Arklow Bank Wind Park 2

Environmental Impact Assessment Report

Volume III, Appendix 21.1: Socio Economic Impact Report





Economic Impact of Arklow Bank Wind Park 2

A report to Sure Partners Ltd May 2024





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Table 0-1 Glossary

Term	Meaning
Arklow Bank Wind Park 2 (ABWP2)	Arklow Bank Wind Park 2 (ABWP2) is the onshore and offshore infrastructure
Direct Impact	Economic impact associated with the activity of primary contractors involved in the development, construction and operation and maintenance of the Proposed Development.
EIAR	An Environmental Impact Assessment (EIAR) is a statutory process report by which certain planned Projects must be assessed before a formal decision to proceed can be made.
Indirect Impact	Economic impact associated with the spending taking place across the supply chain of those businesses involved in the development, construction and operation and maintenance of the Proposed Development.
Induced Impact	Economic impact associated with the spending across the economy of those workers involved in the development, construction and operation and maintenance of the Proposed Development.
Jobs	A measure of annual employment, used in the context of operation and maintenance jobs.



Study Area	This is an area which is defined for each EIA topic which includes the windfarm site as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each EIA topic is intended to cover the area within which an effect can be reasonably expected.
The Developer	Sure Partners Ltd.
The Project	All components of ABWP2 together. That is the Offshore Infrastructure, Onshore Grid Infrastructure and Operations Maintenance Facility.
The Proposed Development	Arklow Bank Wind Park 2 Offshore Infrastructure: This includes all elements to be consented in accordance with the Maritime Area Consent. This is the subject of this EIAR.
Years of Employment	A measure of temporary employment used in the context of development and construction jobs. For instance, a job lasting for a period of 18 months can be considered as accounting for 1.5 years of employment.



Table 0-2 Acronyms

Term	Meaning
aFTE	Annualized Full Time Equivalent
CAPEX	Capital Expenditure including development
DECEX	Decommissioning Expenditure
DEVEX	Development Expenditure
CSO	Central Statistics Office
EIAR	Environmental Impact Assessment Report
aFTE	Annual Full Time Employment
GVA	Gross value added
MANEX	Manufacturing Expenditure
O&M	Operation and Maintenance
OMF	Operation and Maintenance Facility
OPEX	Operations and Maintenance Expenditure
OWF	Offshore Wind Farm
TOTEX	Total Expenditure
WTG	Wind Turbine Generators



Table 0-3 Statement of Authority

Name	Qualifications	Experience
Simon Cleary MA (Hons.)	MA (Hons.) in Economics and Mathematics from the University of Aberdeen	Simon is an economist with 12 years of experience in assessing the economic impact of renewable energy projects and their relationship with the supply chain and other receptors. He has assessed the economic impact of over 100 renewable energy projects and has worked with developers and public sector agencies to identify the opportunities from the development of the wind sector across the island of Ireland.
		Simon has a significant understanding of the supply chain for the offshore wind sector and the implications of the development of these supply chains, particularly for rural economies. He also has a good understanding of the social implications of the development of the wind energy sector and the interactions between this sector and others which are important for rural and coastal communities, such as tourism and fishing



1. Executive Summary

The development, construction, operation and decommissioning of Arklow Bank Wind Park 2 (ABWP2) has the potential to generate a significant level of economic activity in the local and Irish economy. This report has been prepared as part of the planning application for ABWP2.

Sure Partners Ltd proposed offshore wind farm (OWF) - ABWP2, is expected to feature either 47 or 56 Wind Turbine Generators (WTGs) generating a total expected capacity of around 800 MW.

Figure 1-1 below shows the estimated contract values associated with each phase of ABWP2 by study area, including the Regional Area, comprised of County Wicklow and County Wexford, and the Republic of Ireland as a whole, as well as total expenditure (TOTEX). All values reported are inclusive i.e. spending in Ireland includes spending in the Regional Area.



Figure 1-1 Assumed Contract Values and Shares by Project Stage

The impacts have been measured across three project stages: capital expenditure (CAPEX including Development), operational expenditure (OPEX) and decommissioning (DECEX). During the lifetime of ABWP2 it is expected that €4.8 billion will be spent on the development, construction, operation and decommissioning of the wind farm. Companies and organisations in the Wicklow and Wexford area (i.e., the Regional Area) are estimated to be awarded contracts worth approximately €1,062 million during this period. Based on the current industrial structure in Ireland, and the ability of businesses to provide relevant goods



and services associated with ABWP2, it is expected that businesses across Ireland would receive €1.4 billion. The largest short term economic opportunity will be during the development and construction phase of ABWP2, however the long term operation and maintenance (O&M) activity will be the main economic benefit from this project.

This expenditure will drive economic activity through the Gross Value Added (GVA) and jobs that it supports. As with spending, GVA and employment impacts are inclusive, i.e., impacts in Ireland include those occurring in the regional area. During the development and construction phase, it is expected that ABWP2 will support the following:

- 430 Annualized Full-Time Equivalent Jobs (aFTEs) and generate €25 million GVA across Wicklow and Wexford; and
- 1,720 aFTEs and generate €111 million GVA in Ireland.

This economic activity and jobs include those directly employed by ABWP2 and its contractors as well as the supply chain companies who have allocated a proportion of their time to ABWP2.

The impact during the development and construction period is expected to peak in 2028/29, with an estimated average employment of 530 FTEs across Ireland.

The economic impacts during the operational phase of the project will be long term and this phase represents a significant opportunity to both the regional and Irish economies. In an average year, the operational expenditure on ABWP2 is expected to support:

- 60 jobs and €11 million GVA across Wicklow and Wexford per annum; and
- 100 jobs and €15 million GVA per annum in Ireland.

When the development, construction and operational impacts are combined, the total impact on the direct contractors and the supply chain is expected to be:

- €409 million GVA across Wicklow and Wexford; and
- €642 million GVA in Ireland.

If the full impact is considered, including the induced impacts (i.e., impacts from staff spending across the wider economy), over the lifetime of the project, ABWP2 will generate:

- €484 million GVA across Wicklow and Wexford; and
- €773 million GVA in Ireland.



Table 1-1 Total Economic Impacts by Stage and Geographic Area (Including Induced)

	Regional Area	Ireland	
Development and Construction			
	1	1	
GVA (€m)	27	125	
Jobs (aFTEs)	530	2,110	
Annual OPEX			
GVA (€m)	13	19	
Jobs (FTEs)	80	130	
Decommissioning			
GVA (€m)	5	8	
Jobs (aFTEs)	40	60	



2. Approach

This section outlines the overall approach to the estimation of the economic impact of ABWP2, including the parameters of the study and the data sources that were used.

2.1 Definitions

This assessment considered the direct, supply chain and staff spending economic impacts of ABWP2. Unless stated otherwise, costs are reported in nominal terms. This involved the following considerations:

- costs have been adjusted for inflation, therefore the values given reflect the nominal, or face, value the contracts will have at the time they are completed;
- where it is known how a supplier may procure goods or services, this expenditure has been subtracted from the initial supplier contract and assessed individually to avoid double counting; and
- contract values are all reported in Euros.

In some instances, when necessary, values are reported in real prices. In each case this is explicitly highlighted.

This analysis has considered:

- Direct impacts those impacts that arise from the initial organisation of spend;
- Indirect impacts those impacts that arise from the supply chain that

supports the initial organisation of spend; and

 Induced impacts – those impacts that arise from staff spending their wages in the wider economy.

This way of reporting the economic impacts from offshore wind farms reflects best practice and mirrors the approach followed within the EIAR. For example, if a construction company was contracted by the developer to do the groundworks and foundations for the onshore substation, the direct impacts would capture the jobs directly supported in this construction company by this contract. In addition, this contract would have economic impact and support jobs in their supply chain, such as concrete providers, haulage companies and plant hire. This would be captured in the supply chain impact calculations.

In addition, our analysis has considered the wider economic impact associated with ABWP2 by providing an estimate of its induced impacts, that is, the economic impact which is associated with the directly employed staff spending their money in the wider economy. While this element was not considered in assessing the scale of impacts within the EIAR, it is included for reference and future economic impact assessments of ABWP2.



Figure 2-1 Levels of Economic Activity and Impact



The analysis of the economic impact from ABWP2 considers two commonly-used measures of economic activity: Gross Value Added (GVA) and FTEs.

- Gross Value Added (GVA) this is a measure of economic value added by an organisation or industry. It is typically estimated by subtracting the non-staff operational costs from the revenues of an organisation. This has been reported in nominal values, as with expenditure, throughout this report unless stated otherwise; and
- Full Time Equivalent (FTEs) this is a measure of the employment which is equivalent to one person being employed full time and is used for long term impacts such as those during the operational phase of ABWP2. For short term contracts or cumulative employment periods, these employment impacts have been annualised, to indicate one year of full-time equivalent employment. This is denoted as aFTEs.

Gross Value Added has been included in the analysis since it gives a more comprehensive picture of the economic impact of ABWP2. This aligns with the approach followed in the EIAR, which relies on this measure of economic activity.

The geographic areas which are used in this analysis allow for consideration of activity at construction and O&M ports. The study areas are:

- the counties of Wicklow and Wexford; and
- the Republic of Ireland.

Unless otherwise stated, the values for each geographic area are reported inclusively, i.e., the figure for Ireland includes the activity within Wicklow and Wexford.



2.2 Method

An economic model has been designed to assess the economic impacts of the proposed offshore wind development. The principle of this model has been applied by BiGGAR Economics to multiple offshore developments, both before and after construction, and the assessment of over 150 onshore renewable energy developments. These principles have also been applied by other assessors when considering the economic impact of offshore wind farms (BVG Associates, 2017) and are considered best practice.

This model is based on the level of development, capital and operational expenditure for ABWP2 and the impact that this expenditure would have on the companies and organisations involved. The model estimates the direct, supply chain and induced economic impacts from this expenditure.

The key steps, and data sources that are used at each step of the methodology for estimating the total economic impact of ABWP2 are outlined in Figure 2-2. This approach ensures that leakages are considered, including at Step 3 when the initial contracts are distributed by geographic area. Leakage is the term used to describe economic value that is generated outside the study area, for example from imports to Ireland.



Figure 2-2 Economic Impact Methodology and Data Sources

1. Total Investment	Developer data Sector Studies	
2. Estimate Contract Value by type	Developer dataSector StudiesBiGGAR economics experience	
3. Estimate Contract Content by Geographic Area	 Economic and sectoral analysis of each Geographic Area Developer data and sector Studies BiGGAR Economics Experience 	
4. Convert Contract Values to FTEs	 Company data CSO Business Demography Survey CSO Institutional Sector Accounts Non-Financial 	
5. Estimate GVA from Contract Values	Company data CSO Institutional Sector Accounts Non-Financial	
6. Estimate Supply Chain Impacts	• CSO Supply and Use and Input Output Tables for Ireland 2011	
7. Estimate Induced Impacts	 Irish Government Input Output Tables 	
Total Economic Impact		

Source: BiGGAR Economics



3. Economic Impact Assessment

This section outlines the economic impacts that ABWP2 could have and the process through which those calculations are made.

3.1 Expenditure Assumptions

The first step is considering the total level of investment. This would include both the capital investment during the development and construction phase of ABWP2 and the ongoing investment that would be required during the 36.5-year operational lifetime.

The basis for estimating the cost elements of this project are:

- discussions with Sure Partners Ltd regarding the changes to the project since previous analysis was completed; and
- it is assumed that the final design of ABWP2 project has 56 WTGs, in line with the most numerous scenario outlined in the Environmental Statement; and
- In addition, the finance and insurance costs have also been included in the analysis. It was assumed these would be €145 million for the duration of the construction period.

Elements	Current Estimate
Development and Project Planning	€106 m
Turbine	€758 m
Balance of Plant	€920 m
Installation and Commissioning	€874 m
Finance and Insurance	€145 m
Total CAPEX	€2,802 m
Operations and Maintenance (Annual)	€54 m
Decommissioning	€198 m

Table 3-1 Contract Elements by Value

Source: SSE



3.2 Geographic Split

The next stage in estimating the economic impact associated with this development is to consider the likely location of companies that would be awarded these contracts. The process for estimating this was to check the availability and number of suppliers for each sub-product or service in the Regional Area and then rest of Ireland based on the following:

- the capacity of companies to deliver the goods or services in each area; and
- BiGGAR Economics experience of similar offshore wind projects.

1.1.1 Capital Investment

In total the capital investment will require €2.8 billion. The contract and market analysis estimated, that €254 million (8%) is likely to be secured from Ireland. This includes €78 million (3%) that is likely to be secured from Wexford and Wicklow.

The splits of CAPEX by region and contract category are shown in Figure 4-2.



Figure 3-1 Contract Share by geographic area

Source: BiGGAR Economics Assumptions and Developer data

The largest opportunity for securing contracts in Ireland will be linked with the development and consenting services. This includes the specialised engineering services required at the design stages of the project. It is estimated that companies in Ireland will be able to secure contracts worth up to €90 million in this area, including the completion of geological and hydrological surveys.

The following two opportunities are linked with the development and construction of the onshore infrastructure, including the substation and cable route. Combined these contract areas could be worth over €100 million. The enabling infrastructure, including the pier



improvements at Arklow and the construction of the operations and maintenance facility (OMF) will also represent an economic opportunity for companies based in Ireland. The offshore infrastructure is currently going through an EIAR process, while the planning permissions for the onshore grid infrastructure and the OMF have already been approved following an EIAR process.



Figure 3-2 Largest contract opportunities in Ireland

Source: BiGGAR Economics Assumptions and developer data

1.1.2 Operational Investment

It is estimated that 60% of the overall operational expenditure will be retained in Ireland, including 52% which will be retained in Wexford and Wicklow. This will primarily be centred around the activities at the OMF at South Dock, Arklow Bank.

3.2.1 Decommissioning Investment

Estimating the share of decommissioning expenditure that will occur in in Ireland is complex as there is a higher degree of uncertainty about the what the domestic capacity will be able to provide in decades to come. For example, the port capacity to deal with the construction of major offshore wind projects does not currently exist in Ireland (Wind Energy Ireland and Gavin & Doherty Geosolutions, 2022). However multiple ports have investment proposals to provide these services and therefore could provide services for the decommissioning activities as well. It was therefore assumed that 8% of decommissioning expenditure would occur in Ireland and this would predominantly be linked with port activities and pre-decommissioning engineering works.



3.3 Estimating the economic impact

The contract values potentially awarded in each region would represent an increase in turnover of businesses in these regions.

The industries that would benefit during the capital investment stage in Ireland are typically those in the Construction and Technical sectors. In particular, the sector in Ireland that is expected to see the largest value contracts will be civil engineering sector, which is estimated to be awarded contracts with a value of €83 million during the development and construction of ABWP2. These will be linked with the contracts to construct the onshore infrastructure and the works around the OMF in Arklow.

This is followed by the technical and engineering sectors that will provide support during the development phase of the project.

The top 6 industries for expected contract opportunities in Ireland are shown in Figure 3-3.



Figure 3-3 Project turnover by industry of supplier in Ireland, Top 6

Source: BiGGAR Economics Analysis

The Irish National Accounts (CSO, 2020) provides the turnover/ GVA ratio for each section of the economy. This data is used to estimate the direct GVA impact from any increase in turnover from all of the relevant industries. Similarly, the same data source can be used to estimate the employment that this increase in turnover would support. The National Accounts provides data on the headcount employment in each. This calculation was based on real prices, as the survey data is based on turnover per aFTE in 2020 prices.



Figure 3-4 Direct Contractor Impact Process



On this basis it was estimated that the initial contracts awarded for development and construction of ABWP2 would directly support 1,120 years of employment in Ireland, including 320 within Wexford and Wicklow. Within the Regional Area, the majority of the opportunities would be linked with the construction of the onshore infrastructure, while across Ireland the greatest direct employment opportunity will be in the development phase.

	Regional Area	Ireland
CAPEX	320	1,120
Annual OPEX	50	70
Decommissioning	20	30

Table 3-2 Indicative Employment Impacts in Directly Contracted Companies (aFTEs)

The Gross Value Added from the initial contracts would be €81 million in Ireland, including €21 million within the Regional Area. Each year during the operational phase it is estimated that the direct employment on the ABWP2 will generate €9 million GVA for the economy of Wexford and Wicklow.



Table 3-3 Directly Contracted Impact - GVA (€m)

	Regional Area	Ireland
CAPEX	21	81
Annual OPEX	9	10
Decommissioning	4	5

3.4 Estimating the wider supply chain impacts

There would also be knock on effects in the supply chain. This includes the elements of the supply chain that would work closely with the main contractor, such as subcontractors that would also be based on the construction yard, and also elements of the supply chain which are further afield, such as the companies which provide the raw materials, the tools, and professional services that the main contractors rely on.

Table 3-4 Stages of Economic Impact Assessment: Supply Chain Impact



To estimate what this impact would be, it is necessary to use Type 1 multiplier which are calculated based on the Irish Input Output (Central Statistics Office (CSO), 2014) tables and are specific for each sector. These multipliers calculate which elements of the supply chain of a particular sector are procured from either Ireland or abroad. In this way it is possible to consider the likely level of value generated outwith each study area (leakage) within each supply chain and exclude that from the analysis.

This would include, for example, the typical share of imports within an industry's supply chain.



An overview of the process for calculating this impact is shown in Figure 3-5. This process considers that there can be a significant proportion of the supply chain which is external to each geographic area. Unless data is known for a specific company that could be included in the supply chain, it is assumed that the supply chain of the companies that are involved in these contracts would be similar to the sector they are in. For example, the Input Output tables find that 55% of the supply chain across all elements of the Irish construction sector is from Irish companies. The Irish construction sector imports the remaining 45% is of it supplies. This would be considered leakage when calculating the impact in Ireland.



Figure 3-5 Supply Chain Impact Process

This analysis was done for each Subproduct/service and at for each geographic area. The Type 1 multipliers that were used were those of the corresponding relevant sector.

On this basis it was estimated that the supply chain for the initial contracts awarded for development and construction of ABWP2 would directly support a further 600 aFTEs (annual Full Time Equivalent) in Ireland, including 110 within Wexford and Wicklow.



	Regional Area	Ireland
DEVEX	30	240
CAPEX	80	360
Total Development and Construction	110	600
Annual OPEX	10	40
Decommissioning	10	20

Table 3-5 Supply Chain Employment Impacts by Stage and geographic area (aFTEs)

During the construction and development stages the Gross Value Added from the supply chain to the initial contracts would be €30 million in Ireland. This includes the supply chain within the Regional Area that would generate €4 million of GVA. Each year, the wider supply chain in Ireland would also generate an average of €4 million GVA from operational expenditure.

Table 3-6 Supply Chain GVA Impacts by Stage and geographic Area (€m)

	Regional Area	Ireland
DEVEX	1	17
CAPEX	2	14
Total Development and Construction	4	30
Annual OPEX	2	4
Decommissioning	1	2



3.5 Induced Economic Impacts

In addition to the impacts associated with the direct contractors and their supply chains, the staff employed in these companies will also have an impact on the economy through the spending of their wages. This is the induced impact, and although it is not included in typical economic evaluations, they are included in this analysis to give a full picture of the economic impacts of ABWP2. The induced impact can be particularly important in rural communities, where the success of small rural businesses can be heavily dependent on the spending of local workers.



 Table 3-7 Stages of Economic Impact Assessment: Staff Spending Impact

This impact is calculated for each sector of direct impact using the appropriate Type 2 multipliers for that sector.

	Regional Area	Ireland			
Development and Construction					
GVA (€m)	2	14			
Jobs (aFTEs)	100	390			
Annual OPEX					
GVA (€m)	2	3			
Jobs (FTEs)	10	20			
Decommissioning					
GVA (€m)	1	1			
Jobs (aFTEs)	10	10			

Table 3-8 Induced Impacts by Stage and geographic Area



3.6 Total Economic Impacts

The direct and supply chain (indirect) impacts represent the economic activities that will need to occur to realise the project. As shown in Table 3-9, the total of this activity would be 1,720 aFTEs across Ireland during the development and construction phase, of which 430 would be in the Regional Area. This employment would generate €111 million for the Irish economy, of which €25 million would be within the Regional Area.

Over the lifetime of the project, the €16 million of annual GVA generated by the operational phase would be equivalent to over €500 million for the Irish economy, the majority of which would be retained in the Regional Area.

	Regional Area	Ireland			
Development and Construction					
GVA (€m)	25	111			
Jobs (aFTEs)	430	1,720			
Annual OPEX					
GVA (€m)	11	16			
Jobs (FTEs)	60	100			
Decommissioning					
GVA (€m)	5	8			
Jobs (aFTEs)	30	50			

Table 3-9 Total Economic Impacts by Stage and geographic Area (Direct and Indirect)

The inclusive impacts for each geographic area are given in Table 3-10 and include the direct, indirect and induced effects. This shows that across Ireland, ABWP2 will support €125 million GVA and 2,110 aFTEs during its development and construction and a further 120 jobs and €18 million GVA during each year of its operation.



Table 3-10 Total Economic Impacts by Stage and geographic Area (including Induced)

	Regional Area	Ireland			
Development and Construction					
GVA (€m)	27	125			
Jobs (aFTEs)	530	2,110			
Annual OPEX					
GVA (€m)	12	18			
Jobs (FTEs)	70	120			
Decommissioning					
GVA (€m)	5	8			
Jobs (aFTEs)	40	60			

3.7 Impact Timescales

3.7.1 Development and Construction

The capital investment impact is expected to be spent over a 9-year period, from 2020 to 2029. This includes development activity that has already taken place. The economic impacts which are described in Section 4 will be distributed over this time period. This analysis considered how the impact of the directly contracted and supply chain companies was distributed over this time period.



Figure 3-6 Development and Construction Jobs over Time (Direct and Indirect)

Source: BiGGAR Economics Analysis



The peaks in employment in Ireland would occur from 2027, which would see an average of 510 directly contracted and supply chain FTEs supported at this point. This peak aligns with the construction of the onshore infrastructure. This would occur during the construction period of the onshore infrastructure and enabling works.

3.7.2 Entire Project Life Cycle

Over the lifetime of the project, it is estimated to spend around €4.9 billion across development, construction operations and decommissioning. The majority of this expenditure will occur during the development and construction phase.



Figure 3-7 Total Expenditure over Project Lifecycle

Source: BiGGAR Economics Analysis

The peak in employment experienced in during the construction phase would represent the highest point of employment for the lifetime of the project. During the operational phase it is expected that the project would support around 100 jobs either directly or in the wider supply chain across Ireland. This long term employment opportunity represents the greatest economic opportunity to Ireland from ABWP2.





Figure 3-8 All employment in Ireland over time (Direct and Indirect)

3.8 Potential Port Impacts

It is not expected that Irish ports will be used for the construction of ABWP2. However, should the construction port be located in Ireland, this would result in additional GVA and employment impacts nationally through activities associated with marshalling, offshore logistics, and installation vessels.

Potential expenditure, and the share of expenditure which could occur in Ireland if an Irish port was used to support construction, was estimated based on discussions with Sure Partners Ltd and BiGGAR Economics experience of similar offshore wind projects. Total expenditure associated with construction port activities is expected to be approximately €162 million. Of this, it was estimated that 28% of associated contract spending would go to Irish companies, equivalent to €45 million.

	Share of Expenditure	Irish Expenditure (€ million)
Marshalling Harbour	100%	€16
Offshore Logistics	100%	€16
Installation Vessels	10%	€13
Total	28%	€45

Table 3-11 Potential Port Expenditure

Source: BiGGAR Economics Analysis

Source: BiGGAR Economics Analysis



As with other impacts associated with construction, the potential direct impacts of the construction port being located in Ireland were estimated by applying the relevant turnover/GVA and turnover/job ratios for each section of the economy.

Indirect and induced impacts were then calculated by applying relevant Type 1 and 2 GVA and employment multipliers. In this way, it was calculated that, should the construction port be located in Ireland, this would generate an additional €23 million GVA and 197 aFTEs nationally.

Table 3-12 Total Economic Impacts Associated with Construction Port in Ireland

	Ireland
Port Activities	
GVA (€m)	€23
Jobs (aFTEs)	197

Source: BiGGAR Economics Analysis



4. References

BVG Associates (2017), A new economic impact methodology for offshore wind. Available Online: <u>https://bvgassociates.com/publications/#GVAWP</u> [Accessed June 2023]

CSO (2014), Supply and Use and Input-Output Tables for Ireland 2011. Available Online: <u>https://www.cso.ie/en/releasesandpublications/ep/p-</u> <u>sauio/supplyanduseandinput-</u> <u>outputtablesforireland2011/</u> [Accessed June 2023]

Central Statistics Office (2020) National Accounts. Accessed via the OECD Structural Analysis (STAN) Databases.

Wind Energy Ireland & Gavin & Doherty Geosolutions (2022), National Port Study. Available Online: <u>https://windenergyireland.com/images/files/final-national-ports- study.pdf</u> [Accessed June 2023]



BiGGAR Economics, Shandwick House,

67 Shandwick Place, Edinburgh Scotland EH2 4SD

info@biggareconomics.co.uk

biggareconomics.co.uk

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