE)	10	10	10
Total jobs (FTE)	40	40	40

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Option 2, Scenario 1: Shared onshore cable route with Five Estuaries, separate construction

- 3.10 The tables below reflect the economic impact jointly supported by onshore and offshore activities across the development and construction, operational and decommissioning phases of the project. A breakdown of impacts across the onshore and offshore dimensions of the project can be found in Appendix B.

Development and construction phase

- 3.11 Table 3.5 shows the annual average and peak GVA and employment impacts generated during the development and construction phase of the project. The central scenario

indicates that peak impacts are 9-10% lower compared to Option 1 (North Falls Alone). This is due to development and construction efficiencies being achieved by the sequential delivery of onshore infrastructure jointly for North Falls and Five Estuaries. Average annual impacts are 36-38% lower compared to Option 1 (North Falls Alone), as they also reflect the fact that the construction timescale could be up to three years longer under Option 1, Scenario 2.

- 3.12 Appendix B provides the average GVA and employment impacts generated per annum during the development and construction phase for the onshore and offshore elements of the project respectively.

Table 3.5 Average and peak GVA and employment impacts generated per annum during the development and construction phase

	Worst Case Scenario		Baseline Scenario		Enhanced Scenario	
GVA impacts						
UK impact						
	Annual average impact	Peak annual impact	Annual average impact	Peak annual impact	Annual average impact	Peak annual impact
Direct GVA (£m)	12.4	33.6	18.2	39.6	29.4	80.8
Indirect GVA (£m)	5.6	32.9	9.0	39.3	16.6	83.3
Total GVA (£m)	18.0	66.5	27.2	78.9	46.1	164.2
Local impact (Essex & Suffolk)						
Direct GVA (£m)	1.4	5.5	3.2	9.3	3.2	9.5
Indirect GVA (£m)	0.5	3.5	1.3	9.4	1.4	9.6
Total GVA (£m)	2.0	9.0	4.5	18.6	4.6	19.1
Employment impacts						
UK impact						
Direct jobs (FTE)	160	510	240	770	340	1250
Indirect jobs (FTE)	40	250	70	380	140	650
Total jobs (FTE)	200	760	310	1,150	480	1,900
Local impact (Essex & Suffolk)						
Direct jobs (FTE)	20	70	40	150	40	150
Indirect jobs (FTE)	4	30	10	70	10	70
Total jobs (FTE)	20	100	50	220	50	220

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Operational phase

- 3.13 Table 3.6 shows the average GVA and employment impacts generated annually during the operational phase of the project. These have not changed relative to Option 1 (North Falls Alone) due to divestment post-construction, which will allow the two wind farms to be operated independently of each other.
- 3.14 Appendix B provides the average GVA and employment impacts generated per annum from operational activity related to the onshore and offshore infrastructure respectively.

Table 3.6 Average GVA and employment impacts generated per annum during the operational phase

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£m)	12.6	13.1	12.8
Indirect GVA (£m)	5.7	6.4	7.2
Total GVA (£m)	18.3	19.6	20.0
Local impact (Essex & Suffolk)			
Direct GVA (£m)	6.4	6.3	6.5
Indirect GVA (£m)	2.4	2.6	2.7
Total GVA (£m)	8.9	8.9	9.3
GVA impacts			
UK impact			
Direct jobs (FTE)	70	150	150
Indirect jobs (FTE)	40	40	50
Total jobs (FTE)	110	190	200
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	70	70	70
Indirect jobs (FTE)	20	20	20
Total jobs (FTE)	90	90	90

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Decommissioning

- 3.15 Table 3.7 shows the annual average GVA and employment impacts generated as a result of decommissioning activities. These have not changed relative to Option 1 (North Falls Alone). This is because no decision has been made regarding the final decommissioning plan for the onshore project substation, as it is recognised that industry best practice, rules and legislation change over time. As such, the estimates below only pertain to offshore decommissioning activities.

Table 3.7 Average GVA and employment impacts generated per annum during the decommissioning phase

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£m)	8.7	10.4	11.2
Indirect GVA (£m)	3.9	4.7	6.4
Total GVA (£m)	12.6	15.1	17.6
Local impact (Essex & Suffolk)			
Direct GVA (£m)	3.7	3.7	3.5
Indirect GVA (£m)	1.4	1.4	1.5

Total GVA (£m)	5.0	5.0	5.0
GVA impacts			
UK impact			
Direct jobs (FTE)	80	100	110
Indirect jobs (FTE)	20	30	40
Total jobs (FTE)	100	120	150
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	30	30	30
Indirect jobs (FTE)	10	10	10
Total jobs (FTE)	40	40	40

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Option 3: Offshore electrical connection

- 3.16 There will be no onshore activity under this option. As such, the tables below reflect the economic impact supported by offshore activities across the development and construction, operational and decommissioning phases of the project.

Development and construction phase

- 3.17 Table 3.8 shows the annual average and peak GVA and employment supported during the development and construction phase of the project. The central scenario indicates that annual average and peak impacts are 89-90% lower at a local and 61-62% lower at a UK level, compared to Option 1 (North Falls Alone). The decline is primarily driven by the lack of onshore development and construction activities and an offshore export cable.

Table 3.8 Average and peak GVA and employment impacts generated per annum during the development and construction phase

	Worst Case Scenario		Baseline Scenario		Enhanced Scenario	
GVA impacts						
UK impact						
	Annual average impact	Peak annual impact	Annual average impact	Peak annual impact	Annual average impact	Peak annual impact
Direct GVA (£m)	3.4	6.4	11.2	17.1	26.8	51.5
Indirect GVA (£m)	1.5	6.3	5.5	16.9	15.1	53.1
Total GVA (£m)	4.9	12.7	16.8	34.0	41.9	104.6
Local impact (Essex & Suffolk)						
Direct GVA (£m)	0.5	1.3	0.5	1.1	0.6	1.3
Indirect GVA (£m)	0.2	0.9	0.2	1.1	0.3	1.3
Total GVA (£m)	0.7	2.2	0.8	2.2	0.9	2.6
Employment impacts						
UK impact						
Direct jobs (FTE)	40	90	147	330	290	790
Indirect jobs (FTE)	10	45	45	165	120	410

Total jobs (FTE)	50	135	192	495	410	1,200
Local impact (Essex & Suffolk)						
Direct jobs (FTE)	6	15	6	16	7	19
Indirect jobs (FTE)	1	7	2	8	2	9
Total jobs (FTE)	7	21	8	23	9	28

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Operational phase

- 3.18 Table 3.9 shows the annual average GVA and employment impacts supported during the operational phase of the project. The central scenario indicates that annual average impacts are 2-6% lower at a local and 1-2% lower at a UK level, compared to Option 1 (North Falls Alone). The decline is driven by the lack of onshore transmission maintenance and offshore cable maintenance.

Table 3.9 Average GVA and employment impacts generated per annum during the operational phase

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£m)	12.4	12.9	12.5
Indirect GVA (£m)	5.6	6.3	7.1
Total GVA (£m)	18.0	19.2	19.6
Local impact (Essex & Suffolk)			
Direct GVA (£m)	6.3	6.2	6.4
Indirect GVA (£m)	2.4	2.5	2.7
Total GVA (£m)	8.7	8.7	9.1
GVA impacts			
UK impact			
Direct jobs (FTE)	68	144	143
Indirect jobs (FTE)	39	44	50
Total jobs (FTE)	107	188	193
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	68	67	71
Indirect jobs (FTE)	16	17	18
Total jobs (FTE)	84	84	89

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Decommissioning

- 3.19 Table 3.10 shows the annual average GVA and employment impacts supported by offshore decommissioning activities. The central scenario indicates that annual average impacts are 55-63% lower at a local and 38-48% lower at a UK level, compared to Option 1 (North Falls Alone).

Table 3.10 Average GVA and employment impacts generated per annum during the decommissioning phase

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£m)	6.9	8.3	9.0
Indirect GVA (£m)	3.1	3.8	5.1
Total GVA (£m)	10.1	12.1	14.1
Local impact (Essex & Suffolk)			
Direct GVA (£m)	2.9	2.9	2.8
Indirect GVA (£m)	1.1	1.1	1.2
Total GVA (£m)	4.0	4.0	4.0
GVA impacts			
UK impact			
Direct jobs (FTE)	65	78	86
Indirect jobs (FTE)	18	22	30
Total jobs (FTE)	83	100	117
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	27	27	26
Indirect jobs (FTE)	6	6	7
Total jobs (FTE)	33	33	33

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Annex A - Option 2, Scenario 1: Breakdown of economic impacts by onshore and offshore activities

Development and construction phase

Table A.1 Average GVA and employment impacts by onshore development and construction activity

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£m)	14.1	14.5	14.5
Indirect GVA (£m)	6.3	7.1	8.2
Total GVA (£m)	20.4	21.6	22.7
Local impact (Essex & Suffolk)			
Direct GVA (£m)	1.4	3.9	3.9
Indirect GVA (£m)	0.5	1.6	1.6
Total GVA (£m)	2.0	5.4	5.5
Employment impacts			
UK impact			
Direct jobs (FTE)	180	190	190
Indirect jobs (FTE)	50	60	70
Total jobs (FTE)	230	250	260
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	20	50	50
Indirect jobs (FTE)	4	10	10
Total jobs (FTE)	20	60	60

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Table A.2 Average GVA and employment impacts by offshore development and construction activity

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£m)	3.6	11.5	27.5
Indirect GVA (£m)	1.6	5.6	15.5
Total GVA (£m)	5.2	17.1	43.0
Local impact (Essex & Suffolk)			
Direct GVA (£m)	0.63	0.67	0.74
Indirect GVA (£m)	0.24	0.27	0.31

Total GVA (£m)	0.88	0.95	1.06
GVA impacts			
UK impact			
Direct jobs (FTE)	40	150	290
Indirect jobs (FTE)	10	50	120
Total jobs (FTE)	50	200	420
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	10	10	10
Indirect jobs (FTE)	2	2	2
Total jobs (FTE)	10	10	10

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Operational phase

Table A.3 Average GVA and employment impacts by operational activity related to onshore infrastructure

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£)	230,000	230,000	230,000
Indirect GVA (£)	103,800	103,800	103,800
Total GVA (£)	333,800	333,800	333,800
Local impact (Essex & Suffolk)			
Direct GVA (£)	103,800	103,800	103,800
Indirect GVA (£)	39,400	39,400	39,400
Total GVA (£)	143,200	143,200	143,200
GVA impacts			
UK impact			
Direct jobs (FTE)	3	3	3
Indirect jobs (FTE)	1	1	1
Total jobs (FTE)	3	3	3
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	1	1	1
Indirect jobs (FTE)	0	0	0
Total jobs (FTE)	1	1	1

Source: Hatch calculations based on BVG Associates estimates and RWE data

Table A.4 Average GVA and employment impacts by operational activity related to offshore infrastructure

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			

Direct GVA (£m)	12.4	12.9	12.5
Indirect GVA (£m)	5.6	6.3	7.1
Total GVA (£m)	18.0	19.2	19.6
Local impact (Essex & Suffolk)			
Direct GVA (£m)	6.3	6.2	6.4
Indirect GVA (£m)	2.4	2.5	2.7
Total GVA (£m)	8.7	8.7	9.1
GVA impacts			
UK impact			
Direct jobs (FTE)	70	140	140
Indirect jobs (FTE)	40	40	50
Total jobs (FTE)	110	190	190
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	70	70	70
Indirect jobs (FTE)	20	20	20
Total jobs (FTE)	80	80	90

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Annex B - Option 1, Scenario 2: Breakdown of economic impacts by onshore and offshore activities

Development and construction phase

Table A.5 Average GVA and employment impacts by onshore development and construction activity

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£m)	9.9	10.2	10.2
Indirect GVA (£m)	4.5	5.0	5.8
Total GVA (£m)	14.4	15.2	16.0
Local impact (Essex & Suffolk)			
Direct GVA (£m)	1.0	2.7	2.7
Indirect GVA (£m)	0.4	1.1	1.1
Total GVA (£m)	1.4	3.8	3.9
Employment impacts			
UK impact			
Direct jobs (FTE)	130	130	140
Indirect jobs (FTE)	40	40	50
Total jobs (FTE)	160	170	180
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	10	40	40
Indirect jobs (FTE)	3	10	10
Total jobs (FTE)	20	40	50

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Table A.6 Average GVA and employment impacts by offshore development and construction activity

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£m)	2.5	8.0	19.2
Indirect GVA (£m)	1.1	3.9	10.9
Total GVA (£m)	3.7	12.0	30.1
Local impact (Essex & Suffolk)			
Direct GVA (£m)	0.44	0.47	0.52
Indirect GVA (£m)	0.17	0.19	0.22

Total GVA (£m)	0.61	0.66	0.74
GVA impacts			
UK impact			
Direct jobs (FTE)	30	110	210
Indirect jobs (FTE)	10	30	90
Total jobs (FTE)	40	140	290
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	5	10	10
Indirect jobs (FTE)	1	1	2
Total jobs (FTE)	10	10	10

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

Operational phase

Table A.7 Average GVA and employment impacts by operational activity related to onshore infrastructure

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			
Direct GVA (£)	230,000	230,000	230,000
Indirect GVA (£)	103,800	103,800	103,800
Total GVA (£)	333,800	333,800	333,800
Local impact (Essex & Suffolk)			
Direct GVA (£)	103,800	103,800	103,800
Indirect GVA (£)	39,400	39,400	39,400
Total GVA (£)	143,200	143,200	143,200
GVA impacts			
UK impact			
Direct jobs (FTE)	3	3	3
Indirect jobs (FTE)	1	1	1
Total jobs (FTE)	3	3	3
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	1	1	1
Indirect jobs (FTE)	0	0	0
Total jobs (FTE)	1	1	1

Source: Hatch calculations based on BVG Associates estimates and RWE data

Table A.8 Average GVA and employment impacts by operational activity related to offshore infrastructure

	Worst Case Scenario	Baseline Scenario	Enhanced Scenario
GVA impacts			
UK impact			

Direct GVA (£m)	12.4	12.9	12.5
Indirect GVA (£m)	5.6	6.3	7.1
Total GVA (£m)	18.0	19.2	19.6
Local impact (Essex & Suffolk)			
Direct GVA (£m)	6.3	6.2	6.4
Indirect GVA (£m)	2.4	2.5	2.7
Total GVA (£m)	8.7	8.7	9.1
GVA impacts			
UK impact			
Direct jobs (FTE)	70	140	140
Indirect jobs (FTE)	40	40	50
Total jobs (FTE)	110	190	190
Local impact (Essex & Suffolk)			
Direct jobs (FTE)	70	70	70
Indirect jobs (FTE)	20	20	20
Total jobs (FTE)	80	80	90

Source: Hatch calculations based on BVG Associates estimates and RWE data. Figures may not add up as rounding has been applied.

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