Northland Power Supply Chain Engagement

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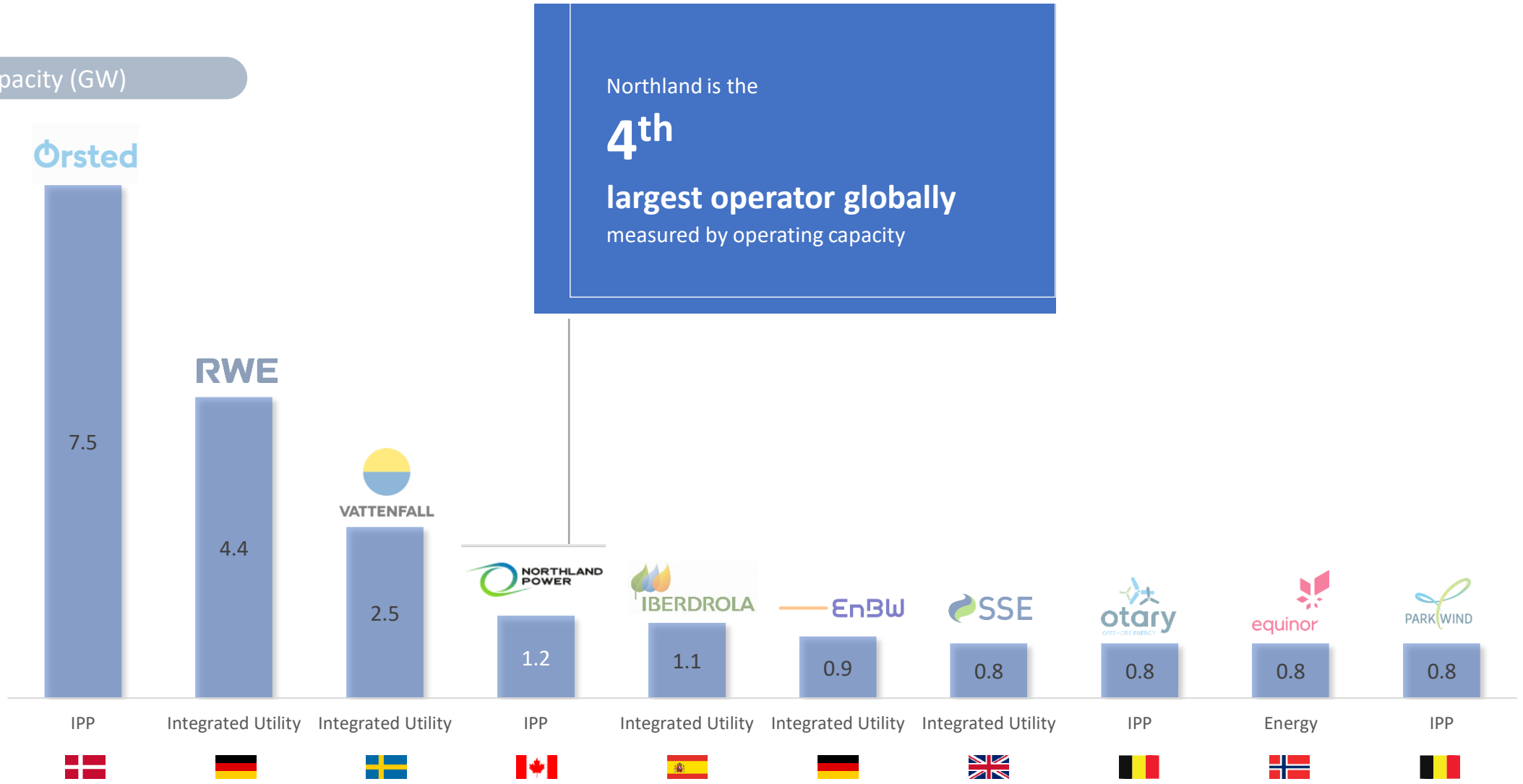
Global Offshore Wind

Northland is a Top 10 Incumbent in Global Offshore Wind

Installed Capacity (GW)



Northland is the

4th

largest operator globally

measured by operating capacity

Source: 4C Offshore, Company Filings. As of September 2021.

Northland's Global Reach – Offshore Wind Success

Today, Northland is actively developing projects and new offshore wind opportunities in Europe, Asia and Canada, including:

- 2,340 MW N2 (floating) and N4 (fixed) sites in Scotland
- 1,300 MW offshore wind development in Germany (Nordsee Two & Three & Delta)
- 1,200 MW in mature development in Poland (Baltic Power)
- 400 MW partnership in Canada (Hecate Straight)
- 1,044 MW secured in Taiwan under FIT and auction (Hai Long)
- 1,800 MW early-stage opportunities under upcoming Taiwanese zonal round
- 1,000 MW early-stage opportunity in South Korea (Dado Ocean)
- 600 MW partnership in Japan (Shizen Energy)

12 countries

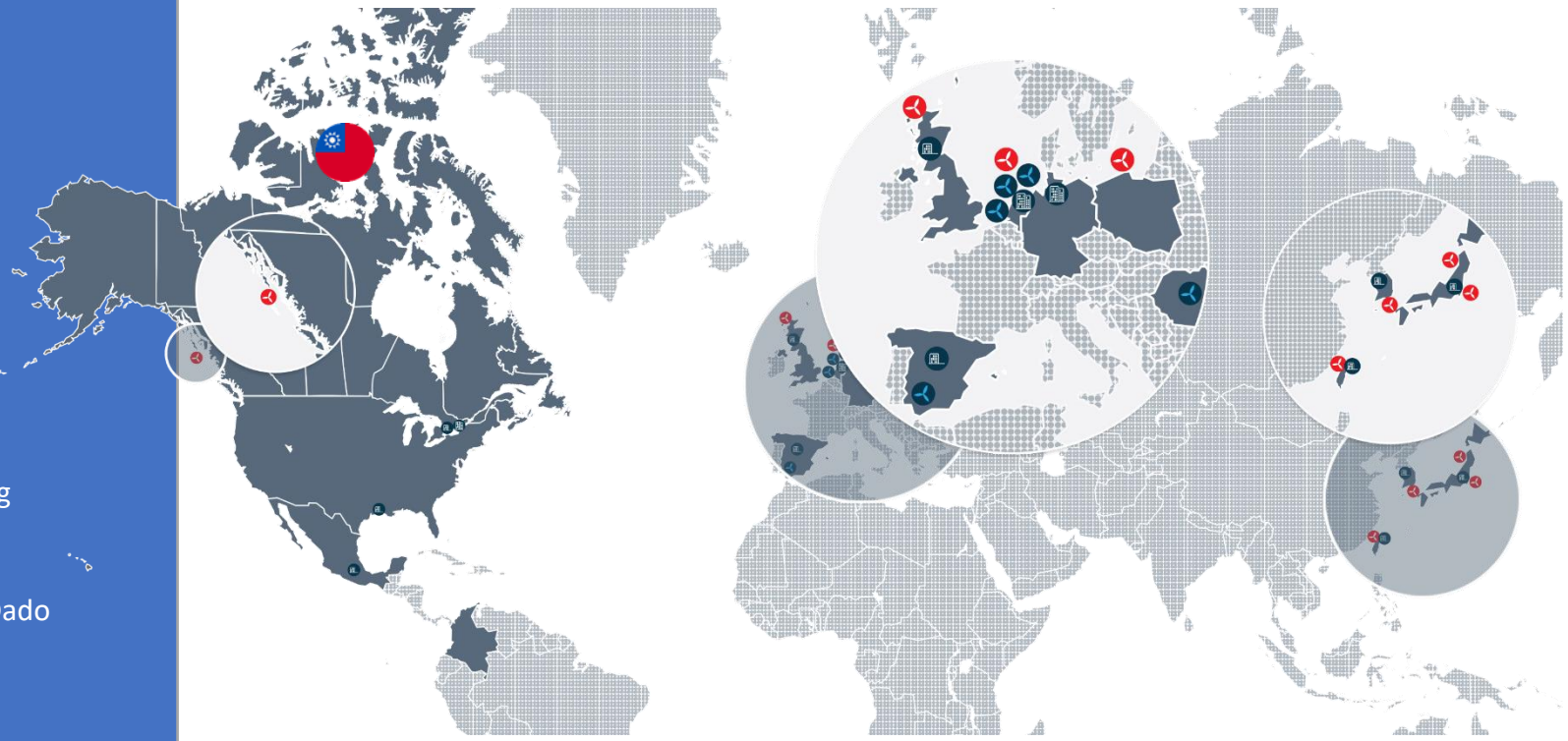
34+ Years of sustainable energy solutions

1000+ employees

3.2GW of gross renewable energy capacity

27+ projects

6.5 GW expected gross capacity by 2027



N4 and N2

The selected sites offer a combination of:

- A mixture of water-depths, allowing for both fixed and floating foundation technologies (no hybrid sites)
- Strong wind resource, providing above average capacity factors and higher yield but also challenging met-ocean conditions
- Mixture of near shore and further from shore sites

N4 – Fixed bottom 840 MW

- 5km to shore
- 60 turbine locations
- Fixed bottom foundations
- Grid – Expected grid connection through Arnish on Isle of Lewis (2030)
- Onshore substation
- COD – late 2020s?

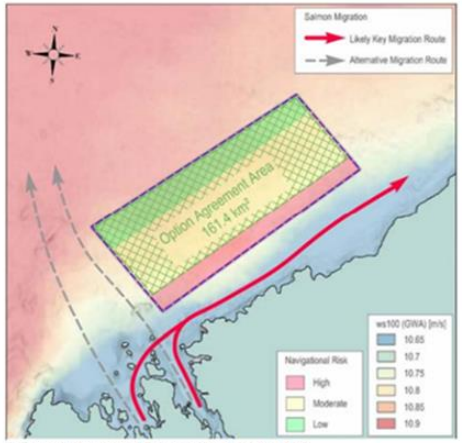


Figure 1: Option Agreement Area for N4

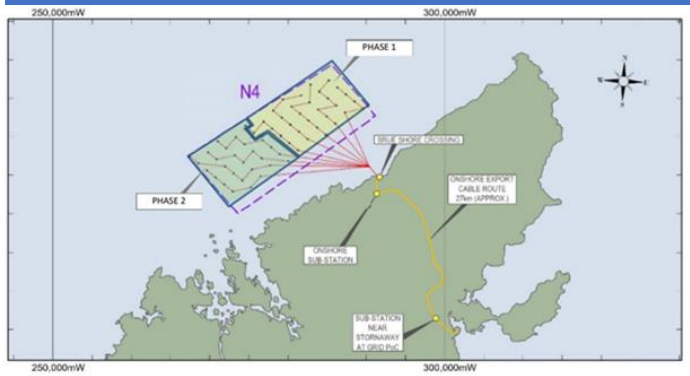
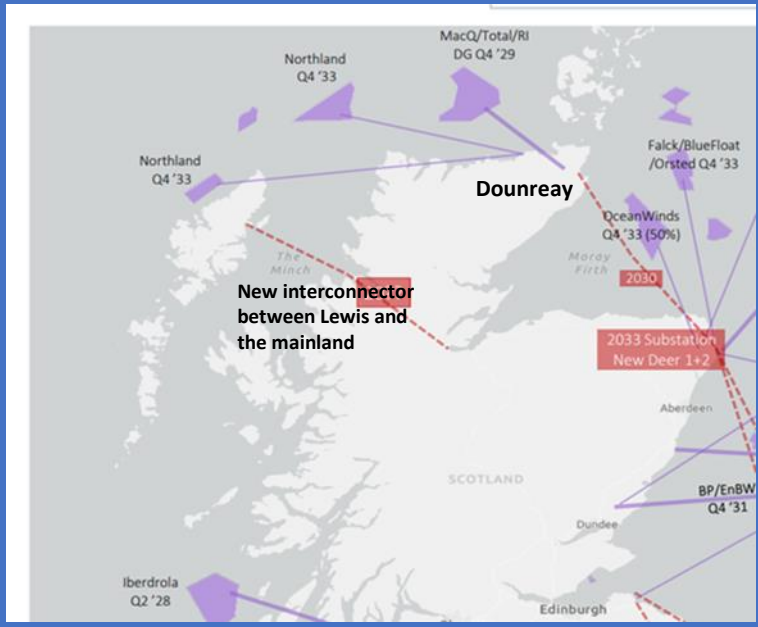


Figure 2: Proposed layout and export route



Source: 4C Offshore

N2 Floating – 1.5GW

- Approx 35km offshore
- 114 locations
- No preferred turbine yet
- Semi submersible floating foundation assumed for the Bid (but might change)
- Buffer from SAC
- Grid offer accepted to Dounreay – 2033 connection?
- COD – early/mid 2030's?

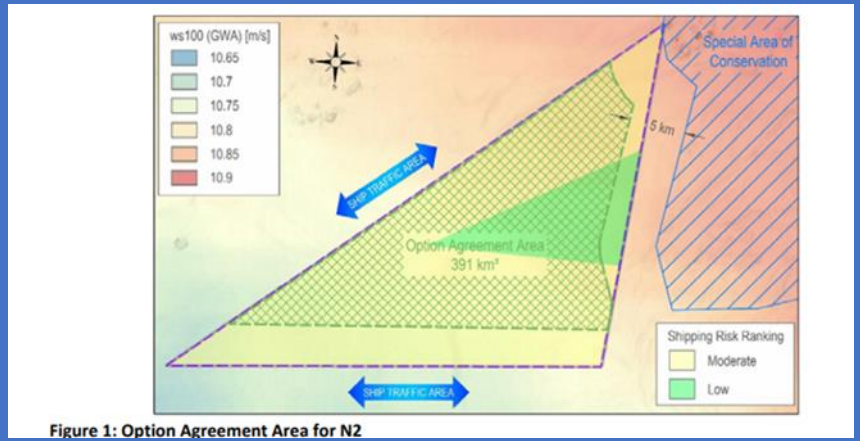


Figure 1: Option Agreement Area for N2

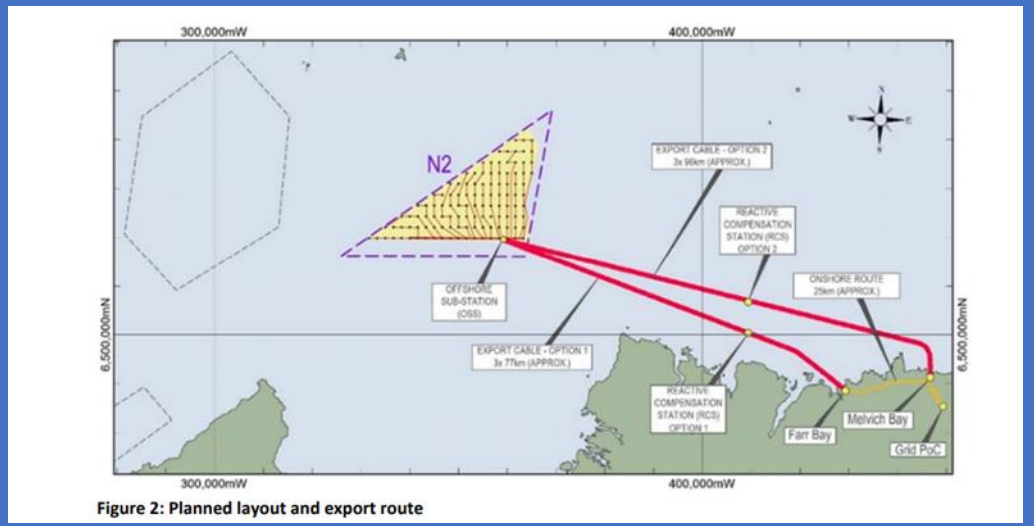
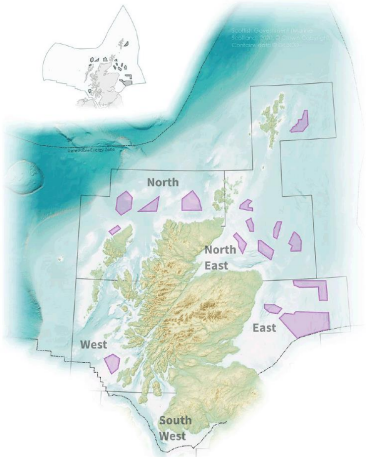


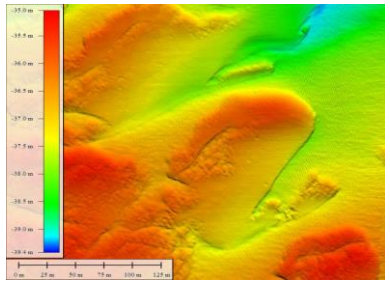
Figure 2: Planned layout and export route

Offshore Wind Farm project stages

Site Selection



Planning and Development



Construction and Installation

Operations and Maintenance

Decommissioning

Development Phase








Development Phase

During this phase of the project many support services are required for surveying, environmental studies, project management, consenting, and design including:

- Environmental Impact assessment studies
- Marine and Ornithology surveys
- Metocean surveys
- Geophysical site surveys
- Geotechnical site surveys
- Wind farm design

Many local support services are required from the earliest phase throughout the life of a project such as:

- Accommodation
- Training- eg: Health and Safety/First Aid at work
- Catering
- Transportation, hire cars and taxis
- Office space and equipment
- Security
- Plant hire
- Fuel supply
- **People**

Construction Phase


Wind Turbine Generators

Wind Turbine Generators

The Wind Turbine Generator package includes the design, supply, installation and commissioning of the wind turbine generators.

The scope includes marshalling facilities during construction and provision of operations and maintenance services for the turbines for a prescribed period.

Opportunities for local suppliers to support the Tier 1 Wind Turbine contractor may include the following:

- Fabrication of turbine towers
- Production of wind turbine blades
- Production of wind turbine generator nacelles
- Transportation of blades and nacelles
- Supply, installation and commissioning of Davit Cranes
- Power Curve Testing Services

During construction operations, a pre-assembly area is needed, preferably near the wind farm site. This will have the following requirements.

- Lease of land for turbine pre-assembly area adjacent to port quayside
- Onshore infrastructure development and construction services
- Site Offices, warehousing, canteen/ kitchen and welfare facilities
- Heavy lift equipment e.g. cranes, SPMTs
- Perimeter fencing and security services
- Electrical Distribution Systems to support construction activities
- Site lighting to applicable standards and to enable 24hr working
- Fire-fighting equipment
- Boom lift for installation vessel
- Lifting equipment
- Portakabins
- Catering and beverages
- Labour hire
- PPE and clothing
- Cleaning and laundry
- Local training providers Tool suppliers (hand and power)
- Cranes
- Electrical wholesalers
- Metal work fabrication and turning
- Fork lift hire
- Hotels/accommodation

Foundations

Foundations

The projects will require multiple foundations and substructures contracts. There will be opportunities for potential suppliers to get involved in the long term strategy and tender for these packages including the following:

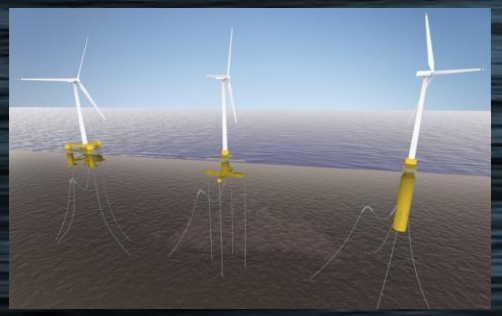
» Design of the foundations and substructures

» Fabrication of foundation structures

» Fabrication of transition pieces and piles

» Fabrication of monopiles

» Supply of grouting / bolting materials



Transport and installation of foundations

The projects will procure a number of contracts relating to the offshore installation of foundation structures and support activities:

- Transport of fabricated structures from fabricator to the wind farm location
- Installation of wind turbine generator substructures and foundations
- Transport and installation of offshore substation foundation and substructure
- Assembly and bolting of foundations
- UXO surveys
- Supply of offshore survey equipment
- Provision of port and harbour services
- Provision of personnel transport to offshore locations
- Supply of lifting tools and rigging
- Contingency drilling

Transmission Works

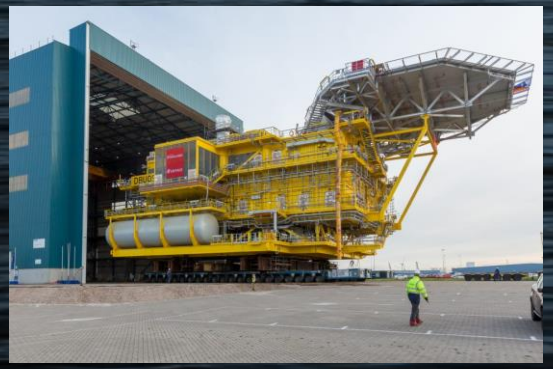
Offshore Transmission and Cables

The wind farms offshore transmission system is dependent on the final design and grid connection location and will include the offshore elements, onshore grid connection and cabling at the find farm and between the wind farm and grid connection. The following elements:

» the design, supply and installation of cables between the wind turbines (inter array)

» the design, supply and installation of the cable between the wind farm and the onshore grid connection (export cable), as well as route engineering works.

» the design, supply and installation offshore high voltage offshore substation platform



Opportunities for local businesses to support the construction of the offshore electrical transmission system include:

Offshore Substation

- Fabrication of the Offshore substation and foundation
- Supply of lifting tools and rigging
- Supply of offshore survey equipment
- Provision of personnel transport to offshore locations
- Provision of cable protection systems
- Telecommunications, fire and intruder alarms and site security
- Power and UPS systems
- Fibre Optic works

Inter array cables and Export Cables

The projects will require a number of supplies and services for the manufacture, transport and installation of inter array and export cables, including:

- Engineering to design the inter array and offshore export cables
- Manufacture of array cables to the project
- Installation
- Supply or termination and testing services
- Provision of cable protection systems
- Guard vessels
- Rock installation & dredging
- Diving services
- UXO Survey

Onshore Transmission system

The wind farms onshore transmission system is dependent on the final design and grid connection location and will include the following elements:

» the design, supply and construction of an onshore substation

» the design, supply and installation of onshore export cable to connects the offshore cable to the substation

» the electrical system design and the manufacture and supply of components for the primary equipment, including main transformers.

Opportunities for local businesses to support the construction of the electrical transmission system include:

- Supply of survey equipment
- Provision of personnel transport to offshore locations
- Provision of materials and labour for onshore substation
- Onshore substation Civil works and cable installation
- Telecommunications, fire and intruder alarms and site security
- Power and UPS systems
- Fibre Optic works
- Site supervision and traffic management
- Design and installation of Horizontal Directional Drilling
- Onshore cable supply and installation
- Landfall civil works
- Steelwork (Structures / buildings etc.)
- Site accommodation and welfare
- Site security
- Cleaning and welfare
- Site landscaping
- Enabling works and road works
- Hardware supplies and plant hire
- Environmental consultants
- Waste management services
- Transportation and vessels
- Logistics and port services
- Accommodation and catering

Operations and Maintenance phase

Operations and Maintenance

Operations and Maintenance of the wind farms will run for at least 25 years from preferred Operations and Maintenance (O&M) port location(s) in an economic distance of the wind farm sites, providing long term opportunities for both direct employers and the provision of services

The Operations and Maintenance phase will require creation of the port infrastructure to support ongoing operations as well as long term arrangements for all the necessary supplies and manpower. The requirements include:

- Operation and Maintenance building
- Onshore infrastructure development and construction services
- Site & Asset Management services
- Site technicians and third-party support
- Spare parts, tooling and consumables
- Crew transfers vessels and logistics
- Turbine corrective and preventative maintenance
- Foundations, Substructure corrective and preventative maintenance
- Offshore Substation corrective and preventative maintenance
- Access systems, communications, fall arrest and PPE
- Personnel training and education
- Data Acquisition & Management
- Facilities Management
- Marine consultancy, client representatives, vessel inspections, etc)

Contacts

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