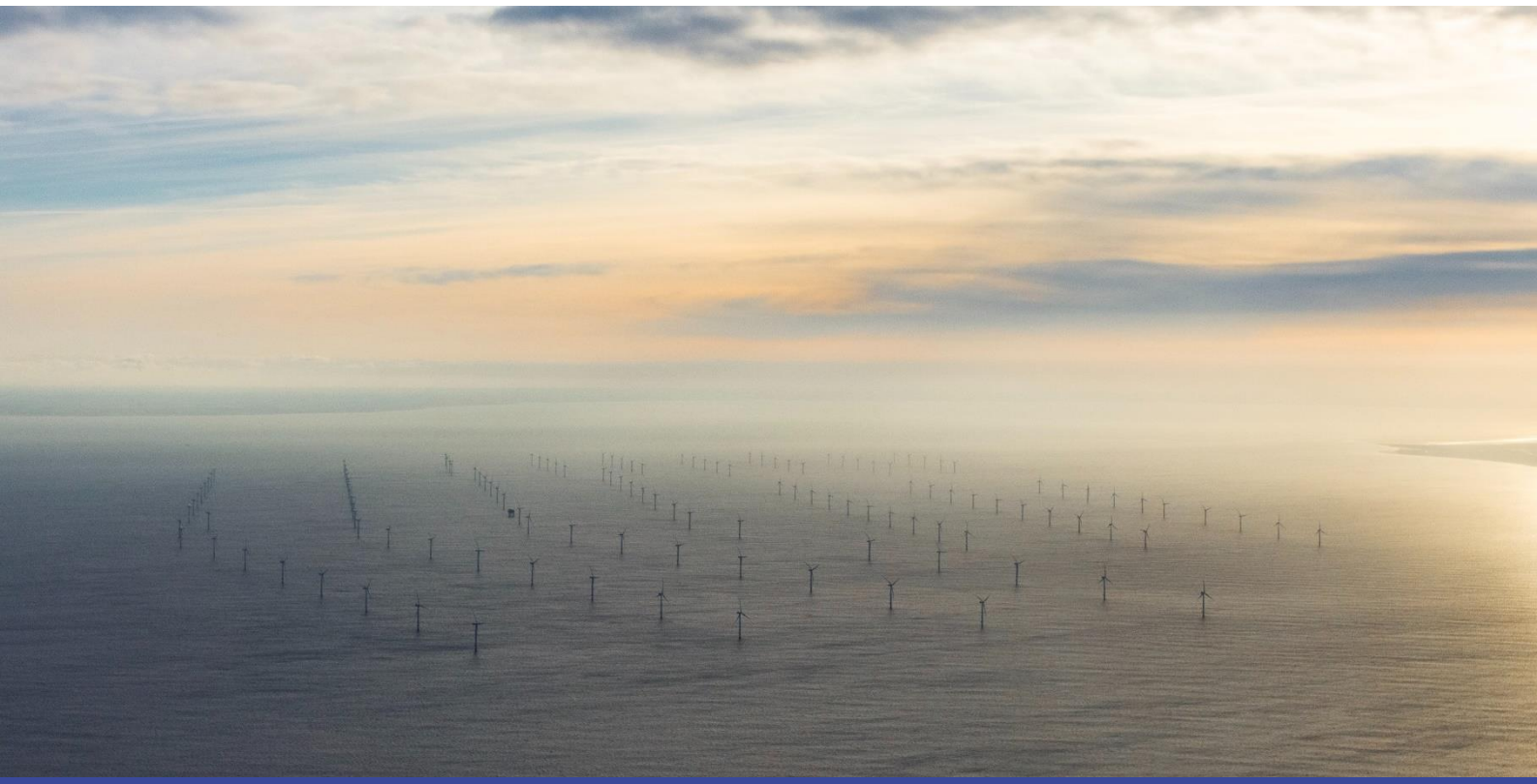
codling wind park

Environmental Impact Assessment Report

Volume 4

Appendix 29.3 Economic Impact Analysis

BVGAssociates



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Codling Wind Park
Economic impact analysis

November 2023

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Glossary

Term	Definition
Assembly (pre-assembly and final assembly)	Pre-assembly: the assembly of components to form major sub-assemblies, such as the pre-assembly of tower sections into a tower. Final assembly: the assembly of major subassemblies with the substructure, to form an assembled offshore wind turbine.
Balance of plant (BoP)	Includes all the components of the wind farm except the turbines, including transmission assets built as a direct result of the wind farm.
Capital expenditure (CAPEX)	Spend on all activities up until works completion date.
Crew transfer vessel (CTV)	A vessel used to transport wind farm technicians and other personnel to the offshore wind farm turbines either from port or from a fixed or floating base. Vessels operating today are typically specially designed catamarans that accommodate around 12 passengers.
Decommissioning expenditure (DECEX)	Spend on removal or making safe of offshore infrastructure at the end of its useful life, plus disposal of equipment.
Environmental impact assessment (EIA)	Assessment of the potential impact of the proposed development on the physical, biological, and human environment during construction, operation, and decommissioning.
Final investment decision (FID)	The point at which a developer has in place all the consents, agreements and major contracts required to commence project construction (or these are near execution form) and there is a firm commitment from equity holders and debt funders to provide funding to cover the majority of construction costs.
Gigawatt (GW)	Unit of power.
High voltage alternating current (HVAC)	An electric power transmission system that uses alternating current for the bulk transmission of electrical power. Alternating current is the form in which electric power is generated by wind turbines and delivered to an end user.
Inter-array cables (IACs)	Subsea electrical cables connecting the offshore wind turbines and the offshore substation.
Megawatt (MW)	Unit of power.
Monopile foundation	A type of foundation with a cylindrical tube (normally steel) that is normally driven tens of metres into the sea bed, although it can also be inserted into pre-drilled holes.
Onshore export cable	The cables that transport electricity generated by the wind turbines from the offshore substations to the landfall.
Offshore export cable	The cables that transport electricity generated by the wind turbines from the transition joint bays at the landfall to the onshore substation.
Offshore wind turbine	The integrated wind turbine and substructure.
Offshore substation (OSS)	A fixed structure located within the array site, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
Operational expenditure (OPEX)	Spend on all activities from work completion date until decommissioning. Note O&M expenditure is a subset of this.
Operations and maintenance (O&M)	O&M comprises wind farm O&M and onshore transmission O&M. Operations: day-to-day management including all the work not covered under maintenance and service. For wind farm O&M, this includes cost for port facilities, buildings, management personnel, environmental monitoring, and community engagement.

	Maintenance of assets: scheduled (that is, planned a long time in advance) maintenance, that may be based on suppliers' recommendations or owner's experience. It includes condition-based or time-based maintenance programmes and planned health and safety inspections. Typical maintenance includes inspection, checking of bolted joints and replacement of wear parts (with design life less than the design life of the project). Maintenance also includes the unscheduled interventions in response to events or failures. Interventions may be proactive (before failure occurs, for example responding to inspections or condition monitoring) or reactive (after failure that affects generation has occurred). Also included are interventions due to major components not lasting the full turbine design life (even if intervention was planned prior to construction) and both on site repair and replacement of large and small components.
Ports	Manufacturing port: where equipment is made and shipped from, such as turbines or balance of plant. Construction port: where equipment is stored and pre-assembled, then finally assembled, before transport to site. O&M port: the base port for operations and maintenance vessels and supporting materials.
Service operation vessel (SOV)	A vessel that provides accommodation, workshops, and equipment for the transfer of personnel to turbine during O&M. Vessels in service today are typically up to 85 m long with accommodation for about 60 people.

Summary

Codling Wind Park (CWP) is the largest of Ireland's Phase One projects, with potential to meet over 20% of the targeted 5 GW of offshore wind to be connected to the grid by 2030. The project has recently been successful in Ireland's first offshore wind energy support scheme. CWP is being developed by Codling Wind Park Limited (CWPL), a joint venture between Fred. Olsen Seawind and EDF Renewables.

CWPL has engaged BVGA to provide this report to establish the economic impacts of the project to the local and Irish economy and to inform project stakeholders as part of the environmental impact assessment report (EIAR). This report presents the economic impacts, measured using gross value-add (GVA) and full-time equivalent job years (FTE years) that the CWP Project will potentially generate during its development, construction and lifetime operation.

We used the economic impact methodology that BVGA developed to model economic impacts for the offshore wind industry. It is based on the offshore wind local content methodology that seeks to understand the supply chain in the lower tiers and produces a figure that is equivalent to direct and indirect GVA. Calculating a national and local content figure, and understanding profit margins, costs of employment and salaries enables direct and indirect FTEs to be calculated.

The supply chain opportunities for CWP are mainly in development and project management and operations and maintenance categories of the supply chain. Turbine and balance of plant components will mostly be supplied from Europe or rest of the world. The project will produce about €1 billion GVA and about 8,500 FTE years in Ireland, over its lifetime. Of which, about €530 million GVA and about 4,300 FTE years are created locally. Most of the economic impacts to Ireland will arise during 25 years of operations.

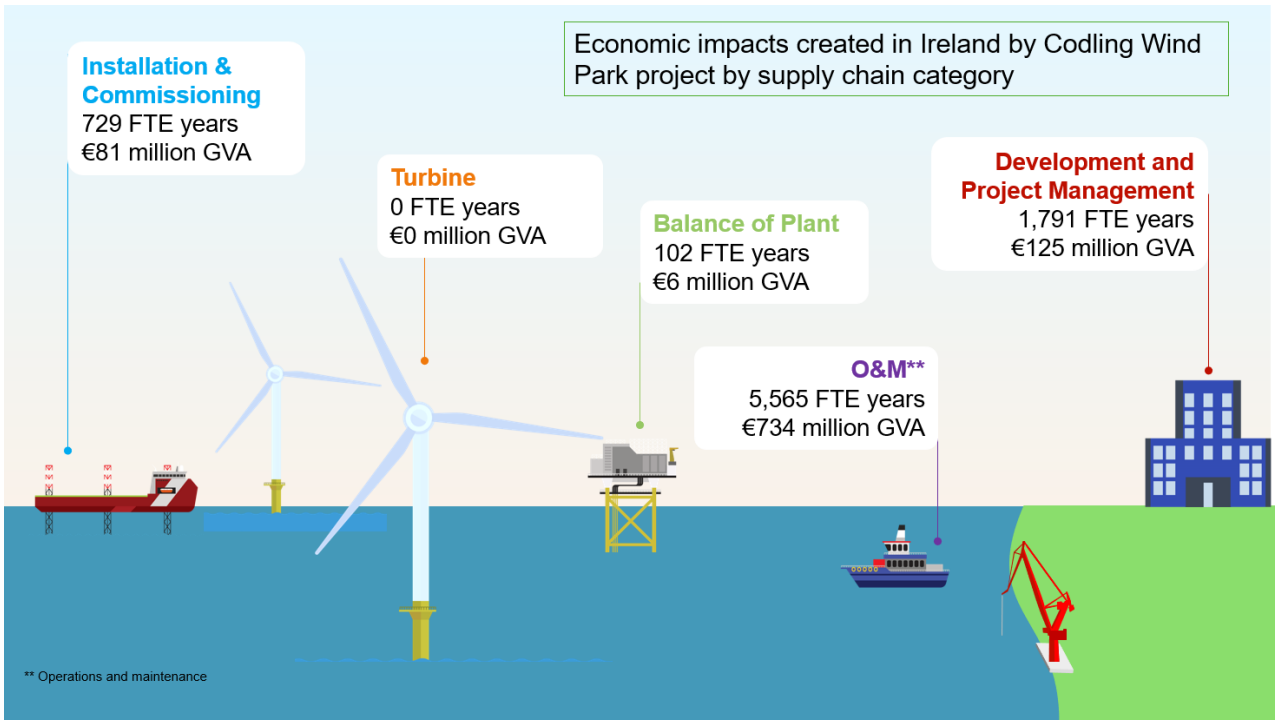

Figure 1 Economic impacts created in Ireland by Codling Wind Park project.

1. Introduction

To meet its 2050 carbon neutrality target, the Irish Government set a target of 5 GW of bottom-fixed offshore wind by 2030. In May 2020, the Government announced that seven offshore wind farm projects had been designated as Relevant Projects, allowing these projects to obtain a Maritime Area Consent under the Maritime Area Planning Act 2021. These projects are now known as Phase One projects.

In May 2023, EirGrid published provisional auction results for Phase One Ireland's first Offshore Renewable Electricity Support Scheme. Codling Wind Park Limited (CWPL), a joint venture between Fred. Olsen Seawind and EDF Renewables was announced as a successful applicant.

CWPL is developing Codling Wind Park (CWP), the largest of the Phase One projects, with potential to meet over 20% of the targeted 5 GW of offshore wind to be connected to the grid by 2030.

This document provides inputs to the environmental impact assessment report (EIAR) for the CWP Project. The purpose of the EIAR is to provide decision-makers, stakeholders and all interested parties with the environmental information required to develop an informed view of any likely significant impacts resulting from the CWP Project, as required by the European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) (the EIA Directive). This economic analysis supports the EIAR by identifying potential economic impacts from the development of the project.

CWPL (hereafter 'the Applicant') commissioned this report from BVG Associates (BVGA) to assess the economic impacts of the CWP Project. This report presents the economic impacts, measured using gross value-add (GVA) and full-time equivalent job years (FTE years) that the CWP Project will potentially generate during its development, construction, lifetime operation, and decommissioning.

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

In November 2005, the Applicant was awarded a Foreshore Lease under the Foreshore Act 1933 for the original CWP. The Foreshore Lease enabled a grid connection to the Irish coastline and the construction of up to 220 wind turbines and associated infrastructure, with a generating capacity of up to 1,100 megawatts (MW).

In March 2009, the Applicant submitted an application for a Foreshore Lease for the Codling Wind Park Extension (CWPE); a similar sized array containing up to 200 additional turbines of up to 1,000 MW capacity. The proposed CWPE array adjoins the original CWP array site and extends to the south.

Significant advances in wind turbine technology, combined with considerable reductions in the cost of energy from offshore wind, means that the original CWP and CWPE can now be developed with a reduced number of turbines while optimising the renewable electricity production from the site.

The CWP Project now consists of a single array site with a maximum export capacity of up to 1,300 MW. The offshore export cables will make landfall at Poolbeg with onshore export cables routed north, approximately 0.7 km across the Poolbeg Peninsula, to an onshore substation located on the south bank of the River Liffey.

A full description of CWP is provided in Chapter 4 Project Description of the EIAR.

2. Methodology

Economic impacts are typically quantified as GVA and FTE years for the project. GVA is the value generated by any unit engaged in the production of goods and services, and one FTE job year is one full-time job for one year. These metrics are modelled locally and nationally. Definitions of the distinction between local and national impacts is described below.

2.1. Local impacts

In defining what constitutes '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, CWP has no 'local' area, but its local economic footprint is largely related to the construction of the onshore transmission infrastructure and the long-term operation and maintenance (O&M) of the wind farm.

The onshore grid connection for CWP will be across the Poolbeg Peninsula on the south bank of river Liffey.

While Wicklow Port is the Applicant's preferred location for the development of an operations and maintenance base (OMB), a specific location for this is not yet confirmed. Therefore, since the location of any base will create significant local benefits regardless of the location, we modelled the impacts on a theoretical 'local' area. An alternative O&M solution to an OMB may involve the use of a service operations vessel (SOV) with a berth and a base.

2.2. National impacts

The Irish Government is a key stakeholder, so national in this report is defined as the Republic of Ireland. Where impacts or content are referred to as "Irish", this includes the local impacts as well.

The analysis distinguished between direct and indirect, where:

- Direct impacts were associated with the project partners and their major contractors, and
- Indirect impacts were associated with the small suppliers to the project partners and the suppliers to the project's major contractors.

We used the economic impact methodology that BVGA developed to model economic impacts for the offshore wind industry. The method is based on the offshore wind local content methodology that seeks to understand the supply chain in the lower tiers and produces a figure that is equivalent to direct and indirect GVA. Calculating a national and local content figure, and having an understanding of profit margins, costs of employment and salaries enables direct and indirect FTEs to be calculated. The same methodology is followed for local content.

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 full-time equivalent (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. We estimated typical salary levels, costs of employment and profit margins, bringing together BVGA's specific sector knowledge and research into typical labour costs for the work undertaken in each part of the supply chain.

2.3. Key assumptions and data inputs

Four key inputs were used for the economic impact modelling:

- Project specification

- Supply chain narrative
- Wind farm costs, and
- Salaries and employment costs.

2.3.1 Project specification

The key assumptions for the proposed project are shown in Table 1.

Table 1 Key assumptions for the project.

Assumption	Value
Wind farm capacity	1,400 MW [i]
Year of commissioning	2030
Operating lifetime	25 years
Grid connection technology	HVAC
Foundation type	Monopile

2.3.2 Supply chain narrative

Local companies will be used to contribute to the various supply chain categories for the CWP Project. This means that expenditure will be generated locally and in rest of Ireland which will lead to economic impacts and job creation. These economic impacts created by the proposed project will be driven by the location of suppliers.

We defined the supply chain categories in agreement with the CWPL team. The supply chain categories used in the analysis are shown in Table 2.

Table 2 Supply chain categories used in the analysis.

Level 1 category	Level 2 category
Development and project management	Developing and permitting
	Project management (technical and non-technical)
Turbine	Nacelle, rotor, and assembly
	Blades
	Towers
Balance of plant	Foundation supply
	Inter- array cable supply
	Export cable supply
	Onshore substation supply
	Onshore substation supply
Installation and commissioning	Turbine installation
	Foundation installation
	Inter array cable installation
	Onshore export cable installation
	Offshore export cable installation
	Onshore substation installation
	Offshore substation installation
Operations and maintenance (O&M)	Wind farm operations
	Turbine maintenance and service
	Foundation maintenance and service
	Subsea cable maintenance and service
	Substation maintenance and service
Decommissioning	Decommissioning

[i] The (BVGA) report uses a range of considerations and assumptions for the project specification including inter alia grid connection technologies, operating lifetime, foundation type, year of commissioning and a capacity figure of 1400 MW to inform its conclusions. The 1400 MW capacity figure was based on the grid connection capacity which predated the ORESS approved capacity figure of 1300 MW. However, we do not consider this difference in MW capacity to substantively change the overall conclusions of the report, noting that the supply chain, wind farm cost and salary and employment cost assumptions would remain the same.

For each category, we developed the supply chain narrative by assessing the local and national suppliers in each category. We provided the areas of the supply chain for which CWPL expects to use suppliers based locally and rest of Ireland. This assessment was based on:

- CWPL's supply chain strategy
- Industry trends in other relevant offshore wind projects
- Technology requirements for the project
- The expected availability of capable local and national suppliers at the time when procurement of the project would be underway, and
- The logistical benefits of local and national supply.

We used these assumptions to develop a narrative of the project's supply chain and used this to estimate the percentages of expenditure spent locally and in the rest of Ireland for each supply chain categories.

We quantified the supply chain narrative by calculating the content for the local area and the rest of Ireland.

2.3.3 Wind farm costs

We provided the lifetime expenditure expectations for the proposed project across each of the supply chain categories. These were approved by CWPL.

2.3.4 Salaries and employment costs

We researched salaries and employment costs from public sources and from data collected by BVGA. We assumed that profit margins in the Irish supply chain were similar to those reported for other offshore wind markets.

BVGA has gathered a significant amount of data on the number of jobs associated with 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, most major packages of supply chain work are likely to be awarded to established companies that have been active in Europe or Asia for many years. Despite this, there are some opportunities for Ireland-based companies and local companies. These opportunities are mainly in development and project management and O&M categories of the supply chain. The supply chain narrative summarised in Table 3 and described in more detail beneath.

Table 3 Supply chain assessment.

Level 1 category	Level 2 category	Local supply chain	Rest of Ireland supply chain
Development and project management	Developing 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.	Mostly consultancy-based work led by Ireland-based teams.
	Project management (technical and non-technical)	Project management office with use of local services.	Mostly consultancy-based work led by Ireland-based teams.
Turbine	Nacelle, rotor, and assembly	No local supply	Imported from existing factories in Europe or rest of the world.
	Blades	No local supply	Imported from existing factories in Europe or rest of the world.
	Towers	No local supply	Imported from existing factories in Europe or rest of the world.
Balance of plant	Foundation supply	No local supply	Imported from existing factories in Europe or rest of the world.
	Inter-array cable supply	No local supply	Imported from existing factories in Europe or rest of the world.
	Export cable supply	No local supply	Imported from existing factories in Europe or rest of the world.
	Onshore substation supply	No local supply	Engineering and project management in Ireland, along with some low voltage systems. No Irish supply for high voltage equipment. Onshore substation structures and materials supplied from Ireland.
	Offshore substation supply	No local supply	Engineering and project management in Ireland, along with some low

			voltage systems. No Irish supply for high voltage equipment. Offshore substation structure supplied from outside of Ireland
Installation and commissioning	Turbine installation	Installation contractors not local but some support services are provided, such as CTVs.	Non-Irish based contractors. Non-Irish marshalling drawing on local support. Installation crew from across Europe.
	Foundation installation	Installation contractors not local but some support services are provided, such as CTVs.	Non-Irish based contractors. Non-Irish marshalling drawing on local support. Installation crew from across Europe.
	Inter-array cable installation	Installation contractors not local but some support services are provided, such as CTVs.	Non-Irish based contractor drawing on local port and vessel services. Installation crew from across Europe.
	Onshore export cable installation	Labour, plant hire, site security provided locally.	Irish based contractor drawing on local port services. Installation crew from across Europe.
	Offshore export cable installation	Intertidal cable installation will involve local contractors and equipment, plant hire, security, etc. Some support services such as CTVs will be provided locally.	Non-Irish based contractor drawing on local port and vessel services. Installation crew from across Europe.
	Onshore substation installation	Labour, plant hire, site security provided locally. This includes heavy lift cranes, steel (steel frame and secondary steel), cladding fabrication and installation.	Irish civil engineers and building contractors drawing significantly on a local labour force for services such as security and plant hire.
	Offshore substation installation	Highly specialised and short duration activity, opportunity for local supply chain involvement is very limited. Some support services provided, such as CTVs.	Highly specialised and short duration activity, opportunity for local supply chain involvement is very limited. Some support services provided, such as CTVs
Operations and maintenance	Wind farm operations	Windfarm administration undertaken locally at the O&M base. Dedicated vessels operated locally from the O&M base.	Some contractor work led from Ireland.
	Turbine maintenance and service	Routine and minor maintenance undertaken using labour local to the O&M base. Some support services delivered locally for major component maintenance.	Some contractor work led from Ireland. Spare parts, consumables and major unplanned maintenance use a mixture of Irish and European companies.
	Foundation maintenance and service	Some services provided locally.	Some contractor work led from Ireland.

	Subsea cable maintenance and service	Some services provided locally.	Some contractor work led from Ireland.
	Substation maintenance and service	Some services provided locally.	Some contractor work led from Ireland.
Decommissioning		Some support services provided locally.	Non-Irish based contractor using Irish port. Local installation support services.

3.1.1 Development and project management

Development and project management includes activities required to secure planning consents, such as the EIA, as well as activities required to define the design and engineering aspects 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, Irish contractors will be utilised where possible. Engineering and design services, particularly those related to substations and onshore cable routing with associated transmission studies, are expected be delivered by companies with an Irish presence.

Development and project management was 4% of total expenditure of which Irish content is calculated to be 2.6% and local content was 0.2%.

3.1.2 Turbine supply

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

Ireland has no companies capable of manufacturing any of the major wind turbine components, and the size of Ireland's offshore wind pipeline is unlikely to be large enough to warrant investment by turbine suppliers in new manufacturing facilities. These components will be manufactured by companies located in Europe or elsewhere and transported to a construction port.

Turbine supply was 30% of total expenditure of which Irish content was calculated to be 0%.

3.1.3 Balance of plant supply

The balance of plant includes all the components of the wind farm, except the turbines. This includes transmission assets built as a direct result of the wind farm. It encompasses turbine foundations, inter-array cables, export cables, onshore substations, and offshore substations.

Ireland has no companies capable of doing the manufacturing any of the major balance of plant components. The lack of an established Irish offshore wind pipeline will not likely warrant investment by suppliers in new manufacturing facilities.

None of the medium or high-voltage electrical equipment or foundations for the turbines or offshore substations will be supplied from Ireland. These will be supplied from established factories, none of which are in Ireland. These components will be transported to site either directly, or via a construction staging port. Therefore, there is very low Irish content within this supply chain area.

Irish companies will provide balance of plant equipment and materials that are in relation to the onshore and offshore substations. For the onshore and offshore substations, low voltage electrical equipment, lighting security systems and building materials will be supplied from Irish companies.

Balance of plant supply was 24.3% of total expenditure of which Irish content was 0.1% and local content was 0%.

3.1.4 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 the proposed project will utilise experienced installation

companies in the offshore wind industry across Europe and Asia. These international companies will operate large installation vessels, likely from a construction port outside of Ireland. There are some companies in Ireland which will provide vessels for some installation support services. The greatest contribution of Irish content in installation and commissioning will be the provision of local crew to support marine activities.

There will be opportunities for local companies in the installation of onshore cabling, the onshore substation, and the operations base. In these areas local contractors will be hired for much of the excavation, road crossing and cable laying work. Similarly, civil engineering and construction of substation buildings, O&M warehouses, workshops, and staff facilities will use local contractors.

Installation and commissioning was calculated to be 12.2% of total expenditure of which Irish content was 1.7% and local content was 0.9%.

3.1.5 Operations and maintenance

O&M supports 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 25 years.

Wind farm administration will be undertaken locally at the O&M base. Dedicated vessels will be operated locally from the O&M base. Asset management will be provided by CWPL from their Ireland-based offices.

Crew transfer vessels (CTVs) are used to transfer technicians to the wind farm offshore. Experienced fishermen and local workers will be upskilled to crew the CTVs expected to be needed for the wind farm. Training, health, and safety are provided by Ireland-based suppliers with some support from local suppliers.

O&M was calculated to be 25.2% of total expenditure of which Irish content was 15.4% and local content was 9.8%.

3.1.6 Decommissioning

Decommissioning involves the removal or making safe of offshore infrastructure at the end of its useful life. Turbines, foundations, cables, and substations must be removed, shipped to shore, and either disposed of or reused.

Decommissioning will involve similar skills and contractors to those used in the installation and commissioning phase of the offshore windfarm. Because decommissioning practice could evolve over the operating life of the wind farm, it is possible that these numbers will change significantly.

Decommissioning was 4.3% of total expenditure of which Irish content was 1.1% and local content was 0.2%.

3.2. National and local content

Table 4 shows the rest of Ireland and local content broken down by supply chain categories. Local content is 11.1%, while rest of Ireland content is 9.8% of the total project spent. The contribution to Irish content is dominated by O&M. This reflects the considerable local activity needed to support the routine operation of the wind farm.

Non-Irish content is around 79.1%. This recognises the challenge of Irish suppliers in competing with established European suppliers that have already invested in lean manufacturing processes in response to a highly competitive market.

Table 4 Local and Rest of Ireland content for supply chain categories.

Level 1 category	Percentage of total expenditure	Territory	Percentage of total expenditure
Project development and management	4.0%	Local	0.2%
		Rest of Ireland	2.4%
		Rest of world	1.4%
Turbine supply	30.0%	Local	0.0%
		Rest of Ireland	0.0%
		Rest of world	30.0%
Balance of plant	24.3%	Local	0.0%
		Rest of Ireland	0.1%
		Rest of world	24.2%
Installation and commissioning	12.2%	Local	0.9%
		Rest of Ireland	0.8%
		Rest of world	10.5%
Operation and maintenance	25.2%	Local	9.8%
		Rest of Ireland	5.6%
		Rest of world	9.8%
Decommissioning	4.3%	Local	0.2%
		Rest of Ireland	0.9%
		Rest of world	3.2%
Total	100.0%	Local	11.1%
		Rest of Ireland	9.8%
		Non-Irish	79.1%

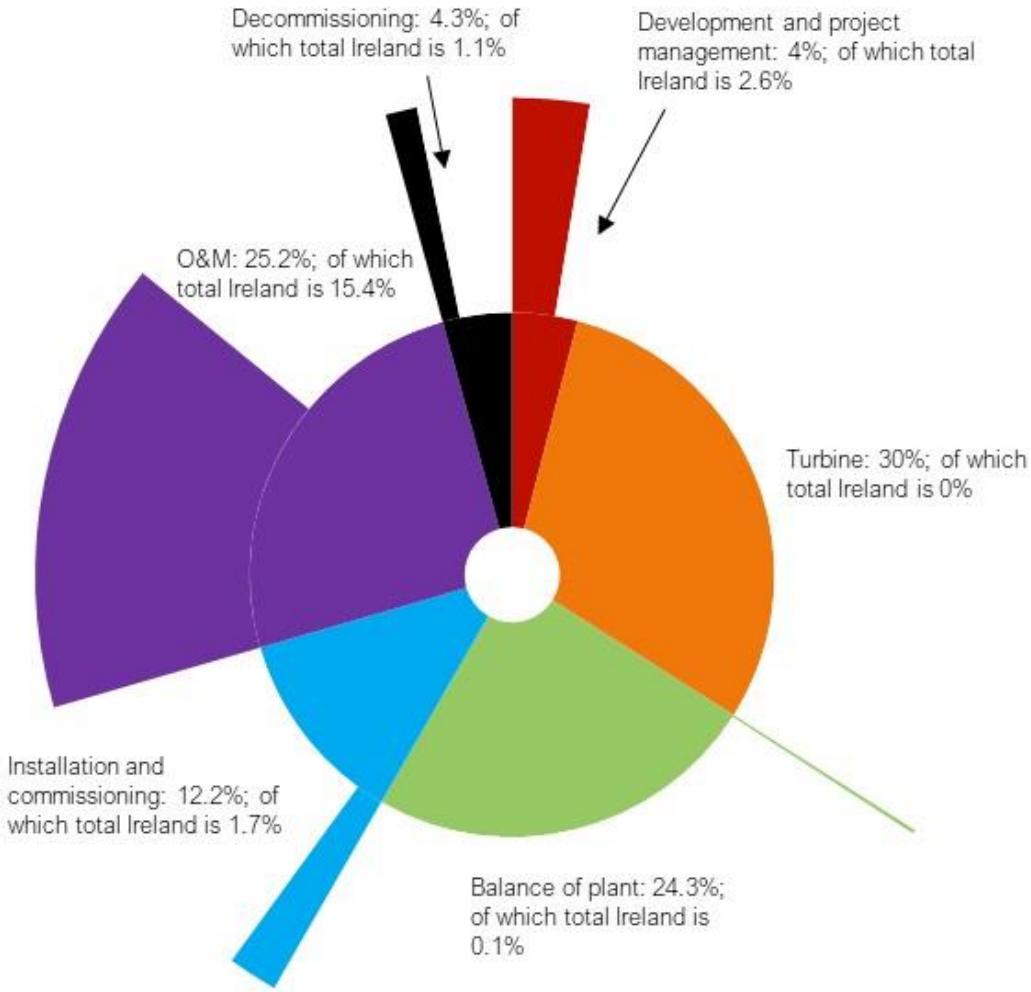

Figure 2 Total Ireland content by supply chain categories as percentages of lifetime spend.

3.3. Economic impacts

Table 5 and Table 6 shows the direct and indirect, GVA and FTE years delivered locally and in Ireland over the lifetime of the CWP Project.

The project will create about €1 billion GVA over the lifetime of the wind farm, of which about €530 million is created locally. The associated FTE years created are about 8,500 of which about 4,300 are local. It not possible to translate this is into the actual number of roles because many individuals will only devote a fraction of their working time to the wind farm.

Areas of the supply chain such as project development and management, and O&M are the areas with the most direct economic impacts in Ireland. These are areas where typically CWP could hire people directly, carry out development activities using in house personnel, and hire wind farm technicians to carry out O&M activities.

A clearer picture can be gained from the annual profiles. The local GVA and FTE years delivered annually for each supply chain category are shown in Figure 3 and Figure 4, respectively. The equivalent total Irish profiles are shown in Figure 5 and Figure 6.

Table 5 Direct and indirect GVA created locally and in the Rest of Ireland.

	€million								
	Local			Rest of Ireland			Total Ireland		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Development and project management	4	5	10	60	60	120	64	65	130
Turbine	0	0	0	0	0	0	0	0	0
Balance of plant	0	0	0	10	0	10	10	0	10
Installation and commissioning	15	30	45	10	30	40	25	60	85
O&M	200	270	470	20	250	270	220	520	740
Decommissioning	5	5	10	0	40	40	5	45	50
Total (rounded)	224	310	534	100	380	480	324	690	1,015

Table 6 Direct and indirect FTE years created locally and in the Rest of Ireland.

	Full-time equivalent (FTE) years								
	Local			Rest of Ireland			Total Ireland		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Development and project management	60	80	140	750	910	1,660	810	990	1,800
Turbine	-	-	-	-	-	-	-	-	-
Balance of plant	-	-	-	100	10	110	100	10	110
Installation and commissioning	190	200	390	160	190	350	350	390	740
O&M	2,010	1,740	3,750	200	1,610	1,810	2,210	3,350	5,560
Decommissioning	50	30	80	20	250	270	70	280	350
Total (rounded)	2,310	2,050	4,360	1,230	2,970	4,200	3,540	5,020	8,560

Local economic impacts peak in 2029 with about €24 million GVA and about 240 direct and indirect FTEs when majority of the installation work is done. When the project is fully operational, it brings in over €14.2 million GVA and supports about 120 direct and indirect FTEs, annually. These include not only those individuals who are working on the wind farm but also those in support functions, including the maintenance of the grid infrastructure.

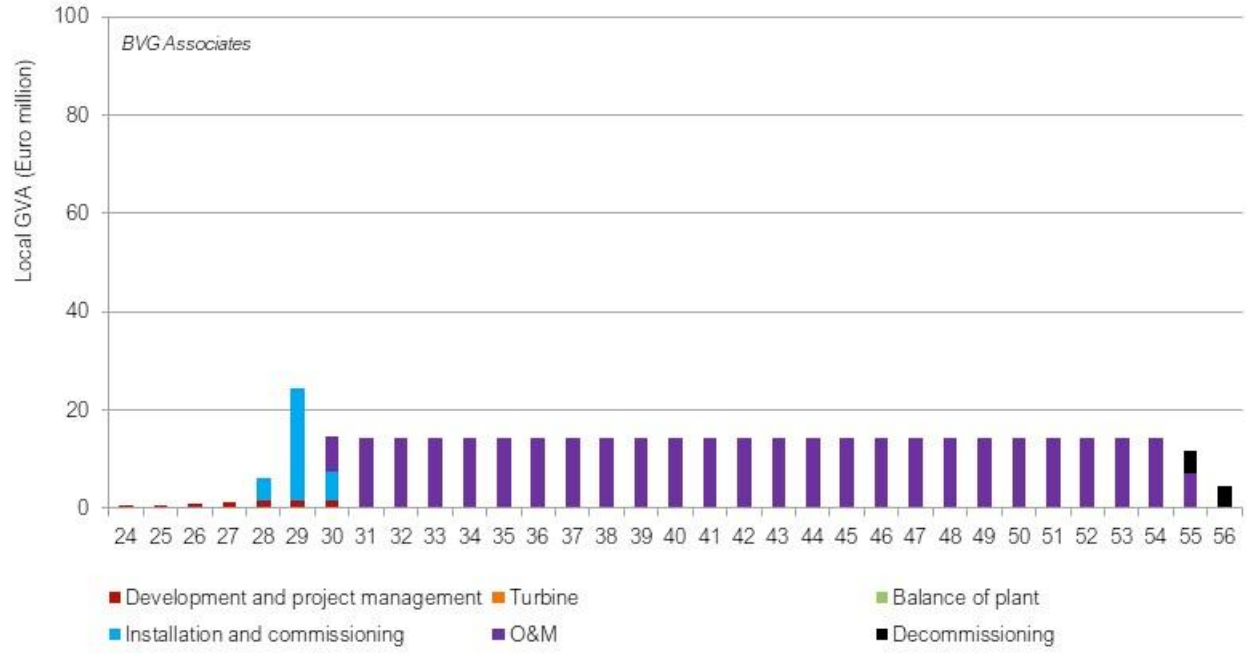

Figure 3 Local GVA created by the project over the lifetime of the wind farm.

Figure 4 Local full-time equivalent jobs created by the project over the lifetime of the wind farm.

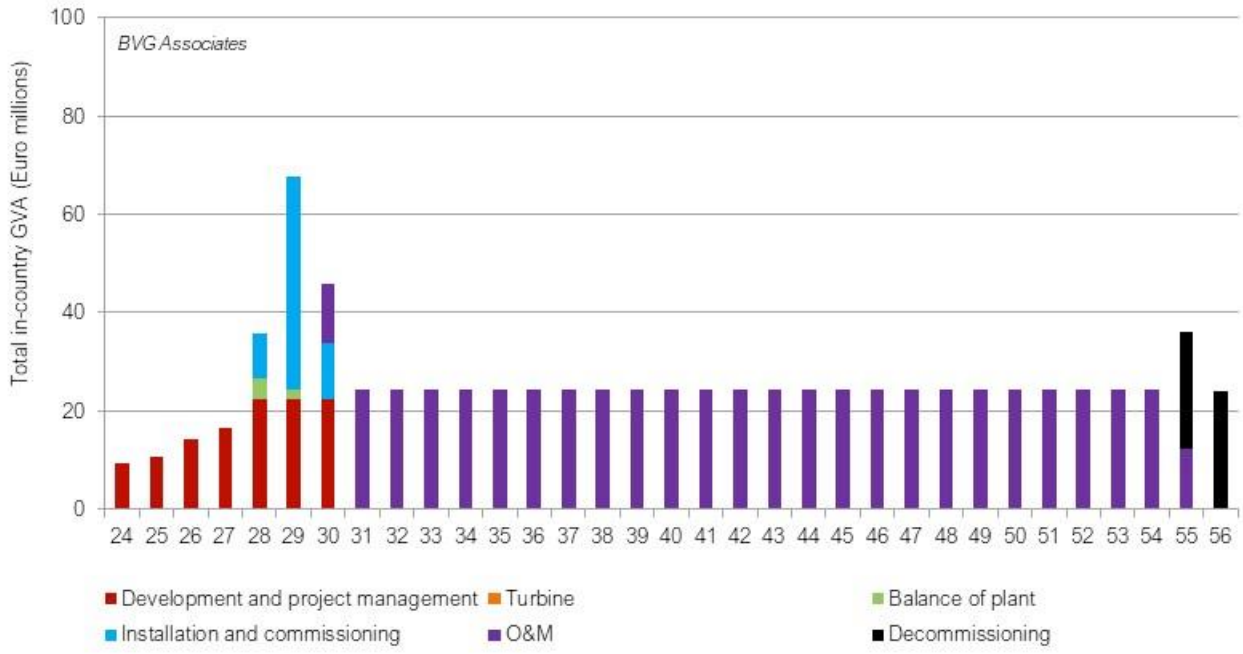

Figure 5 Total Ireland GVA created by the project over the lifetime of the wind farm.

Figure 6 Total Ireland full-time equivalent jobs created by the project over the lifetime of the wind farm.

Appendix A: Additional graphs

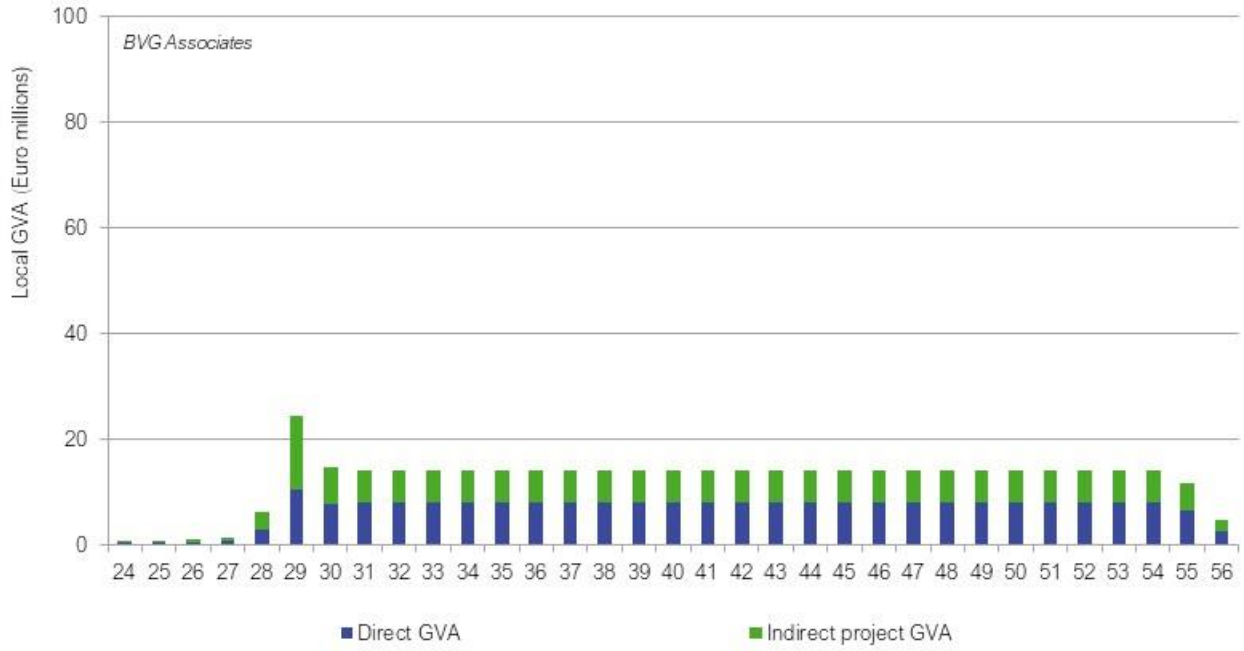

Figure 7 Local GVA created by the project over the lifetime of the wind farm split into direct and indirect impacts.

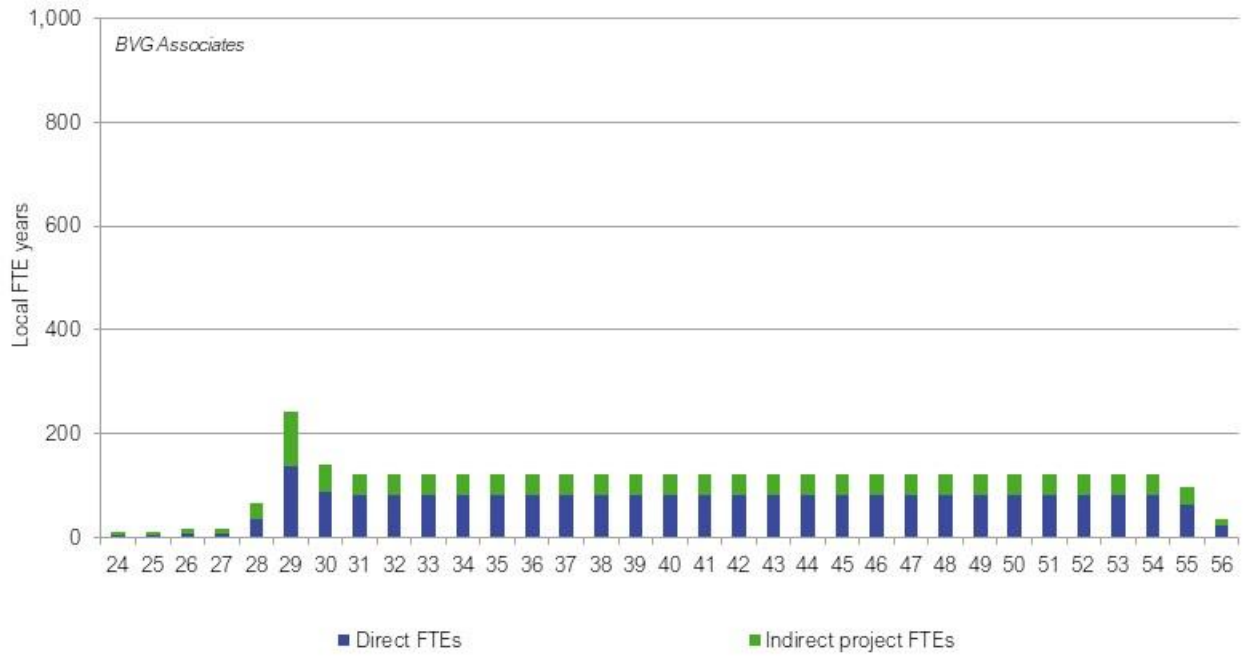

Figure 8 Local full-time equivalent jobs created by the project over the lifetime of the wind farm split into direct and indirect impacts.

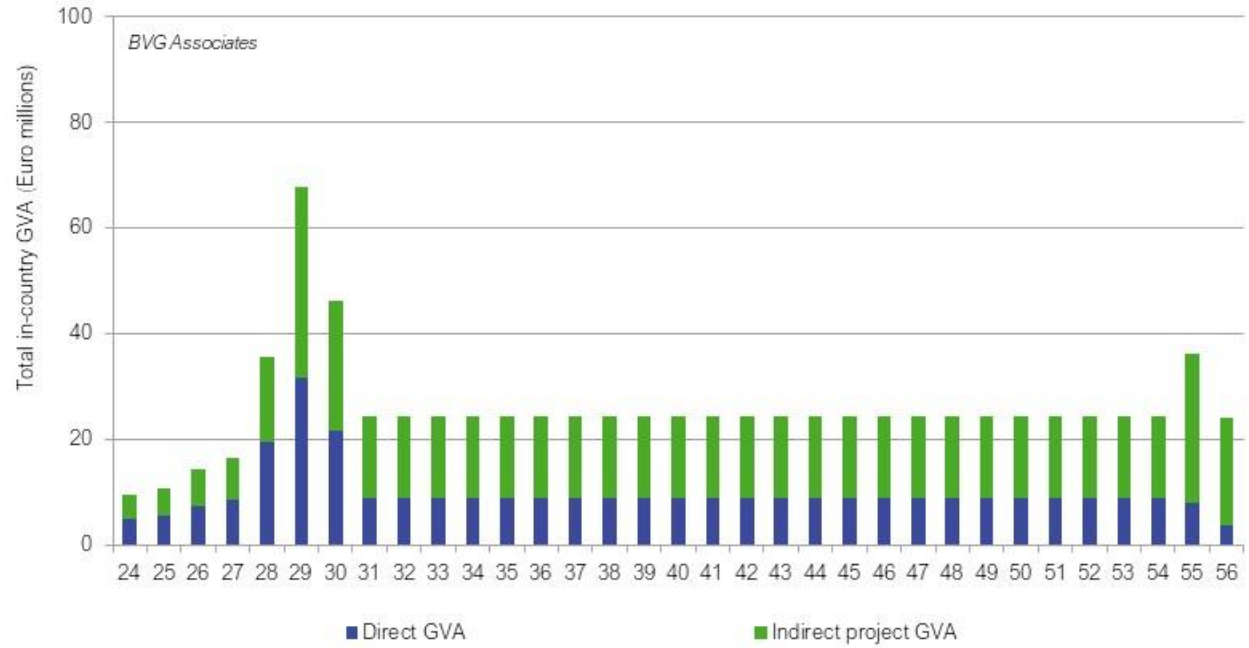

Figure 9 Total Ireland GVA created by the project over the lifetime of the wind farm split into direct and indirect impacts.

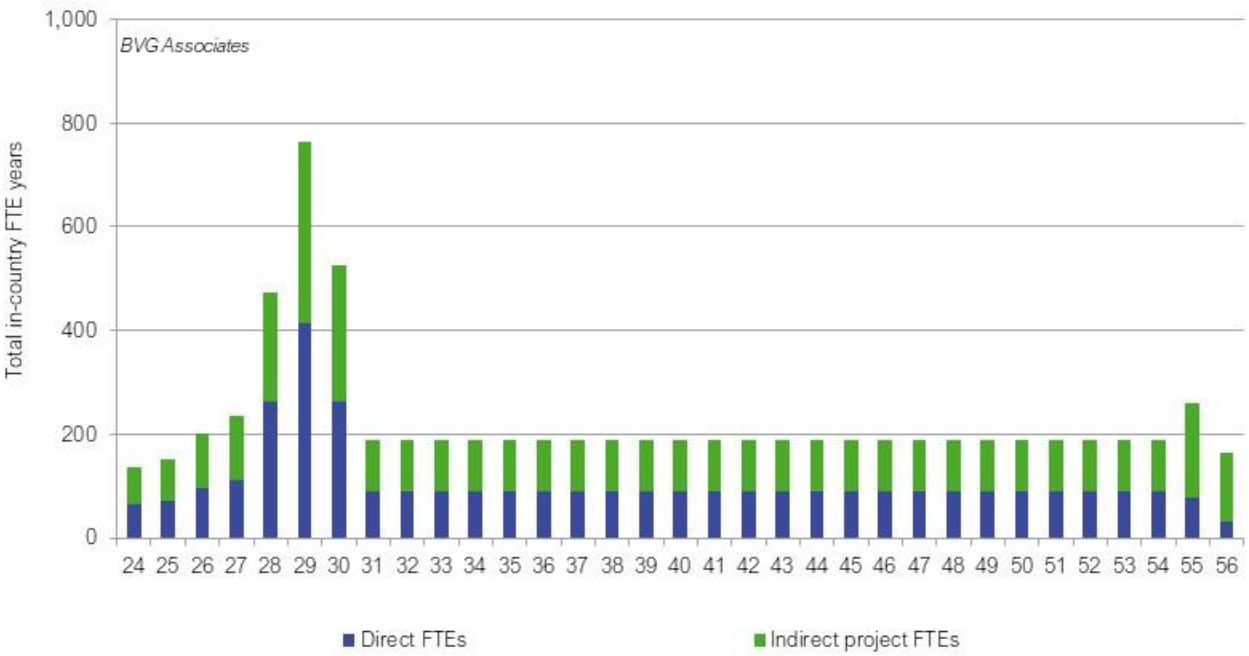

Figure 10 Total Ireland full-time equivalent jobs created by the project over the lifetime of the wind farm split into direct and indirect impacts.

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 Ireland.
- 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.