West of Orkney Windfarm

WEST OF ORKNEY WINDFARM

Inverness Supply Chain Event

10 October 2023

The Kingsmills Hotel, Inverness

Agenda

09:45	Arrival & Registration	
10:10	Welcome Address	***Stuart Black**, CEO, Highlands and Islands Enterprise*
10:20	West of Orkney Windfarm Project Overview	***Mike Hay**, Deputy Project Director, West of Orkney Windfarm*
10:40	Supply Chain Procurement	***Alex Sealy**, Contracts Manager, West of Orkney Windfarm*
	Q&A	
11:00	Break	
11:10	O&M Supply Chain Requirements	***Katie Worlledge**, O&M Package Manager, West of Orkney Windfarm*
11:25	T&I Scope and Requirements	***Neill Jeffrey**, Offshore Logistics Package Manager, West of Orkney Windfarm*
11:40	EMEC Research & Innovation Programme	***Heather Turnbull**, Project Manager, EMEC*
	Q&A	
12:00	Lunch Break	
13:00	Green Freeport Opportunities	***Calum MacPherson**, CEO, Inverness and Cromarty Firth Green Freeport, Ltd.*
13:30	Scottish Cable Factory Development	***Toshiyuki Furuhashi**, General Manager, Sumitomo Electric Industries, Ltd.*
	Q&A	
14:00	Exhibition networking / 1-to-1 meetings	
16:30	Event Close	

Supply Chain Events and Contacts

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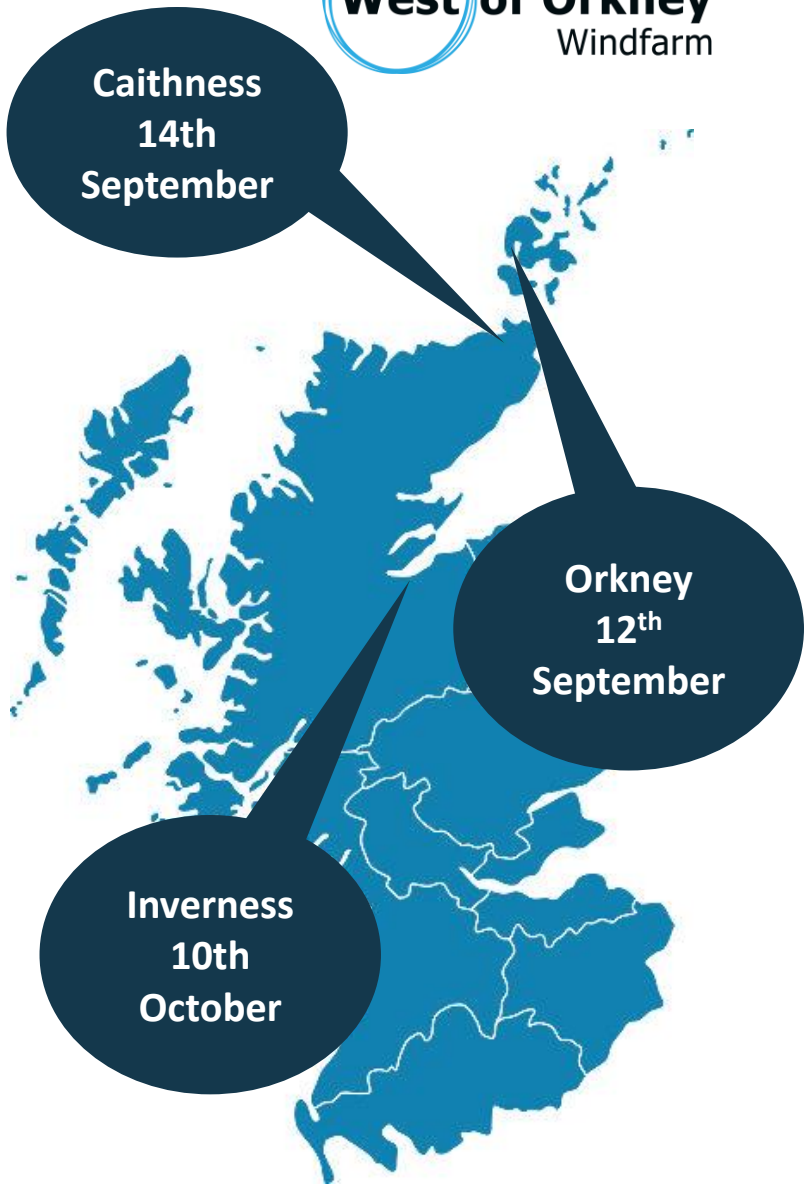
West of Orkney Windfarm



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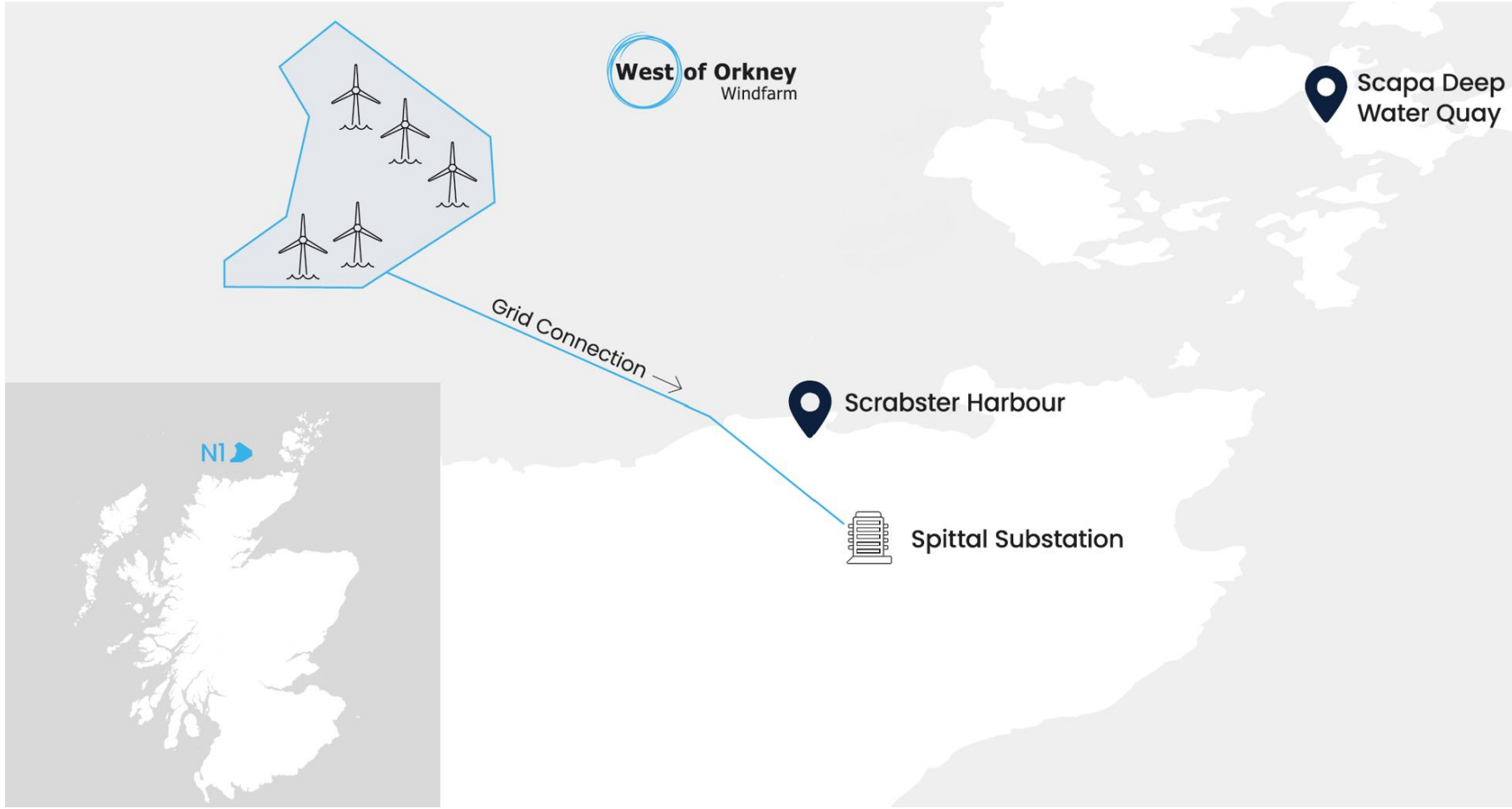
Project Overview

Mike Hay, Deputy Project Director

Project Overview



Scotwind 'N1'	West of Orkney
Lease Area	650km2
Wind Turbines	Up to 125 WTG – 15-21MW
Generation	2.25GW Grid Connection
Water Depth	50 to 70m: Dynamic Sea States
Foundation Types	Jacket / Monopile
Transmission Syst'	HVAC
OSS / OSPs & ONS	2-5 OFF & 1 ONS
Inter Array cabling	Either 66KV or 132KV
Offshore Cable	36km: 5 circuits 275KV
Onshore Cable	23km: 5 circuits 275KV
Lease Period	60 years

The Project Partners

West of Orkney Windfarm

The West of Orkney Windfarm brings together a unique combination of financial, technical and project development capability, with deep Scottish roots, a commitment to delivery, and a clear vision for the North of Scotland

CORIO

TotalEnergies

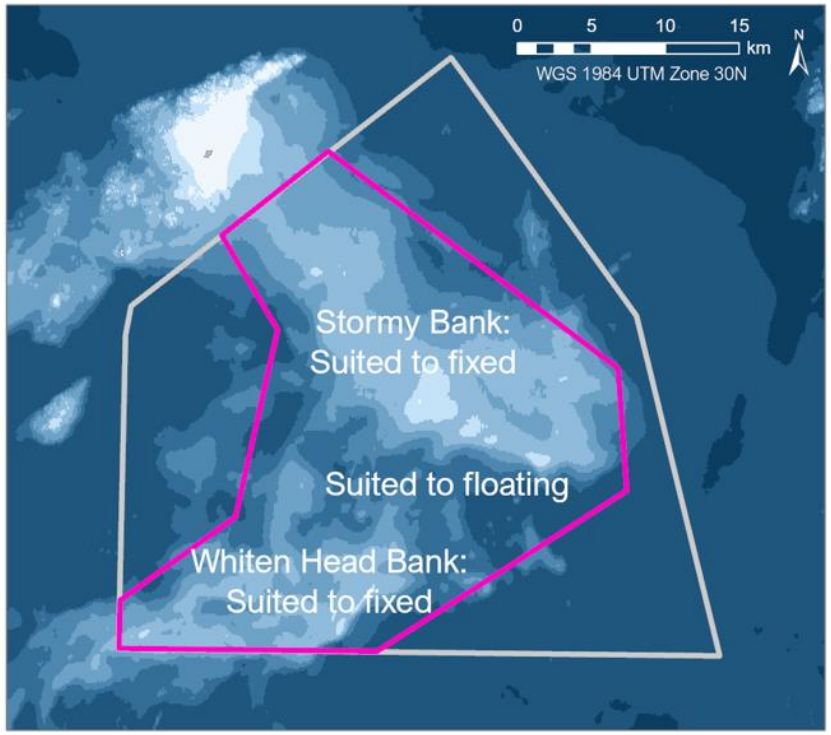
RIDG

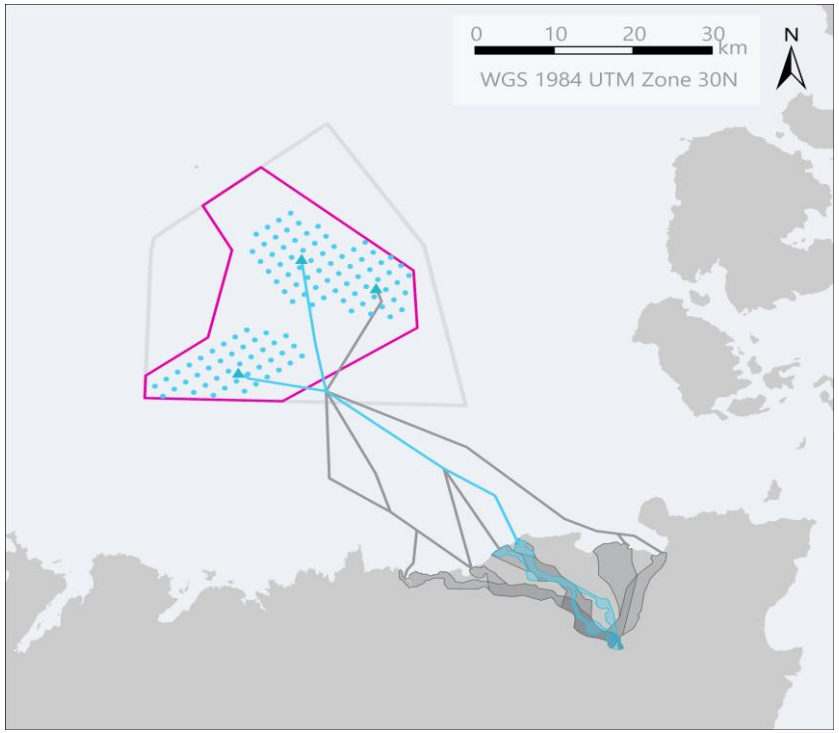
Corio Generation – part of the Macquarie Group, a specialist offshore wind developer with global development pipeline of over +20GW today

TotalEnergies – one of the largest offshore operators on UK continental shelf. Targeting 35GW of renewables by 2025 and 100GW by 2030

RIDG – Scottish offshore wind project developer set up in 2017 to deliver high value projects alongside strategic partners

The West of Orkney Windfarm





Plan Option N1
Option Agreement Area

Depth (m)
0 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 100
>100

Preferred Project Concept
WTG layout
OSP locations
Offshore cable route
Onshore route corridor
Onshore substation

Wider Project Options
Offshore cable route
Onshore route corridor
Onshore substation

Fast-tracked project delivery timeline

West of Orkney Windfarm

Activities to date

March
Public consultation event 1

November 22
Pre-Application Consultation Events

May / June 23
Pre-Application Consultation Events

2022 Q1 | Q2 | Q3 | Q4 | 2023 Q1 | Q2 | Q3 | Q4 | 2024 | 2027 | 2029

March
Scoping Report submitted

June
Receipt of Scoping Opinion

Offshore aerial bird & mammal surveys complete

Seabed surveys complete

Marine traffic surveys

Offshore EIA preparation

Onshore surveys complete

Offshore consents application

Onshore consents application

Consent determination

Commence construction

First power

2022 Project Refinement

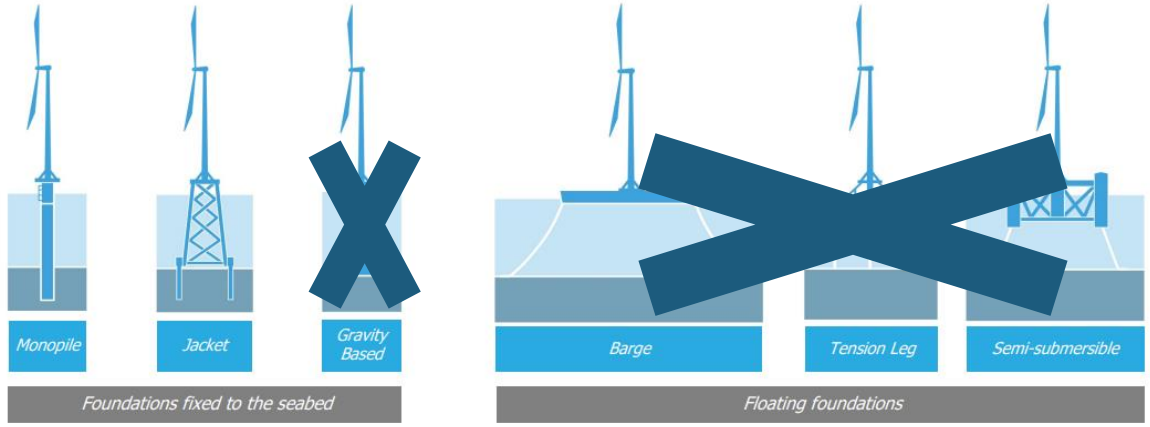
Red Line Boundary, Offshore 2023 Consents Fixed Only

Maximum Offshore Design Envelope

- Up to 125 turbines
- Max tip height of 370m
- Fixed foundations
- Up to five offshore substation platforms with cables linking the wind turbines
- Up to five export cables to shore

Maximum Onshore Design Envelope

- Up to five underground cables
- Caithness: Substation at or near the Spittal substation



Supply chain and skills development

- Commitment to **60% UK content, 40% in Scotland and 20% in the rest of the UK**, measured over the lifetime of the project.
- Enabled by a **£105 million project-level supply chain investment** programme that will be enhanced to £140m through match funding from third parties.
- **Early supplier collaboration, local port investments, and skills development**, to boost the competitiveness of companies throughout Scotland and provide the security key suppliers need for ongoing growth in capacity and capability to meet our delivery schedule.

One	Two	Three	Four	Five
Investment in ports & harbour infrastructure	Collaborative supplier design & supply studies	Innovation & demonstration partnership	Skills development programme	Supply chain & infrastructure investment fund

Local Content To Date

West of Orkney Windfarm

Environment and Consents

XODUS
EIA Lead Coordinator

Caledonian Conservation Ltd
Onshore ecological surveys

HiDef Aerial Surveying Limited
Aerial bird surveys

ORCA Orkney Research Centre for Archaeology
Archaeology

anatec
Shipping and navigation

Sea Mammal Research Unit
Marine mammals

MacArthur Green
Ornithology

Facilitating Change
Public consultation and engagement

Engineering and Technical

OWC An ABL Group Company
Engineering Coordinator

SPECTRUM OFFSHORE
Nearshore and landfall hydrographic

TUGRO
Onshore geotechnical

EMEC The European Marine Energy Centre Ltd
Scanning lidar deployment and innovation programme

Measurement Services
Ground-based Lidar

RAMBØLL
WTG foundations design

ARUP
OSP foundations design

CAIRN RISK CONSULTING
Principal designer

LR
Certification early works

Gardline
Offshore geophysical

Legal, Commercial and Comms

SHEPHERD+WEDDERBURN
Legal

aurora DESIGN STUDIO
Web design

JOHNSTON CARMICHAEL
Accounting

McMILLAN
Public Affairs

NEILDAVIDSON LOW CARBON COMMUNICATIONS
Public Relations

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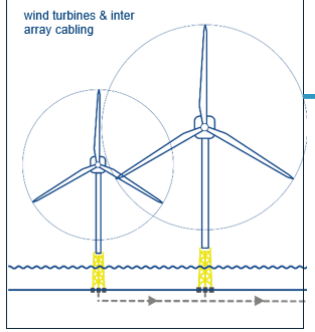
Supply Chain Procurement

Alex Sealy, Contracts Manager

Key Contract Packages

West of Orkney Windfarm

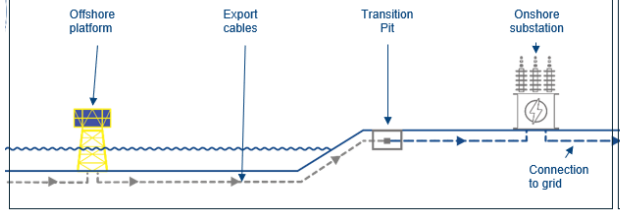
GENERATION ASSETS



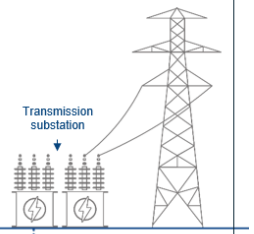
Operation

- Port Services
- Helicopters (TBC)
- SOVs/CTVs (TBC)
- Control Centre (TBC)

OFTO ASSETS



TRANSMISSION NETWORK



Turbines (WTG)

- Engineering & Supply
- Transport & Installation Services
- Marshalling Port & Services
- Operations & Maintenance Services

WTG Foundations

- FEED
- Detailed Design & Supply
- Transportation & Installation Services
- Marshalling Port & Services

Array Cables

- FEED
- Detailed Design & Supply
- Transportation & Installation

Export Cables (Offshore)

- FEED
- Detailed Design & Supply
- Transportation & Installation

Exports Cables (Onshore)

- Cable Route FEED
- Detailed Design & Supply
- Transportation
- Civil Installation Services

Offshore Substations

- FEED
- Detailed Design & Supply
- Transportation & Installation

Offshore Substation Foundations

- FEED
- Detailed Design & Supply
- Transportation & Installation

Onshore Substations

- FEED
- Detailed Design & Supply
- Transportation & Installation (including Civil works)

Goods/Services Required - Overview

West of Orkney Windfarm

❖Development expenditure (DEVEX): Projects Typically at Pre-FEED & FEED Stage:

- Consenting & Planning support, including Environmental Impact, Sealife & Bird Studies.
- Specialist Surveys; Wind Yield, Metocean, Marine Traffic.
- Surveys; Onshore & Offshore Geophysical & Geotechnical.
- Engineering Studies; Owners Engineer, Specialist Packages – Electrical Design, Inter Array & Export Cable Design, Foundation Design, Offshore Substation, Onshore Substation.
- Project Management, Finance, Insurance.

❖Capital expenditure (inc. OFTO assets), (CAPEX): Supporting CFD & FID decisions:

- Fabrication of fixed Foundations.
- Supply of Wind Turbine Generators.
- Supply of Inter Array & Export Cables (Offshore & Onshore).
- Fabrication of Offshore Substations, including all electrical transformer equipment & controls.
- Onshore Marshalling Yards / Ports in reasonable proximity to offshore sites.
- Transport & Installation of all offshore assets, including commissioning.
- Construction of Onshore Substations, including grid connections.

❖Operational expenditure over 25 - 60 years (OPEX):

- Onshore operational bases & port infrastructure in close proximity to offshore sites.
- Fleet of vessels to support equipment & technician transfer to offshore assets

Procurement Timeline

West of Orkney Windfarm

2023	2024	2025	2026+
Pre FEED Engineering	Pre-FEED Complete	EP(CI) ITTs	Ops ITT Activities
WTG ITT launched	EP(CI) ITT Activities	Foundations	Ops Base & Services
Offshore Geo Surveys	FEED Activities	Substations	
	Cable ITT Activities	Transportation & Installation	

Procurement Timeline above is indicative and subject to change.

Project Contracting Key Drivers

West of Orkney Windfarm

Local Content

- 60% Local Content, 40% Scotland
- Supply Chain Engagement

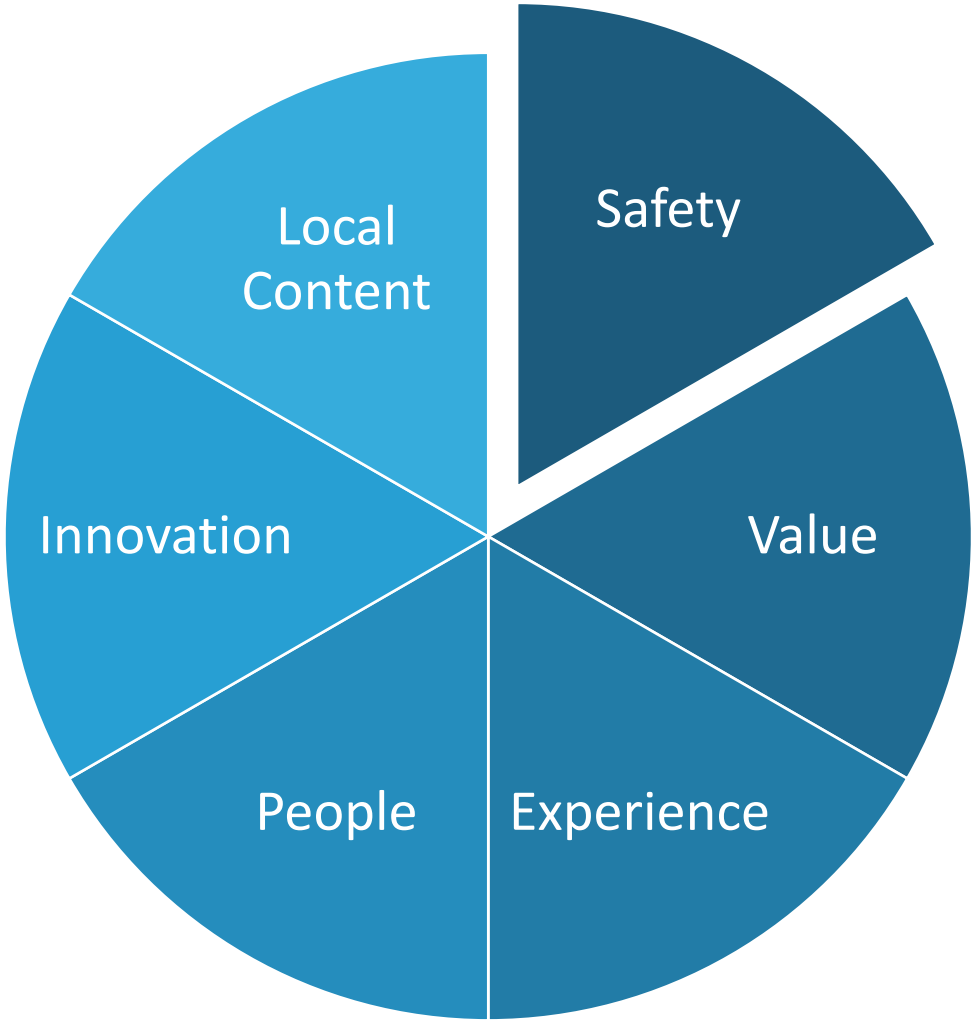
Maximising Value

- Secure Levelised Cost of Energy (LCoE)
- Competitiveness
- Maximise likelihood of successful CFD and/or route to market.

Cost & Schedule Certainty

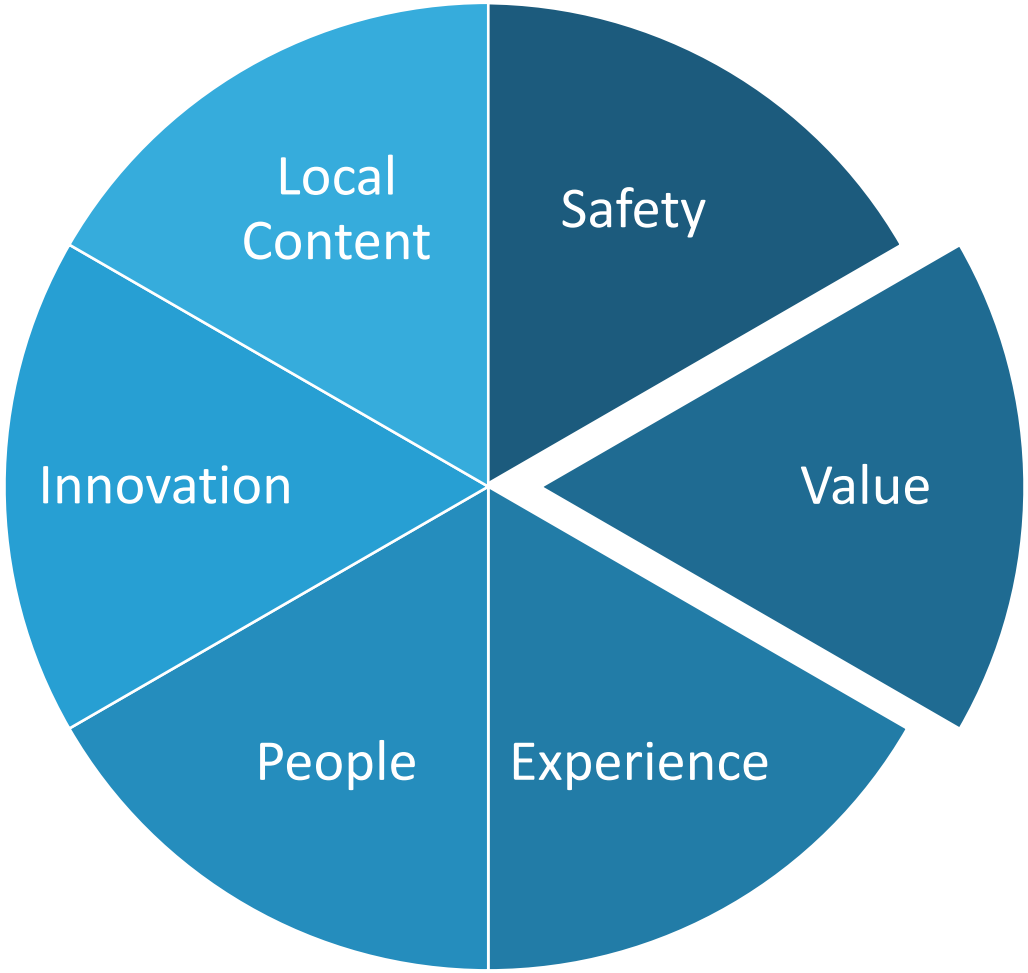
- Achieve CFD
- Secure Manufacturing
- Secure COD

Company Expectations / Successful Bidding



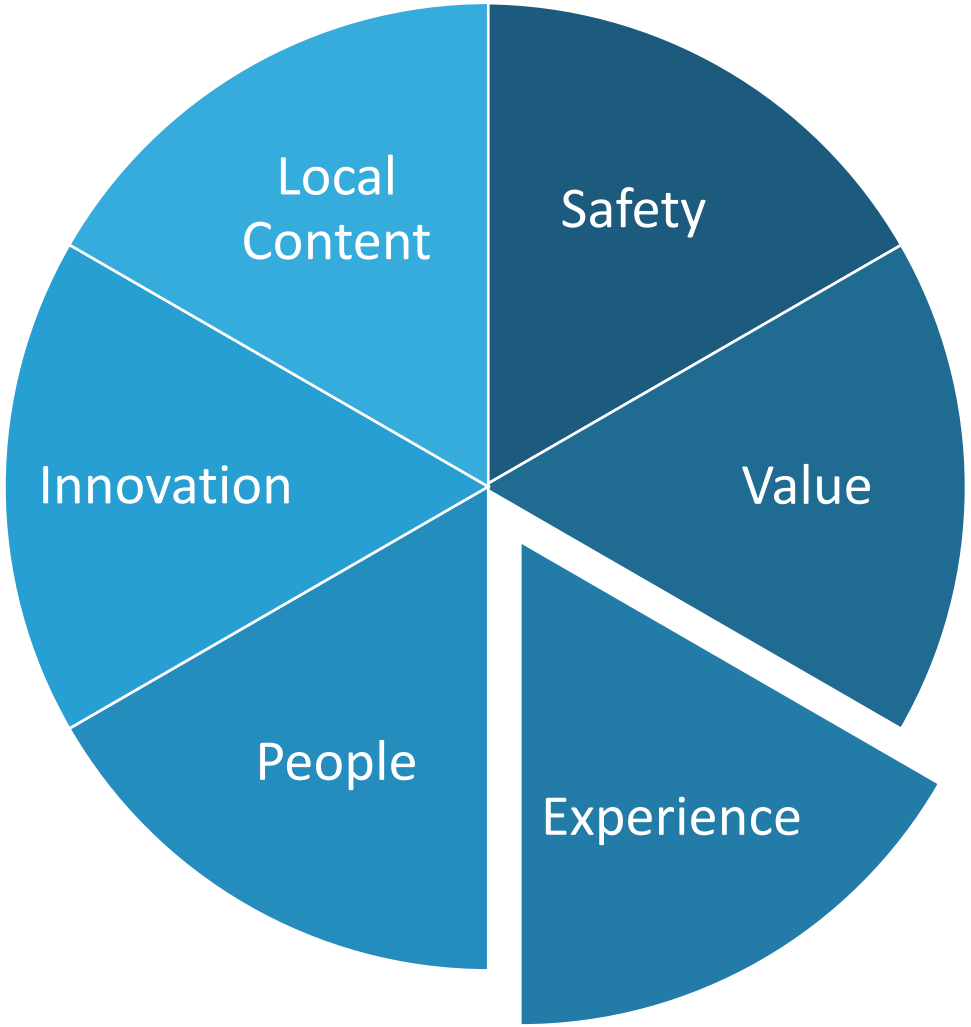
- Strong HSE leadership underpinning a robust safety culture
- Tested safety management systems and proven safety performance
- Demonstrable continual improvement in all aspects of HSE

Company Expectations / Successful Bidding



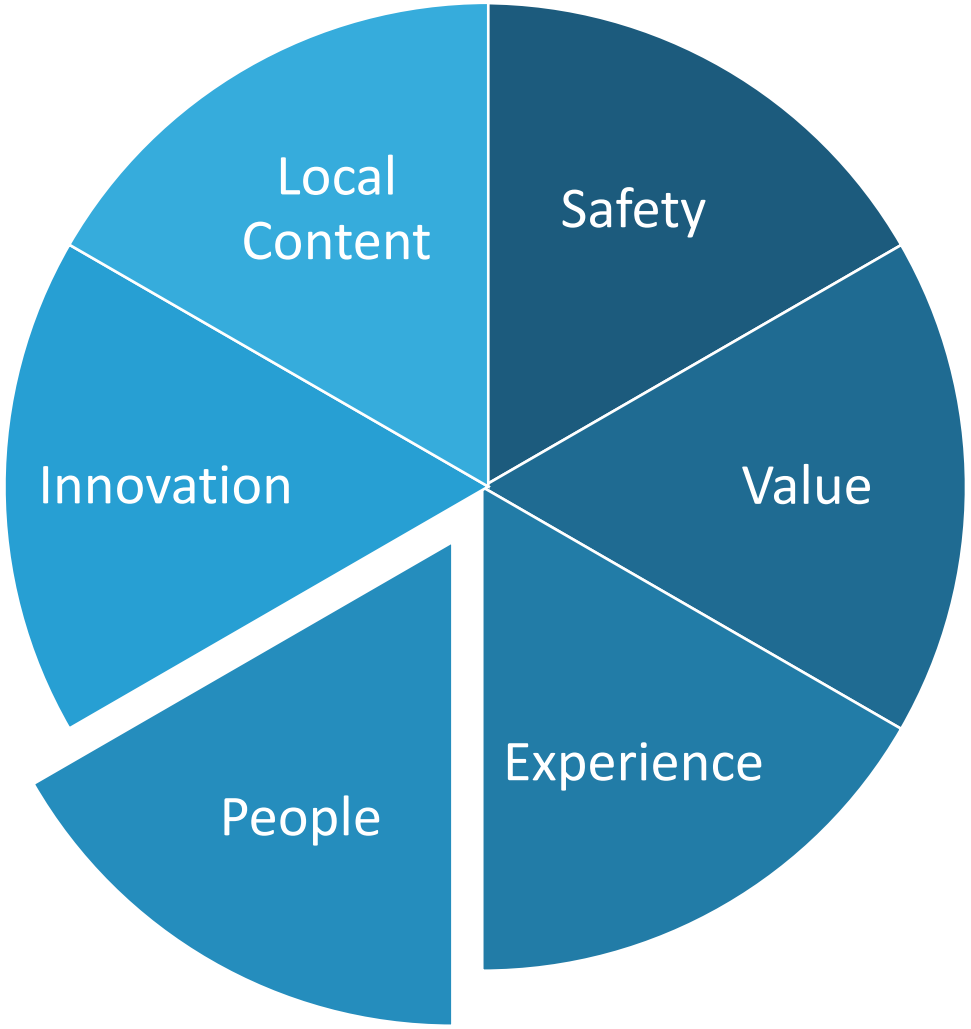
- Economically viable despite challenging environment and escalating costs
- Proven cost saving initiatives

Company Expectations / Successful Bidding



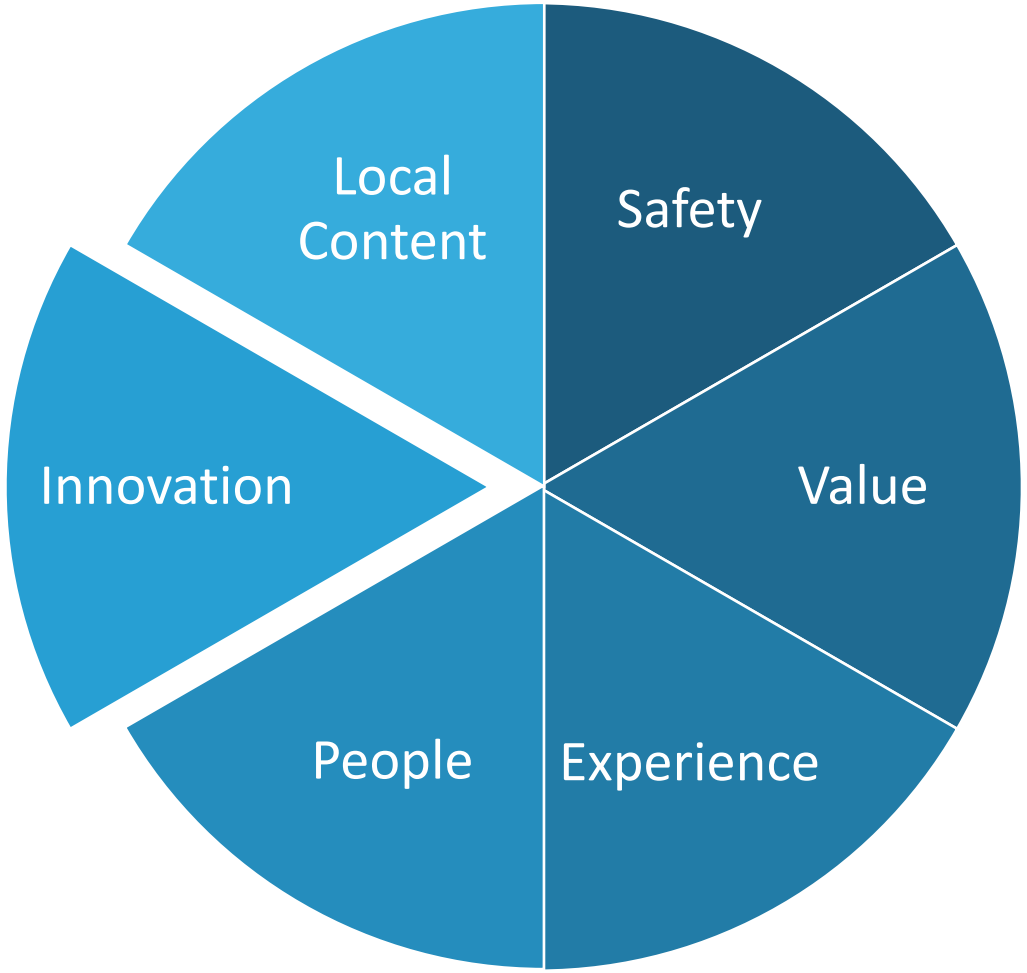
- Proven track record of completing similar scopes of work on time and budget to a high standard
- Previous work in other industries seen as transferrable should be highlighted

Company Expectations / Successful Bidding



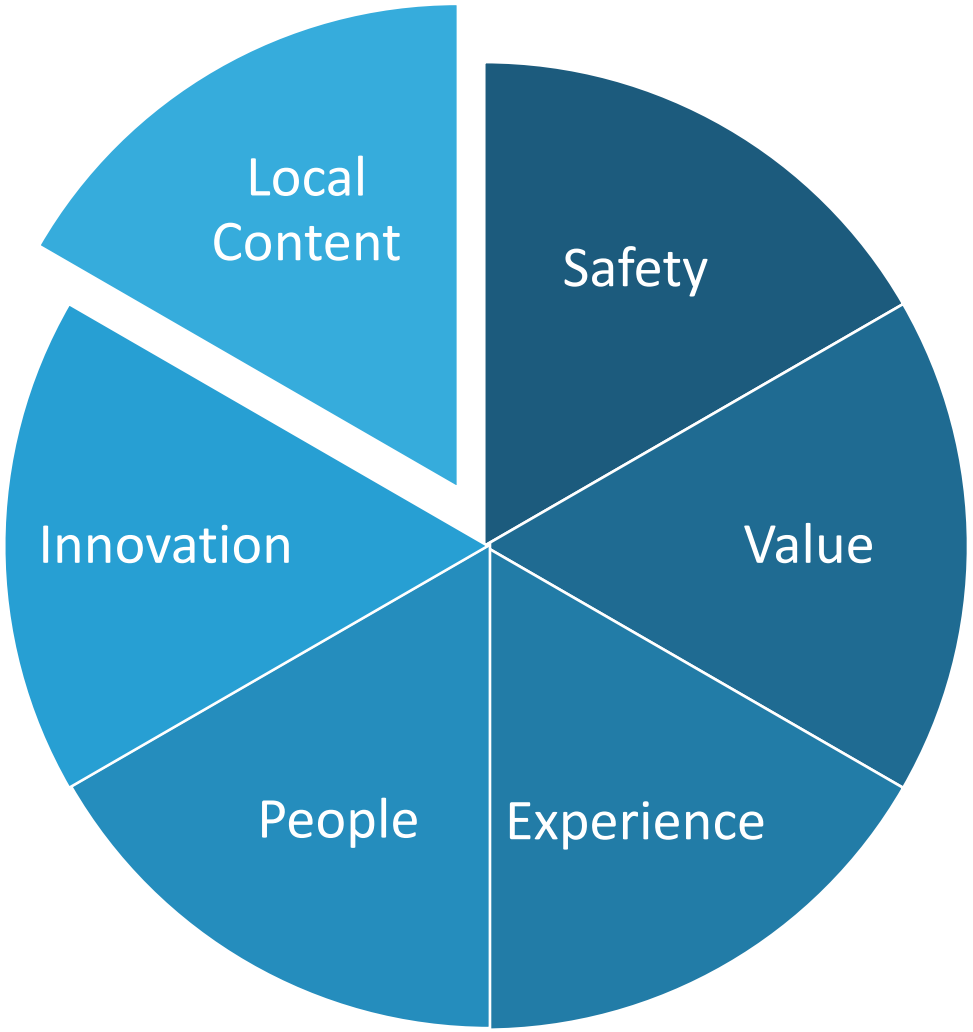
- Fully competent, highly trained and certified to complete challenging work scopes.
- Optimised processes that provide high levels of business efficiency
- Working conditions and remuneration consistent with the Universal Declaration of Human Rights

Company Expectations / Successful Bidding



- Develop and explore new technologies and ways of working to ease well known supply chain challenges
- Challenge industry “norms”, increasing efficiency and value within the industry

Company Expectations / Successful Bidding



- Existing infrastructure, labour and any plans to create new or enhance existing infrastructure and skills should be explained
- Any commitments or existing opportunities that are already being pursued should also be shared

Supply Chain Challenges – 1 of 2

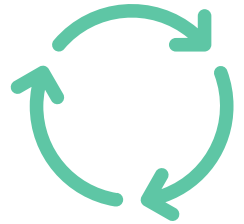
West of Orkney Windfarm

❖**Delivering 60% Local Content Commitments over the lifetime of the project; 40% in Scotland and 20% in rest of UK.**

- Early engagement to identify & support investment; £105M large sum but insufficient to cover all.
- New Ports ~£250M, New Plants ~£200M to £500M, New Vessels ~£1Bn+
- Needs multi-project / multi-developer, industry & governments collaboration to deliver.

❖ **Sustainability; Offshore Wind Supply Chain Continuity & Circularity of Products.**

- New industry investments must be sustainable in long term and products environmentally acceptable.



❖**Very Active 'Dynamic' Metocean Conditions for Construction & Operations.**

- Northern Scotland 'Summer Seasons' for construction and heavy maintenance.

❖ **Size and Scale: Up to 125 WTGs of up to 25MW, exceeding 200m height.**

- Limitations of Installation Vessels for foundations, OSS, Cables and WTGs in 'dynamic' conditions.

❖ **Lack of Port Infrastructure, Onshore Marshalling / Craneage and Fabrication facilities.**

- UK Ambition for 50GW by 2030 = additional 300-400 WTGs & Foundations per year.

❖**Skills shortage for developing, constructing and operating new Wind Farms.**

- New industry requiring training at schools & universities and transition from existing industries.

Supply Chain Challenges – 2 of 2

West of Orkney Windfarm

❖**Grid Connection under review with possible delays to 'Fast-Track' Schedule.**

- Need for flexibility in delivery of components and installation vessels / services.

❖ **Consenting advancing but in process with outcome forecast Mid 2024.**

- Uncertainty on process / time and possible impact on development design.

❖**Classical Contracting Approach with Tier 1 EPCs → balancing package size & interface risks.**

- At same time engaging widely with the lower-level supply chain actors

❖ **Competition for Supply Chain Capacity could result in Supply Constraints.**

- Rapid growth in UK offshore wind, resurgence of UK Oil & Gas and from outside UK; Europe & USA.

❖**Offshore Wind Supply Chain demanding balance of risks & reasonable profitability levels.**

- History of competitive processes, cost reduction & development challenges = supply chain losses.

❖**Dramatic Cost Inflation → some developments claiming +20 to 40% over last 2 years.**

- From commodity prices, labour inflation, interest rates, exchange rates, energy costs.

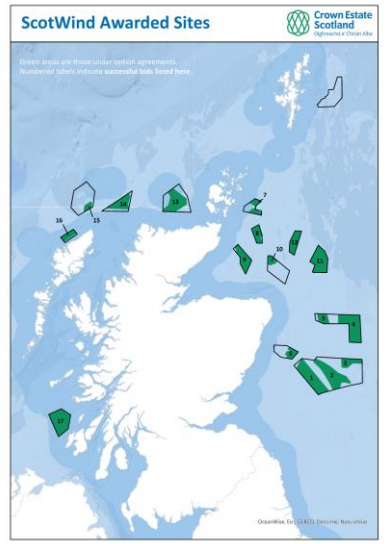
❖ **Achieving Commercial Competitiveness Lowest 'LCOE' towards CFD and FID.**

- UK projects currently challenged delivering AR4 CFDs = potential return of CFD?
- Given developer squeeze between cost inflation & CFD reduction, what margins for FID?

Supply Chain Solutions

Early supplier collaboration, local port investments, and skills development.

To boost the competitiveness of companies throughout Scotland and provide the security key suppliers need for ongoing growth in capacity and capability to meet our delivery schedule.



Continuous engagement with local businesses

By working with regional economic bodies and local business networks to facilitate supply chain engagement events, progress and challenges can be shared in advance of procurement to ensure preparedness of supply chains

Collaboration between developers through the Strategic Investment Model (SIM).

By working across the Scottish industry and public sector, effort and potentially investment can be pooled and risks shared. 44 applicants with a capital value of £4bn are currently under review.

Tea & Coffee Break

Next: T&I Scope and Requirements

@ 11:10

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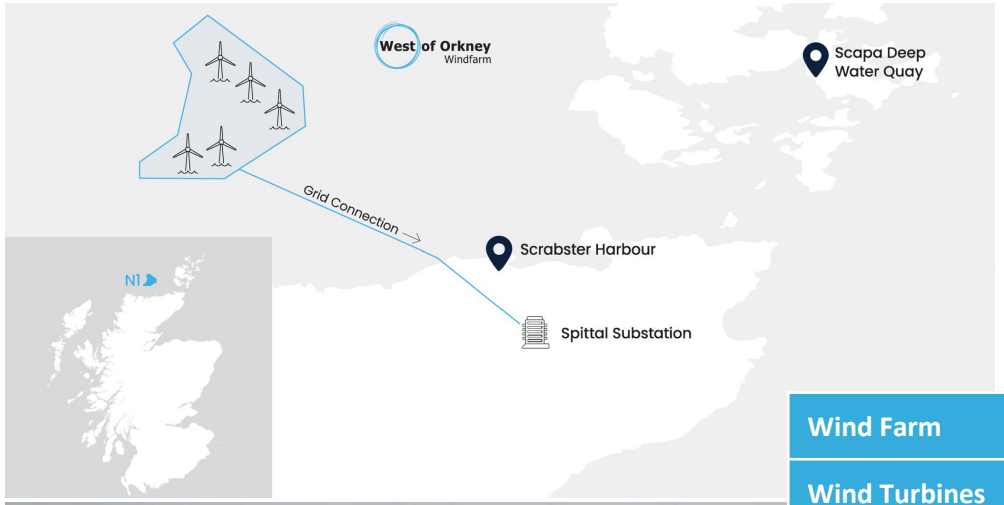
T&I Scope and Requirements

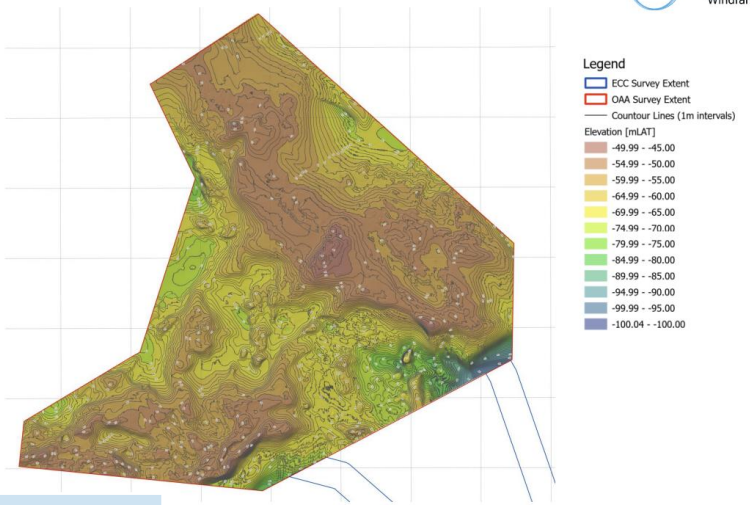
Neill Jeffrey, Offshore Logistics Package Manager

Project Overview



Wind Farm	2.25GW
Wind Turbines	Up to 125
Water Depth	50 to 70m: Dynamic Sea States
Foundation Types (Fixed)	Jacket / Monopile

Bathymetry



West of Orkney Windfarm

Annual Hs(m)-Tp(s) distribution at SE1 - total wave - in %

Hs-Tp	2 - 4	4 - 6	6 - 8	8 - 10	10 - 12	12 - 14	14 - 16	16 - 18	18 - 20	20 - 22	Total
0 - 1	0.31	0.54	2.15	2.91	0.54	0.12	0.03	0.01	0.00		6.6
1 - 2	0.03	2.79	4.41	15.91	10.18	2.11	0.58	0.16	0.04	0.00	36.2
2 - 3		0.53	1.88	5.38	12.29	6.17	1.53	0.29	0.05	0.00	28.1
3 - 4		0.00	0.38	1.80	4.95	5.88	1.90	0.38	0.05	0.00	15.3
4 - 5			0.02	0.28	1.90	2.95	1.64	0.40	0.04		7.2
5 - 6				0.00	0.70	1.35	1.11	0.36	0.01		3.5
6 - 7					0.11	0.69	0.59	0.24	0.01		1.6
7 - 8					0.00	0.28	0.31	0.11	0.01		0.7
8 - 9						0.07	0.19	0.07	0.01		0.4
9 - 10						0.01	0.07	0.02	0.01		0.1
10 - 11						0.00	0.03	0.02	0.00		0.1
11 - 12							0.01	0.02	0.00		0.0
12 - 13							0.00	0.00	0.00		0.0
13 - 14							0.00	0.00			0.0
Total	0.3	3.9	8.9	26.3	30.7	19.6	8.0	2.1	0.3	0.0	100.0

Transport & Installation Scope

West of Orkney Windfarm

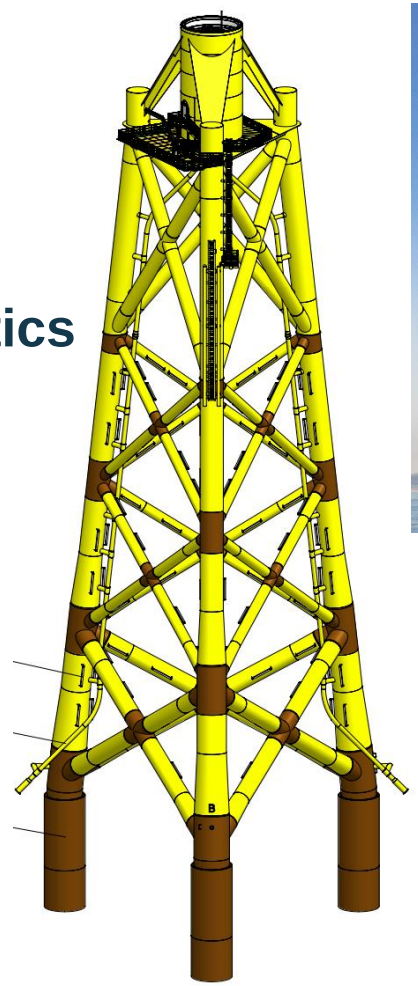
What's involved?

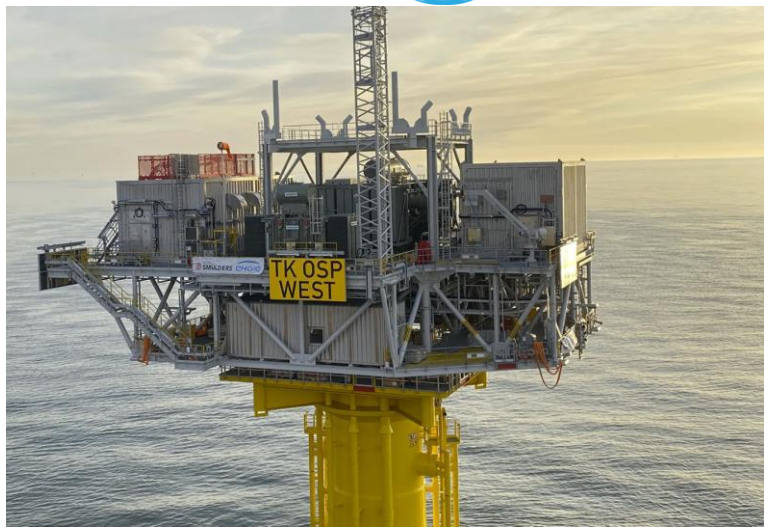
WTG Foundation Marine Logistics

WTG Installation

OSP Installation

Inter Array Cable Installation

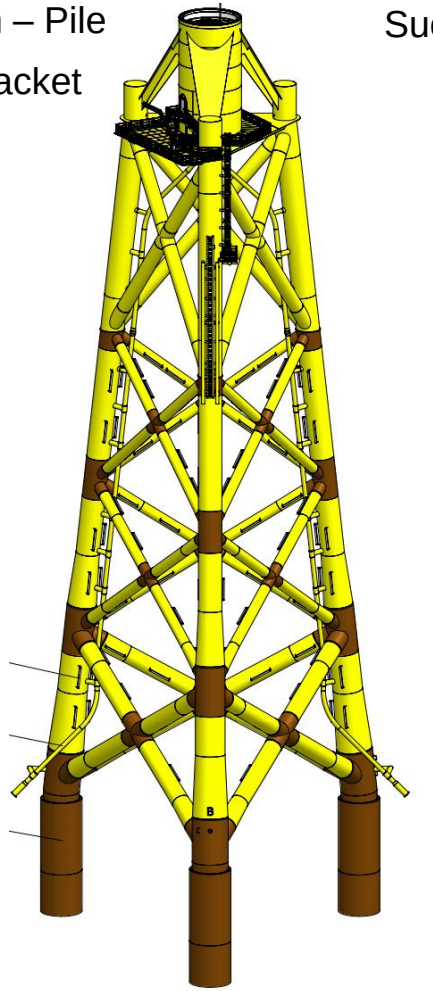




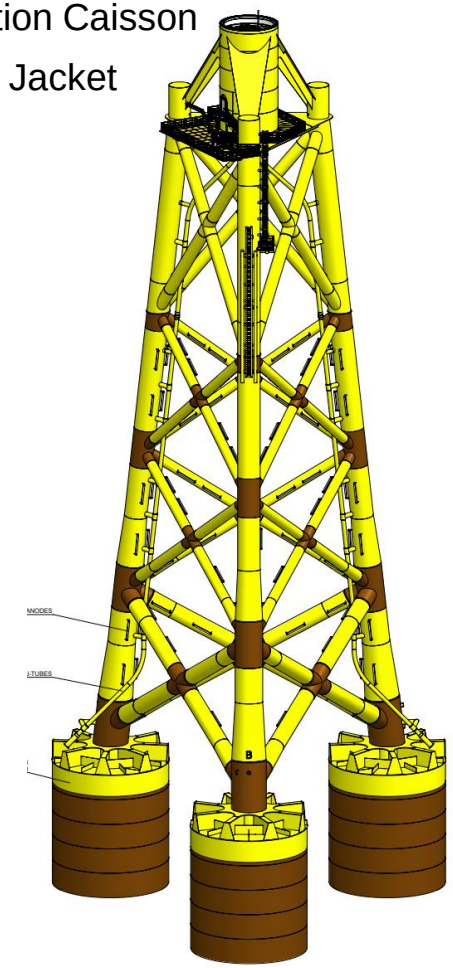
WTG Foundation Types

West of Orkney Windfarm

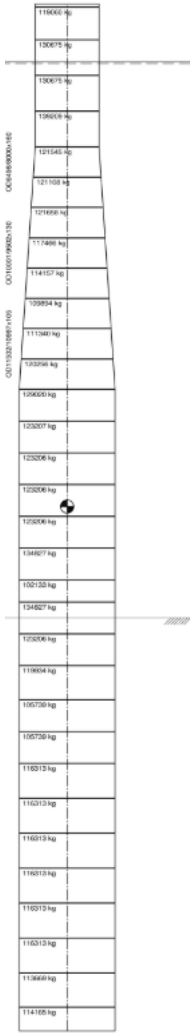
Pin – Pile Jacket



Suction Caisson Jacket



Monopile



Pin Pile Jackets	Height from 97m to 117m tall
Suction Caisson Jackets	Height from 106m to 126m tall
Monopile	Length from 105m to 135m Diameter at toe 10m to 13m

WTG Types

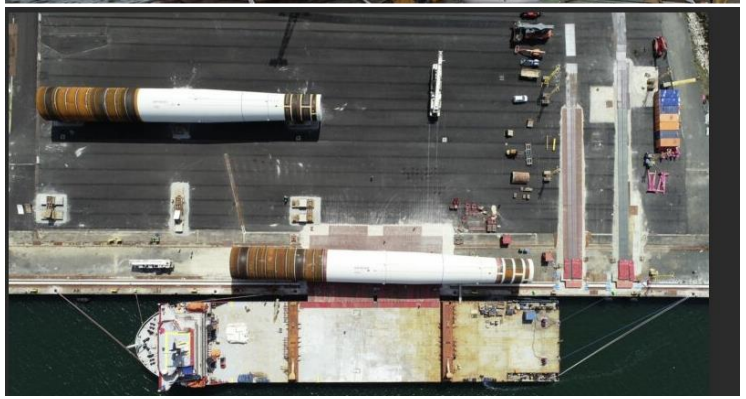
Tower	Height from 126m to 140m tall Weight from 800t to 1300t each (pending final turbine selection)
Nacelle	Rating from 15MW to 21MW Weight from 600t to 1200t each Hub Height (from LAT) 158m to 180m (pending final turbine selection)
Blades	Individual Length from 115m to 135m Rotor diameter from 235m to 276m Weight from 63t to 85tm (pending final turbine selection)

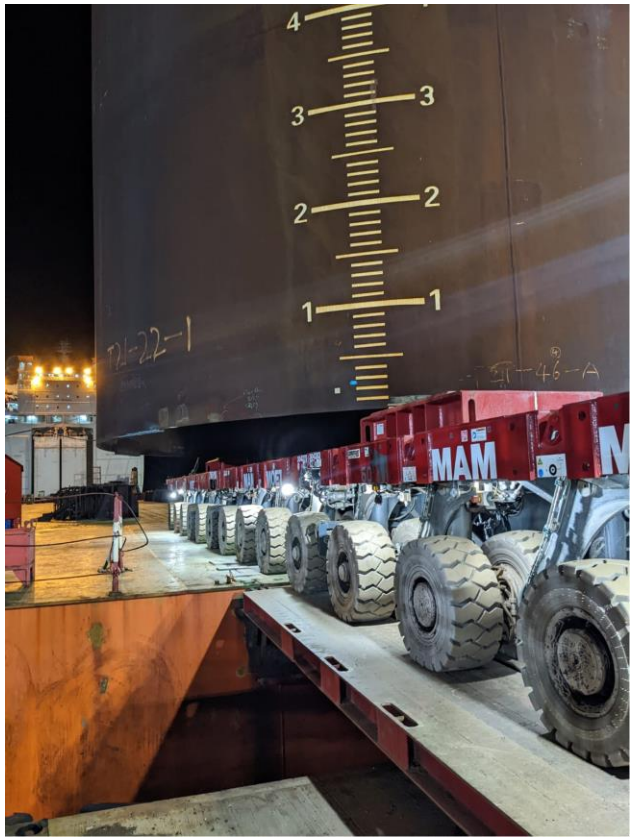
Transport & Installation Scope

West of Orkney Windfarm

WTG Foundation Marine Logistics

Loadout at Fabricators





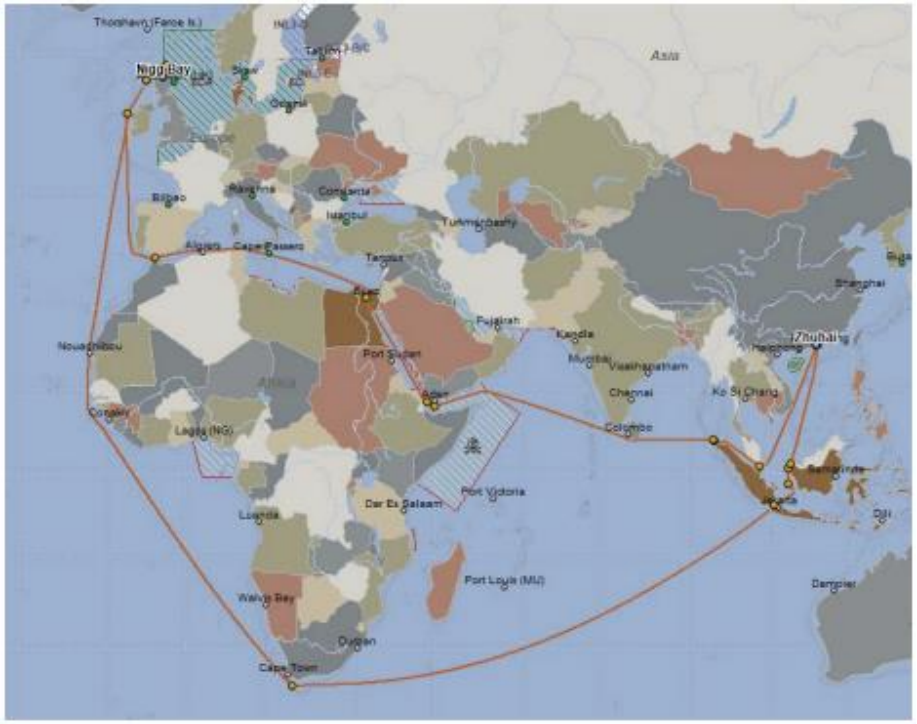
Ro / Ro using SPMTs

Transport & Installation Scope

West of Orkney Windfarm

WTG Foundation Marine Logistics

Long Haul Transportation



Transport & Installation Scope

WTG & WTG Foundation Marine Logistics

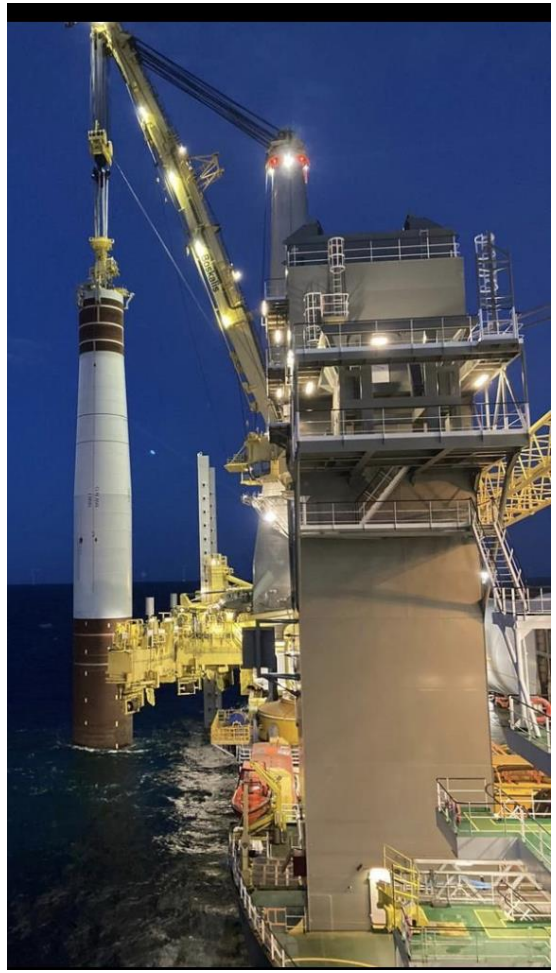
Marshalling Components

Transport & Installation Scope

West of Orkney Windfarm

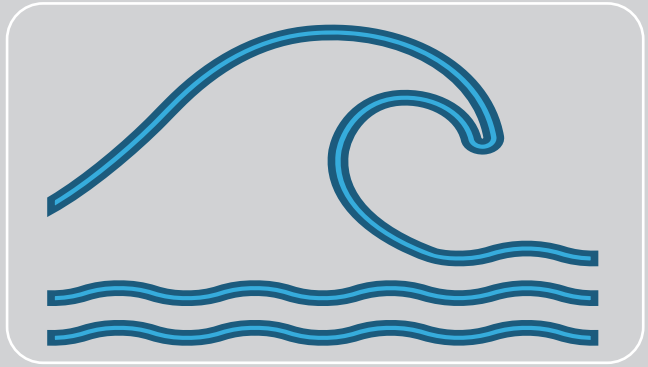
WTG & WTG Foundation Marine Logistics

Installation



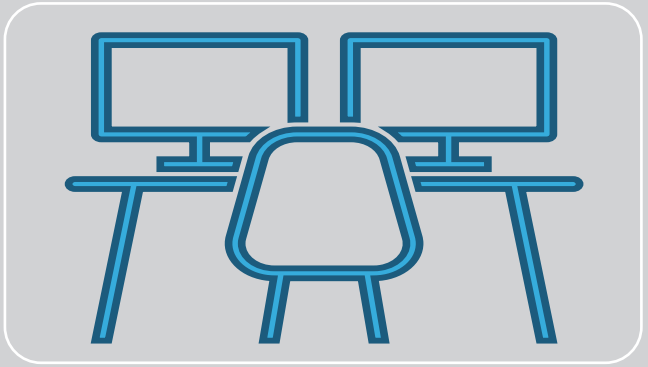
What skills and services are needed for T&I
....some examples

West of Orkney Windfarm



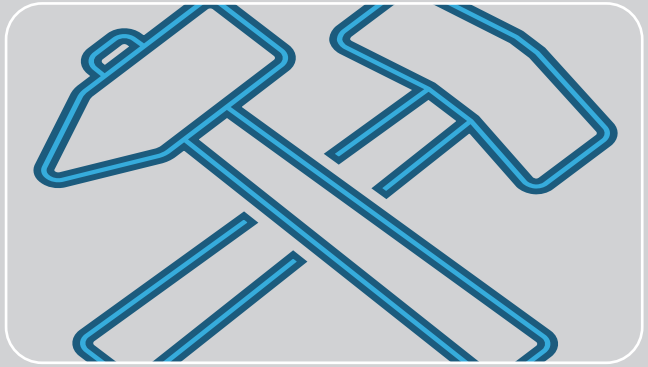
Offshore roles

- Client reps
- Grouting operations
- Scour protection / rock dumping
- Wind turbine technicians
- Specialists for heavy lift operations
- Rigging suppliers
- Marine chandlery
- Offshore Engineers (mixed disciplines)
- Vessel Crews
- Other marine specialists – e.g. surveys and remedial works carried over



Onshore roles

- SPMTs & Craneage
- Logistics specialists
- Ships agents
- MEWP providers
- Marine Warranty
- Onshore civils for foundation bases
- Mooring analysis
- NDT
- Grillage & SF fabrication (welding & painting)
- Weather forecasting
- LOLER inspectors



Other Support Services

- Light fabrication and refurbishment services.
- Marine operations, tugs, pilotage
- Courier and logistics support
- PPE Suppliers
- Statutory Inspectors
- Tooling calibration and certification
- Office catering
- Tooling and consumables suppliers
- Accommodation

4

O&M: Supply chain requirements and Facilities

Katie Worlledge, O&M Package Manager

Wind Farm Operations

West of Orkney Windfarm

What is Operations?

Once construction and commissioning is complete, the wind farm will be generating power and will enter the Operations phase for the next approx. 30 years

The wind farm doesn't just run itself, there are a range of operational and maintenance activities that are required constantly throughout the life to ensure the efficient and safe operation of the site

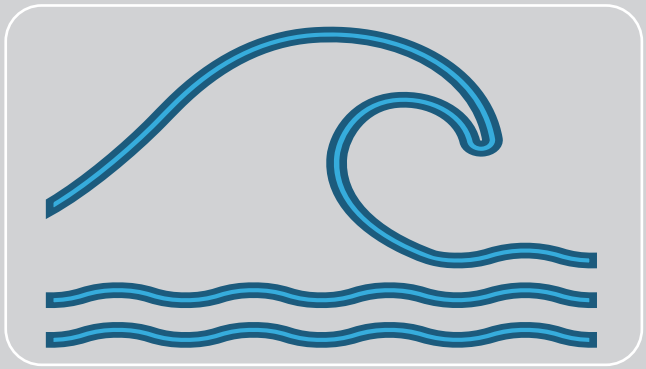
Typically, these activities are undertaken by a combination of site-based teams (offshore and onshore), remote activities from central office and using a range of local service providers

The Operational phase of an offshore wind farm is very reliant on a robust supply chain. This also provides the opportunities for direct and indirect employment in the area (and further afield) and can provide the momentum for further innovation in technical solutions from a range of organisations.

Images from offshore-windindustry.com

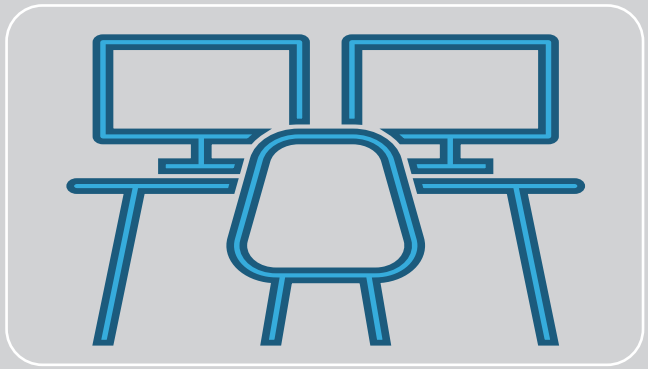
What skills and services are needed for O&M?
....some examples

West of Orkney Windfarm



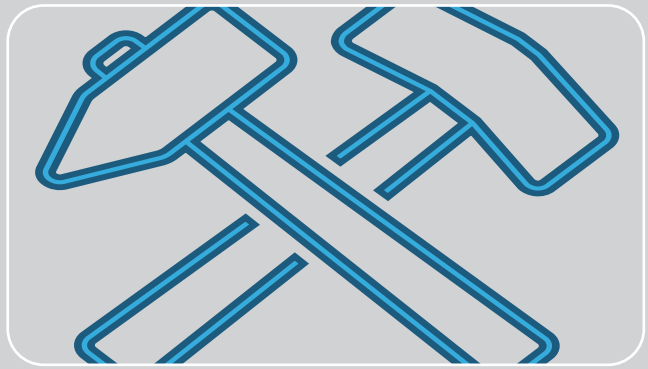
Offshore roles

- Wind turbine technicians
- Specialists for heavy lift operations
- Blade inspection and maintenance teams
- Balance of plant technicians
- Offshore Engineers (mixed disciplines)
- Vessel Crews
- Other marine specialists – e.g. surveys and monitoring



Onshore roles

- Work planners and schedulers
- Logistics specialists
- Team managers and supervisors
- Data analysts
- Systems specialists
- Facilities management
- Corporate and administrative support
- Health, Safety and Environmental specialists
- Technical Authors
- Weather forecasting



Other Support Services

- Light manufacturing and refurbishment services.
- Waste management
- Courier and logistics support
- PPE Suppliers
- Statutory Inspectors
- Tooling calibration and certification
- Office catering
- Tooling and consumables suppliers
- Cable repair

The O&M Base: The onshore ‘home’ for the offshore wind farm

West of Orkney Windfarm

To facilitate and support the onshore and offshore activities an onshore O&M facility will be established – the onshore ‘home’ for the wind farm and the people that work there

This will be a **permanent base for the lifetime of the site**, to support operations and maintenance activities.
A central operational base for technicians, supporting office staff and will typically house a control room for monitoring of the work. It will also be the location for the warehouse and daily service vessels and maintain the spare parts inventory and safety equipment.

Internal Requirements
• Warehouse space for parts and materials • Office Space • Changing and welfare facilities • Drying room • Electrical component storage (temperature and humidity controlled) • Hazardous material storage • Server room • Wind farm control room

External Requirements
• Hardstand areas for spare cable storage • Laydown space for shipping containers • Parking for staff and visitors • Ability for make the area secure

The O&M Base (cont'd)

West of Orkney Windfarm

As the O&M base is there to support the work offshore, a key criteria is that the harbour selected for the onshore base can support the vessels chosen for the logistics strategy.

Vessel Facilities

- **Pontoon access** for the vessels involved in the O&M activities.
- **24/7** access, if possible, to allow for maximum flexibility in the Operations plans
- Access to **quayside cranes** and other lifting equipment (quayside with appropriate loading capability)
- Meeting minimum **draft specification, channel width and turning areas** (e.g. minimum draft requirement of 8m)
- **Bunkering facilities**, waste disposal, etc.
- **Additional quayside space** may be required on an ad-hoc basis over the life of the windfarm for major maintenance interventions (c. 250m quay length with 10-12m depth alongside depending on vessel, with ancillary storage areas)

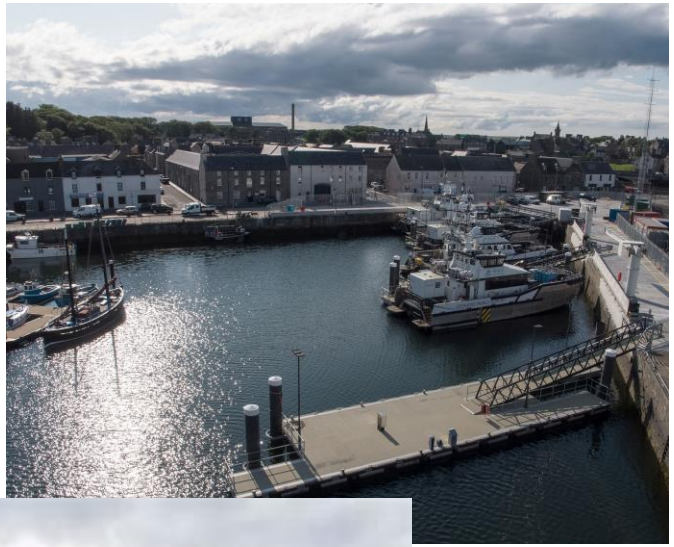
Image from galloperwindfarm.com

Example O&M Facilities

West of Orkney Windfarm

Dogger Bank (Port of Tyne), (Equinor &SSE)

Beatrice (Wick) – renovation of existing historic buildings



Seagreen, Montrose

Triton Knoll, Grimsby

Scrabster as O&M Harbour:
Current base case, subject to future confirmation

West of Orkney Windfarm

Scrabster is the established commercial port on the North mainland coast. Strategic location for many sectors

2022-23 – 2,116 vessel arrivals, total vessel tonnage 8.595 million tonnes.

Current sectors – ferry, fishing, offshore energy (renewables / oil & gas), fuel, general and international cargoes, cruise and leisure.

Over £38 million invested over past decade in improved infrastructure and port facilities.

Modern marine infrastructure in place and capable of supporting SOV and CTV operations.

Over 1,000m of deepwater quays

Heavy lift capability

Water and fuel available

Existing local supply chain offering port related service including cranes, fuel, haulage, agency, stevedoring and engineering services.

Development options available for onshore O&M base requirements.

Good connectivity – easier to get goods and people to port than the islands.

24/7 port with good customer service and a can-do attitude from both the port and local supply chain.

Scrabster as O&M Harbour (cont'd)

- ✓ **Distance to site**: Proximity to site – reducing transit time
- ✓ **Quayside access**: Space to accommodate SOV(s) and CTVs and maintain flexibility
- ✓ **Harbour characteristics**: Suitable channel widths and depths to support likely logistics options
- ✓ **Space available**: Options for the O&M base
- ✓ **Connections:** Good road connections – important for deliveries and other logistics

O&M Base
Construction and Timescales

Services required for O&M Base Construction

Development and Design
- Architects and building designers
- Logistics specialists

Construction
- Construction teams
- Project Managers
- Quality Managers
- WHSE Support
- Office fit out
- IT Services
- Fire Protection Services
- Security Services

Pre 2023
- Project Management
- Initial feasibility

2023
- Pre-FEED / Conceptual Study
- Identifying suitable harbours

2024
- FEED
- Early building design
- Discussion with O&M suppliers (who will also be users of the building)

2025 onwards
- Detailed Design
- Construction underway

2029
- Facility in use to support commissioning activities

2030 - 2060
- O&M Period
- Facility fully utilized by O&M team(s)

5

EMEC R&I Platform

Heather Turnbull, Project Manager, EMEC

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EMEC and The Offshore Wind R&I Programme

Lisa MacKenzie
Marketing and Communications Manager

EMEC

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

An innovation catalyst
pioneering the transition to a clean energy future



Reducing the time, cost, and risk of progressing low carbon technologies to market.

EMEC's journey

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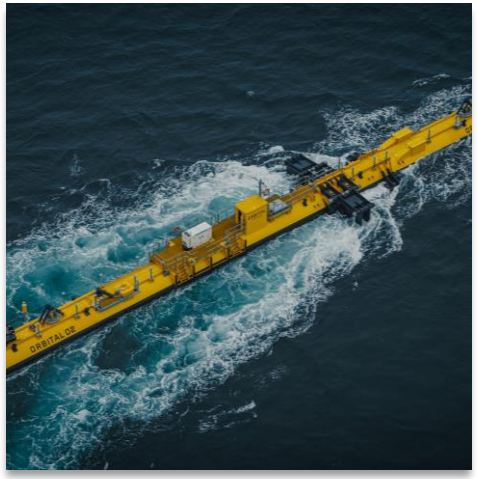




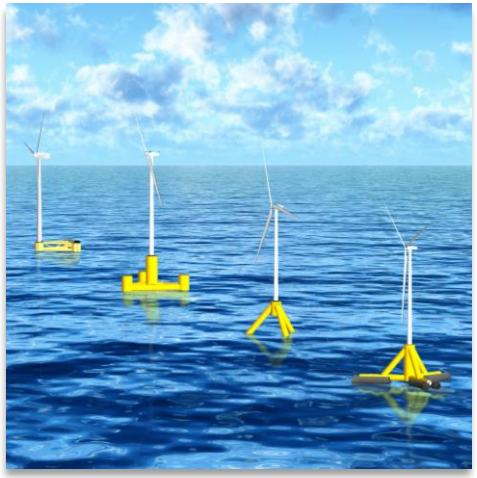

Ocean energy demonstration sites

1. **Fall of Warness**
   Grid-connected tidal test site
2. **Billia Croo**
   Grid-connected wave test site
3. **Shapinsay Sound**
   Scale tidal test site
4. **Scapa Flow**
   Scale wave test site
5. **Floating Wind**
   Grid-connected floating wind test site (planned)

Hydrogen demonstration sites

6. **Caldale**
   Hydrogen production and storage plant
   Vanadium flow batteries
7. **Kirkwall Pier**
   Fuel cell
8. **Kirkwall Airport**
   Combined heat and power unit (CHP)

EMEC offices

9. **Stromness**
   Headquarters
10. **Kirkwall**
    Satellite office

Orkney decarbonisation projects

11. **Kirkwall Airport**
    Sustainable Aviation Test Environment (SATE)
12. **Hatston**
    ReFLEX Orkney – Experience Centre
13. **ICNZ**
    Islands Centre for Net Zero
14. **West of Orkney Windfarm**
15. **Flotta Hydrogen Hub**

20 years of impact

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THE EUROPEAN MARINE ENERGY CENTRE LTD

UK

£370 MILLION
GVA TO UK ECONOMY

540 FTE
SUPPORTED

SCOTLAND

£263 MILLION
GVA TO SCOTTISH ECONOMY

406 FTE
SUPPORTED

ORKNEY

£130 MILLION
GVA TO ORKNEY ECONOMY

224 FTE
SUPPORTED

SHOPPING LOCAL

97%
EMEC SPEND IN UK

67%
EMEC SPEND IN SCOTLAND

50%
OVER £30 MILLION
EMEC SPEND IN ORKNEY

TOP 20
EMPLOYER IN ORKNEY

R&D

365
R&D PROJECTS OVER 20 YEARS

EMEC INVOLVED IN
£538 M
R&D PROJECTS SINCE 2016

£49.5 M
SECURED DIRECTLY BY EMEC

A JUST TRANSITION | FAIR • INCLUSIVE • LEAVE NO ONE BEHIND

Offshore Wind Research & Innovation Programme

An EMEC initiative

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

Sponsored by

West of Orkney Windfarm

Aims and objectives

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Reduce time, cost and risk of offshore wind roll out

Accelerate innovation, enhancing R&I capacity in the North of Scotland

Create jobs and help businesses grow, bringing skills and capabilities closer to the wind farms

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West of Orkney Windfarm

Programme

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Establish R&I Programme

West of Orkney Windfarm

Work with windfarm to identify site specific challenges

Review latest innovation outputs relevant to challenges

Review local / regional innovation capabilities

Prioritise and establish a programme of innovation calls

Develop detailed call documentation

First call launch in October

Work with bidders to develop suitable projects

First projects starting early 2024

Wind farm 2

Wind farm …

Join
Offshore Wind R&I Programme

Second call

…

Future projects…

Regional research & innovation capacity

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Assessment of existing R&I capabilities within the region (Orkney and Caithness).

'Street-level' view: 70 orgs identified / 16 interviews; reflecting cross-section of organisations and geographies

9 Orkney
5 Caithness
2 North Highland and Islands

3 Public bodies
5 Academic bodies
8 Private companies

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Regional research & innovation capacity

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Academia

- Committed to growing their capacity locally
- Keen to attract more R&I activity to the region drawing upon support from their wider university networks.

Private companies

- Keen to engage and understand needs/timescales of windfarm
- R&I useful stepping stone to developing new products and services

Public bodies

- Clear support and priority focus amongst public sector bodies in the region
- Transition imperative to evolve economic impact of Flotta and Dounreay

Key R&I themes:

- Resource characterisation
- Environmental monitoring
- Maritime safety
- Digital twin, AI and machine learning
- Subsea robotics
- Energy systems and multi-vector management (with a strong green hydrogen hook)
- Socio-economic impacts

Key R&I themes:

- **Cable stabilisation and cable management**
- Substation technology
- Mooring option analysis
- O&M optimisation, prediction and design
- Risk management/emergency response
- Robotics
- Subsea drones
- Wave calming measures……

Work need to coordinate actions in R&I space

- HIE new innovation programme
- Orkney Islands Council - ports decarbonisation agenda
- Scotwind initiatives

Analysis

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Capabilities

- Knowledge of local waters critical
- Awareness of R&I as gateway to growth/diversification
- Some large companies with small presences; some small companies with notable global experience
- Skills mostly centre around O&M, vessels, logistics, and environmental support services; some manufacturing, lifting and handling, and electrical expertise

Facilities

- EMEC: world leading test sites in extreme conditions
- Academic networks, UHI, RGU, HW
- NOV lab, Flotta
- SATE, Kirkwall Airport
- Subsea7 Wick fabrication site
- Space Port, Sutherland

Analysis

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

Gaps

- Engineering R&I
- Little evidence of experience around offshore wind turbine generators and substructures
- Supply chain, infrastructure and workforce (not unique to R&I programme)

Opportunities

- Energy transition opportunity (re-skilling oil and nuclear workers)
- R&I advantage in working with smaller companies but need for strong facilitator experienced in R&I Projects to ensure successful outcomes
- Include wider socio-economic challenges e.g. recruitment, rural accommodation, connectivity

Challenge areas

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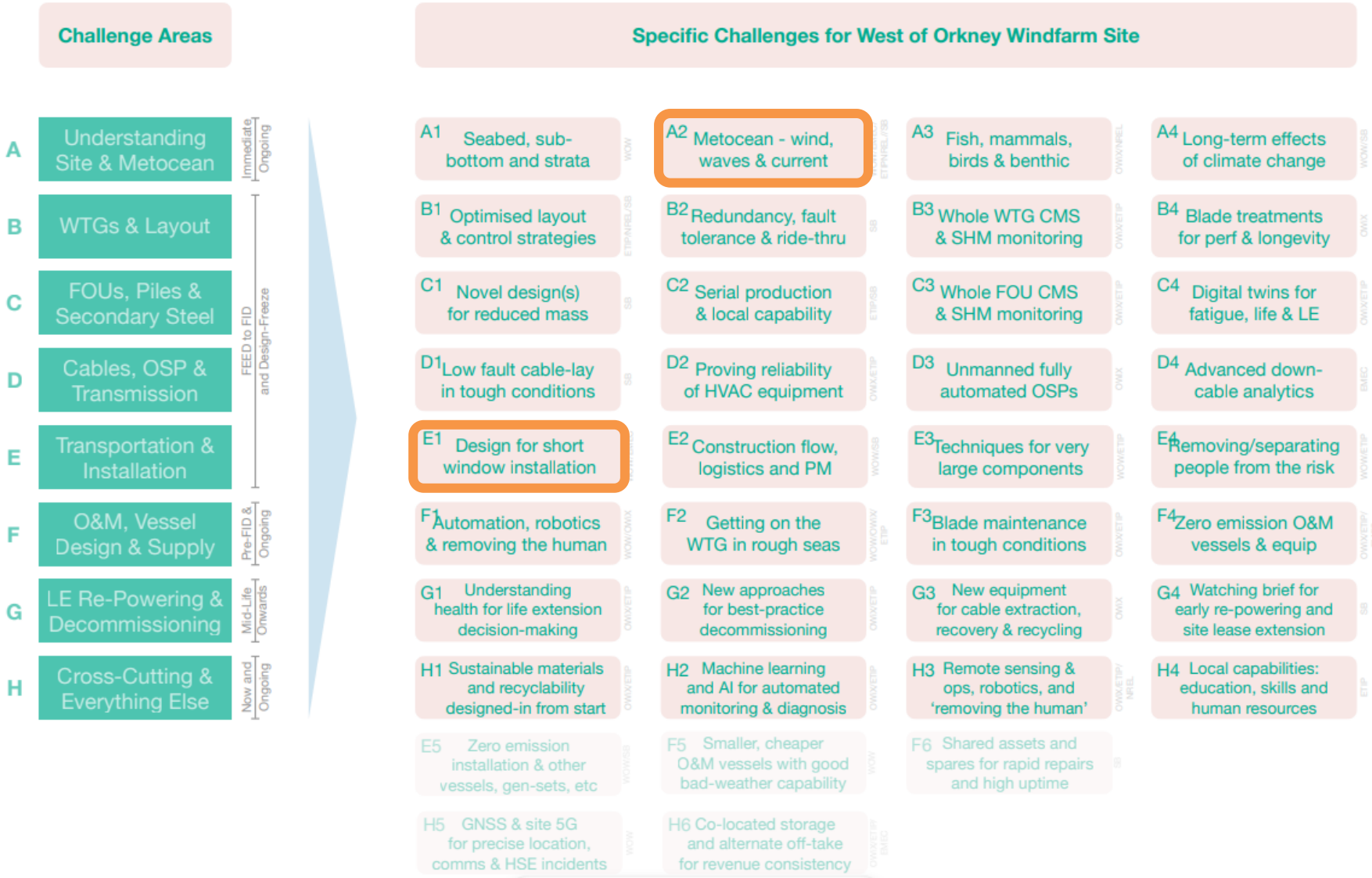

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First call

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Metocean – wind, waves and current

- **Challenge:** understand the wind, wave and current conditions on site and en-route
- **Aim:** inform major decisions regarding installation and O&M including vessel choice and weather windows.
- **Examples:**
  - Long-range remote sensing
  - Measurement buoys / FLiDAR
  - Seabed sensors
  - Satellite measurement
  - Advanced modelling and prediction techniques
  - Predictions v actual analysis

Design for short window installation

- **Challenge:** maximise installation opportunities
- **Aim:** streamline installation requirements and processes to fit the short weather windows with highest probability of occurrence.
- **Examples:**
  - Higher sea-state capability vessels
  - Higher windspeed capability lifting equipment
  - High capability load-compensation equipment
  - Quick release and refix deck-clamping systems
  - Self-installing gear

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How to get involved

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Project sponsor:

- Work individually or collectively to address site specific challenges
- Improve non-price factor project capacity
- Build up expertise close to site and maximise local supply chain impact

Project participant:

- Projects need to be innovative and targeted to the wind farm (detailed call packs in development)
- Looking for Scottish impact
- Programme priorities will shift over time

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Heather.Turnbull@emec.org.uk

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6

Green Freeport Opportunities

Calum MacPherson, CEO, Inverness and Cromarty Firth Green Freeport, Ltd.

Calum MacPherson - CEO

Inverness & Cromarty Firth Green Freeport
a free trade zone

Transforming the Highland Economy and Delivering National Energy Security

WHAT IS A GREEN FREEPORT?

- **TAX TREATMENT -**
  - **Capital Allowances, LBTT, Buildings Allowances, NDR rate holiday**
  - **Customs Reliefs – suspension, process, exemption**
- **REGIONAL SUPPORT -**
  - **Strategic planning, NDR retention – up to £25m p/a**
  - **PowerHouse – training, innovation NIC Fund**
  - **Supply chain development**
- **Inward Investment-**
  - **Combined capability pitch**
  - **UK T&I, SDI, HIE, ICFGFP support**

CONSORTIUM MEMBERS – incl West of Orkney

Transforming the Highland Economy and Delivering National Energy Security

INVERNESS AIRPORT BUSINESS PARK

Highland Deephaven Industrial Park

AVENTUS ENERGY

PORT OF CROMARTY FIRTH

Falck Renewables

PURE POWER TO GROW

GLOBAL ENERGY GROUP

The Highland Council
Comhairle na Gàidhealtachd

Floating Energy Allyance

Ørsted

JOHNSTON CARMICHAEL

PSG MARINE & LOGISTICS

UHI

Anderson Strathern

serimax

inverness CHAMBER OF COMMERCE

SEMCO maritime

OW OCEAN WINDS

HI TRANS

THE HIGHLANDS AND ISLANDS TRANSPORT PARTNERSHIP

BlueFloat ENERGY

Fred. Olsen 1848

SENSEwind

SCOTTISHPOWER RENEWABLES

Inverness & Cromarty Firth Green Freeport
a free trade zone

Transforming the Highland Economy and **Delivering** National Energy Security

GREEN FREEPORT – BIDDING PROCESS

Bid	• 2020 - 2022
Freeport Status announced	• Jan 2023
OBC Submitted	• Jan 2023 – Oct 2023
Final Business Case	• Nov 23 – Mar 24
Legislation	• 12 week process
Freeport starts	• March 24

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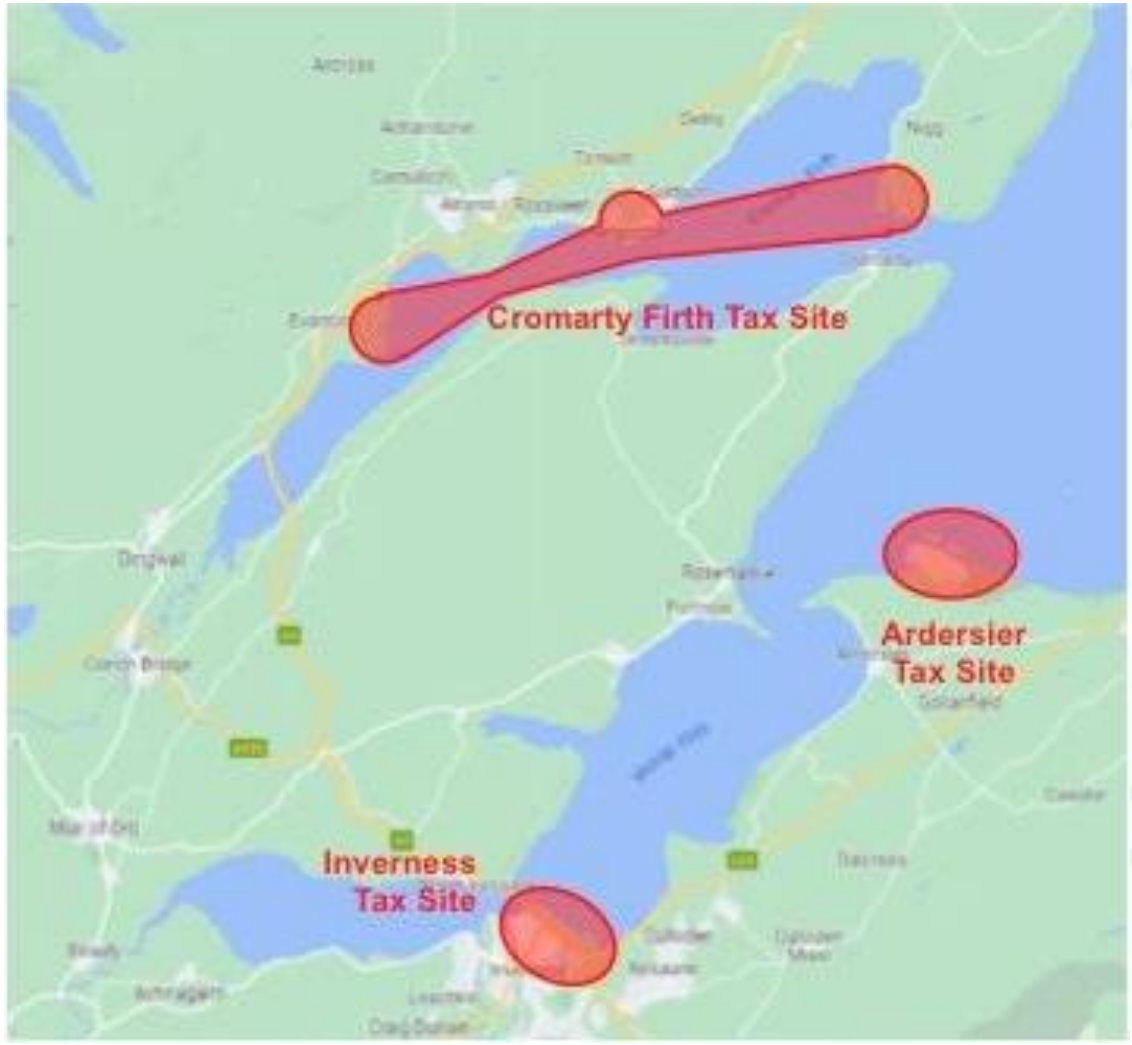
Transforming the Highland Economy and Delivering National Energy Security

GREEN FREEPORTS: KEY FEATURES



Headlines:

- **European & Global Hub for offshore infrastructure.**
- **Circa 540ha quality useable land**
- **5 customs site proposed.**
- **Significant Green Hydrogen plans under development**
- **PowerHouse – 60+ working group supported by NICs and offshore developer contributions.**
- **£25m seedcorn funding critical to unlock capability.**
- **Circa 16,500 jobs over 25 years, 10,250 of which in Highlands.**

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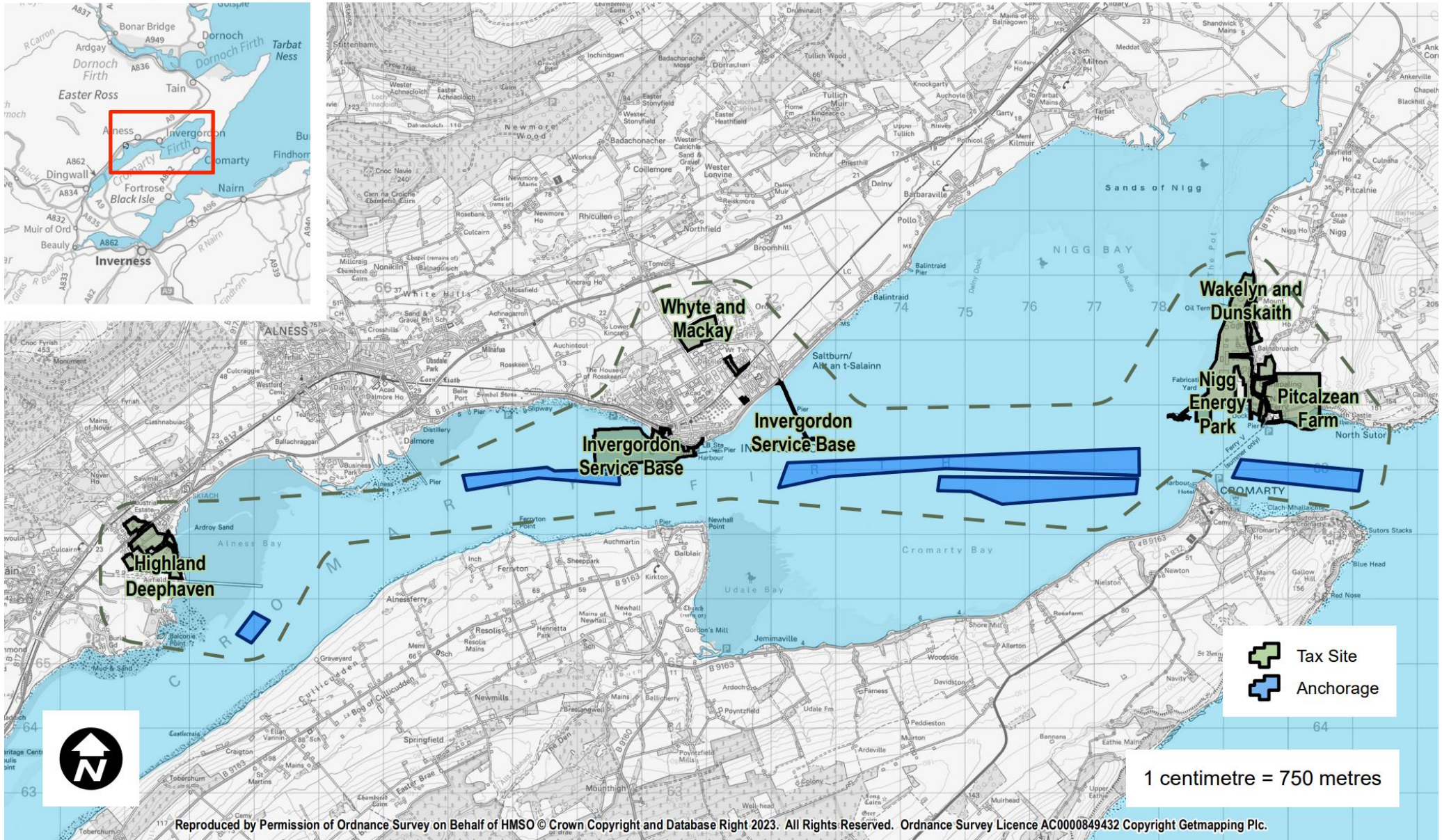
Inverness and Cromarty Firth Green Freeport

Cromarty Firth Tax Site: 353.72 ha

rkney Vindfarm



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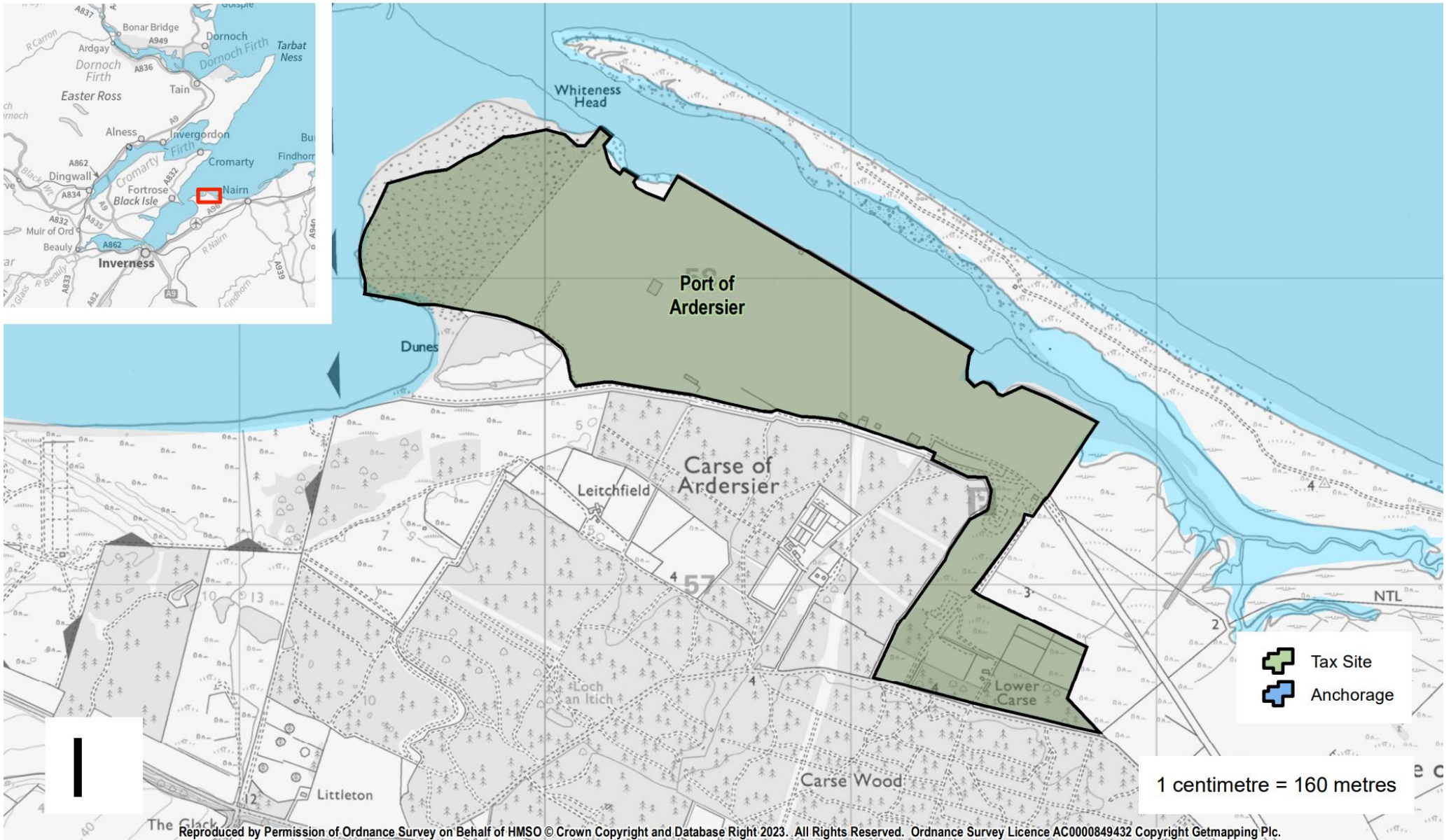
Inverness and Cromarty Firth Green Freeport

Ardersier Tax Site: 148.72 ha

rkney
indfarm



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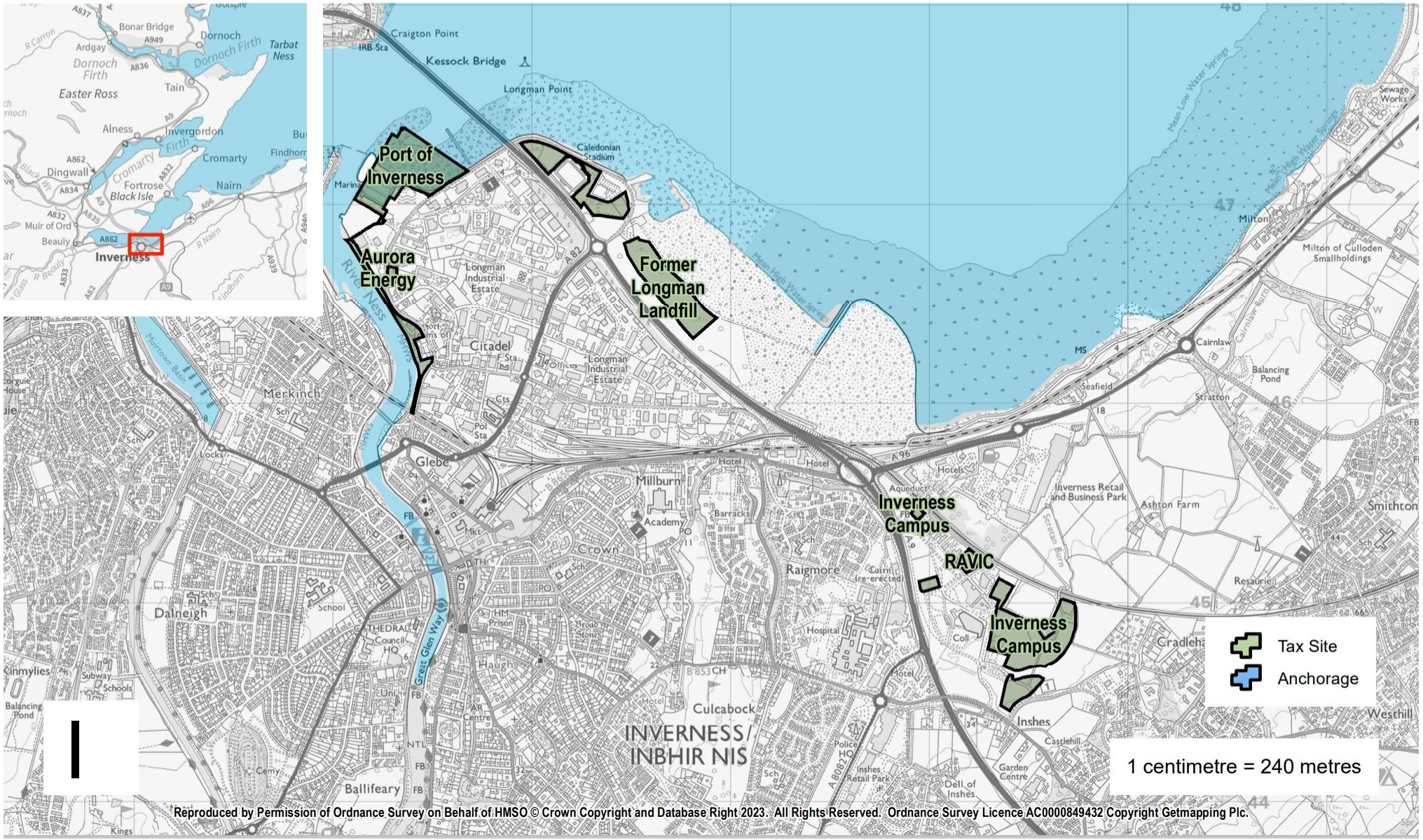
Inverness and Cromarty Firth Green Freeport

Inverness Tax Site: 45.41 ha

Orkney Windfarm



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GREEN FREEPORT – converting the opportunity

- **Supply Chain**
- **People**
- **Community**
- **Bio Diversity / Net Zero**
- **Facilities – capability, quantity, specialism**
- **Match Funding – training / R&D**
- **Critical infrastructure – Homes, Transport, Connectivity**

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GREEN FREEPORT – opportunities

West of Orkney
Windfarm

www.westoforkney.com

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