BVGAssociates

South coast Designated Maritime Area Plan: Regional economic impact of offshore wind development

A report for the Department of the Environment, Climate and Communications

May 2024

Copyright

Disclaimer

1. This document is intended for the use of the Client who has entered into a written agreement with BVG Associates Ltd or BVG Associates LLP (jointly referred to as "BVGA"). To the extent permitted by law, BVGA assumes no responsibility whether in contract, tort including without limitation negligence, or otherwise howsoever, to third parties (being persons other than the Client), and BVGA shall not be liable for any loss or damage whatsoever suffered by virtue of any act, omission or default (whether arising by negligence or otherwise) by BVGA or any of its employees, subcontractors or agents.
2. No part of this document may be disclosed in any public offering memorandum, prospectus or stock exchange listing, circular or announcement without the express and prior written consent of BVGA.
3. Except to the extent that checking or verification of information or data is expressly agreed within the written scope of its services, BVGA shall not be responsible in any way in connection with erroneous information or data provided to it by the Client or any third party, or for the effects of any such erroneous information or data whether or not contained or referred to in this document.

The views expressed in this report are those of BVG Associates. The content of this report does not necessarily reflect the views of the Department of the Environment, Climate and Communications.

Contents

List of figures

List of tables

Executive Summary

This study identifies a substantial economic opportunity for both the south coast region and Ireland as whole as a result of the development of the south coast Designated Maritime Area Plan (DMAP) offshore wind pipeline. The study is based on a scenario where implementation of the DMAP results in the development of approximately 5 GW of future offshore wind capacity.

Overall, the south coast DMAP will deliver an estimated €4.4 billion in gross value add (GVA) benefits to the Irish economy.[1] GVA reflects the total Euro value of the goods and services purchased in the project lifecycle of the offshore wind farms considered.

It will also deliver an estimated 49,000 full-time equivalent (FTE) years of employment to the Irish economy. FTE years are a measure of employment activity. Each FTE year is equivalent to one person working full time for one year. It is also equivalent to two people working for six months.

Of these benefits, €2.9 billion and 32,200 FTE years is expected to be captured by the south coast region in the baseline scenario, and €3.1 billion GVA and 34,300 FTE years in the manufacturing upside scenario. This means that the south coast region captures between 66% and 70% of the total Irish GVA and employment benefits associated with the south coast DMAP.

Figure A shows the total GVA benefit captured by the south coast region and the rest of Ireland from the south coast DMAP pipeline, in the manufacturing upside scenario where investment in a wind turbine tower factory, occurs in the south coast. A wind turbine tower is a large tubular steel structure which is mounted on the wind turbine foundation and supports the wind turbine nacelle. Figure B shows FTE year employment figures on the same basis.

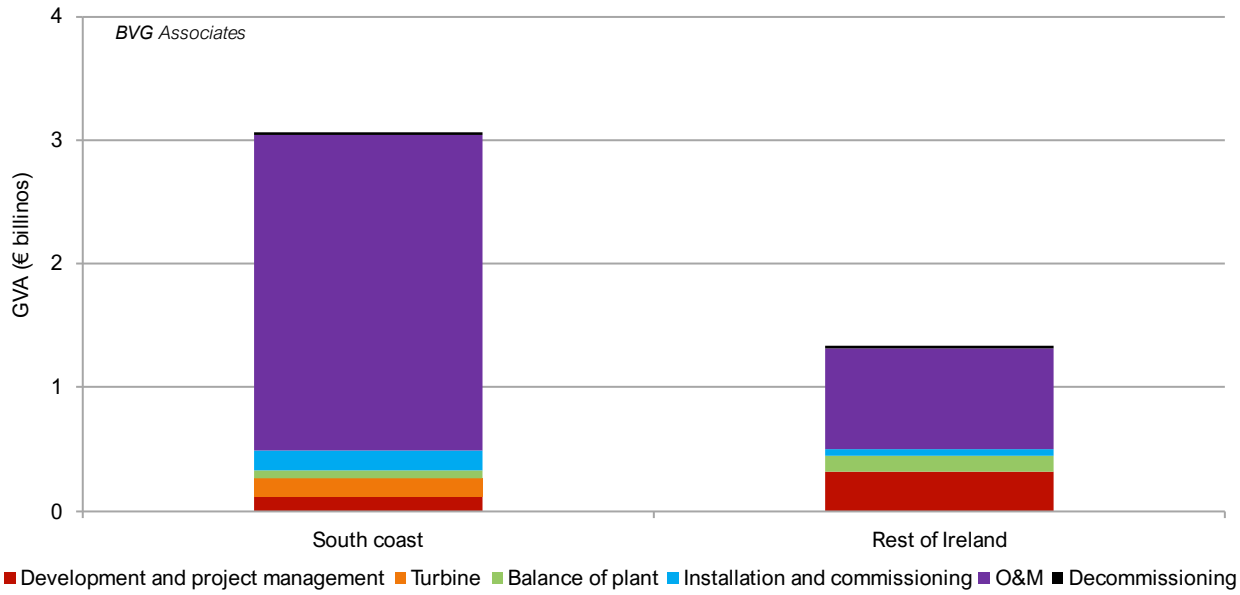


Figure A GVA impacts of DMAP pipeline, in the manufacturing upside scenario, split by cost category.

[1] Throughout, figures in 2022 terms. This aligns with the *Offshore renewable energy export potential for Ireland* analysis by Afry and BVG Associates, published alongside the consultation on the *Offshore Renewable Energy Future Framework* policy statement.

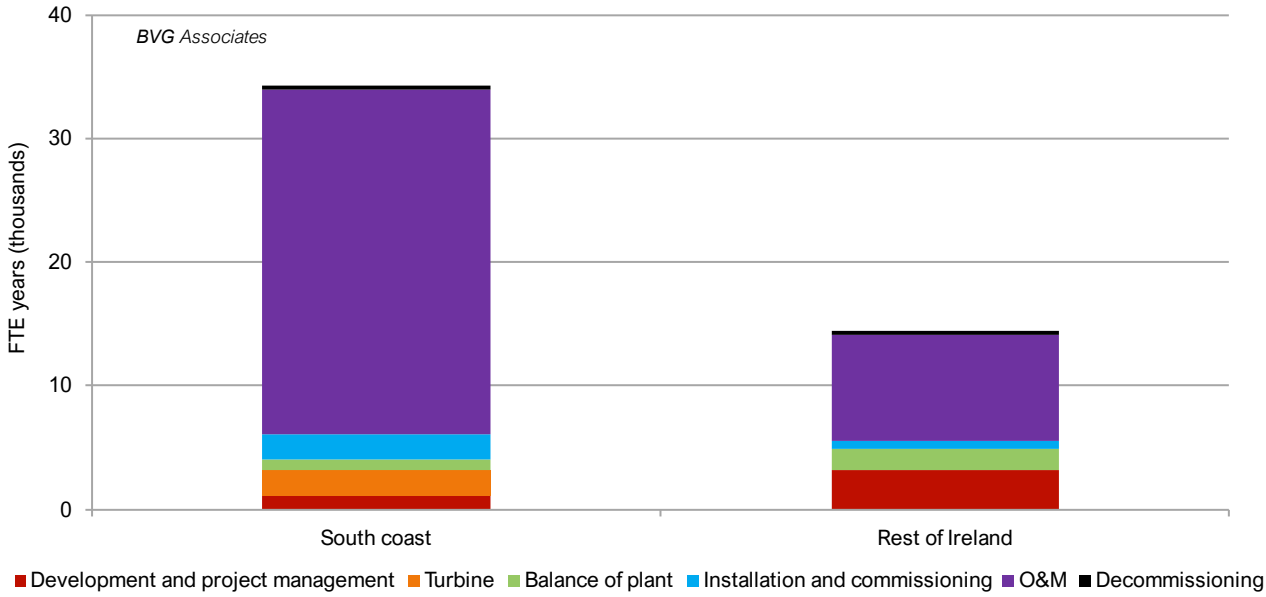


Figure B Employment impacts of south coast DMAP pipeline, in the manufacturing upside scenario, split by cost category.

These results are an estimate based on an assessment of current Irish supply chain capabilities and likely future opportunities. The benefits realised by the south coast and by the Irish economy as a whole may be higher or lower in practice, and action on the part of Government to create the right conditions for supply chain investment to occur, through creation of a strong policy environment, backed up by clear industrial strategy, investment incentives, and skills and R&D programmes will be key to ensuring Ireland captures, and potentially exceeds, the economic benefits set out in this report. The GVA and employment benefits of south coast DMAP projects can be divided into six high-level cost categories, each discussed below.

Development and consenting

Ireland captures a large share of project development and consenting activities, as these typically benefit from in-country delivery by staff with strong local knowledge and efficient access to sites. Ireland also has strong capabilities in the relevant surveying, engineering and environmental and social assessment skills. We estimate that Ireland will capture €430 million GVA and 4,300 FTE years employment from this cost category over the course of offshore wind deployment within the south coast DMAP. €110 million GVA, 26% of the total GVA, and 1,100 FTE years employment, 27% the total employment, is captured by the south coast region.

Turbine

Due to a lack of established wind turbine component supply chain or parallel industries with comparable capabilities, Ireland captures no economic value from the manufacture of most key turbine components (blades, nacelles and associated electrical systems).

There may be an opportunity for Ireland to capture value from this supply chain category if investment in manufacturing facilities can be secured. To illustrate the impact of such an investment, we have modelled the impact of the establishment of a tower factory on GVA and jobs.

Whether Ireland will capture such investment, and the location of the resulting factory is currently uncertain. We have modelled regional economic benefits in two scenarios:

- A conservative baseline scenario, in which the factory is located outside the south coast, and
- The manufacturing upside scenario, in which the facility is located in the south coast region.

In either scenario, Ireland captures €160 million GVA and 2,100 FTE years employment from this cost category over the course of south coast DMAP deployment. If the facility is located in the south coast region, 100% of this

GVA and 100% of employment is captured by the region. If it is not, the economic benefit is captured by another region of Ireland.

Balance of plant

As for turbine manufacturing, we assume Irish participation in balance of plant manufacturing is limited, due to a lack of established Irish manufacturers of key components such as monopiles, jackets, and subsea cable. The key exception within this category is onshore substations, where Ireland participates in provision of building materials and non-specialist electrical components. Ireland captures €190 million GVA and 2,500 FTE years employment from this cost category over the course of offshore wind deployment within the south coast DMAP. €58 million GVA, 30% of the total GVA, and 760 FTE years employment, again 30% the total employment, is captured by the south coast region.

Installation and commissioning

The bulk of installation and commissioning work is usually carried out by large international contractors with access to the specialist equipment and skills necessary to undertake such work, such as jack-up and cable lay vessels. As a result, we anticipate limited levels of Irish content within this supply chain category, with the exception of onshore civil engineering works associated with installation of onshore cables and substations.

Irish participation is also anticipated in the provision of local construction ports. The ports of Cork and Rosslare are well placed to undertake construction work within the south coast DMAP zone. Some investment in infrastructure at both ports is required to realise this opportunity, and both of these ports have plans in place to do so, though challenges remain.[2]

The GVA and employment opportunities associated with the construction of this new infrastructure represent a further opportunity which is not included in our modelling, but is discussed further in Section 3.3.

Ireland captures €210 million GVA and 2,800 FTE years employment from this cost category over the course of offshore wind deployment within the south coast DMAP. €160 million GVA, 76% of the total GVA, and 2,100 FTE years employment, 76% of the total employment, is captured by the south coast region.

Operations and maintenance

Ireland captures a high percentage of operations and maintenance (O&M) spend. The bulk of operations and maintenance work is normally carried out from the closest viable port, as minimising transit time is a key concern for operations and maintenance activity. Ireland captures €3.4 billion GVA and 36,000 FTE years employment from this cost category over the course of offshore wind deployment within the south coast DMAP. €2.6 billion GVA, 76% of the total GVA, and 28,000 FTE years employment, 77% of the total employment, is captured by the south coast region.

Overall, the O&M opportunity represents a high proportion of the economic benefit for Ireland and for the south coast region. O&M activity makes up about 75% of Irish GVA and employment benefits, and more than 87% of south coast GVA and employment benefits.

Decommissioning

Decommissioning work is typically carried out by specialist international contractors. We assume a small amount of Irish content from the provision of supporting services such as port facilities and non-specialist support vessels. Ireland captures €47 million GVA and 590 FTE years employment from this cost category over the course of south coast DMAP deployment. €24 million GVA, 50% of the total GVA, and 300 FTE years employment, 50% the total employment, is captured by the south coast region.

[2] *We can build them: Supporting Irish ports to build offshore wind farms*, Gavin and Doherty Geosolutions on behalf of Wind Energy Ireland, April 2023, available online at https://windenergyireland.com/images/files/20230329-final-irish-ports-funding-study.pdf.

Government policy recommendations

To ensure these benefits are realised, and to develop Irish supply chain capability, thereby delivering greater benefits to the local economy, we recommend:

1. The Department of the Environment, Climate and Communications (DECC) establishes clear, timely, predictable and bankable frameworks for seabed-leasing, permitting, offtake and grid connection, backed up by consistent policies and long-term statements of ambition and visibility of pipeline, to build investor confidence.
2. The Department of Enterprise, Trade and Employment (DETE) establishes and implements a clear industrial strategy for offshore wind, which targets investment in specific areas of the supply chain, including those identified in this report, and seeks to maximise benefits in key areas of Irish advantage, such as project development and O&M.
3. DETE, with collaboration from the Department of Finance, puts in place investment incentives consistent with Ireland's status as an EU Member State, specifically targeted at these areas. Such incentives could include investment grants, tax incentives or preferential financing arrangements such as government-backed loan schemes or guarantees.
4. DETE, IDA Ireland, local authorities, industry bodies and relevant landowners work together to identify opportunities to capture large inward investment opportunities and coordinate support packages to facilitate timely investment decisions.
5. The Department of Transport establishes mechanisms to provide investment support for port infrastructure upgrades.
6. The Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) and the Sustainable Energy Authority of Ireland (SEAI) support this effort through targeted skills development initiatives and support for research and development in areas relevant to areas of active Irish participation. This could include, for example, seabed surveying, LiDAR and remote monitoring technologies, or support for synthetic materials research.
7. Local authorities develop regional, county and city development plans with regard to emerging offshore renewable energy (ORE) opportunities, where such considerations are not already integrated.

1. Introduction

Ireland's offshore wind industry is set to undergo a major transformation, with ambitious national targets to install 5 GW of offshore wind energy capacity by 2030, 20 GW by 2040 and 37 GW by 2050. Offshore wind forms a key part of the national objectives to generate 80% of electricity from renewable sources and the legally binding target of achieving a 51% reduction in greenhouse gas emissions by 2030. It is further expected to make a significant contribution towards achieving the legally binding objective of delivering a climate neutral economy by no later than 2050. Current installed capacity stands at approximately 25 MW, but with a large area of suitable seabed there is potential for significant growth.

Achieving these ambitious targets represents a substantial economic opportunity for the south coast region and for Ireland as a whole. The capacity target of 37 GW by 2050 has the potential to add approximately €41 billion gross value add (GVA) and 460,000 full-time equivalent (FTE) years of employment to the Irish economy over the lifetime of all installed offshore wind farms.

With the publication of the draft south coast Designated Maritime Area Plan (DMAP) in May 2024, the Department of the Environment, Climate and Communications (DECC) has identified four broad maritime areas, which we assume are capable of providing for deployment of approximately 4.9 GW of fixed offshore wind capacity in the waters off the south coast. It is intended that the first 900 MW site will be auctioned via the upcoming Offshore Renewable Electricity Support Scheme (ORESS) 2.1 process, expected to commence later in 2024 or early in 2025. Contingent on continued environmental monitoring, it is intended that further maritime areas in the DMAP area may be released for development over the coming years, which we assume to have the potential to deliver a further approximately 4 GW of fixed offshore wind capacity.

Building on the *Offshore renewable energy export potential for Ireland* analysis published alongside the consultation on the *Offshore Renewable Energy Future Framework* policy statement,[3] this report identifies the specific economic and employment impacts of the 4.9 GW of offshore wind development potential identified in the south coast DMAP, including the breakdown of impacts within the south coast region and in the rest of Ireland.

2. Methodology

2.1. Deployment assumptions

In keeping with Ireland's ambition to deploy 5 GW offshore wind by 2030, and 20 GW by 2040, we have assumed the first 900 MW from the south coast DMAP, to be allocated in the upcoming ORESS 2.1 auction, will be operational by 2030. Of the 4 GW identified for future development, we have assumed 2 GW will be operational by 2035 and a further 2 GW by 2040.

Figure 2.1 shows the assumed deployment timeline of south coast DMAP projects that have informed this study. Broadly, we assumed that wider Irish deployment will follow the pathway set out in the 37 GW deployment scenario examined in workstream four of *Offshore renewable energy export potential for Ireland*.[4] More detail on project parameters can be found in Appendix C.

[3] Afry and BVG Associates (2024) '*Offshore renewable energy export potential for Ireland', Workstreams 1 to 5, Available at* https://www.gov.ie/en/consultation/747c7-consultation-on-the-offshore-renewable-energy-ore-future-framework-policy-statement/.

[4] Afry and BVG Associates (2024) *'Offshore renewable energy export potential for Ireland Workstream 4: Export viability, policy considerations, trade and investment opportunities', Available at* https://assets.gov.ie/281435/8d698eac-0112-4058-9524-e43d1668e979.pdf#page=null.

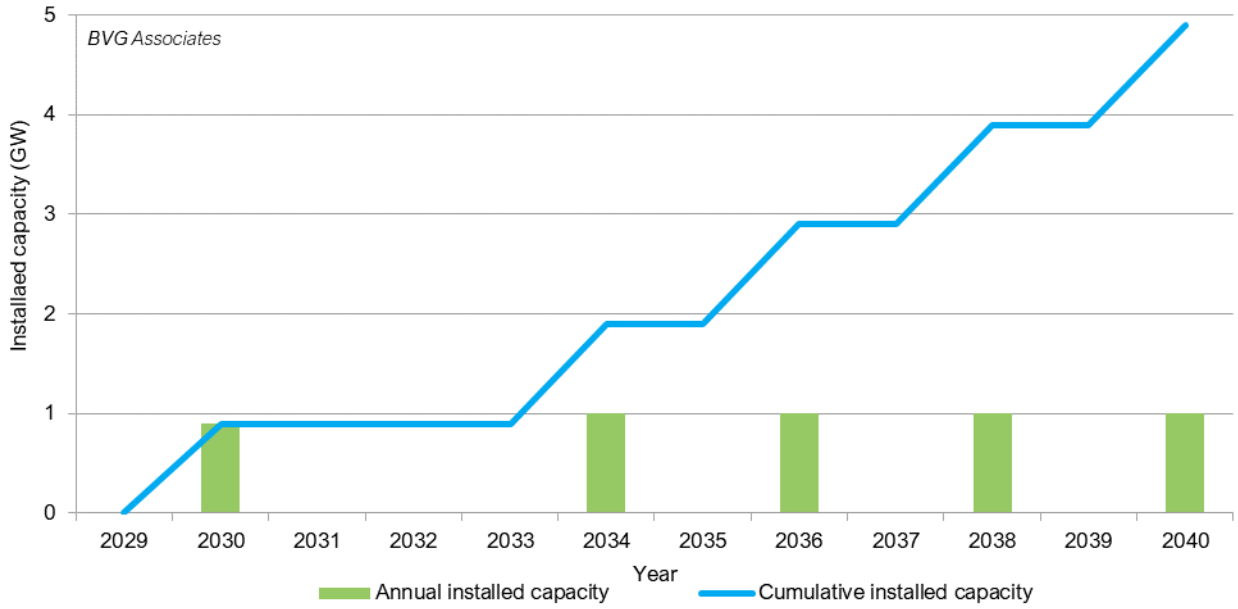


Figure 2.1 Cumulative deployment forecast for south coast DMAP projects.

2.2. Economic modelling

Our economic analysis includes all aspects of the development, manufacturing, construction, operation and decommissioning of an offshore wind farm, including the electricity export system up to and including the onshore substation. It does not include economic impacts associated with construction and operation of electricity transmission infrastructure beyond the onshore substation, nor does it include economic impacts associated with construction of port or manufacturing facilities.

Assumptions in relation to local content applied in this report align with those applied in the 37 GW deployment scenario examined in workstream four of the *Offshore renewable energy export potential for Ireland* report.[4] To establish economic benefits to Ireland associated with offshore wind deployment, we derived an estimate of likely Irish participation in each element of the Irish supply chain, based on an assessment of current local capability, likely opportunities to strengthen capability and the strength of logic for local supply in each area.

Local content may be higher or lower in practice, depending on Government policy, relative attractiveness of different markets for investment and the supply chain's appetite for investment.

To assess and compare the local versus national economic impacts of offshore wind deployment associated with the south coast DMAP, we divided Ireland into two regions:

- The south coast, encompassing the counties of Cork, Waterford, and southern Wexford. The area of southern Wexford includes the region to the south of the Slaney Estuary and the route of the N25 road linking Waterford and Wexford. It includes the town of Wexford and the port of Rosslare.
- The rest of Ireland, including northern Wexford and all other Irish counties.

When considering the GVA and employment benefits specific to the south coast and the rest of Ireland, local content multipliers are applied to overall global GVA figures reflecting the estimated percentage of the value within each cost category which is likely to be captured within the south coast and the rest of Ireland. Further detail on these assumptions can be found in Section 2.3.

We modelled economic impact in terms of gross value add (GVA), and employment impact in terms of full time equivalent (FTE) years.

GVA reflects the total Euro value of the goods and services purchased in the project lifecycle of the offshore wind farms considered. Throughout this report, currency figures are quoted in 2022 terms. This aligns with the *Offshore renewable energy export potential for Ireland* report.[3]

FTE years is the measure used to quantify employment. One FTE year is the equivalent of one person working full time for one year. It is also equivalent to two people working for six months. For seasonal roles therefore, one FTE year is likely to involve multiple people. This measure is clearer than others which consider the number of workers but not the amount of time each works.

Direct impacts are defined as those associated with project developers and their main contractors. Indirect impacts are defined as those associated with their sub-suppliers.

Details of the methodology are provided in Appendix A.

2.3. Irish content assumptions

We allocated the local economic benefit from each supply chain category either to the south coast or rest of Ireland using the assumptions set out below. A summary of the regional and national content shares within each high-level cost category is shown in Table 2.1. A more detailed quantified breakdown of the allocation of economic benefits between the south coast, rest of Ireland and non-Irish suppliers is presented in Appendix B.

Table 2.1 Trajectory of local content for each supply chain category.

Supply chain level 1 category	2030		2040	
	South coast (%)	Rest of Ireland (%)	South coast (%)	Rest of Ireland (%)
Development and project management	18	49	18	51
Turbine	2.4 in whichever territory hosts tower factory		2.4 in whichever territory hosts tower factory	
Balance of plant	1.1	2.5	1.1	2.5
Installation and commissioning	8.4	2.3	8.9	3.2
Operations, and maintenance	40	13	42	13
Decommissioning	2.5	2.5	2.5	2.5
Overall local content	14	5.8 to 6.6 depending on location of tower factory	14	6.2 to 6.9 depending on location of tower factory

Development and consenting

We assume Ireland captures a large share of project development and consenting activities, as these typically benefit from in-country delivery by staff with strong local knowledge and efficient access to sites. Ireland also has strong capabilities in the relevant surveying, engineering and environmental and social assessment skills. Depending on the cost category, south coast content makes up between one quarter and one third of Irish content. Though project developers will often establish an office and project team in the local region, much of the work may be carried out by staff from outside the region, as well as specialist suppliers who may not be based in the south coast region.

Turbine

Due to a lack of established wind turbine component supply chain or parallel industries with comparable capabilities, we assume Ireland does not capture economic value from the manufacture of most key turbine components (blades, nacelles and associated electrical systems).

There may be an opportunity for Ireland to capture value from this supply chain category if investment in manufacturing facilities can be secured. To illustrate the impact of such an investment, we have modelled the impact of the establishment of a tower factory on jobs and GVA. We assume the factory is established in time to

service projects deploying in 2030, with a maximum production capacity of 150 towers per year. It supplies up to two-thirds of the tower requirements of south coast DMAP projects, with the remainder supplied from overseas.

The timing and location of any such investment remains uncertain at this stage. In the baseline scenario, presented in Sections 3.1 and 3.2, we assume this tower factory is established in Ireland but outside the south coast region. In the manufacturing upside scenario presented in Section 3.4, the facility is located in the south coast region, facilitating comparison of the regional economic benefit in either scenario. In each case, we assume all of the associated Irish value accrues to the region where the facility is located.

It is currently uncertain whether Ireland will capture such investment in manufacturing facilities as the international market to secure such investments is competitive. Factors which could increase the attractiveness of Ireland as an investment destination include:

- Strong statements of ambition demonstrating a long term commitment to substantial offshore wind deployment
- Consistent offshore renewable energy (ORE) policy and bankable frameworks for leasing, permitting, offtake and grid connection
- A clear industrial policy and skills development framework to support the development of industrial clusters, and
- Investment incentives such as investment grants, tax incentives or preferential financing arrangements.

Balance of plant

As for turbine manufacturing, we assume Irish participation in balance of plant manufacturing is limited, due to a lack of established Irish manufacturers of key componentry such as monopiles, jackets, and high voltage cable. The key exception within this category is onshore substation manufacturing, where Ireland participates in provision of building materials and non-specialist electrical componentry. We assume about 30% of the Irish content in this category accrues to the south coast.

Installation and commissioning

The bulk of installation and commissioning work is usually carried out by large international contractors with access to the specialist equipment and skills necessary to undertake such work, such as jack-up and cable lay vessels. As a result, we anticipate limited levels of Irish content within this supply chain category.

Key exceptions, in which significant Irish participation is expected, are installation of onshore export cables and substations, which rely upon civil engineering skills, an area of Irish strength. The south coast is expected to capture around three quarters of the Irish value in these categories, as the bulk of work is likely to be carried out by local contractors.

Irish participation is also anticipated in the provision of local construction ports. The ports of Cork and Rosslare are well placed to undertake construction work within the south coast DMAP region. Some investment in infrastructure at both ports is required to realise this opportunity, and both ports have plans in place to do so, though challenges remain.[5] We have assumed that investment will be made in one or both ports by 2030, such that these ports are able to service two-thirds of the capacity deployed under the south coast DMAP. The remainder is serviced from outside Ireland. All of the Irish value accrues to the south coast, where the ports are located. The GVA and employment benefits of the operation of this infrastructure to service offshore wind projects are included in our modelling. The benefits associated with its construction are not, and represent a further opportunity for the south coast and Ireland as a whole, discussed further in Section 3.3.

[5] *We can build them: Supporting Irish ports to build offshore wind farms*, Gavin and Doherty Geosolutions on behalf of Wind Energy Ireland, April 2023, available online at https://windenergyireland.com/images/files/20230329-final-irish-ports-funding-study.pdf.

Operations and maintenance

We assume Ireland captures a high percentage of operations and maintenance spend. The bulk of operations and maintenance work is normally carried out from the closest viable port, as minimising transit time is a key concern for operations and maintenance activity.

This is especially true when using a crew transfer vessel (CTV)-based O&M strategy, as assumed for the first 900 MW project. Under the CTV-based strategy, the bulk of operations and maintenance work at the project site is conducted by small vessels which travel out to site and return to port each day. The frequency of these trips means minimising transit time is critical to reducing overall costs. Due to the small size and draft of CTV vessels, small regional ports are well suited to hosting such activities, typically with a small investment. A CTV-based strategy is generally preferred when projects are located close to the coast, up to around 40 km. The exact distance at which CTVs are no longer preferred depends on factors such as project size and metocean conditions. Generally, this distance is dropping over time.

Under a service operation vessel (SOV)-based strategy, as assumed for later projects within the DMAP area, larger vessels are used, which remain at sea for weeks at a time before returning to port to reprovision and take on a new crew. More substantial port infrastructure is required to host SOVs due to their larger size and draft. Typically, SOVs will travel further to the project site, as suitable host ports are more limited and minimising travel time is less of a concern, due to the much lower frequency of trips from the host port. One benefit of SOVs is that they provide 'walk to work' access to turbines, increasing the envelope of metocean conditions where access is possible.

Under both CTV and SOV strategies, we expect ports hosting O&M activities to be located on the south coast and for the south coast to capture the majority of the economic value from these activities.

An exception in which Ireland does not capture a high percentage of spend is in major repair and component replacement, which is generally carried out by specialist international contractors. Within other O&M spend categories, significant spend occurs on spare components and consumables, the majority of which are likely to be sourced from specialist international suppliers.

The south coast captures the majority of Ireland's share of operations and maintenance spend, due to the strong logic for geographic proximity of such services to the project location.

Decommissioning

As in installation and commissioning, decommissioning work is expected to be carried out by specialist international contractors. We assume a small amount of Irish content from the provision of supporting services such as port facilities and non-specialist support vessels. Half of this benefit accrues to the south coast.

3. Results

For readability, GVA and employment profile charts throughout display economic impacts for several years beyond project commissioning, but do not extend to cover the full project lifecycle. There is additional O&M spend (at the level shown) for the full project lifetime of 32 years or more, and decommissioning at end of project life.[6] This is not displayed on these charts, but impacts to the end of decommissioning are included in the GVA and employment figures stated. Figure 3.3, Figure 3.4, Figure 3.9 and Figure 3.10 show whole lifetime impacts, including decommissioning.

3.1. ORESS 2.1 project impacts

3.1.1 Irish impacts

Figure 3.1 shows the Irish GVA generated annually by a single 900 MW south coast DMAP project installed in 2030. The peak annual Irish GVA, in 2029, is about €67 million. The total Irish GVA over the lifetime of the project is about €940 million. 9% of this is in development and project management, 4% in turbine manufacture, 5% in balance of plant manufacture, 5% in installation, 77% in operations and maintenance and 1% in decommissioning.

Figure 3.2 shows the Irish FTE years employment created annually for this single project. It shows that Irish annual employment peaks in 2029 at about 860 FTE years, when there is significant turbine and balance of plant manufacture as well as installation. Total Irish employment for the project is about 10,400 FTE years over the lifetime of the project. 8% of this is in development and project management, 5% in turbine manufacture, 6% in balance of plant manufacture, 5% in installation, 75% in operations and maintenance and 1% in decommissioning. Of the lifetime employment created, 46% of these are direct jobs.

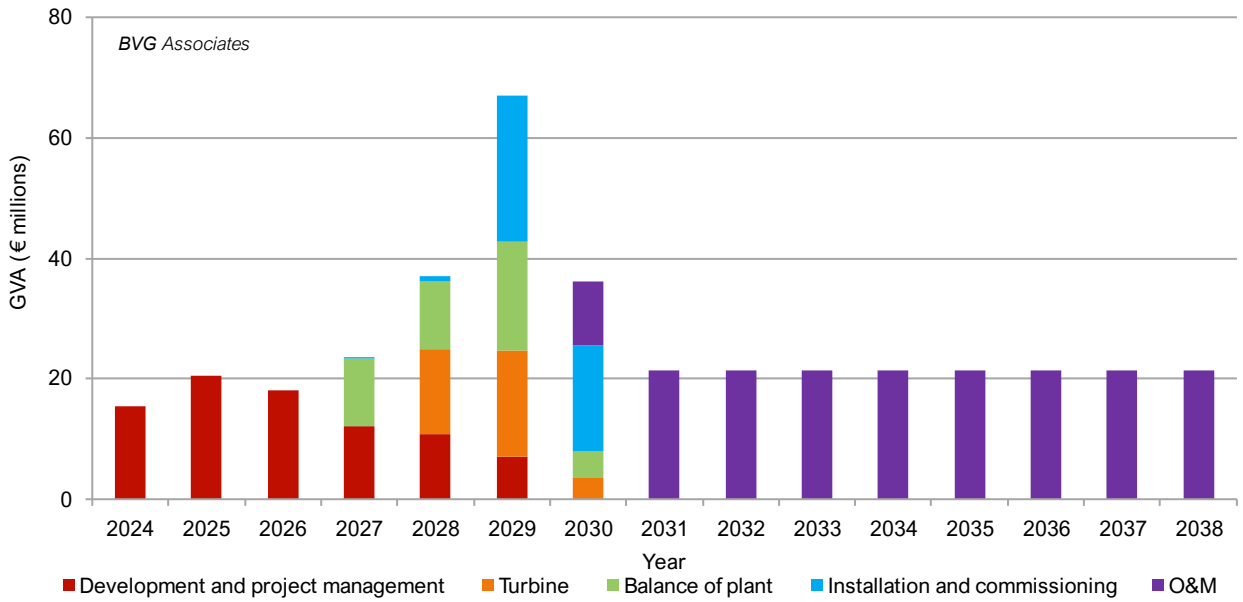


Figure 3.1 Irish GVA impacts of a 900 MW south coast DMAP project installed in 2030, split by cost category.

[6] See Appendix C for detailed project parameter assumptions.

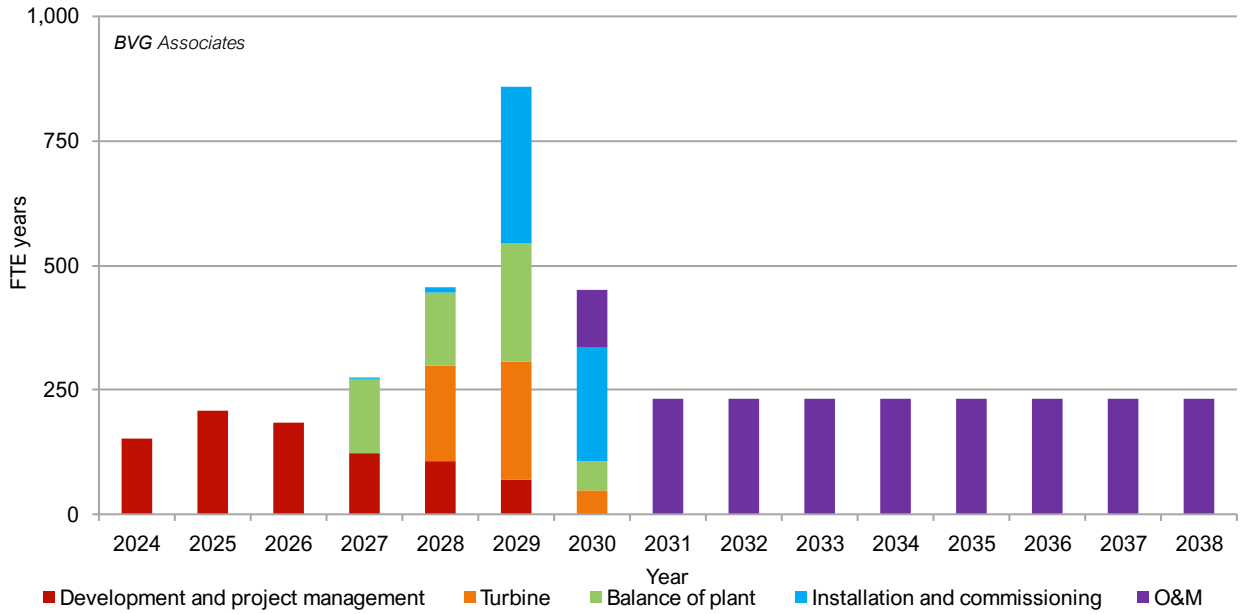


Figure 3.2 Irish employment impacts of a 900 MW south coast DMAP project installed in 2030, split by cost category

3.1.2 Regional impacts

Figure 3.3 shows the Irish GVA benefits of this 900 MW project in each region, in the baseline scenario. Overall, the south coast region captures €620 million GVA, representing 66% of total Irish GVA. The rest of Ireland captures €320 million. The south coast captures 76% of Irish O&M spend. Project development spend is less concentrated locally, with 26% of Irish spend benefitting the south coast, and the remainder benefitting the rest of Ireland.

Figure 3.4 shows the Irish employment benefits of this 900 MW project in each region. The south coast region captures 6,900 FTE years, representing 66% of total Irish employment benefits. The rest of Ireland captures 3,500 FTE years. The south coast captures 77% of Irish O&M jobs. Overall, O&M jobs represent 87% of the total south coast employment. Project development employment impacts are less concentrated locally, with 27% of Irish spend benefitting the south coast, and the remainder to the rest of Ireland.

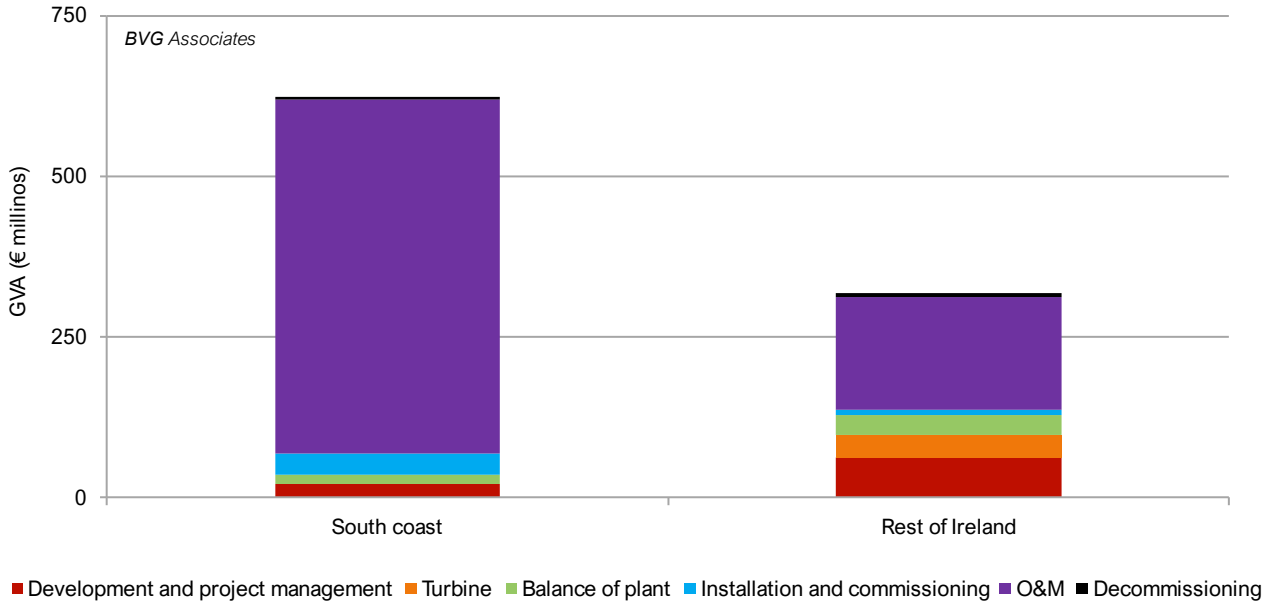


Figure 3.3 Regional comparison of lifetime GVA benefits of 900 MW south coast DMAP project installed in 2030 in the baseline scenario, split by cost category.

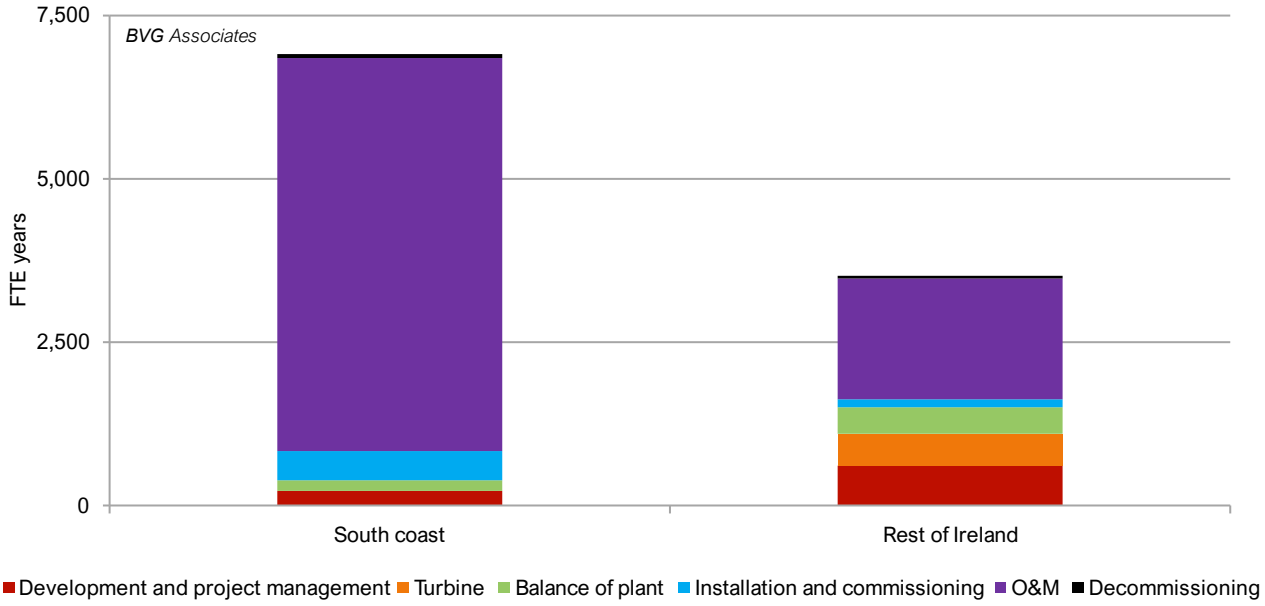


Figure 3.4 Regional comparison of lifetime employment benefits of 900 MW south Coast DMAP project installed in 2030 in the baseline scenario, split by cost category.

Figure 3.5 shows the profile of GVA benefits to Ireland associated with the development of a 900 MW south coast DMAP project installed in 2030 in the baseline scenario, split by region. South coast and rest of Ireland annual benefits peak in 2029 at €27 million and €40 million respectively. Post 2030, the project enters the operational phase and the south coast captures 76% of annual GVA benefits, equivalent to €16 million per year for the operational lifetime of the project.

Figure 3.6 shows the same, but for employment benefits. South coast and rest of Ireland annual employment peaks in 2029 at 340 FTE years and 520 FTE years respectively. Post 2030, the project enters the operational phase and the south coast captures 77% of annual employment benefits, equivalent to 180 FTE jobs per year for the operational lifetime of the project.

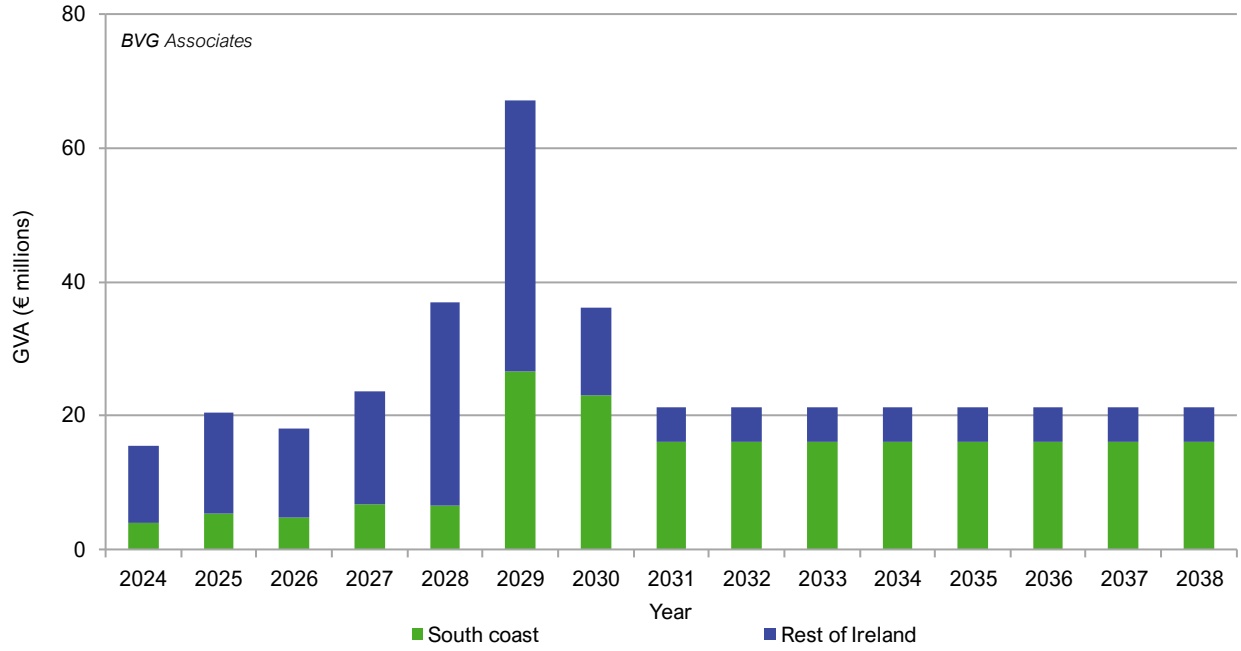


Figure 3.5 Irish GVA impacts of 900 MW south Coast DMAP project installed in 2030 in the baseline scenario, split by region.

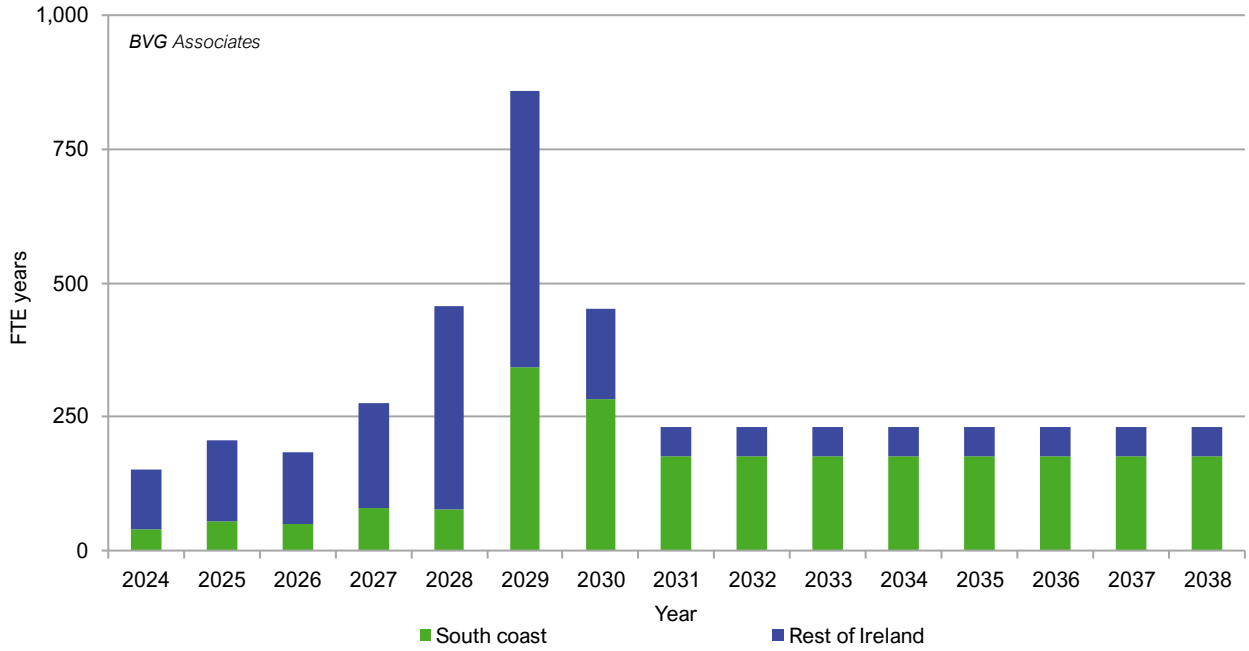
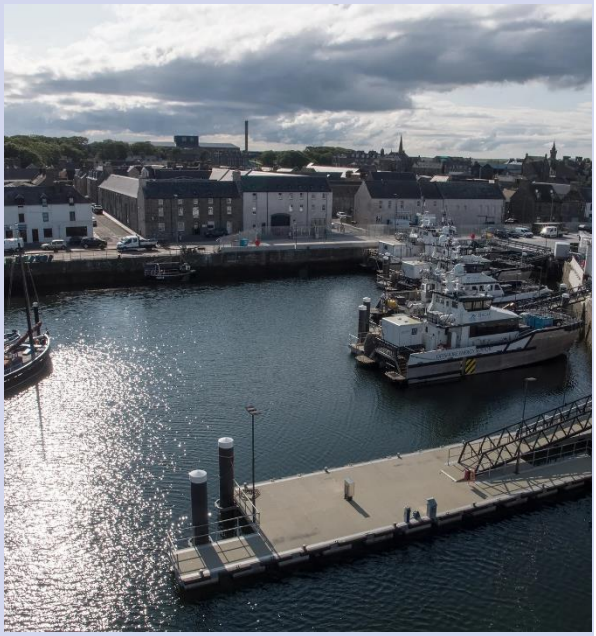


Figure 3.6 Irish employment impacts of 900 MW south Coast DMAP project installed in 2030 in the baseline scenario, split by region.

Case Study: O&M at Wick Harbour, Scotland, UK

The 84 turbine, 588 MW Beatrice offshore wind farm is one of the largest operational offshore wind farms in Scotland. Located in the Moray Firth, in Northern Scotland, Beatrice became fully operational in June 2019. It was constructed and is operated by Beatrice Offshore Wind Ltd. (BOWL), a partnership led by UK developer SSE Renewables.

During the construction of Beatrice, the developer tendered several contracts through the Open4Business platform, an initiative aimed at increasing the local content of major regional projects and supporting the development of the local supply chain in the Highlands and Islands. The scheme was originally set up by SSE and is now run by Highlands and Islands Enterprise, the local public development agency. Through this, the developer awarded several contracts relating to construction of the substation, O&M harbour and site transport.[7]



The offshore wind O&M base at Wick harbour. Image courtesy of Beatrice Offshore Wind Ltd.

Beatrice is served by an O&M base in Wick, a small town in the county of Caithness with a rich maritime heritage. Wick harbour is well located to service Beatrice, at around 25 km away, or a 40 minute journey by crew transfer vessel (CTV).

Wick has a population of around 7,000 and in the 19th century was one of Europe's busiest herring ports, when it was home to around 1,150 fishing boats.[8] The herring industry declined in the 20th century, and while Wick is no longer a designated white fish landing port, vessels still take advantage of Wick's proximity to fishing grounds. An active and successful shellfish industry continues to operate from the port, landing lobster, scallops, crab and prawns.[9] The harbour is owned and operated by Wick Harbour trust, a public body whose members are elected from local fishing, business and council interests.[10]

"The Beatrice base took a lot of years of negotiation… the Beatrice wind farm was the best thing that happened to Wick harbour in 100 years."

Malcolm Bremner, Harbourmaster at Wick[11]

The Beatrice project developers invested around €25 million in Wick, renovating two largely derelict harbour-front buildings, originally built around 200 years ago to support the herring industry. They also re-purposed a disused corner of the inner harbour area for pontoons. The work was carried out by local construction contractor GMR Henderson.

---

[7] *Economic Impact of Beatrice Offshore Windfarm Limited*, Biggar Economics on behalf of Beatrice Offshore Windfarm Ltd., July 2019, available online at https://www.sse.com/media/umbhxfqn/economic-impact-assesment-of-beatrice-offshore-windfarm-limited-23july19.pdf.

[8] Beatrice Offshore Wind Ltd., https://www.beatricewind.com/wick.

[9] Wick Harbour Authority, https://www.wickharbour.co.uk/commercial/fishing/.

[10] Ports and Harbours of the UK, https://ports.org.uk/port.asp?id=583.

[11] Alan Hendry, 'Team effort praised as former chairman stands down from Wick harbour board', *John O'Groat Journal*, 30 October 2020, available online at https://www.johnogroat-journal.co.uk/news/team-effort-praised-as-former-chairman-stands-down-from-wick-harbour-board-216679/.

The new O&M base includes offices, warehousing and welfare facilities. The inner harbour (pictured) has new pontoons and infrastructure to support the berthing and operation of up to 6 crew transfer vessels. The Beatrice O&M base employs up to 90 personnel, the majority of whom are based in the local area.[12]

"It's really been quite a boost in terms of regeneration in the whole town"

Raymond Bremner, leader of the local Highland Council.[13]

A 2019 economic impact study commissioned by SSE Renewables found that Beatrice O&M activities create £34 million per year for the Scottish economy, and support 160 direct and 130 indirect jobs.[7] Overall, the study found that the £2.4 billion project added £1 billion to the Scottish economy, of which £540 million is associated with the operational phase.[7]

"The vast majority of the staff recruited to work in the base have been local with many having a great deal of experience from other industries that have been very transferrable to the offshore industry. The operation of Beatrice will also continue to provide opportunity for other local businesses to benefit from supply chain openings.

"There are very few locals who have anything negative to say about BOWL and this is a testament to the way the company have endeavoured to go about business in the local area."

Alan Paul, Wick native and control room lead at the Beatrice O&M base.[12]

[12] *Beatrice: Building for the future: Socioeconomic benefits and learnings,* SSE Renewables, July 2019, available online at https://www.sse.com/media/i4jcgkq1/beatrice-economic-report_final_web.pdf.

[13] Stanley Reed, 'Giant Wind Farms Arise Off Scotland, Easing the Pain of Oil's Decline'*, New York Times*, 27 November 2022, available online at https://www.nytimes.com/2022/11/27/business/scotland-wind-farms-offshore.html.

3.2. Impacts of full south coast DMAP project pipeline

Beyond the initial 900 MW project, expected to be auctioned later this year via ORESS 2.1, the draft south coast DMAP identifies additional broad maritime areas with the potential to provide for the development of a further 4 GW of capacity in the region. This section examines the economic impact the deployment of this entire project pipeline on both a national and regional basis, as well as in the context of the overall economic impact of Ireland's 37 GW offshore wind deployment ambition.

3.2.1 Irish impacts

Figure 3.7 shows the Irish GVA generated by the full 4.9 GW planned south coast DMAP pipeline. The peak annual Irish GVA, in 2034, is about €145 million. The total Irish GVA over the lifetime of the projects is about €4.4 billion. 9.7% of this is in development and project management, 3.6% in turbine manufacture, 4.4% in balance of plant manufacture, 4.8% in installation, 76% in operations and maintenance and 1% in decommissioning. 45% is direct spend.

Figure 3.8 shows the Irish FTE years employment created the 4.9 GW planned south coast DMAP pipeline. It shows that Irish annual employment peaks in 2034 at about 1,700 FTE years, when there is significant balance of plant manufacture as well as installation. Total Irish employment for the project is about 49,000 FTE years over the lifetime of the projects. 9% of this is in development and project management, 4% in turbine manufacture, 5% in balance of plant manufacture, 6% in installation, 75% in operations and maintenance and 1% in decommissioning. 45% of the total employment created is direct.

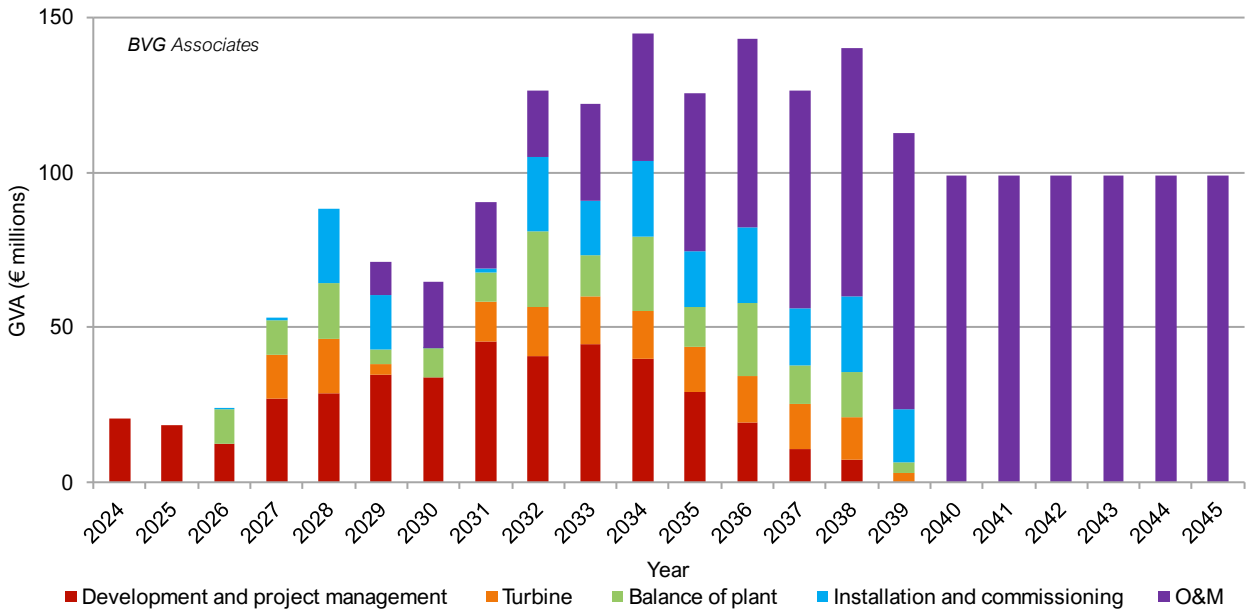


Figure 3.7 Irish GVA impacts of all south coast DMAP projects, split by cost category.

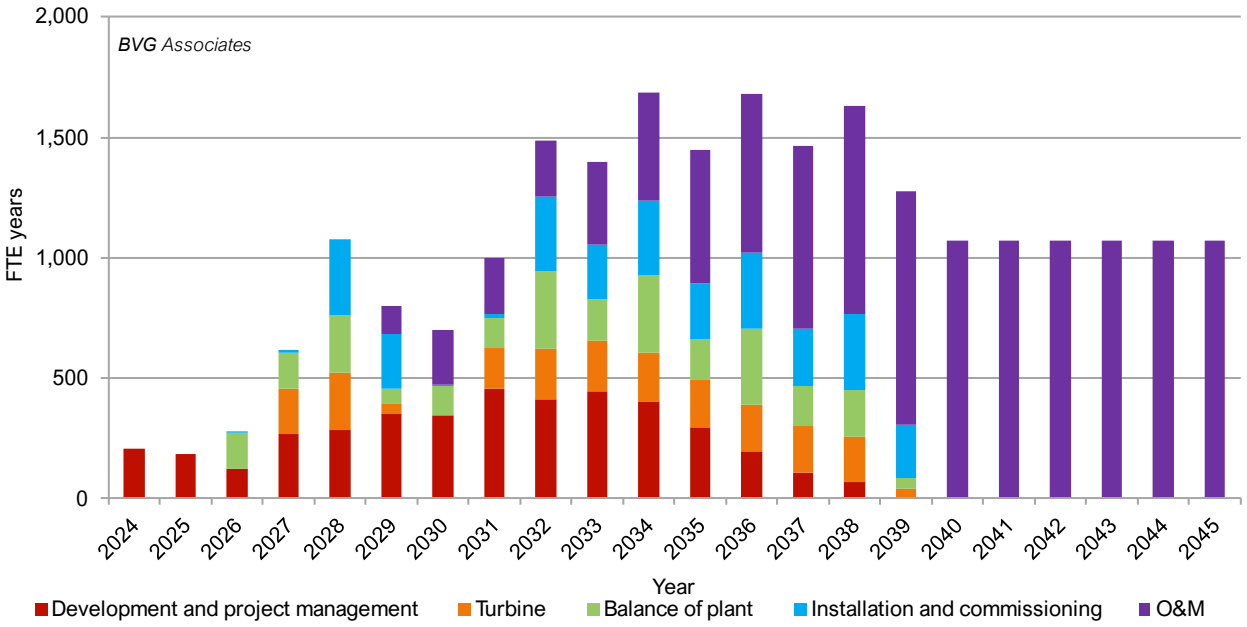


Figure 3.8 Irish employment impacts of all south coast DMAP projects, split by cost category.

3.2.2 Regional impacts

Figure 3.9 shows the regional GVA benefits generated by the full 4.9 GW planned south coast DMAP pipeline in each region, in the baseline scenario in which the tower factory is located outside the south coast. Overall, the south coast region captures €2.9 billion, which is 66% of Irish spend. The rest of Ireland captures €1.5 billion. The south coast captures 76% of Irish O&M spend, representing 88% of total south coast GVA. Project development spend is less concentrated locally, with 26% of Irish spend benefitting the south coast, and the remainder benefitting the rest of Ireland.

Figure 3.10 shows the regional employment benefits generated by the full 4.9 GW planned south coast DMAP pipeline in each region, again in the baseline scenario. Overall, 32,200 FTE years are realised in the south coast region, which is 66% of all Irish employment benefits. The rest of Ireland captures 16,500 FTE years. The south coast captures 77% of Irish O&M jobs, representing 87% of total south coast employment created. Project development employment impacts are less locally concentrated, with 27% of Irish spend benefitting the south coast, and the remainder to the rest of Ireland.

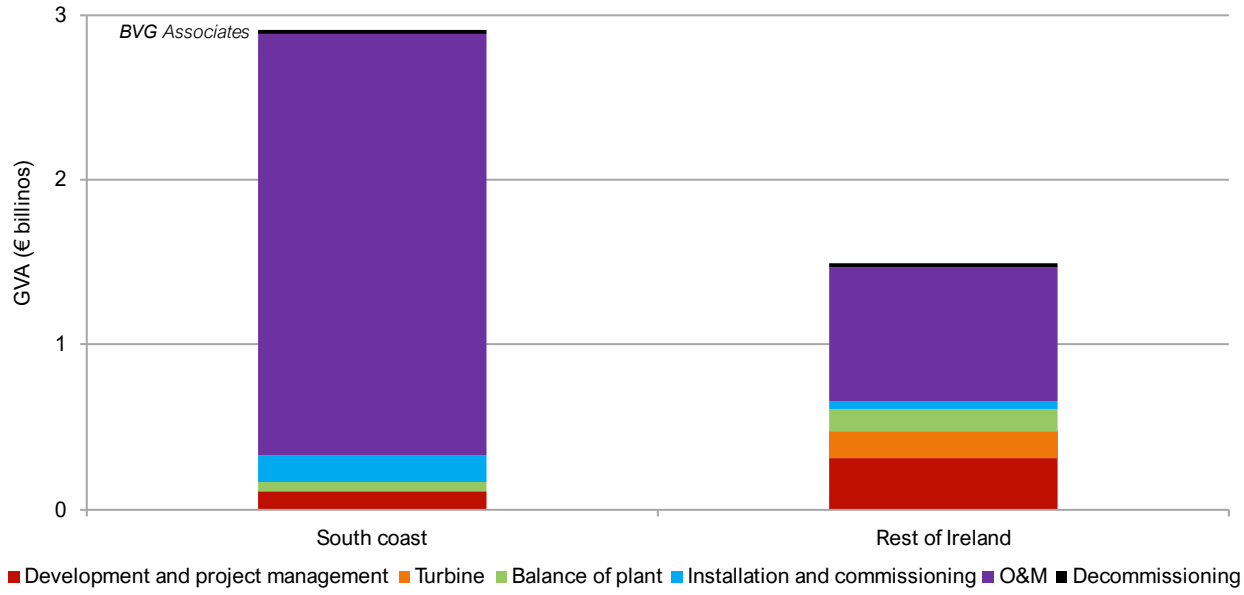


Figure 3.9 Regional comparison of lifetime GVA benefits of south coast DMAP pipeline in the baseline scenario, split by cost category.

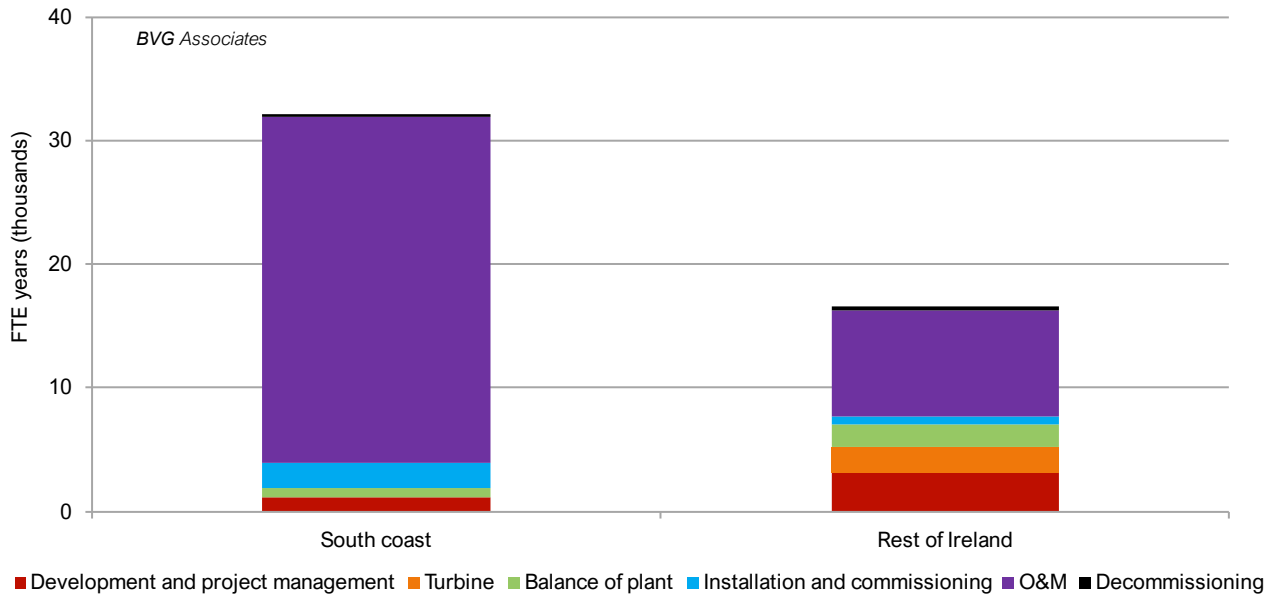


Figure 3.10 Regional comparison of lifetime employment benefits of south coast DMAP pipeline in the baseline scenario, split by cost category.

Figure 3.11 shows the profile of GVA benefits to Ireland associated with all south coast DMAP projects in the baseline scenario, split by region. Overall, the share of south coast's share of economic benefit increases over time, consistent with its strong share of GVA associated with the operational phase. South coast annual benefits peak in 2038 at €73 million, whereas rest of Ireland annual benefits peak earlier, in 2034, at €77 million. Post 2040, the south coast captures 76% of annual GVA, equivalent to €75 million per year between 2040 and 2062, while all south coast DMAP projects are in the operational phase.

Figure 3.12 shows the profile of employment benefits to Ireland associated with all south coast DMAP projects in the baseline scenario, split by regional allocation. As with the previous figure, the south coast's share of economic benefit increases over time, consistent with its strong share of employment associated with the operational phase. South coast annual employment peaks in 2038 at 980 FTE years, whereas rest of Ireland

benefits peak earlier, in 2034, at 900 FTE years. Post 2040, when all south coast DMAP projects are in the operational phase, the south coast captures 77% of annual employment benefits, equivalent to 820 FTE jobs per year between 2040 and 2062, while all projects are in the operational phase.

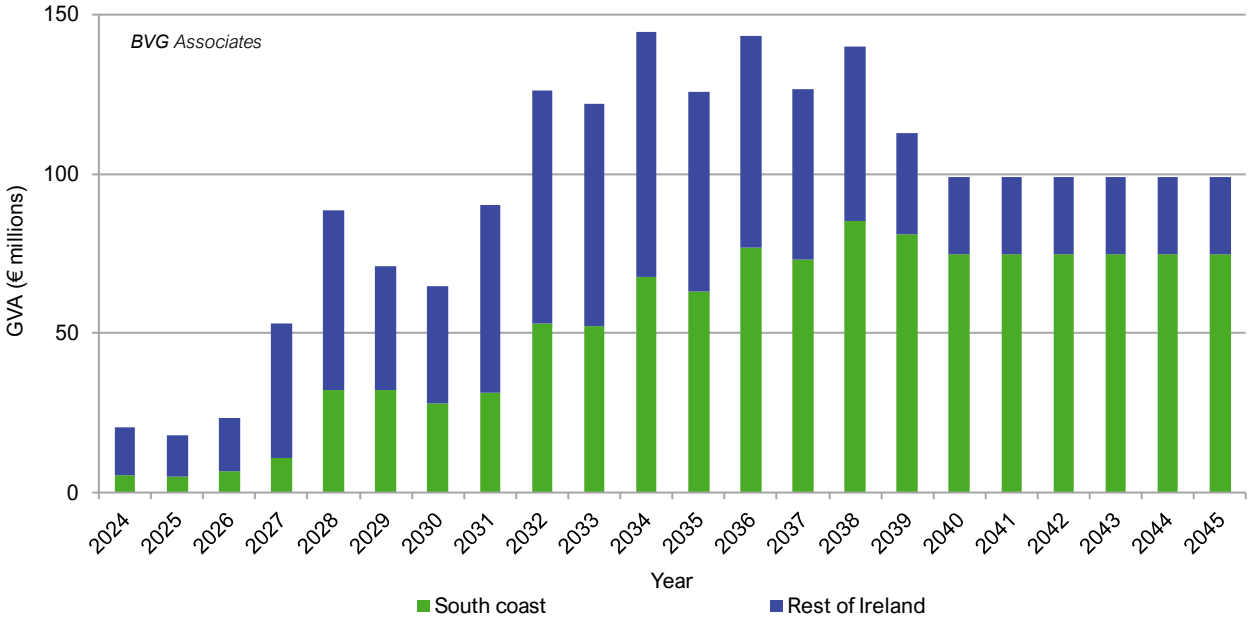


Figure 3.11 Irish GVA impacts of all south coast DMAP projects in the baseline scenario, split by region.

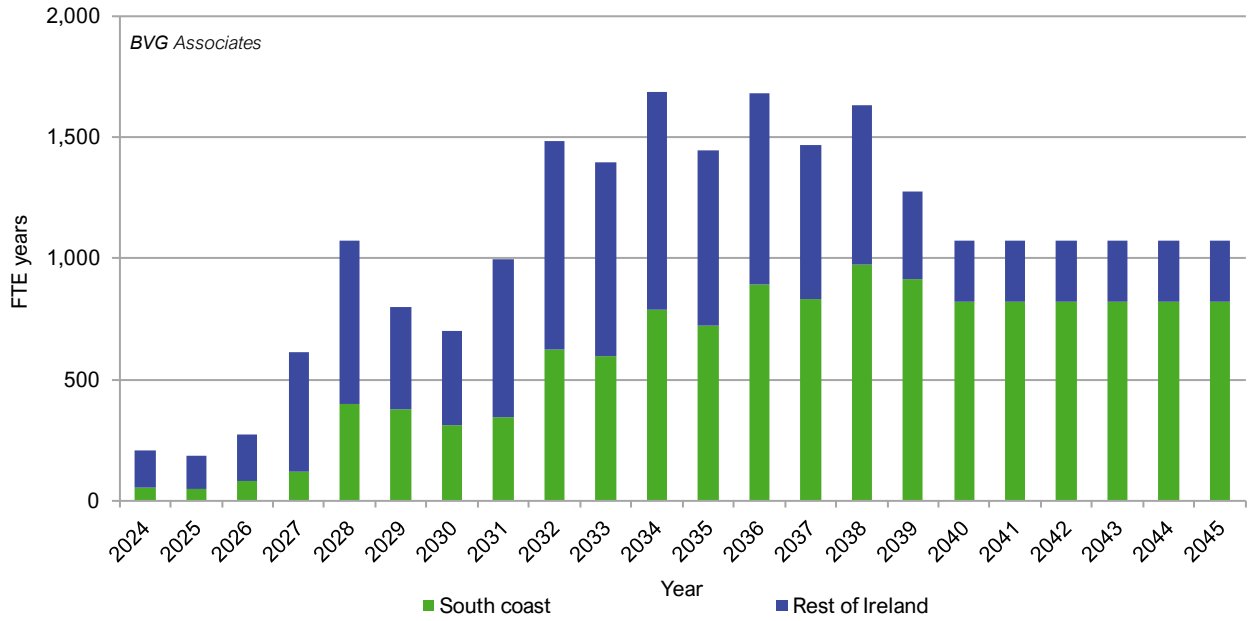


Figure 3.12 Irish employment impacts of all south coast DMAP projects in the baseline scenario, split by region.

3.3. Construction ports and infrastructure investment

As noted in Section 2.3, we assume that necessary investments will be made in south coast ports, likely Cork or Rosslare, to enable offshore wind construction activity to take place within the region.

In addition to the specific economic benefits associated with the operation of south coast construction ports, there will also be GVA and employment benefits associated with the construction phase of these new infrastructure investments. The majority of the economic benefits associated with the development of this new

infrastructure are likely to be captured by Irish civil contractors, with a majority of the work expected to be carried out by local south coast personnel.

The 2022 *National Ports Report* outlines the scale of investment expected in these locations to service offshore wind construction activities, estimated at €120 million for Cork and €200 million for Rosslare. Due to the strength of its civil engineering sector, and the benefits to proximity of supplying construction services, Ireland and the south coast region in particular can expect to benefit significantly from this further economic upside.

Any investment in a tower factory is also likely to lead to economic benefits to the local region, as a result of local participation in construction activity. Construction of such a facility would likely represent an investment in excess of €100 million.

Case study: Nigg Energy Park

The Port of Nigg is located in the Cromarty Firth on the northeast coast of Scotland. It has a history of providing offshore services dating back to 1972, when it was originally built as a fabrication yard to service Scotland's oil and gas industry. More recently, it has served as a construction port for various offshore wind projects including Ocean Wind's Moray East and Moray West, and SSE's Beatrice and Seagreen projects. It also continues to support oil and gas activities, alongside tidal and nuclear energy projects.

Jackets and towers staged at the Port of Nigg. Image courtesy of ROAVR group.

In the mid-1970s additional land was reclaimed to create Nigg Oil Terminal, which served as a crude oil storage and processing depot. The dry dock at Nigg remains one of the largest dry docks in Europe. The port fell out of use in 2000, as oil and gas fabrication work was moved out of the UK.

"Nigg is recognised globally for the abundance of knowledge, skills and expertise it has to offer, including in offshore wind and marine energy projects, and is also recognised for the role it now plays in the energy transition. Now is an opportune time to re-imagine the Scotland around us and to begin building a greener, fairer and more equal society and economy focused on wellbeing."

Paul Wheelhouse, former Energy Minister of Scotland[17]

The Port remained largely dormant until 2011 when Global Energy Group (GEG) acquired the site, intending to transform it into a multi-sector facility supporting both renewable and oil and gas projects. This acquisition was supported by a €2.1 million public grant, provided by the Scottish Government through Highlands and Islands Enterprise (HIE).[Error! Bookmark not defined.] In 2012, the Nigg Skills Academy (NSA) was established by GEG, the University of the Highlands and Islands and the Highland Council as a not for profit organisation to provide the training required to support the renewables industry. Public funding totalling €1.1 million was provided toward the creation of the NSA by the Scottish Funding Council, Skills Development Scotland and HIE. In its

first year, NSA received over 3,000 applicants and recruited over 290. It continues to provide upskilling and training for those wishing to enter the renewables and offshore industries.[14]

To date, GEG has invested about €140 million in developing the site, about 10% of which was contributed by public bodies. Investments include the development of the South Quay and West Finger, both completed in 2014. In 2014 GEG invested €24 million in developing the South Quay, enabling the upgrade and repair of Floating Production Storage and Offloading units (FPSOs) and loadout of offshore energy equipment.[15] Local contractors were used in this project, utilising local labour and materials.[16] In 2021 HIE approved €10 million in funding towards the development of the East Quay, adding 225 metres of additional deep-water quayside area. The total investment amounted to €22 million and enhanced marshalling, assembly and load-out capabilities on completed in 2022. It is forecast to add €13 million in local value from new business due to the new quay in the first three years of operation and result in the creation of up to 39 new jobs.[17]

"The transformation and upgrade of the facilities at the Port of Nigg have been amazing to be a part of during the past few years. We truly have a world class facility which is ideally suited to meet the demands of our multi energy sector clients, and when this is coupled with our fantastic workforce, great things happen."

Rory Gunn, facilities director at Port of Nigg[17]

The local areas surrounding Nigg have benefited from the various projects that have used the port. Combined, the Moray East, Moray West, Beatrice and Seagreen projects which have used Nigg as a construction and staging port represented contracts estimated to be worth more than €115 million to the port.

In February 2024, Japanese manufacturer Sumitomo confirmed an investment of €234 million at Nigg to construct a high-voltage subsea cable factory with the potential to deliver 500 new local jobs.[18] €29 million of public funds sourced from Scottish Government, HIE and Scottish Enterprise were used to secure this project.[19] Dublin-based construction contractor Europlan recently secured the contract to build the facility.[20]

"The new factory will play an important part in our transition to a net zero economy, enabling more enterprises and communities to capitalise on opportunities around low carbon and adding to the region's growing reputation as an excellent location for business and inward investment."

Stuart Black, Chief Executive of HIE[21]

3.4. South coast tower manufacturing opportunity

Figure 3.13 shows the breakdown of GVA created for Ireland in the event a tower factory is built on the south coast, rather than elsewhere in Ireland, in line with the manufacturing upside scenario. All the economic benefit associated with the tower facility, €160 million GVA, is moved to the south coast region, over the base scenario

[14] 'First Minister Launches Industry-Led Energy Skills Academy', *offshoreWIND.biz,* 23 March 2012, available online at https://www.offshorewind.biz/2012/03/23/first-minister-launches-industry-led-energy-skills-academy/).

[15] Arch Henderson LLP, https://www.arch-henderson.co.uk/projects/nigg-cromarty.

[16] Pat Munro Limited, https://www.patmunro.co.uk/case-study-nigg-hardstanding.

[17] '£8.3M Boost for highland energy port', *Press release,* Highlands and Islands Enterprise, 28 January 2021, available online at https://www.hie.co.uk/latest-news/2021/january/28/83m-boost-for-highland-energy-port/.

[18] Scott Maclennan, 'Global Energy gets planning approval for £200 million Green Freeport plant at Nigg', *Ross-shire Journal*,17 January 2024, available online at 'https://www.ross-shirejournal.co.uk/news/global-energy-gets-planning-approval-for-200-million-green-339222/.

[19] '£24.5M to secure £350M inward investment', *Press release,* Highlands and Islands Enterprise, 23 February 2024, available online at https://www.hie.co.uk/latest-news/2024/february/23/245m-to-secure-350m-inward-investment/.

[20] Chloe Emanuel, 'Europlan ECPM contract for NIGG Port subsea cable factory', *4C Offshore*, 29 November 2023, available online at https://www.4coffshore.com/news/europlan-ecpm-contract-for-nigg-port-subsea-cable-factory-nid29315.html.

[21] Peter A Walker, 'Sumitomo commits to £350m Highland investment project', Insider.co.uk, 23 Feb 2024, available online at https://www.insider.co.uk/news/sumitomo-commits-350m-highland-investment-32189151.

in which the tower factory is located outside the south coast region. This means that the south coast's share of Irish value from the 4.9 GW south coast DMAP pipeline rises from 66% to 70%.

Figure 3.14 shows the breakdown of employment benefits created for Ireland in the event a tower factory is built on the south coast, rather than elsewhere in Ireland. All the employment benefits associated with the tower facility, 2,100 FTE years are moved to the south coast region, over the base scenario in which the tower factory is located outside the south coast. This means that the south coast's share of Irish jobs from the 4.9 GW south coast DMAP pipeline also rises from 66% to 70%.

Tower factory GVA and jobs figures presented here only represent the GVA and jobs associated with servicing south coast DMAP project deployment. Any tower factory established on the south coast, or elsewhere, would deliver additional economic benefit from serving projects across the rest of Ireland and internationally. These additional economic benefits have not been modelled.

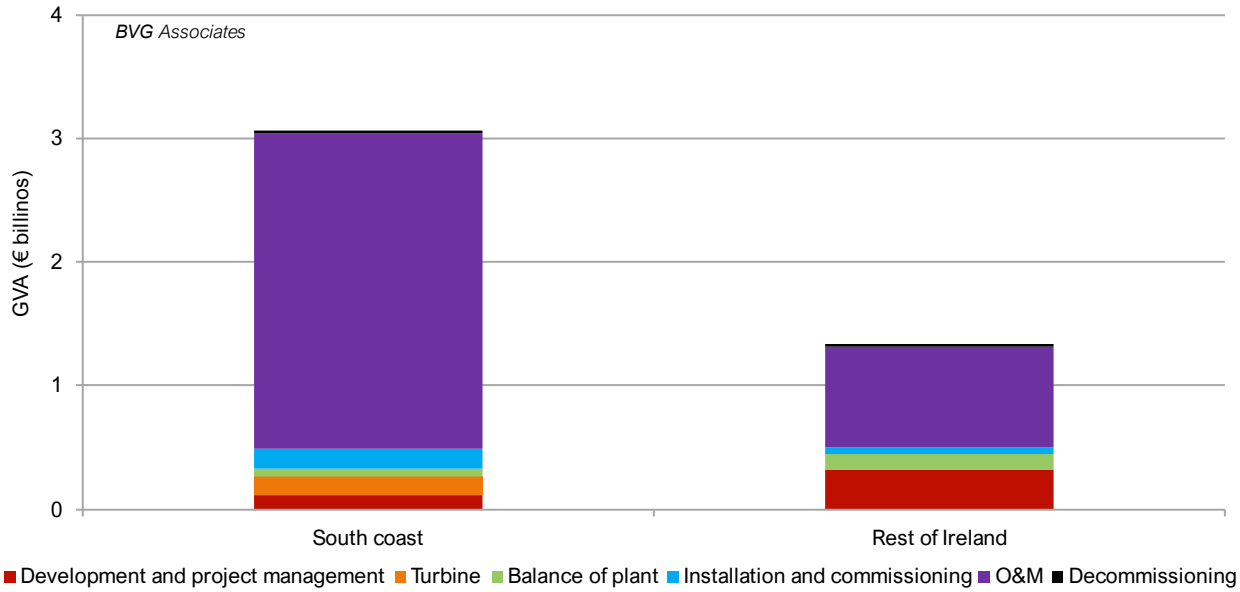


Figure 3.13 GVA impacts of south coast DMAP pipeline in the manufacturing upside scenario, split by cost category.

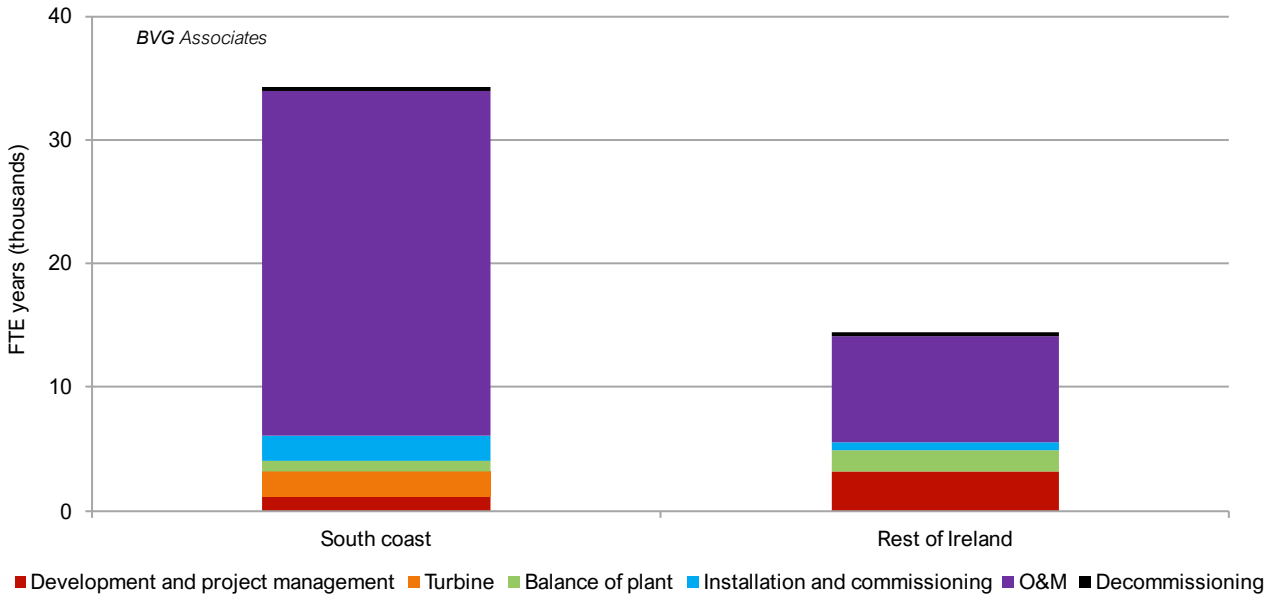


Figure 3.14 Employment impacts of south coast DMAP pipeline, in the manufacturing upside scenario, split by cost category.

Case Study: Blade manufacture at the Port of Hull, England, UK

Siemens Gamesa's blade factory is the largest offshore wind manufacturing facility in the UK, occupying an area of 77,600 square metres. Since production began in 2016, the factory has produced over 2,500 blades for offshore wind projects across Europe.[22] The facility is situated in Hull, a port city located in the north-east of England. The Port of Hull is well placed to service projects in the North Sea and benefits from ample dock space, facilitating loading of blades onto vessels.

Siemens Gamesa Blade Factory at the Port of Hull. Image courtesy of Siemens Gamesa Renewable Energy.

"Most of the people here are actually from Hull itself which is fantastic. We now have a world-class product being made in Hull by Hull people."

Finbarr Dowling, Siemens Gamesa Project Director[23]

Hull was founded in the 12th century as a port town, originally exporting wool. The city's maritime activities continued to develop as it grew into a major centre for fishing and whaling. Today, port activities remain a key part of the local economy, with the Port of Hull handling over 9 million tonnes of varied cargo each year. The Port is owned by Associated British Ports (ABP), a port group that owns and manages 21 ports across the UK.

Prior to the development of the blade facility, Hull City Council, East Riding of Yorkshire Council, ABP, and the University of Hull partnered to form Green Port Hull (GPH) in 2010 with the intent to promote the Hull region as a world-class centre for renewable energy. To carry out this goal, GPH established the Green Port Growth Programme (GPGP) in 2011, sourcing €29 million from the UK's Regional Growth Fund. In that same year, Siemens Gamesa and ABP signed an MOU, selecting the Port of Hull as the preferred location for the blade facility.[24] In 2014, Siemens Gamesa and ABP invested €190 million and €179 million respectively to build the initial phase of the facility.[25] The facility originally produced blades of length 75 m, which were used in offshore wind farms such as Dudgeon, Triton Knoll, and Hornsea One and Two. This initial phase resulted in the creation of 1,000 jobs, with 98% of these positions being filled by personnel located within 30 miles of Hull city centre.[26]

In 2021, a further investment of €221 million was made to expand the facility. A portion of this investment was provided by the UK Government's Offshore Wind Manufacturing Investment Support scheme. The scheme made available up to €190 million of public funds to support investment in various offshore wind manufacturing

[22] Green Port Hull, https://greenporthull.co.uk/what-we-do/siemens-gamesa.

[23] Angus Young, 'Siemens Hull produces first giant wind turbine blade', *Hull Live,* 1 December 2016, available online at https://www.hulldailymail.co.uk/news/business/siemens-hull-produces-first-giant-96116.

[24] *The History of the Siemens-ABP Investment in Hull,* University of Hull Logistics Institute on behalf of Green Port Hull, available online at https://gia.hull.ac.uk/Home/Publication?filename=Green%20Port%20Impact%20Assessment%20Report.pdf.

[25] The Logistics Institute Data Observatory, University of Hull, https://lido.hull.ac.uk/Industry/WindFarmSite/Siemens%20Gamesa.

[26] Humber Freeport, https://humberfreeport.org/case-studies/case-study-siemens-gamesa.

efforts.[27]. This investment enabled the manufacture of next generation blades of length up to 108 m and resulted in the creation of 200 new jobs.[28] An economic impact study conducted by the University of Hull's Logistics Institute estimated that direct employment by the factory could contribute GVA of over €85 million to the local community.[29] As of March 2017, approximately 850 directly employed staff had been recruited by Siemens, of which 97% were located within 30 miles of the city centre.[24]

"This impressive site in Hull is not only important in bolstering the UK's capabilities to produce clean energy but supports over 1,000 jobs, attracts investment to our coastal communities and helps us achieve net zero."

Gareth Davies MP, Exchequer Secretary to the Treasury of the UK[30]

Siemens Gamesa also helped to support the Employment and Skills Development strand of the GPGP by developing a training and apprenticeship framework and has helped over 800 individuals from the Hull area achieve engineering manufacturing and engineering technician qualifications.[31]

"It's good for Hull to be known as the place where these blades are being made. It shows what the city can do."

Jamie Purdue, Hull native and Crane Operator at Siemens Gamesa[23]

The Siemens Gamesa blade factory represents an indicative example of the economic benefit offshore wind manufacturing activity can bring to communities. The investment in a tower factory (as envisaged by this study) or in any other large scale manufacturing activity in Ireland, if successful, would likely have comparable impacts, though economic impacts will vary by size of facility and nature of activity. Examples of comparable tower factories elsewhere include the planned GRI Renewable Industries tower factory in Gdansk, Poland, representing an investment of €200 million and a planned workforce of 400,[32] and the Haizea Wind Group factory in Bilbao, Spain, which also employs around 400, with plans for further expansion to create 350 additional jobs.[33]

3.5. The south coast DMAP in the context of Ireland's 37 GW deployment ambition

Figure 3.15 shows the total Irish GVA benefits of delivering the national objective to achieve by 2050 37 GW offshore wind deployment ambition over time. Overall pipeline GVA figures are derived from the 37 GW deployment scenario economic impact assessment set out in workstream four of the *Offshore renewable energy export potential for Ireland* report.[4] Overall, the south coast DMAP gives rise to 11% of the €41 billion Irish economic benefit associated with delivery of the 37 GW deployment ambition. Irish annual benefits from south coast DMAP deployment peak in 2038, earlier than benefits driven by the rest of the 37 GW pipeline which peak

[27] Adnan Durakovic, 'Siemens Gamesa to Double Hull Blade Factory', *offshoreWIND.biz,* 9 August 2021, available online at https://www.offshorewind.biz/2021/08/09/siemens-gamesa-to-double-hull-blade-factory/.

[28] 'Siemens Gamesa to double size of Hull offshore wind turbine blade factory', *BW Magazine,* 9 August 2023, available online at https://www.bw-magazine.co.uk/siemens-gamesa-to-double-size-of-hull-offshore-wind-turbine-blade-factory.

[29] Green Port Impact Assessment, https://gia.hull.ac.uk/.

[30] Adnan Memija, 'Siemens Gamesa Produces First 108-Metre Wind Turbine Blades for Moray West', *offshoreWIND.biz,* 15 December 2023, available online at https://www.offshorewind.biz/2023/12/15/siemens-gamesa-produces-first-108-metre-wind-turbine-blades-for-moray-west/.

[31] University of Hull Logistics Institute, *Green Port Impact Assessment Report,* available online at https://gia.hull.ac.uk/Home/Publication?filename=GREEN%20PORT%20IMPACT%20ASSESSMENT%20Summary%20Report.pdf.

[32] Adnan Durakovic, 'Offshore Wind Tower Factory to Be Built in Poland', *offshoreWIND.biz* , 23 January 2023, available online at https://www.offshorewind.biz/2023/01/23/offshore-wind-tower-factory-to-be-built-in-poland/.

[33] 'Haizea Bilbao to double its factory in the Port of Bilbao and to create 350 new jobs', Haizea Wind Group, 9 February 2022, available online at https://haizeabreizh.com/wp-content/uploads/2022/03/PRFacilityExpansion.pdf.

in 2048. This is because south coast DMAP projects are expected to deploy earlier on average than the rest of the project pipeline.

Figure 3.16 shows total Irish employment impacts on the same basis. Overall, the south coast DMAP again gives rise to 11% of the 460,000 Irish FTE years employment associated with delivery of the 37 GW deployment ambition. As with GVA benefits, Irish annual employment benefits from south coast DMAP deployment peak in 2034, earlier than rest of Ireland benefits which peak in 2048.

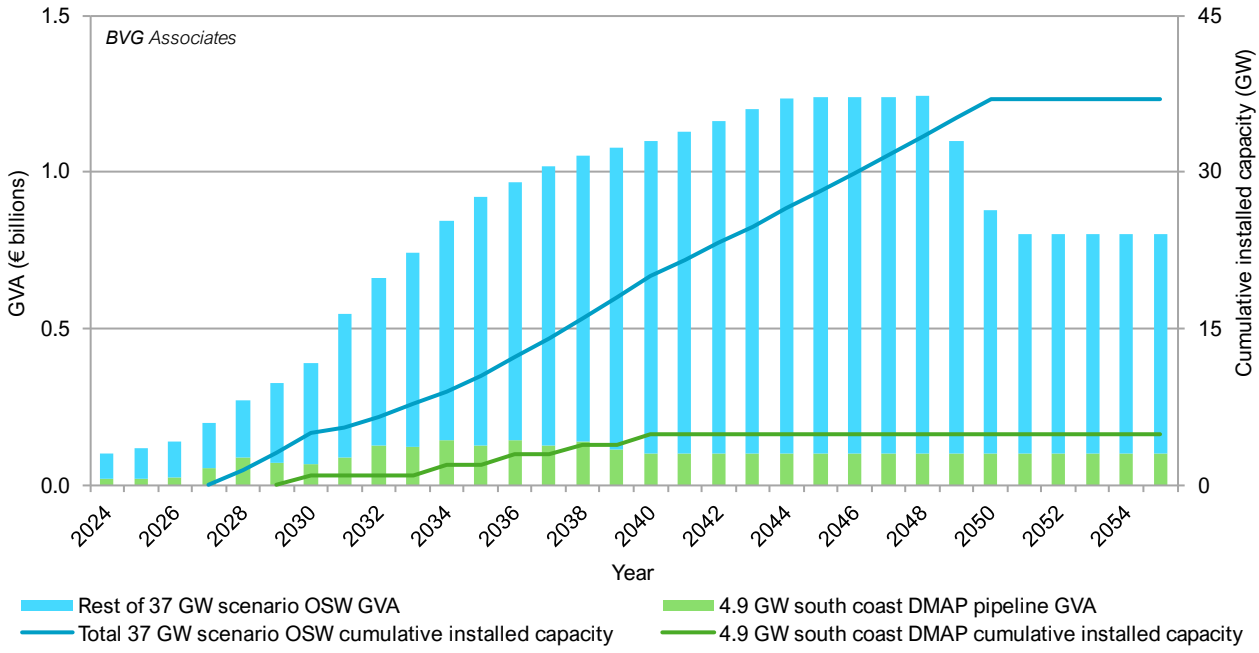


Figure 3.15 GVA impacts of Ireland's 37 GW rollout ambition, split by south coast DMAP projects and other Irish projects.

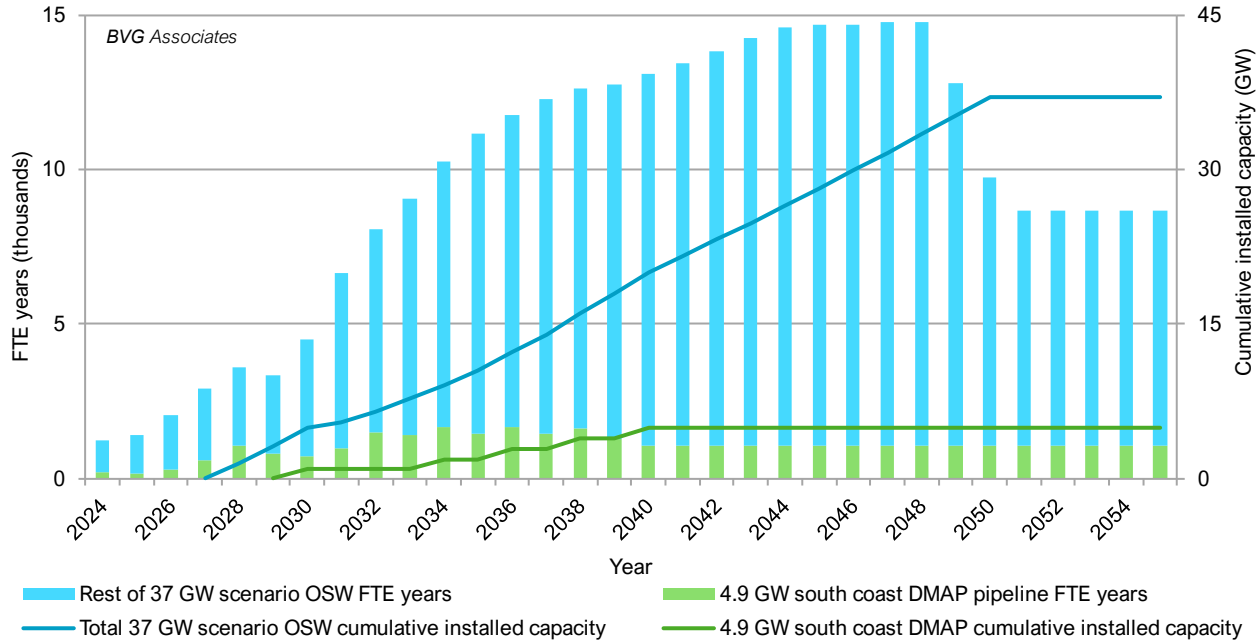


Figure 3.16 employment impacts of Ireland's 37 GW rollout ambition, split by south coast DMAP projects and other Irish projects.

4. Conclusions and recommendations

This study identifies a substantial economic opportunity for both the south coast and Ireland as whole as a result of the full implementation of the potential south coast DMAP offshore wind pipeline. Overall, the south coast DMAP will deliver an estimated €4.4 billion in GVA benefits and 49,000 FTE years of employment to the Irish economy. Of these benefits, between €2.9 billion and €3.1 billion GVA and between 32,200 and 34,300 FTE years is expected to be captured by the south coast region. This represents between 66 and 70% of the total Irish GVA and employment benefits associated with the south coast DMAP.

It is clear that a large proportion of the economic opportunity lies in the operational phase of the projects, which represents more than 80% of the south coast's expected GVA and employment benefits. There is also a significant opportunity in the development and project management phase, though benefits are expected to be more widely dispersed across Ireland.

Capturing the benefits associated with the manufacturing and installation phases of these offshore wind projects requires significant investments to be made in upgrading Ireland's port and manufacturing capability, specifically through the development of domestic ports capable of handling large scale construction activity, and a tower factory. It is important to note that the development of domestic ports and manufacturing facilities could also deliver further economic and employment opportunities, beyond those set out above. This includes both during construction and through other uses of port facilities.

These results are an estimate based on an assessment of current Irish supply chain capabilities and likely opportunities. The benefits realised by the south coast and by the Irish economy as a whole may be higher or lower in practice, and action on the part of Government to create the right conditions for supply chain investment to occur, through creation of a strong policy environment, backed up by clear industrial strategy, investment incentives, and skills and R&D programmes will be key to ensuring Ireland captures, and potentially exceeds, the economic benefits set out in this report.

Government policy recommendations

To ensure these benefits are realised, and to develop the Irish supply chain's capability to deliver greater benefits to the local economy, we recommend:

To ensure these benefits are realised, and to develop Irish supply chain capability, thereby delivering greater benefits to the local economy, we recommend:

1. DECC establishes clear, timely, predictable and bankable frameworks for seabed-leasing, permitting, offtake and grid connection, backed up by consistent policies and long-term statements of ambition and visibility of pipeline, to build investor confidence.
2. The Department of Enterprise, Trade and Employment (DETE) establishes and implements a clear industrial strategy for offshore wind, which targets investment in specific areas of the supply chain, including those identified in this report, and seeks to maximise benefits in key areas of Irish advantage, such as project development and O&M.
3. DETE, with collaboration from the Department of Finance, puts in place investment incentives consistent with Ireland's status as an EU Member State, specifically targeted at these areas. Such incentives could include investment grants, tax incentives or preferential financing arrangements such as government-backed loan schemes or guarantees.
4. DETE, IDA Ireland, local authorities, industry bodies and relevant landowners work together to identify opportunities to capture large inward investment opportunities and coordinate support packages to facilitate timely investment decisions.
5. The Department of Transport establishes mechanisms to provide investment support for port infrastructure upgrades.
6. The Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) and the Sustainable Energy Authority of Ireland (SEAI) support this effort through targeted skills development

initiatives and support for research and development in areas relevant to areas of active Irish participation. This could include, for example, seabed surveying, LiDAR and remote monitoring technologies, or support for synthetic materials research.

7. Local authorities develop regional, county and city development plans with regard to emerging offshore renewable energy (ORE) opportunities, where such considerations are not already integrated.

Appendix A GVA and employment impacts

Conventional modelling of economic impacts for most industrial sectors relies on government statistics, for example those based on industry classification codes and use input-output tables and other production and employment ratios.

Industry classification 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 industry classification analyses of offshore wind need to map existing data onto these activities, which is not easy and a source of error. Analyses using industry classification codes also have to rely on generalized data.

Offshore wind is better suited to a more robust approach that considers current and future capability of local supply chains because offshore wind projects tend to:

- Be large and have distinct procurement processes from one another; and
- Use comparable technologies and share supply chains.

It therefore enables a realistic analysis of the local content of projects even where there are gaps in the data.

The methodology used here was developed jointly by BVGA and Steve Westbrook of the University of the Highlands and Islands, UK, and has been used in many published studies.

The methodology's first input is the cost per MW of each supply chain category listed in Appendix B.

The second stage is to assess the local content for each category, that is the net local expenditure considering that:

- Locally sourced products will have non-local supply chains, and
- Non-local sourced products may have local supplier.

The remaining expenditure is analogous to the direct and indirect GVA created. GVA is the aggregate of labour 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 consider each supply chain category and estimate typical salary levels, costs of employment, and profit margins, bringing together specific sector knowledge and research into typical labour costs for the work undertaken in each level 2 category listed below.

FTEs relate to full time equivalent job years, with part-time or part-year work considered appropriate. A full-time job would normally be at least 7 hours per day over 230 working days of the year. If an individual works significantly more than this over a year, FTE attribution would be more than 1 FTE (for example, 1.5 FTEs if working long hours over 7 days per week).

FTEs are by workplace rather than by residence and will include migrant/temporary resident workers.

Where work in a local area (for example, on an assembly site) is carried out by people who have moved temporarily from elsewhere in Ireland, or overseas and live in temporary accommodation while working on site, their daily expenditures on accommodation, food, and drink, leisure and the like create employment impacts

locally and within Ireland more widely. These impacts have been considered in the indirect impacts because these payments are likely to be covered through subsistence expenses rather than personal expenditures.

The GVA to gross earnings ratio for a business can be relatively high where it is charging for use of expensive plant, equipment, boats, etc. If a specialist vessel, for example, has been built in Ireland for offshore renewables work, the prior employment and earnings impacts from this could be additional to what it has been possible to capture in the analysis carried out for this report.

In this report, GVA and earnings impacts have not been discounted prior to aggregation.

The economic analysis was structured around theoretical projects with characteristics typical of those anticipated in Ireland. We considered projects installed in 2025, 2030 and 2040, and interpolated costs for intermediate years. We developed the cumulative impact by scaling project impact by the capacity of projects anticipated to be installed each year in each of the three scenarios modelled.

For each of the theoretical projects, we made judgements of local content for each of the supply chain categories defined below. To simplify this analysis, we assumed that there is no real term increase in salaries and that changes in cost for the projects between 2025 and 2040 are due to changes to technology and industry learning. As a result, the analysis is likely to underestimate the GVA.

We established the impacts in Ireland by considering the current and potential future capability of the supply chain in Ireland and assessed the likely percentage of local content for each supply chain category in each scenario, varying linearly between estimates every 5 years. Local content is defined as the percentage of project expenditure that is spent in Ireland. It excludes the value of imports to an Irish supplier and includes the value of Irish exports to a non-Irish supplier. The capability of the supply chain in Ireland, opportunities for growth and impact of different scenarios are discussed earlier in this section. Our assessment of Irish local content levels is discussed further in Section 2.3.

We modelled direct and indirect impacts. Direct impacts are defined as those associated with project developers and their main contractors. Indirect impacts are defined as those associated with their sub-suppliers.

Appendix B Project cost categories

Table B.1 shows the breakdown of cost categories considered within the economic analysis.

It provides the share of overall project spend attributable to each cost category, over time. Cost categories with a higher share of overall project spend will have greater GVA impact for each percentage point of local content within that cost category.

It then shows the local content percentage for each cost category for the south coast region and the rest of Ireland. In a number of categories these are expressed as a range, consistent with increasing local content between 2030 and 2040, as the Irish supply chain increases in capability with experience and captures a larger proportion of the value available.

Table B.1 Breakdown of level 2 cost categories, with share of project spend and regional allocation.

			Share of overall project spend			Local content 2030 to 2040	
Phase	Level 1	Level 2	2030 (%)	2035 (%)	2040 (%)	South coast (%)	Rest of Ireland (%)
DEVEX	Development and project management	Development and consenting services	1.2	1.2	1.2	20	60
		Environmental surveys	0.2	0.2	0.2	21 to 22	41 to 44
		Resource and metocean assessment	0.1	0.1	0.1	21 to 22	41 to 44
		Geological and hydrographical surveys	0.2	0.2	0.2	21 to 22	41 to 44
		Engineering and consultancy	0.2	0.2	0.2	13 to 14	39 to 42
		Project management	0.8	0.8	0.8	13 to 14	39 to 42
CAPEX	Turbine	Nacelle and Hub	17.6	18.4	18.2	0	0
		Blades	8.6	8.9	8.9	0	0
		Tower	3.1	2.7	2.6	23 in territory hosting factory	
		Electrical system	1.6	1.7	1.7	0	0
	Balance of plant	Array cables	0.9	0.8	0.8	0	0
		Export cables	4.4	6.9	7.3	0	0
		Monopile foundation	13.9	14.1	14.0	0	0
		Offshore substation	4.9	5.3	5.5	0	0
		Onshore substation	1.9	1.5	1.5	15	35
	Installation and commissioning	Offshore substation	0.9	1.1	1.1	0	0
		Offshore cables	3.2	2.6	2.7	0.3 to 1	0.7 to 2
		Onshore export cables	0.6	0.4	0.5	60	20
		Turbine and foundation	2.4	3.0	2.9	0.3 to 1	0.7 to 2
		Inbound transport	0.4	0.5	0.5	0.3 to 1	0.7 to 2
		Construction port – fixed	0.6	0.6	0.6	40	0
		Offshore logistics	0.1	0.1	0.1	36 to 39	16 to 17
		Onshore substation	0.1	0.1	0.1	60	20
OPEX	Operations and maintenance	Operations	9.5	8.2	8.1	41 to 44	21 to 22
		Maintenance	13.2	11.5	11.3	52	10
		Major repair	4.7	4.1	4.0	2.5	2.5

		Offshore vessels and logistics	1.0	0.9	0.9	36 to 39	16 to 17
		Operations port	0.2	0.2	0.2	70	10
DECEX	Decommissioning	Decommissioning	3.5	4.0	4.0	2.5	2.5

Appendix C Project parameters

Table C.1 shows assumed project parameters over time which we have used in our cost modelling from which GVA and job figures have been derived. 2030 figures reflect the assumed parameters of the first 900 MW project, deploying in 2030. All later projects are assumed to use jacket foundations and an SOV-based O&M strategy. Where project parameters such as turbine rating and lifetime increase over time, these parameters have been derived for the installation year for each of the project in the south coast DMAP pipeline, assuming linear progression over time.

Table C.1 Project parameter assumptions.

Year COD	2030	2035	2040
Turbine rating (MW)	17	21	25
Mean wind speed at 150 m height (m/s)	10.5	10.5	10.5
Lifetime (years)	32.3	34	34.7
Water depth (m)	57	70	70
Foundation type	Monopile	Jacket	Jacket
Distance to construction port (km)	75	100	100
Distance to OMS port (km)	24	100	100
O&M vessel strategy	Crew transfer vessel (CTV)	Service operation vessel (SOV)	SOV
Offshore export distance (km)	50	80	80
Onshore export distance (km)	20	20	20
Transmission type	HVAC	HVAC	HVAC

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.