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A joint venture between Fred.Olsen Seawind & Vattenfall

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PORT OF CROMARTY FIRTH

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West of Orkney Windfarm

IN ASSOCIATION WITH

CATAPULT Offshore Renewable Energy

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MEDIA SUPPORTER

OGV ENERGY

Claire Mack

Chief Executive

Scottish Renewables

Nicola Sturgeon MSP

First Minister of Scotland

Claire Mack
Chief Executive, Scottish Renewables

Nicola Sturgeon MSP
First Minister of Scotland

Opportunity of a lifetime

Claire Mack
Chief Executive, Scottish Renewables

Brian McFarlane
Head of Offshore Development GB, SSE Renewables & SOWEC Co-Chair

Joanne Allday
Strategic Business Development Manager, Port of Cromarty Firth

David Webster
Director of Energy, Forth Ports Group

Colin Maciver
Head of Offshore Wind Development, Crown Estate Scotland

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Setting foundations for the future

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OFFSHORE WIND

Susie Lind

Managing Director

BlueFloat Energy | Renantis Partnership

Llywelyn Petroc Bellrock Broadshore STROMAR Powered by Ørsted, BlueFloat Energy and Renantis

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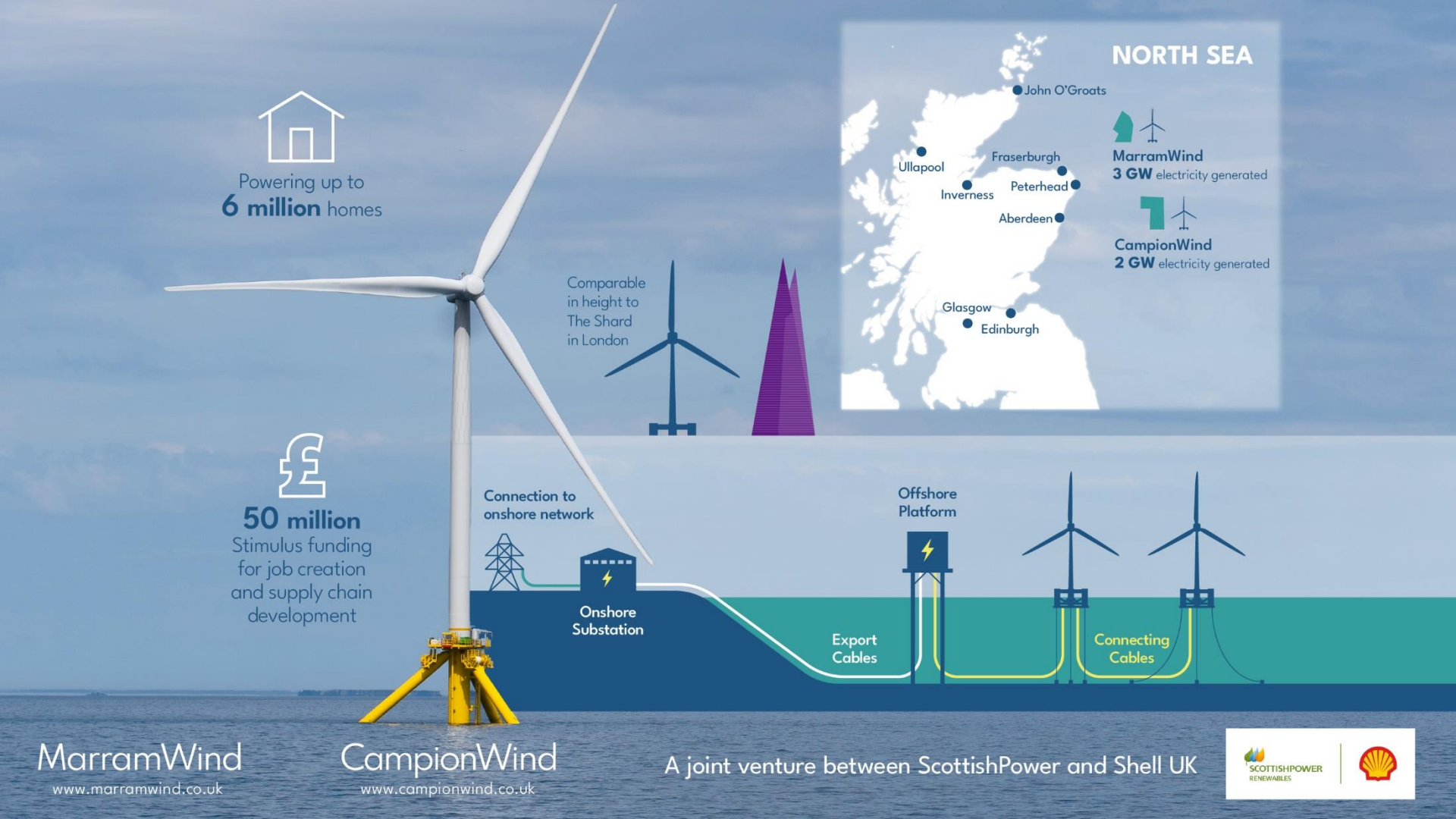
OFFSHORE WIND

Melissa Read

UK Business Manager (Offshore Wind)

Shell


Powering up to
6 million homes
£
50 million
Stimulus funding for job creation and supply chain development
Comparable in height to The Shard in London
NORTH SEA
John O'Groats
Ullapool
Fraserburgh
Peterhead
Inverness
Aberdeen
Glasgow
Edinburgh
MarramWind
3 GW electricity generated
CampionWind
2 GW electricity generated
Connection to onshore network
Onshore Substation
Offshore Platform
Export Cables
Connecting Cables
MarramWind
www.marramwind.co.uk
CampionWind
www.campionwind.co.uk
A joint venture between ScottishPower and Shell UK
SCOTTISHPOWER RENEWABLES

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Sian Lloyd-Rees

UK Managing Director

Mainstream Renewable Power

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OFFSHORE WIND

Iain Sinclair

Executive Director

Global Energy Group

GLOBAL ENERGY GROUP

www.gegroup.com

Iain Sinclair
Executive Director
Iain.Sinclair@gegroup.com

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OFFSHORE WIND

Davis Larssen

Chief Executive Officer

Proserv

Proserv's direction

Davis Larssen, CEO

OEM agnostic control and monitoring technologies for critical infrastructure

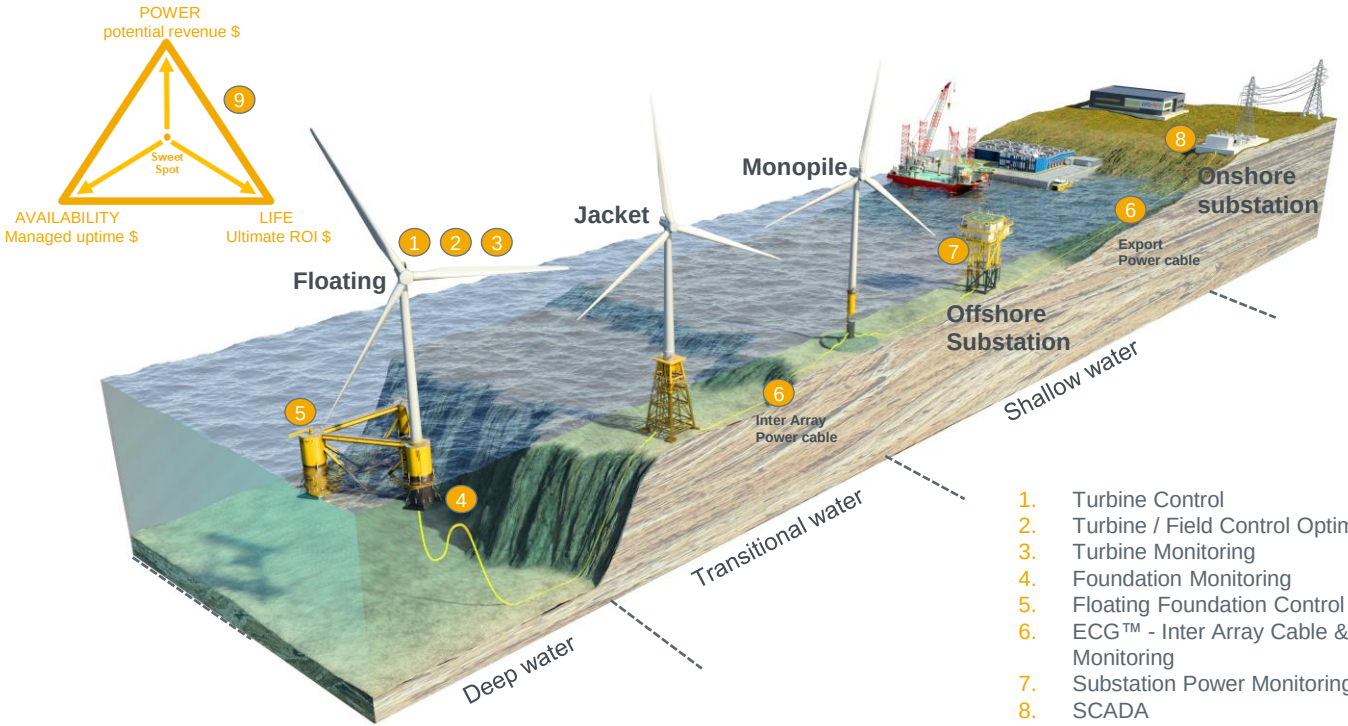
Strategic Partnerships

synaptec

Intelligent Plant

ORTOMATION.IO

EMERSON



1. Turbine Control
2. Turbine / Field Control Optimisation
3. Turbine Monitoring
4. Foundation Monitoring
5. Floating Foundation Control Systems
6. ECG™ - Inter Array Cable & Export Cable Monitoring
7. Substation Power Monitoring
8. SCADA
9. Performance Optimisation Paradox

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Susie Lind

Managing Director, BlueFloat Energy | Renantis Partnership

Melissa Read

UK Business Manager (Offshore Wind), Shell

Sian Lloyd-Rees

UK Managing Director, Mainstream Renewable Power

Iain Sinclair

Executive Director, Global Energy Group

Davis Larssen

Chief Executive Officer, Proserv

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Build it and they will come

Chaired by Morag Watson, Director of Policy, Scottish Renewables

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PORT OF CROMARTY FIRTH

James Glennie

SIA Coordinator

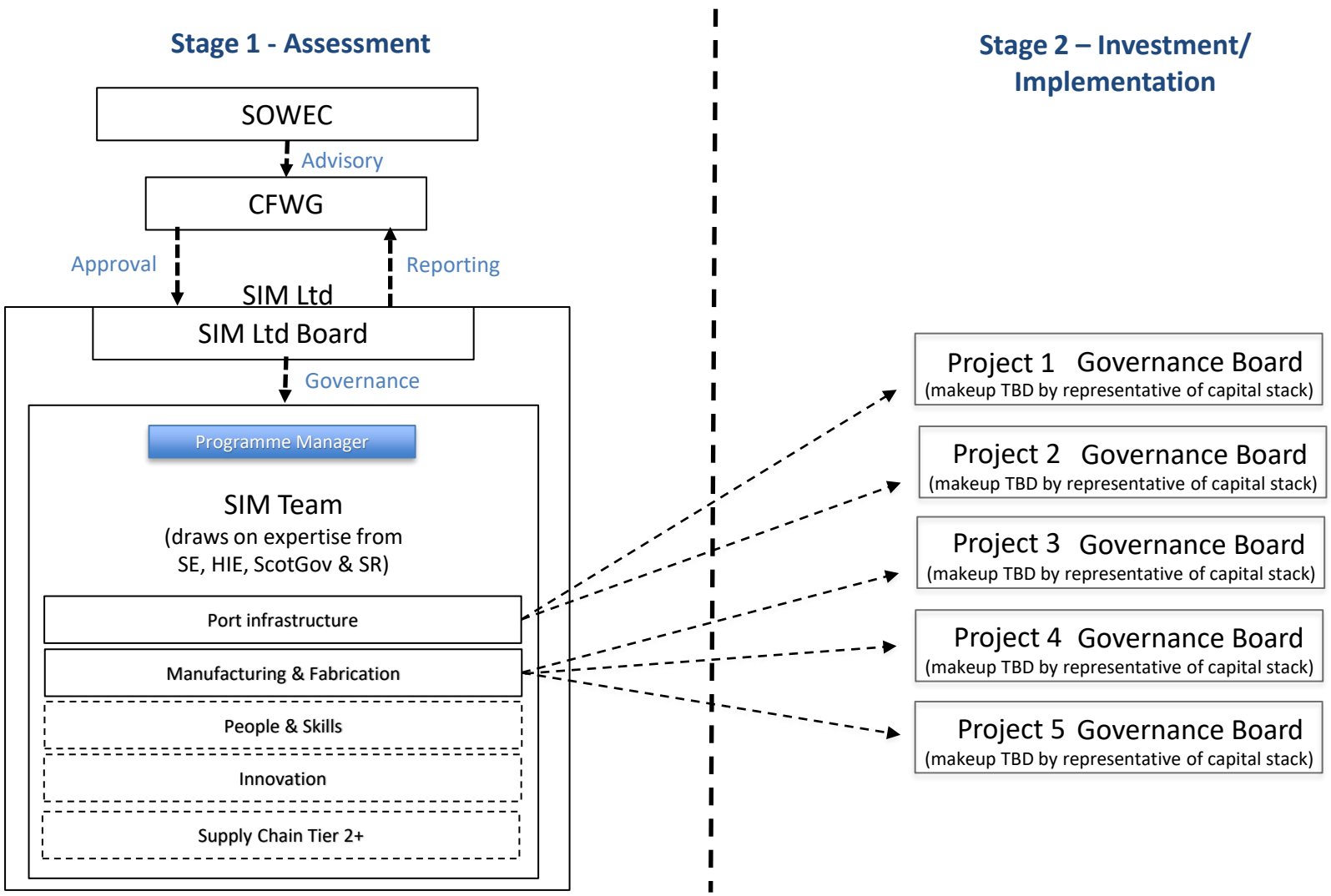
Lumen Energy and Environment

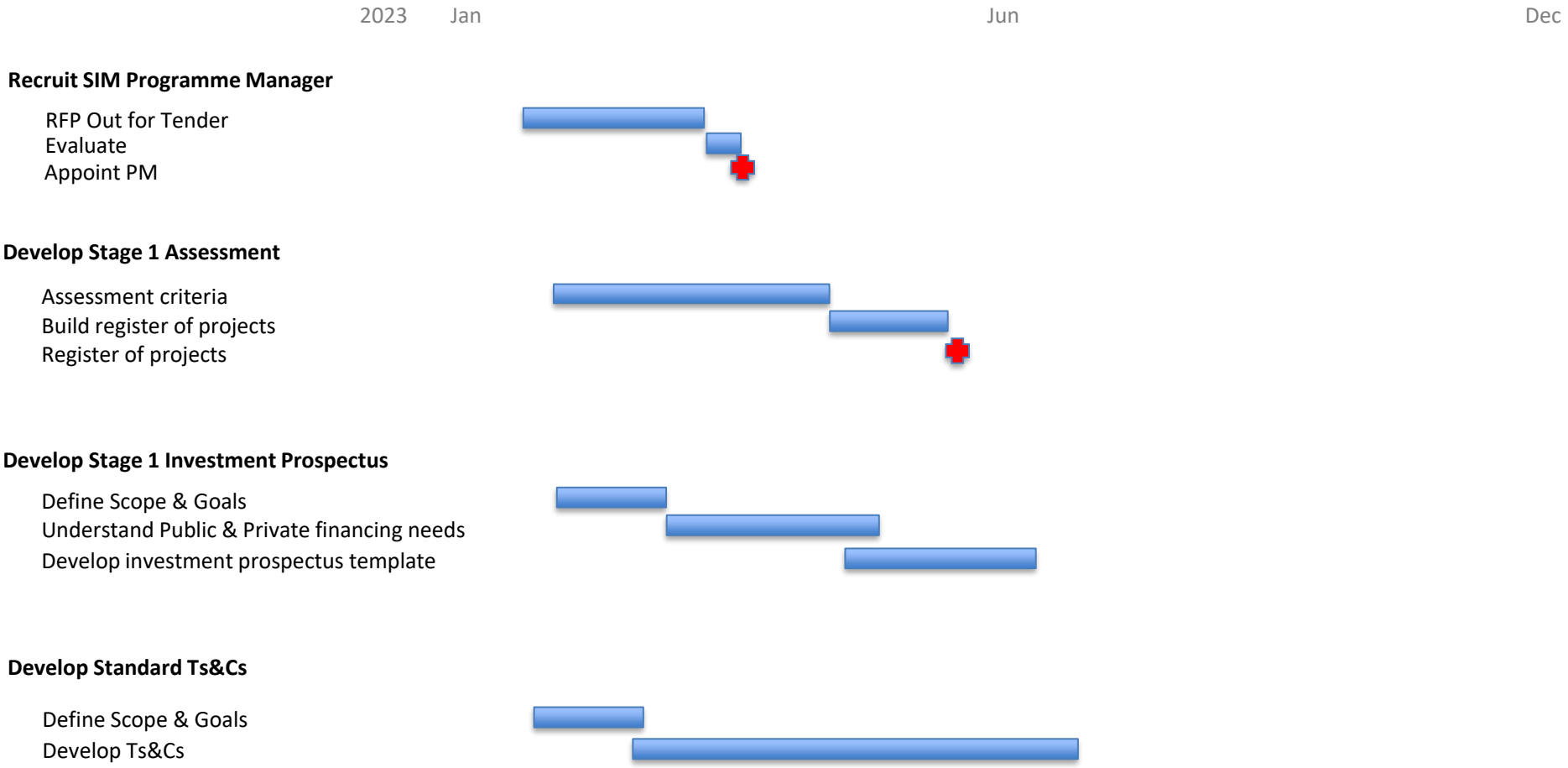
SOWEC
Scottish Offshore Wind Energy Council

SIM Evolution: Current Status & Next Steps

Scottish Renewables: Offshore Wind 2023

Glasgow, SEC. 25 January, 2023


Stage 1 - Assessment
Stage 2 – Investment/ Implementation
SOWEC
Advisory
CFWG
Approval
Reporting
SIM Ltd
SIM Ltd Board
Governance
Programme Manager
SIM Team
(draws on expertise from SE, HIE, ScotGov & SR)
Port infrastructure
Manufacturing & Fabrication
People & Skills
Innovation
Supply Chain Tier 2+
Project 1 Governance Board
(makeup TBD by representative of capital stack)
Project 2 Governance Board
(makeup TBD by representative of capital stack)
Project 3 Governance Board
(makeup TBD by representative of capital stack)
Project 4 Governance Board
(makeup TBD by representative of capital stack)
Project 5 Governance Board
(makeup TBD by representative of capital stack)


2023
Jan
Jun
Dec
Recruit SIM Programme Manager
RFP Out for Tender
Evaluate
Appoint PM
Develop Stage 1 Assessment
Assessment criteria
Build register of projects
Register of projects
Develop Stage 1 Investment Prospectus
Define Scope & Goals
Understand Public & Private financing needs
Develop investment prospectus template
Develop Standard Ts&Cs
Define Scope & Goals
Develop Ts&Cs

SOWEC
Scottish Offshore Wind Energy Council

SIM Evolution: Current Status & Next Steps

Scottish Renewables: Offshore Wind 2023

Glasgow, SEC. 25 January, 2023

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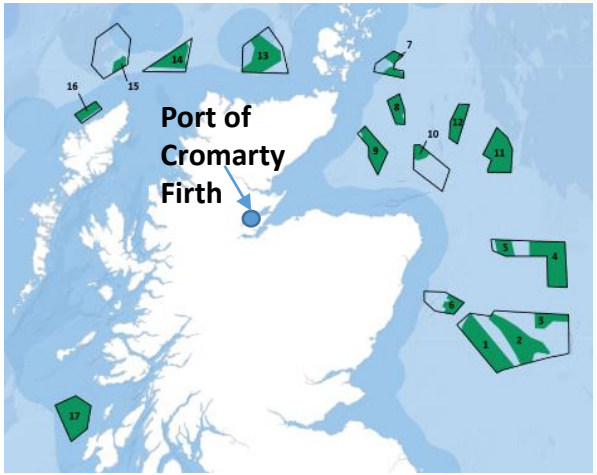
PORT OF CROMARTY FIRTH

Joanne Allday

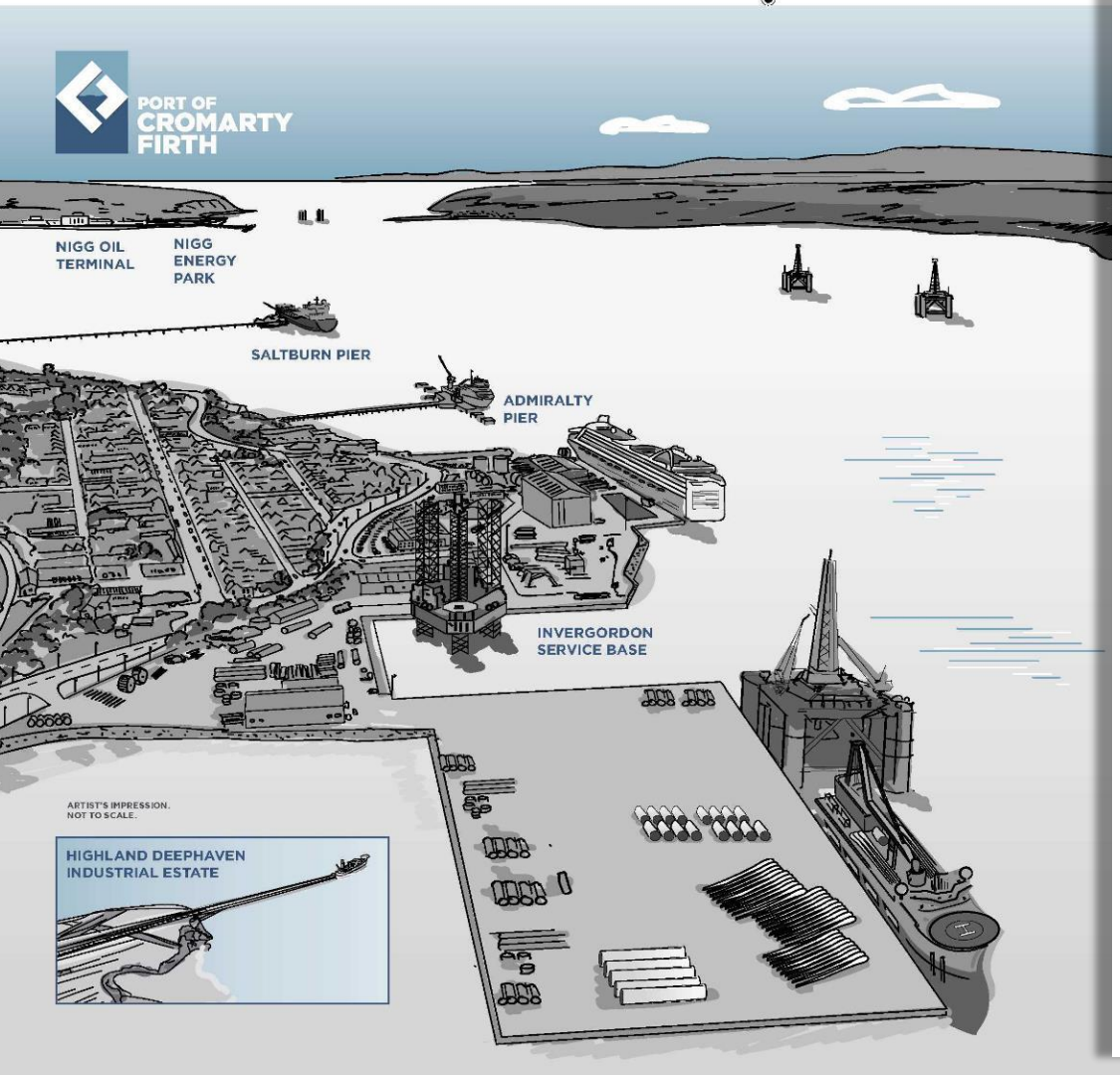
Strategic Business Development Manager

Port of Cromarty Firth

PORT OF CROMARTY FIRTH: OSW HUB



PORT OF CROMARTY FIRTH



WHO WE ARE

- Largest Port in the Highlands of Scotland (~30 miles north of Inverness). Ideally located for North Sea offshore wind projects
- Best track record in offshore wind: Hosted Beatrice, Moray East, Seagreen, Kincardine…
- Trust Port: reinvest 100% of profits for the benefit of stakeholders
- Port authority governing the body of water between the Sutors (entrance) and Cromarty Bridge
- Port's own facilities (Invergordon) and four private facilities within our waters inc. Nigg Energy Park offer strategic renewables hub
- Economic Value Added to the area estimated at £275M/year. 1 in 6 local jobs.

QUAY WEST: LEADING OSW CAPABILITY

- £30M investment, completed 2022
- 372m quay and >90,000sqm laydown area
- Min. depth of 12m at Chart Datum
- Used for Beatrice and Moray East windfarm projects

HIE
Highlands and Islands Enterprise
Iomairt na Gàidhealtachd 's nan Eilean

EUROPE & SCOTLAND
European Regional Development Fund
Investing in a Smart, Sustainable and Inclusive Future
European Union
Aonadh Eòrpa
gov.scot
Eòrpa agus Alba

STUDIES BY INDUSTRY & GOVERNMENT CONCLUDE CROMARTY FIRTH 'BEST LOCATION IN COUNTRY FOR STRATEGIC (FLOATING) OFFSHORE WIND HUB'

Ports for Offshore Wind Report

By Crown Estate Scotland

*"Of the locations reviewed in this study, the **Cromarty Firth** and Inner Moray Firth, and Orkney and Caithness areas were found to be **centrally located** relative to the development zones. As such, they were assessed as being **technically suitable to support multiple fixed-bottom and floating projects (particularly semi-submersible technology)**, providing long-term potential."*

Ctrl+Click to access the report

Industry-led Assessment Report

By Scottish Offshore Wind Energy Council (SOWEC)

*"The report, led by **Professor Sir Jim McDonald**, states: 'As our analysis demonstrates, the **Cromarty Firth** emerges as the **most suitable location** in Scotland for [**floating offshore wind**] platform fabrication and manufacture, with the two ports of Invergordon and Nigg acting as the focus of effort to secure platform fabrication and manufacture'."*

Ctrl+Click to access the report

Strategic Infrastructure and Supply Chain Development Report

By Floating Offshore Wind Centre of Excellence (FOW CoE)

*"Scotland has been supporting major offshore energy activities in the North Sea since the 1970s. This has led to the development of significant port infrastructure and offshore energy supply capability in Scotland, predominantly on or close to the east coast. **Particular hubs** include Leith / Rosyth, Dundee, Aberdeenshire coast and the **Cromarty** and Moray Firths."*

Ctrl+Click to access the report

OFFSHORE WIND – **STRATEGIC NATIONAL HUB**

Opportunity Cromarty Firth
a free trade zone

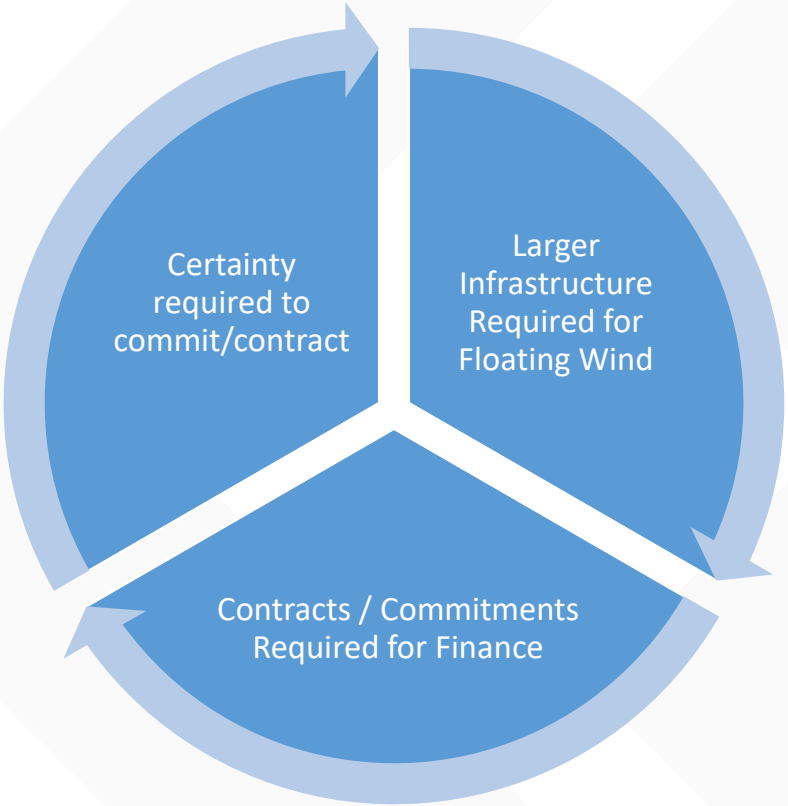
Scotland's Renewable Energy Hub

Three Emerging
Tax Site Locations

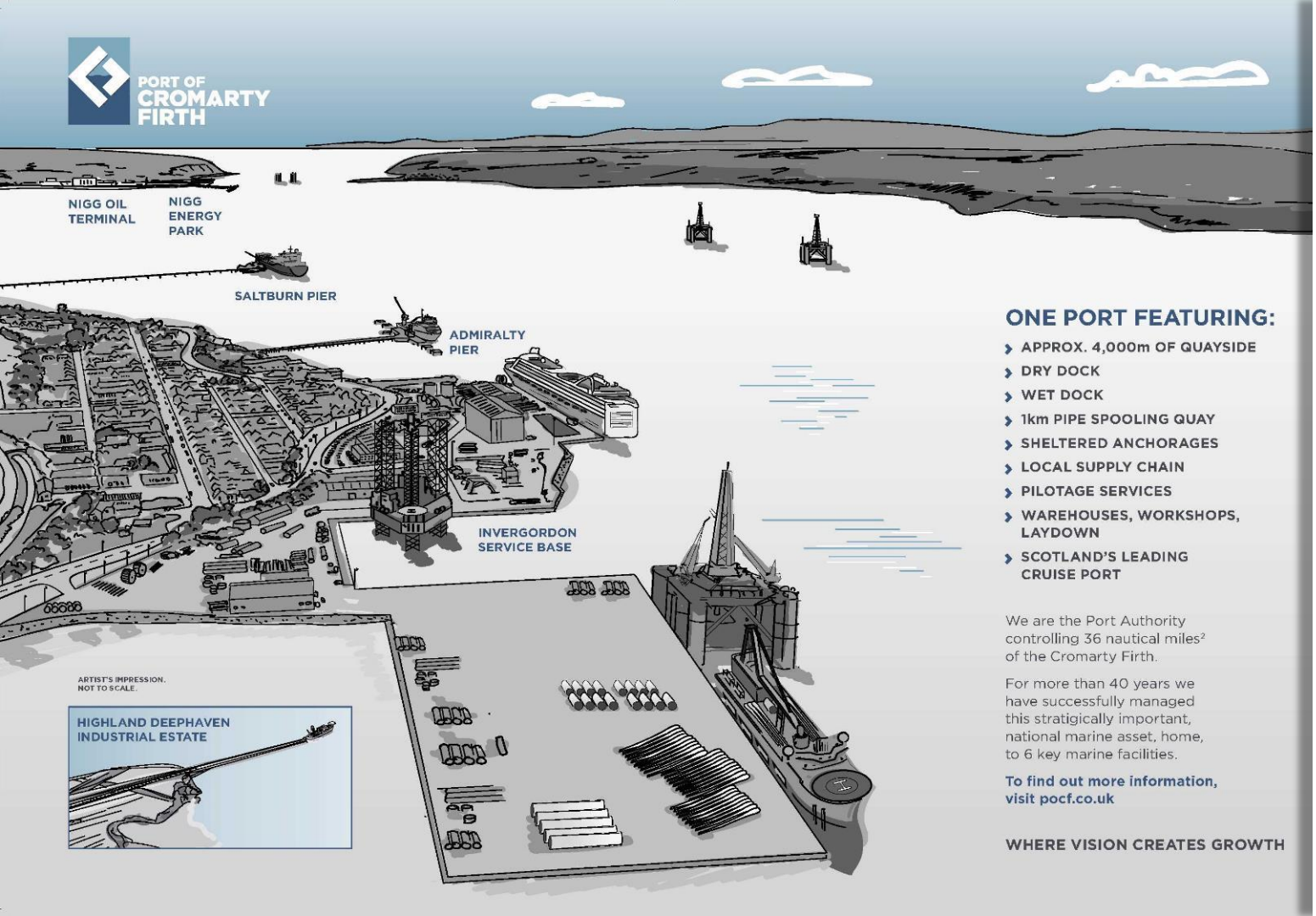
Opportunity Cromarty Firth

Port of Cromarty Firth, Port Office,
Shore Road, Invergordon, IV18 0HD.
Email: info@opportunitycromartyfirth.co.uk

CHICKEN OR THE EGG: **THE CHALLENGE**



PORT OF CROMARTY FIRTH


PORT OF CROMARTY FIRTH
NIGG OIL TERMINAL
NIGG ENERGY PARK
SALTBURN PIER
ADMIRALTY PIER
INVERGORDON SERVICE BASE
ARTIST'S IMPRESSION. NOT TO SCALE.
HIGHLAND DEEPHAVEN INDUSTRIAL ESTATE
ONE PORT FEATURING:
APPROX. 4,000m OF QUAYSIDE
DRY DOCK
WET DOCK
1km PIPE SPOOLING QUAY
SHELTERED ANCHORAGES
LOCAL SUPPLY CHAIN
PILOTAGE SERVICES
WAREHOUSES, WORKSHOPS, LAYDOWN
SCOTLAND'S LEADING CRUISE PORT
We are the Port Authority controlling 36 nautical miles² of the Cromarty Firth.
For more than 40 years we have successfully managed this stratigically important, national marine asset, home, to 6 key marine facilities.
To find out more information, visit pocf.co.uk
WHERE VISION CREATES GROWTH

THANK YOU

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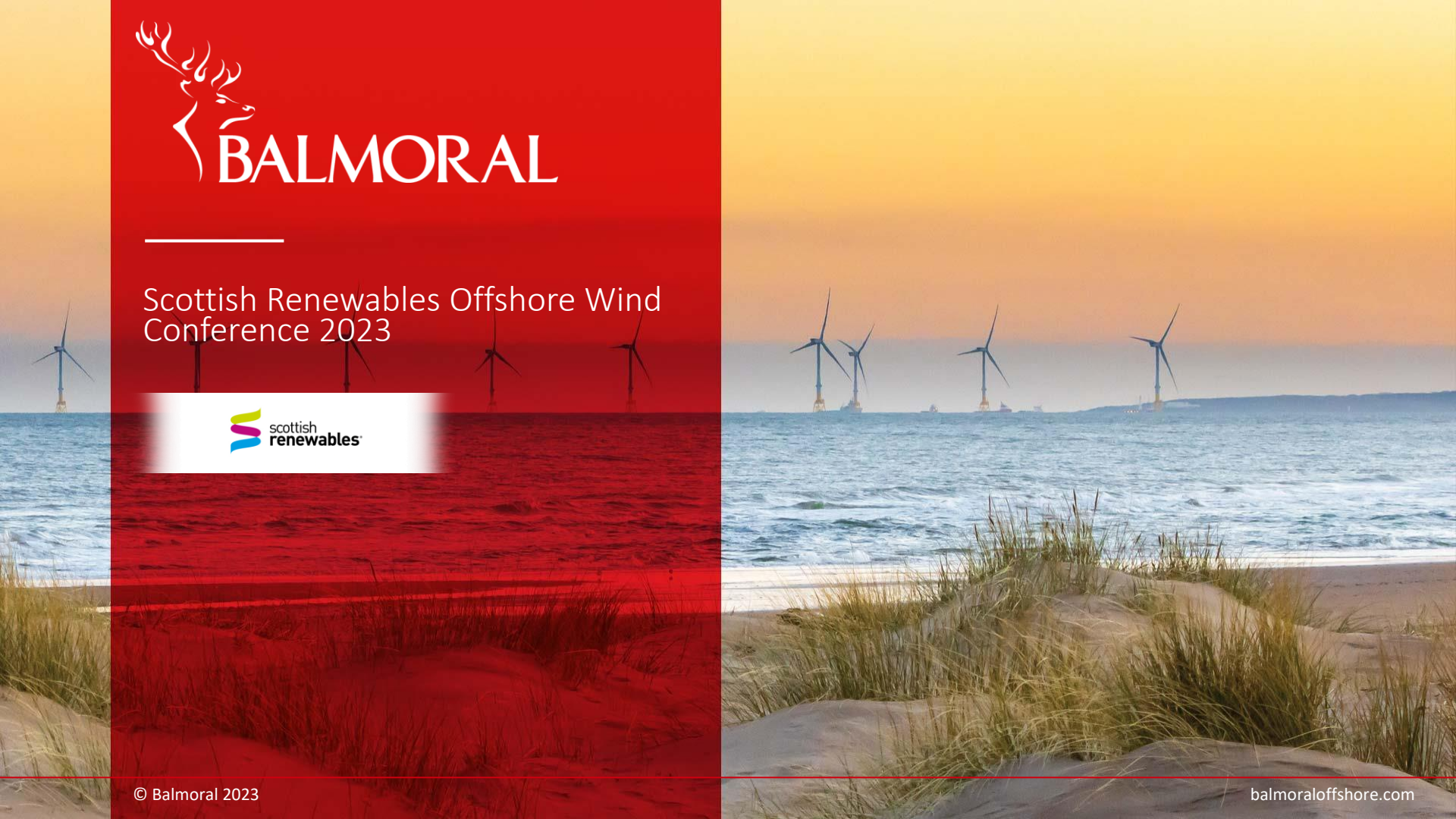
PORT OF CROMARTY FIRTH

Ian Milne

Sales Manager – Renewables

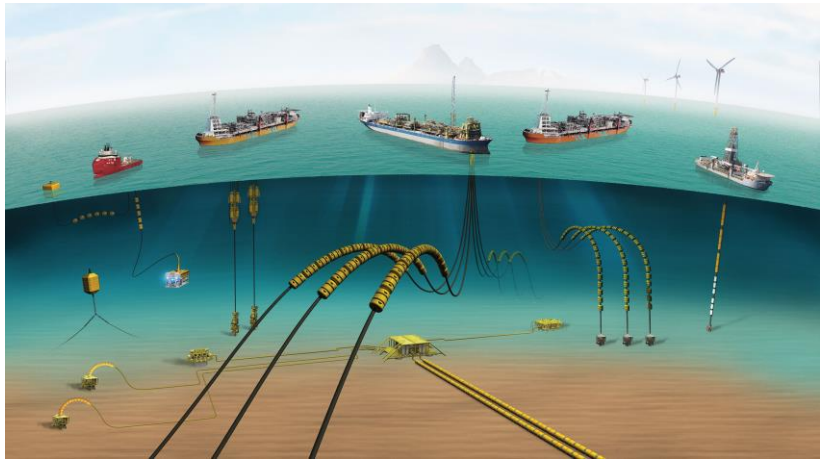
Balmoral

Scottish Renewables Offshore Wind Conference 2023



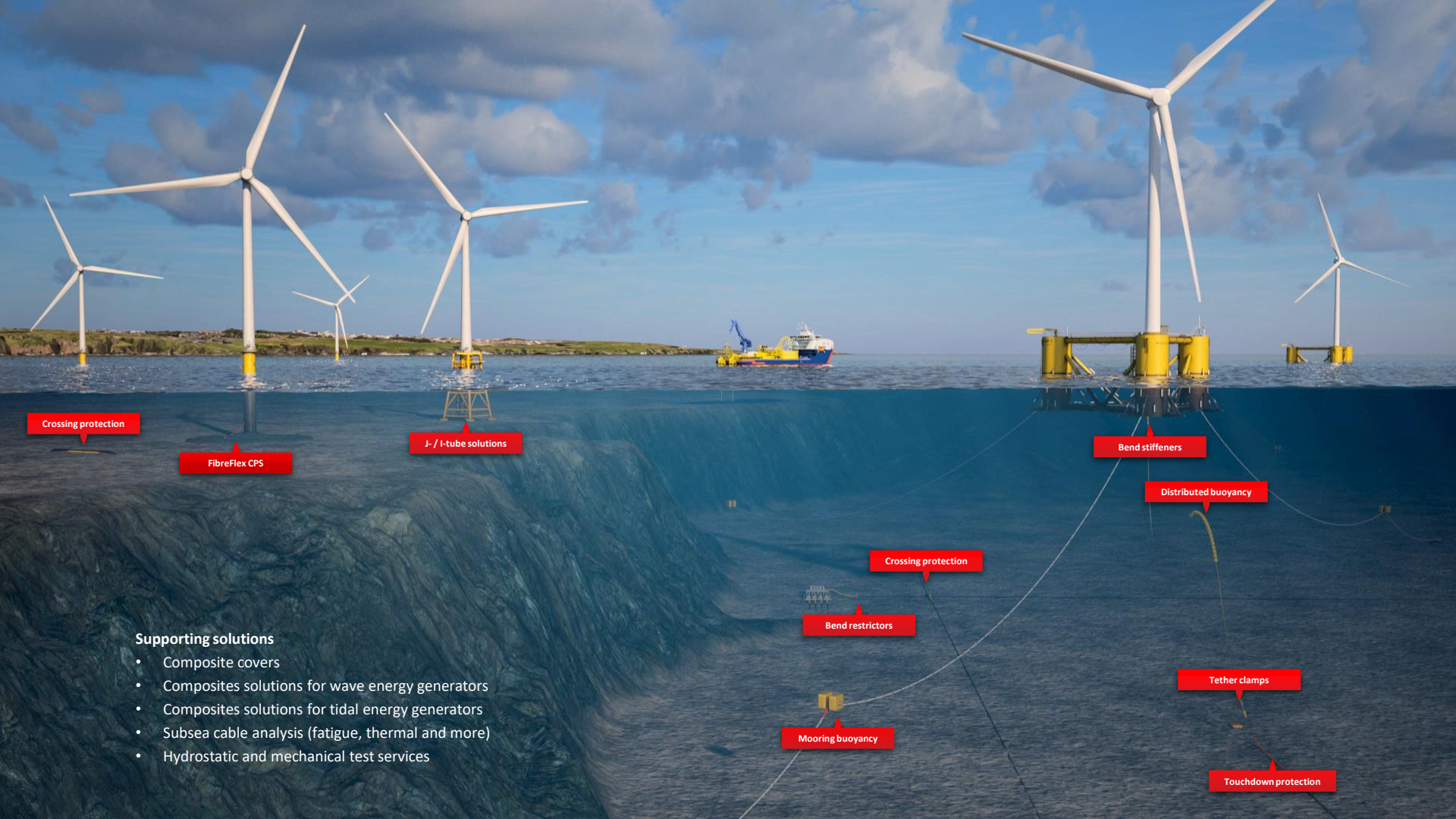
Our company

- Privately owned company
- Headquarters in Aberdeen with a global supply
- Sales Office in Houston & Newcastle
- Manufacturing facilities in Aberdeen, Montrose & Newcastle
- App. 300 plus employees in Aberdeen
- Agents positioned in the key market areas globally
- Europe's largest privately owned subsea test center



Traditionally known for serving the exploration, installation and production phases of O&G markets

- Distributed Buoyancy
- Marine / Anchor Mooring Buoys
- Drill Riser Buoyancy
- Bend stiffeners
- Bend Restrictors
- Subsea Cable & Flowline Protection



Supporting solutions

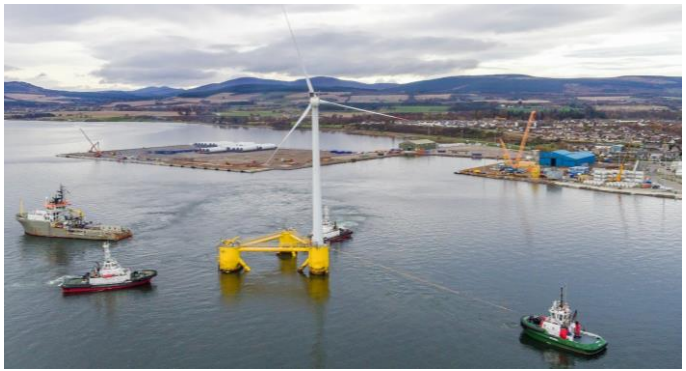
- Composite covers
- Composites solutions for wave energy generators
- Composites solutions for tidal energy generators
- Subsea cable analysis (fatigue, thermal and more)
- Hydrostatic and mechanical test services

Global Supply Chain Challenges

- Global markets and target dates
- Scottish technologies already export for alternative markets – Oil & Gas is still very busy!
- Capacity secured to cater these markets, potential to impact ScotWind aspirations
- Strategic investment – what and where shall we build?
- How can innovation drive investment and reduce risk

What can we do?

- Early commitments / Intentions to commit – drives investment
- Agreeing technologies and attempt standardisation
- Sharing of data and lessons learned
- Expedite licencing & CFD processes to allow earlier final investment decisions (FID's)
- Clearer timelines on installation planning
- Contracting Models and Sharing of Risk



Thank you for your attention

Please get in touch…

ian.milne@balmoral.co.uk Sales Manager – Renewables

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PORT OF CROMARTY FIRTH

Ole Stobbe

Business Development Manager – Northern Europe

BW Ideol

“Build it and they will come” to Ardersier

Glasgow, 25th January 2023

BW ideol

Over 11 years of international experience

A **fully integrated team** of 70+ specialist engineers representing 8 nationalities

A **global player** with offices on 3 continents

A **listed company** on the Oslo Stock Exchange

BWIDL
EURONEXT
GROWTH

A wide range of key responsabilities, as **co-developer**, in charge of **design & engineering o**f the floating wind system, **EPCI WP supplier**, and **asset owner & operator**

2 full-scale assets operating successfully since 2018

A truly universal technology suitable for all environmental conditions and all continents

BW ideol

Projects on all continents and in all key markets

Buchan Offshore wind

960 MW (under development)

élicio · BayWa r.e.

South-Brittany Tender

Up to 270 MW

EDF renouvelables · MAPLE POWER

Mediterranean Tender

2 X 250 MW

EDF renouvelables · MAPLE POWER

EolMed *under construction*

3 X 10 MW

Qair · TotalEnergies

Taïwan

Joint development agreement for both pilot and commercial-scale wind projects with Taiya Renewable Energy

TAIYA RENEWABLE ENERGY 台亞風能

Japan

4 site-specific and technology-exclusive joint development agreements with leading Japanese utilities and developers representing **2GW+**

ENEOS

Tohoku Electric Power Co., Inc.

Target of **at least 10 GW** under development, under construction and in operation **by 2030**

+ soon to be disclosed commercial-scale projects in several European and Asian countries

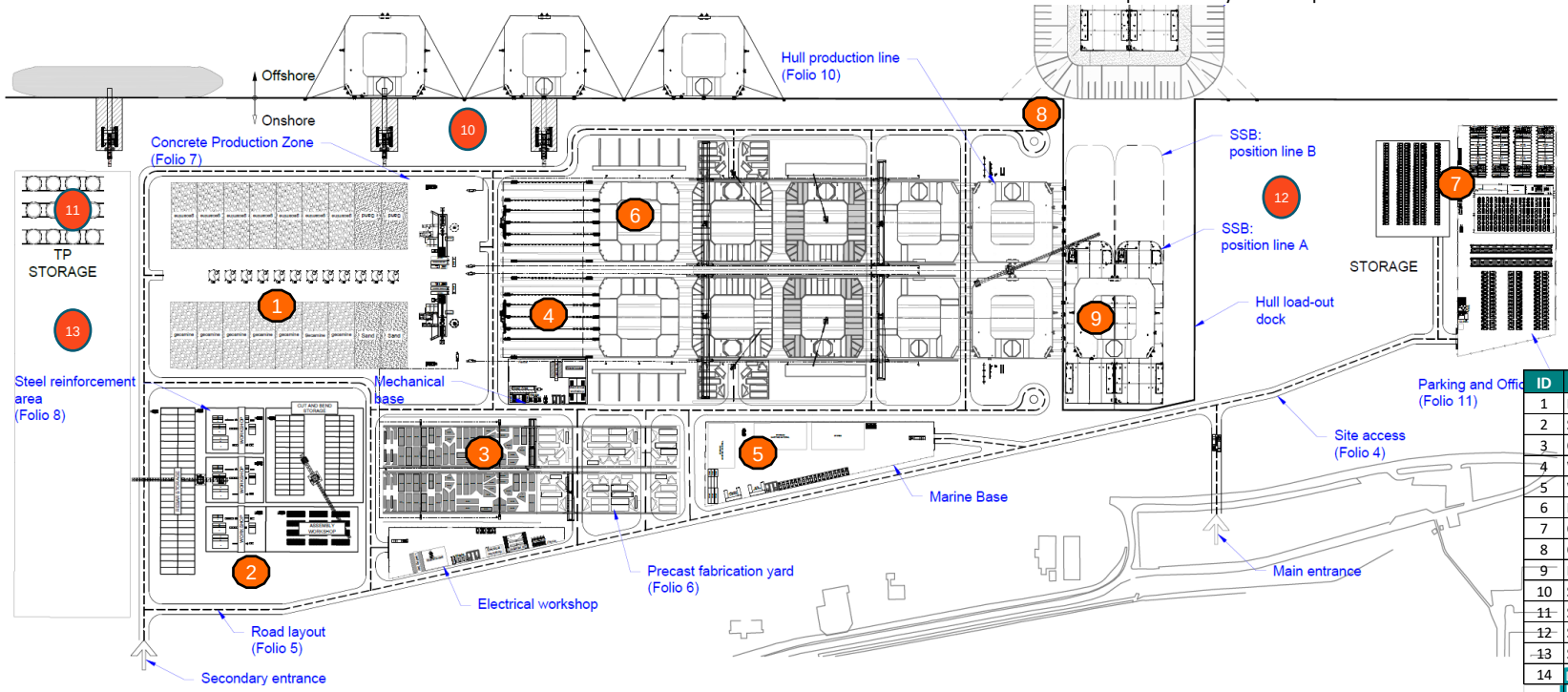
How we can deliver several GW floating projects on time, in budget, with guaranteed local content

NO STANDBY

- Storage for 1 month of production in concrete, rebars, equipment …
- No down time in high wind and rain
- Loadout and offloading inside basin, barge grounded

MAXIMIZATION of Productivity:

- Two lines working in parallel
- Concrete Precast workshop dedicated out of critical path
- Rebar cut & bent and preassembly workshop to maximise steelworks out of critical path



ID	NAME
1	Batching plant
2	Steel reinf cut and bent
3	Concrete precast area
4	Workshop
5	Wharehouses
6	Production line
7	Office / Accomodation
8	Quay incl loadout (15m wide)
9	Loadout basin
10	Station 6 TP install
11	Storage TP
12	Storage area 1
13	Storage area 2
14	Roads (3626m)
	TOTAL

Local Employment

Ca. 2000

new, well-paid jobs

Ready to deliver

Scottish Floating Wind Farms

foreman

welders

mechanics

riggers

carpenter/mason

electricians

steel fixers

plant operators

Local Content

How can we realise this?

There is no doubt about port capacity being required
but there is **uncertainty** over when and where

Ports cannot wait with investment decisions until projects place orders

Projects cannot commit to ports until they have grid connection, CfD, financial close…

Funding support is attractive but **financial guarantees** for private finance to mitigate uncertainties over timelines, CfD results etc. might be the better tool to overcome the chicken/egg problem while reducing cost for all parties.

BW ideol


Thank you!
ole.stobbe@bw-ideol.com
BW ideol

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Morag Watson
Director of Policy, Scottish Renewables

James Glennie
SIA Coordinator, Lumen Energy and Environment

Joanne Allday
Strategic Business Development Manager, Port of Cromarty Firth

Ian Milne
Sales Manager - Renewables, Balmoral

Ole Stobbe
Business Development Manager – Northern Europe, BW Ideol

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Scotland’s short-term pipeline - project updates

Chaired by Amy Keast, Senior Policy Manager - Offshore and Marine, Scottish Renewables

Sophie Large

Senior Project Manager

Seagreen Offshore Windfarm Ltd


Seagreen
Scotland's largest
offshore wind farm

Seagreen at a glance

- Scotland's Largest Offshore Windfarm
- 27km from Angus coastline
- 114 Vestas 10MW Turbines with a maximum capacity of 1075MW
- 114 World’s Deepest Fixed Bottom Jacket Foundations
- Will power more than 1.6m UK homes

Key Achievements

- Financial Close Achieved
- EPCI Contracts Award
- Construction started in locations all over the world

Q2 2020

Q1 2021

- First 5 Jackets sailed away
- 19km of Cable Pulling began

Q4 2021

- First Jacket Installed
- First Turbine Installed

Q1 2022

- OSP fully installed
- Jacket in Oct 21
- Topside in March 22

Q3 2022

- First power achieved

Q4 2022

- All three circuits energised
- 75% of Jackets Installed
- 50% of Turbines Installed

Where are we now

97 Turbine Jackets Installed, 17 remaining

All circuits energised, with 2 circuits exporting

75 turbines installed, 39 remaining

Commercial Operations in Summer 2023

sse Renewables

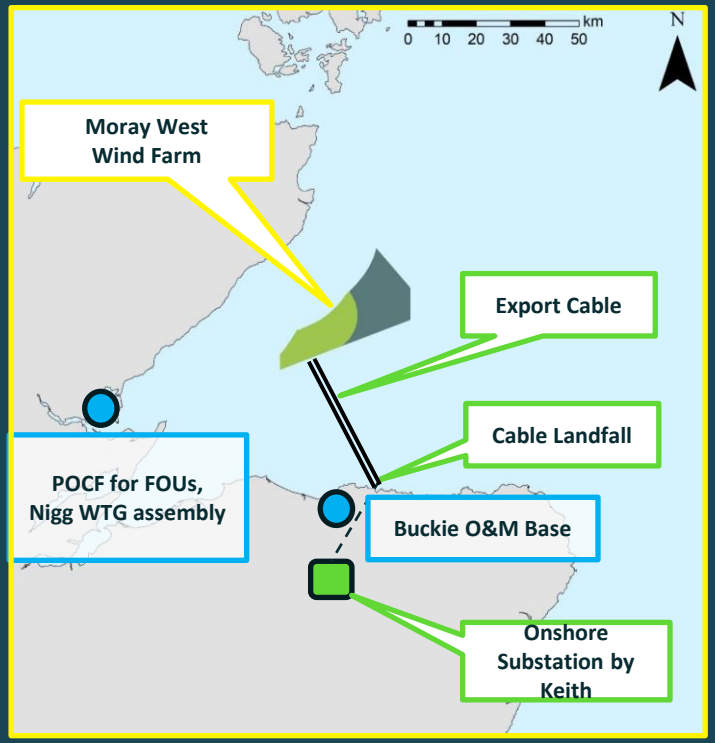
Pete Geddes

EPC Director

Moray West Offshore Wind Farm


moray west
OFFSHORE WIND FARM
OW
OCEAN WINDS
Scotland's short-term pipeline -
Moray West Offshore Wind Farm
Scottish Renewables - 26th January 2023

Moray West
Project overview



- Western part of the Moray Firth Round 3 seabed zone.
- In active development since 2017. Key consents secured and project in construction.
- Ocean Winds is committed to the project with sustained 'at risk' expenditure to maintain critical path to first power in 2024.
- Grid connection capacity of 860MW
- Secured CfD and Corporate PPA. Approaching Financial Close.
- Onshore electrical infrastructure construction well underway.
- Offshore installation will start later 2023
- First power in 2024 and COD 2025

Moray West Tier 1 procurement

- 2 Offshore Substation Platforms
- Siemens Energy / Iemants
- Smulders Projects UK assemble topsides before float out to site

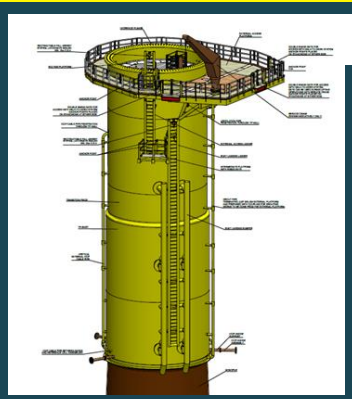
- Siemens Gamesa Renewable Energy (SGRE)
- 60 wind turbines
- Blades from Hull
- Pre-assembly at Nigg

- Nexans supplying all onshore and offshore export cabling (220kV and 400kV)
- Norwegian & US cable factories
- Inter array cable supply by JDR and installation by Seaway7

Onshore Substation near Keith, Moray:

- Siemens Energy

Moray West procurement contd.



- Transition pieces from Lamprell

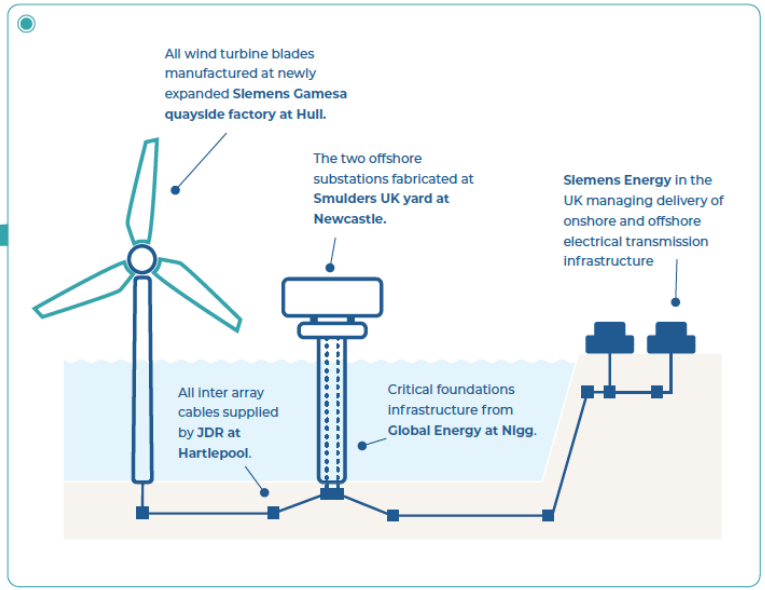
- Monopiles not available in UK to meet project programme

- Transport and Installation contracted directly by project - Deme

- Intermediate port contracted directly by project – Invergordon for MPs

Moray West and major UK Supply Chain Successes

Through close collaboration with suppliers the **Moray West Offshore Wind Farm** is supporting key manufacturing and fabrication capacity in the UK, supporting investment and jobs at these facilities and the broader supply chain to these suppliers.



CROMARTY FIRTH PORTS

Cromarty Firth ports secure further installation related work.

BUCKIE

Buckie hosts construction management office and a new operations base creating new long-term jobs

ABERDEEN

Seaway 7 office in Aberdeen managing installation of inter array cables.

EDINBURGH

Ocean Winds development and project management office

moray west
OFFSHORE WIND FARM

OW
OCEAN WINDS

moraywest.com oceanwinds.com

Challenges

Challenges

- Route to Market – Tax & CfD changes
- Supply chain – capacity & inflationary pressures
- Delivery – Ground Conditions for XXL monopiles
- TNUoS – inequality, exacerbated if LMP introduced

Opportunities

- Resolve grid access for projects able to deliver faster
- Accelerate planning
- Stabilise medium term view on CfD and tax to incentivise investment

www.oceanwinds.com .

Ryanne Burges

Ireland and Offshore Director

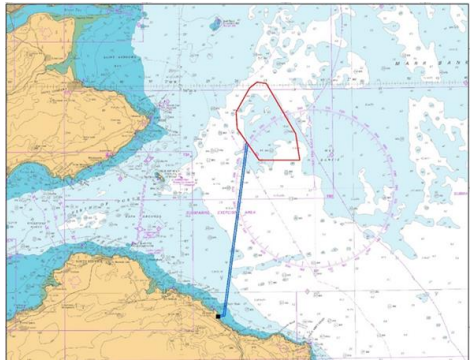
EDF Renewables

Scotland’s Near Term Pipeline – NnG Project update

Ryanne Burges – Director, Offshore and Ireland
EDF Renewables

Project Overview

Capacity	448MW
Site Area	105 km²
Water Depths	45m-55m
First Power	July 2023
COD	Q1 2024
Offshore Substations	2no. 220/66kV Offshore Substations, connected by generator owned 66kV interconnector
Onshore Substation	220/ 400kV, purpose built, onshore substation at Crystal Rig
Grid Connection	Newly extending SPEN substation at Crystal Rig
Export cable	2no, 220kV Export cables (each 38KM offshore / 13KM onshore)
WTGs	54no. SGRE 8.4MW
Foundations	56no. 3 legged jacket foundations (WTGs and OSS)
O&M Base	Eyemouth, Scottish Borders



Construction update

Work package	Status
Offshore Substation Foundations and Topsides	✓
Offshore Export Cables Installation	✓
Offshore Substation Commissioning	Ongoing
Onshore Export Cables Installation	✓
Onshore Substation Construction	✓
Onshore Substation Commissioning	Ongoing
Inter Array Cabling and Interconnector	2023
Wind Turbine Foundation Installation	Ongoing
Wind Turbine Installation	2023
System Testing	Ongoing
Operations and Maintenance Base	✓
Operations	2024

Operational Support Services – 2023 Requirements

Q1

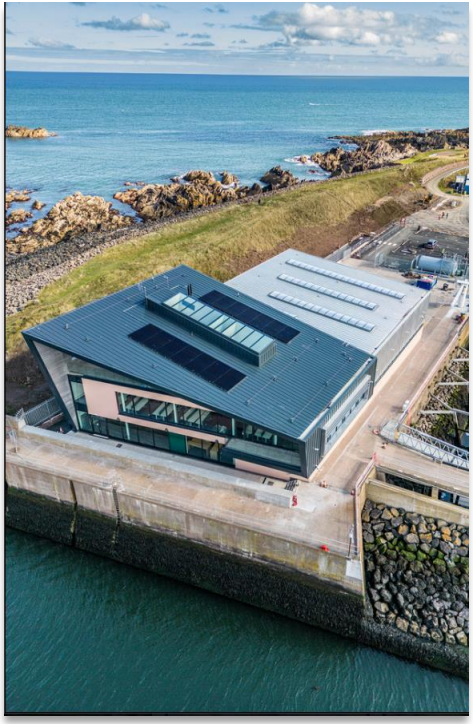
- CTV / Logistics
- HV Management; HV safety rules and personel
- Inspections and Maintenance (Onshore)
- Inspections and Maintenance (OSS topsides)
- Inspections and Maintenance (TP and foundations)

Q2

- Condition monitoring; data analytics and expert advisory
- Monitoring surveys: seabed, foundations, environmental
- Cable repair
- Offshore Welfare

Blade Delivery at Port of Dundee

Operational and Maintenance Base - Eyemouth




NNG OSS S

Allan MacAskill

Chief Technology Officer

Flotation Energy

FLOTATION ENERGY

Kincardine

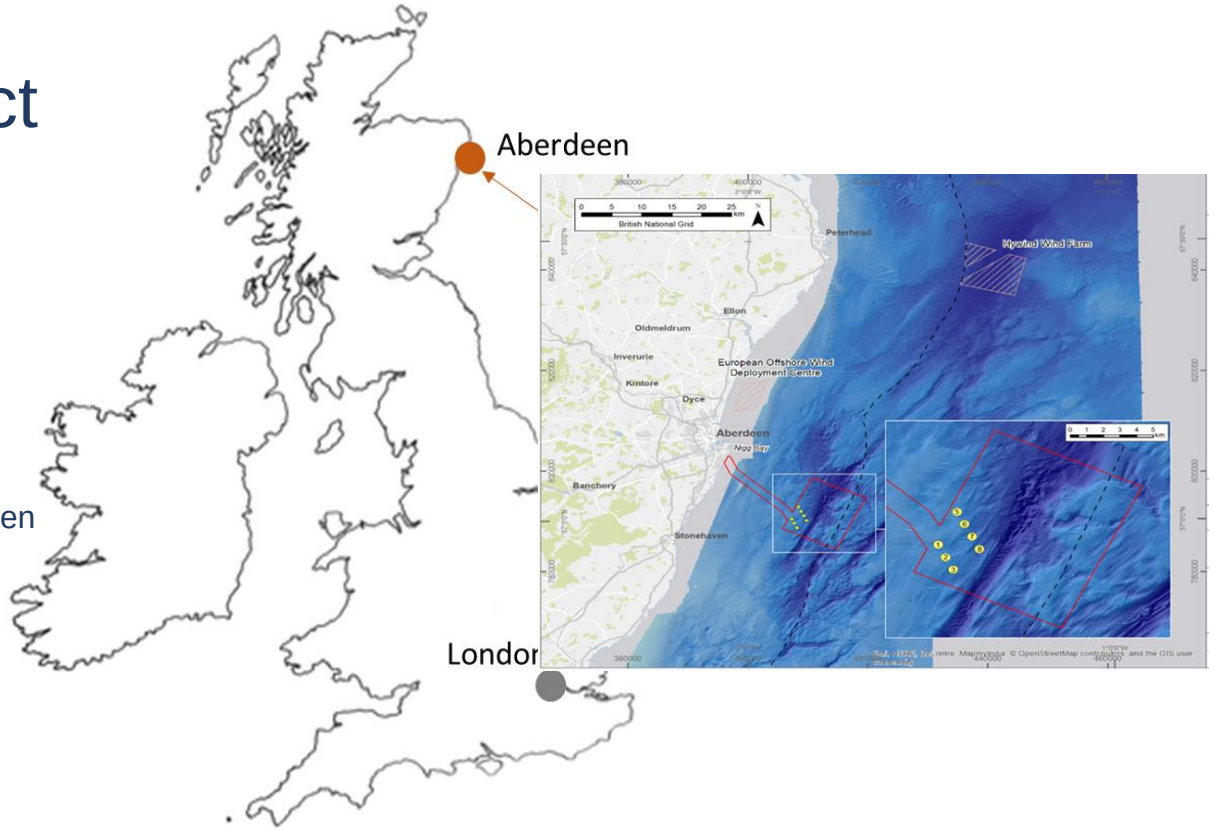
January 2023

Kincardine Project

Case study: Background

- Maximum Output 50 MW
- 15 km east of Aberdeenshire coast
- Water depths 60m to 80m
- Turbines 5 x 9.5 MW Vestas V164
- Grid connection at Redmoss, Aberdeen
- Operational life of 25 years
- First Generation summer 2018

  1 x 2 MW Vestas V80
- Project Completion 2021



Kincardine Project

Semi-submersible structure

- Designed by Principle Power Inc
- Fabricated in steel
- Triangular semi-submersible structure
- Tower over one buoyancy chamber
- 3 mooring lines
- Installation of turbine in port
- Tow and operation in semi-submersible mode
- Maximum dimensions:

  Tip height up to 191 m

  Rotor diameter 164 m

Kincardine Project

2022 Lessons learned

- Be prepared for failure!
- Develop contingency plans
- Learn lessons for the future
- Return to port is a once in a lifetime solution

Kincardine Project

Case study: Looking to the future

- Potential to use site to test additional floating technology
- New substructure solutions: semi-submersible/TLP etc.
- Novel installation/exchange techniques for wind turbines on floating structures
- Hydrogen generation from offshore wind
- Offshore environmental monitoring technology
- Compiling world’s largest offshore bird data set
- Testing novel access systems in floating environment
- Application of lidar technology to optimise output
- Review potential for in situ major component repairs

Richard Copeland

Project Director

Pentland Floating Offshore Wind Farm

Pentland Floating Offshore Wind Farm

Project Update, SR Offshore Wind Conference 2023

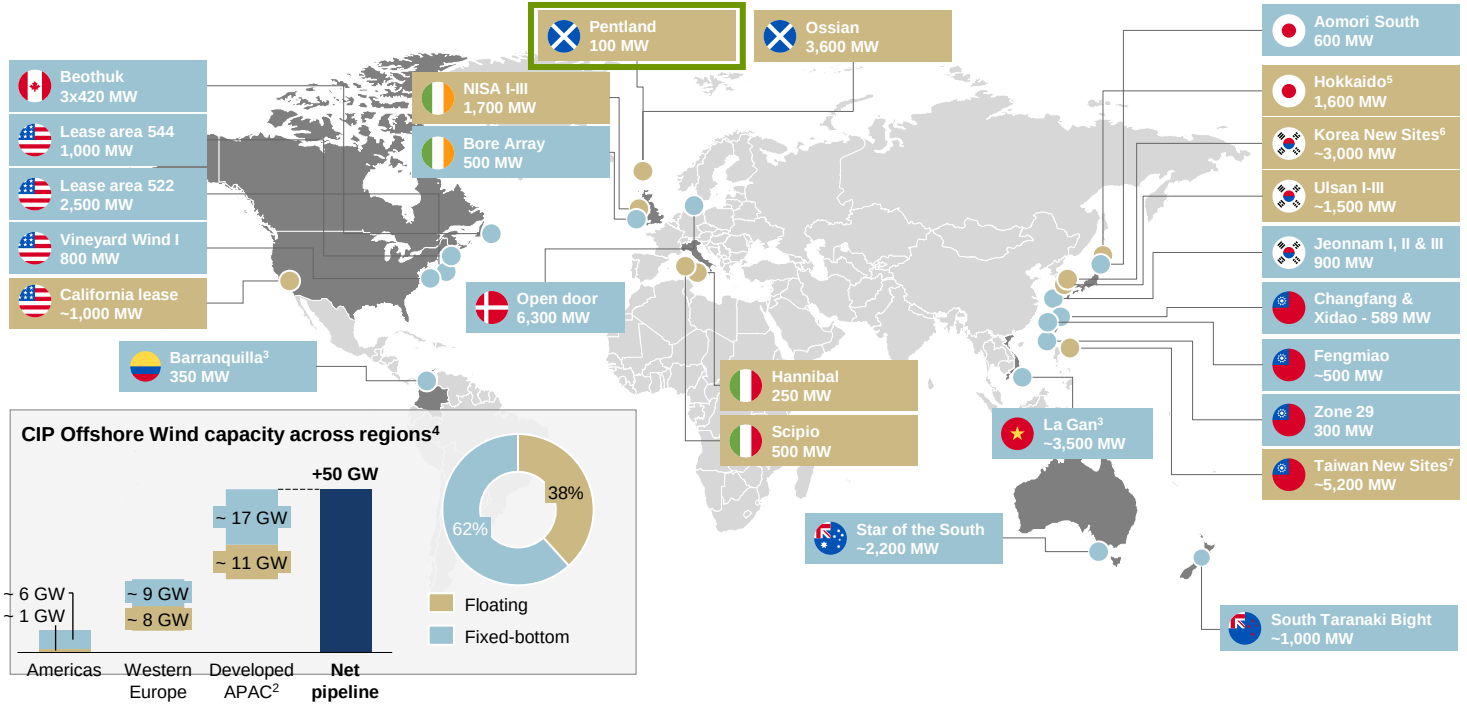
Introduction to CIP & COP

Over 50 GW of offshore wind under development and construction

World map of selected CIP offshore wind activities[1]

Fixed-bottom in development/construction **Floating** in development[2]

- Founded in 2012, **CIP is the world's largest dedicated fund manager within greenfield renewable energy investment** and a **global leader in offshore wind**
- Established **10 funds raising EUR 19bn** from 140 investors with 400 employees across 11 offices
- **COP** is CIP's exclusive **offshore wind development partner** with **over 300 expert offshore wind professionals across 13 offices worldwide**



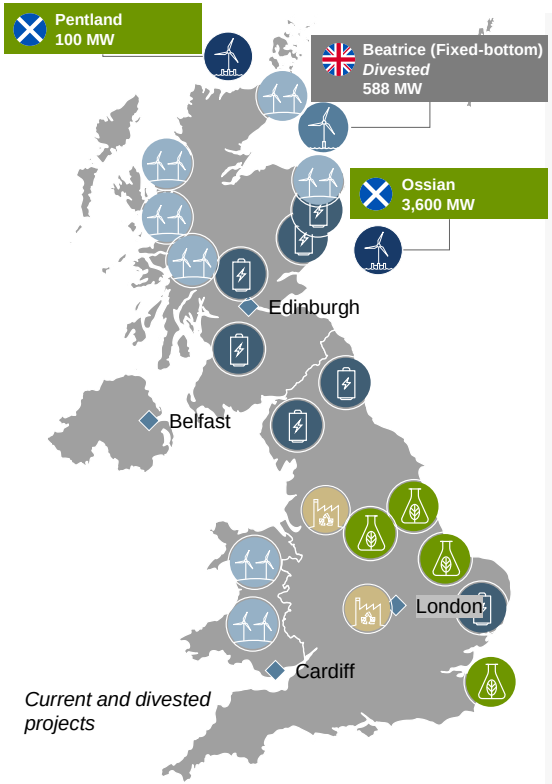
Notes: **1)** Some projects and project capacities are not disclosed for confidentiality reasons. Therefore, totals will not add up; **2)** Includes mixed fixed bottom and floating projects; **3)** Part of CI New Markets Fund I portfolio; **4)** Excl. Greenfish; **5)** Hokkaido includes both Fixed-bottom (1000MW) and Floating (600MW); **6)** KNS includes both Fixed-bottom (1,500MW) and Floating (1,500MW); **7)** TNS includes both Fixed-bottom (1,900MW) and Floating (3,300MW)

CIP in the UK

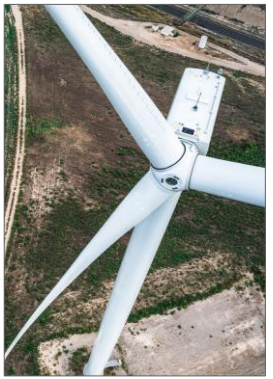
Overview of historical and current CIP investments in the United Kingdom

Copenhagen Infrastructure Partners

Geographical overview of CIP investments in the UK



- **CIP has an extensive global pipeline of renewable projects with the UK being an important market**
- **CIP has invested over 1.7 billion GBP in the UK, with a successful track record of projects**
- **~10 GW in operations, construction and development stage currently in the UK**
- **~1 GW divested after successful completion of projects**
- **Pipeline capacity enough to power more than 5m British homes**



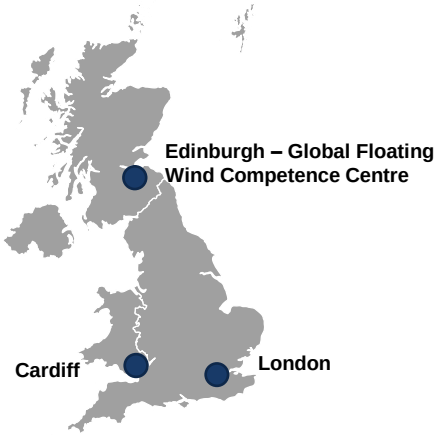
COP in the UK

Established Global Floating Wind Competence Centre in Edinburgh in 2020

COPENHAGEN OFFSHORE PARTNERS

Growing UK Team – over 35 employees working on floating globally

UK Offices



Active Member of the UK Offshore Wind Community

renewableUK

G+

CATAPULT Offshore Renewable Energy

Founding Member of Floating Centre of Excellence

DeepWind North of Scotland Offshore Wind Cluster

SteerCo Member

Scottish Enterprise

HIE

Caithness Chamber of Commerce

scottish renewables

SOWEC Scottish Offshore Wind Energy Council

SMAS Scottish Manufacturing Advisory Service

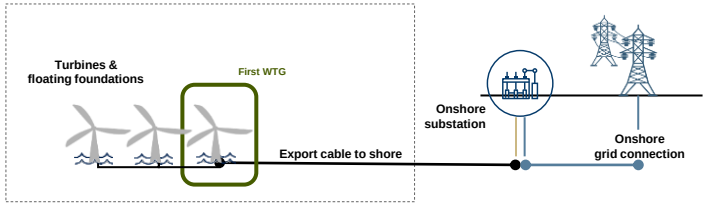
NOF

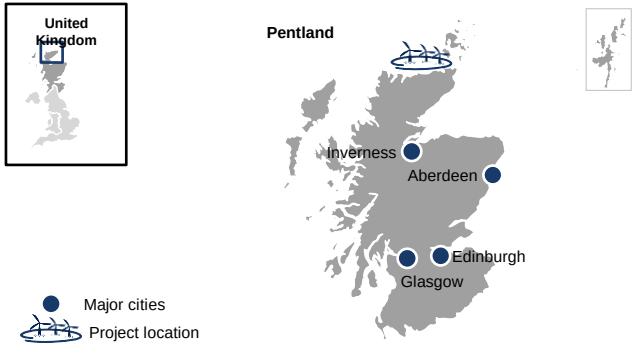
Pentland Floating Offshore Wind Farm

Accelerating the development of floating offshore wind

PENTLAND FLOATING OFFSHORE WIND FARM

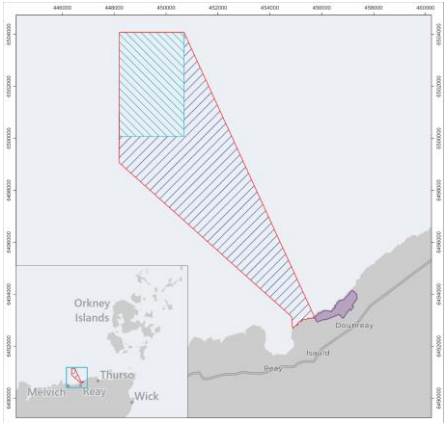
Overview of infrastructure assets and project location





Timeline	2022		2023		2024		2025		2026		2027		2028	
	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
Phases	Development		Construction						Operations					
Key milestones	FID				COD 1st WTG		COD 100 MW							

Key project facts & map

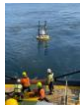
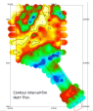


Overview	• 100 MW floating array that will demonstrate technologies to industrialise floating offshore wind • Early deployment of first "Demo" WTG to capture learnings for remaining WTGs and wider floating portfolio
Location	• 7.5km off the coast of Caithness, Northern coast of Scotland
Site conditions	• Site area:10 km^2 • Av. Wind speeds 10.48m/s • Water depths of 66-102m

The Pentland project will kick start industrialisation of floating wind in the UK and support CIP's global floating wind portfolio of 19GW+

FID: Final Investment Decision, COD: Commercial Operation Date, WTG: Wind Turbine Generator, CfD AR 5: Contracts for Difference Allocation Round 5.

The Project is at an Advanced Stage of Development

Offshore Lease	Crown Estate Scotland Oighreachd a' Chrùin Alba	• Option agreement secured with Crown Estate Scotland
Grid Connection		• 100 MW grid connection secured • Onshore infrastructure design at advanced stage
Environment & Consents	 	• Site previously consented for offshore wind • All environmental surveys completed • Offshore consent application submitted • Revised onshore planning permission application submitted
Wind Measurement & Site Investigations	 	• FLiDAR deployed since July 2021 • Extensive offshore site investigations complete: full geophys & UXO, 9 boreholes, 23 CPTs, 5 shallow boreholes. Detailed Geotech contracted for Summer 2023 • All onshore site investigations completed
Technology	 Stiesdal®	• Project will demonstrate a number of technologies that will help industrialise floating offshore wind • Design at an advanced stage • Stiesdal Offshore's Tetrasub floating structure technology selected
Supply Chain		• Advanced stage of Tier 1 selection and supply chain engagement • Targeting 40-60% lifetime UK content • Series of supply chain engagement events held over 2022, with upcoming events in 2023 • MOU with Scrabster Harbour for O&M Port

• Note: CPT: Cone Penetration Test , UXO: Unexploded Ordnance, MOU: Memorandum Of Understanding.

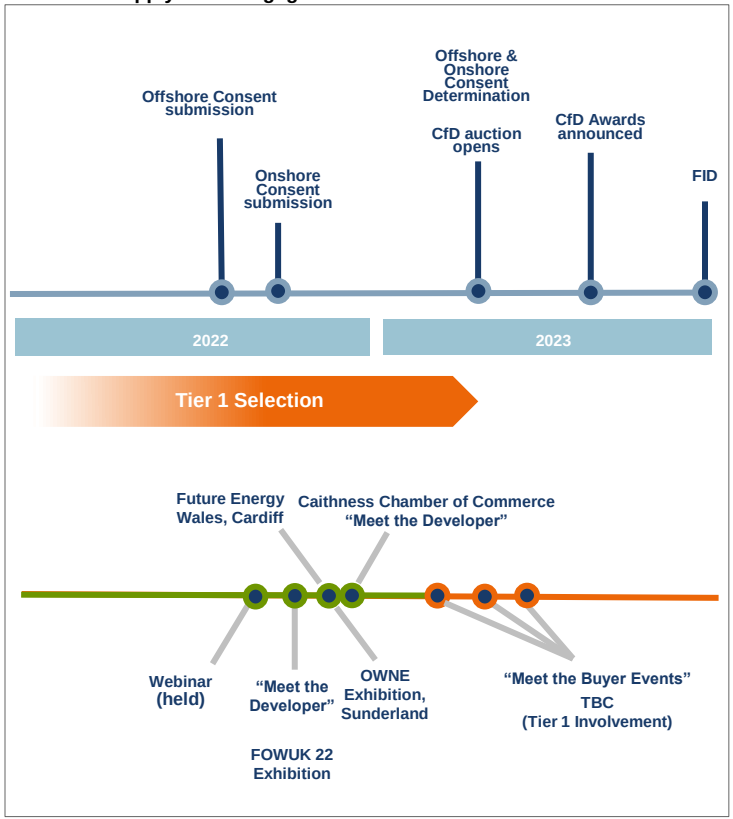
Project Timeline and Supply Chain Engagement

Series of events have been held over 2022, with further events to be announced in 2023

Objective of the Project's supply chain engagement

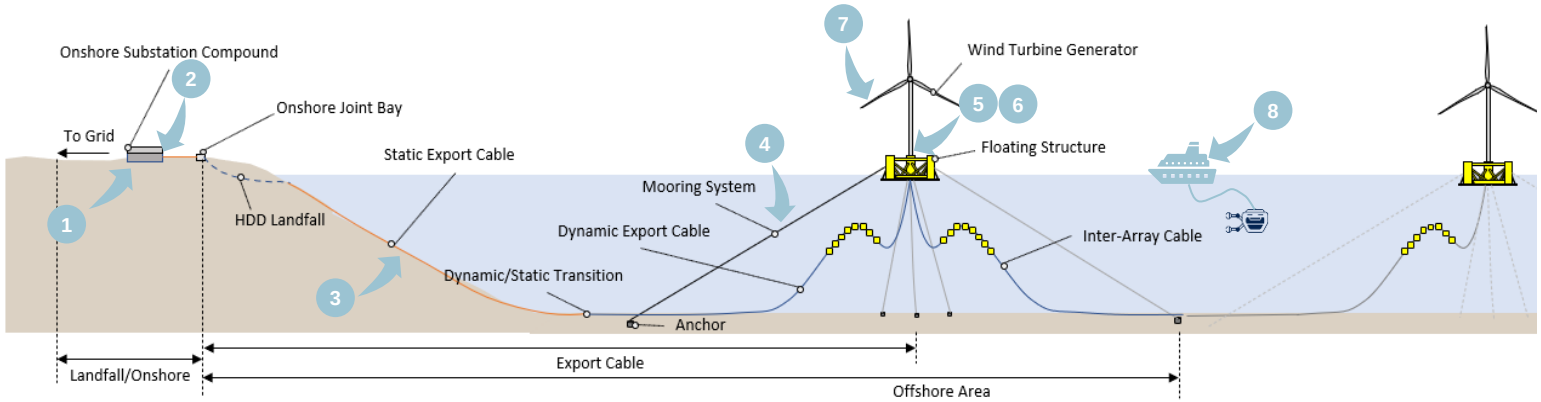
1. Support and improve the ongoing engagement with UK supply chain
2. Provide a high-level overview of work package opportunities and timing
3. Confirm supplier registration process
4. How to meet the Pentland Team via upcoming events
5. How to link up with Tier 1 contractors via Meet the Buyer events

Timeline & supply chain engagement



Note: FOWUK 22: Floating Offshore Wind 2022, OWNE: Offshore Wind North East Conference

Overview of Types of Supply Chain Opportunities

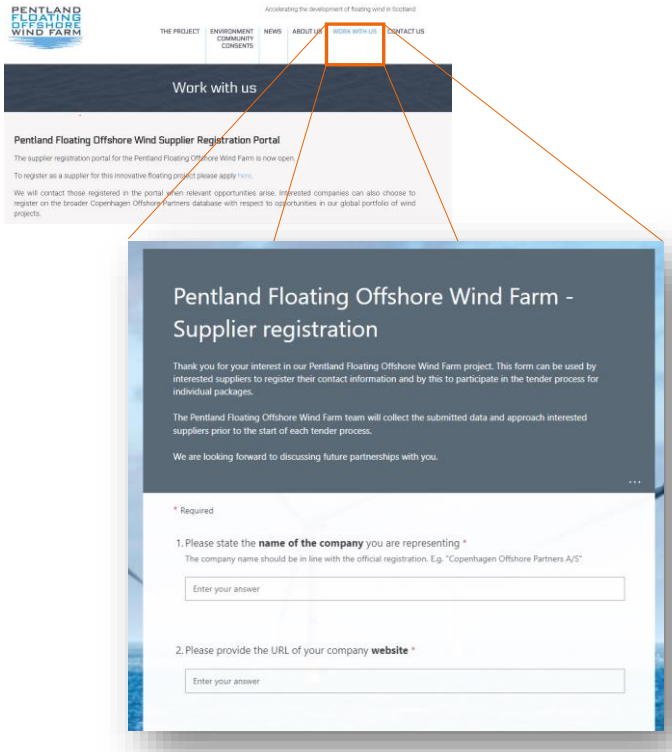


Package/Scope	1 Onshore Substation and Infrastructure	2 HDD and Onshore Cable	3 Export & IAC Cables	4 Mooring & Anchoring/T&I & Hook-up	5 Floating Sub Structure Supply/ Assembly	6 Floating Sub Structure Fabrication	7 Wind Turbine Generator	8 Operation and Maintenance
Tier 1 (EPC or EPCI contractors)	**EPC** selection in progress	**EPCI** selection in progress		**EPCI** selection in progress	**EPC** selection in progress	**EPC** selection in progress	**EPCI** selection in progress	**AMA & SMA** selection in progress
Tier 2 Scopes (high level, non-exhaustive)	• SI/GI • Earthworks • Buildings • HV/LV fit-out • Plant & Temp offices • Security • Waste disposal	• SI/GI • Earthworks • HDD services • Welfare • Generators • Security • Guard vessels • Temp offices	• Cable ancillaries • Vessels • Logistics • Storage • Labour • Site surveys • Lifting services • Vessel crew	• Mooring lines • Vessels & crew • Bunkering • Subsea inspections and repair • Labour • Guard vessels	• Port services • Grout supply • Labour • Tugs • Barges • Power supply • Assembly tooling • Lifting services	• Transport • Load//unloading • Storage • Lifting services • Structural steel • Office/welfare • Anodes • Secondary steel	• Transport & logistics • Lifting equipment • Secondary steel • Temporary site facilities • Welfare	• CTV's/ports • Helicopters • Vessels/ROV • Inspections • Monitoring • Data mgmt • Technicians • Storage

Supplier Registration

Link to Pentland Floating Offshore Wind Farm website portal

Where to register



How your registration will be managed

Supplier Registration Portal

- Established, link included in footnote
- >150 contractors already registered

Pentland Supply Chain Team

- Review and collate registers suppliers
- Pass on relevant supplier details to Tier 1's

Pentland direct contracting

Engagement with Pentland Procurement

Tier 1 contracting

'Meet the Buyer' Event

(Tier 1 intro to Tier 2)

Option to sign up to the global COP database - Pentland can facilitate access to global floating wind opportunities

Link: https://pentlandfloatingwind.com/work-with-us/

THANK YOU

Pentland LinkedIn Page

www.pentlandfloatingwind.com

pentland-procurement@cop.dk

Amy Keast
Senior Policy Manager - Offshore and Marine, Scottish Renewables

Sophie Large
Senior Project Manager, Seagreen Offshore Windfarm Ltd

Pete Geddes
EPC Director, Moray West Offshore Wind Farm

Ryanne Burges
Ireland and Offshore Director, EDF Renewables

Allan MacAskill
Chief Technology Officer, Flotation Energy

Richard Copeland
Project Director, Pentland Floating Offshore Wind Farm

ORGANISED BY

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OGV ENERGY

Fireside chat - Championing offshore wind

Claire Mack
Chief Executive, Scottish Renewables

Benj Sykes
Vice President, Head of Environment, Consenting & External Affairs, Ørsted

Carlos Martin
CEO, BlueFloat Energy

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Getting grid right

Chaired by Morag Watson, Director of Policy, Scottish Renewables

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Amanda Webb

Head of Future Offshore Networks

BEIS

Delivering a coordinated offshore transmission regime: *The Offshore Transmission Network Review (OTNR)*

Amanda Webb, Head of Future Offshore Networks
Department for Business, Energy and Industrial Strategy

January 2023

OTNR: Landscape and Objective

10
Point Plan

40GW
by 2030

68%
Reduction in GHG by 2030

2050
Net Zero

100GW?
by 2050

Net Zero Landscape

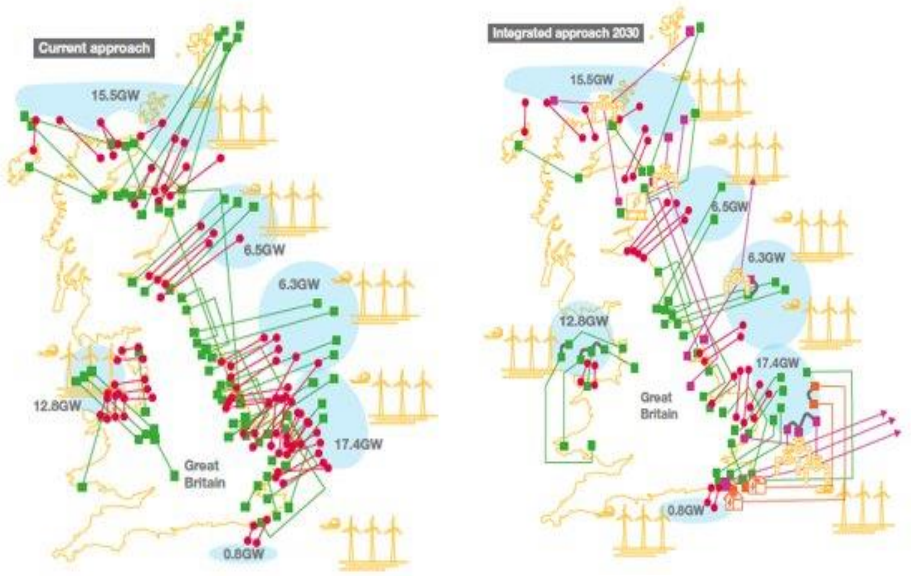
- Offshore wind is central to the UK's Net Zero goals, the 2022 British Energy Security Strategy re-emphasised this with new targets
- Core target of an additional 50GW by 2030 (from 11GW)
- Ambition for circa 100GW by 2050
- Ambitious expansion of floating offshore wind (5GW by 2030)
- Aim for UK to be net exporter of energy by 2040, with 18GW of interconnection

OTNR Objective

To ensure that the transmission connections for offshore wind generation are delivered in the most appropriate way, considering the increased ambition for offshore wind to achieve net zero. This will be done with a view to finding the appropriate balance between environmental, social and economic costs.

Offshore transmission & connection pre OTNR

- At the launch of OTNR the regime incentivised developers to connect their projects to the onshore grid using **individual point-to-point connections**.
- Each induvial connection point requires landing infrastructure and substations to connect to the grid.
- Conception to connection journey for offshore wind projects was lengthy (c13 years) and complex.
- This approach was designed when offshore wind was a nascent sector, with expectations for 10GW by 2030 seen as ambitious.



Key challenges

Delivery Bottlenecks

- ONTR seeks to accelerate the delivery of offshore wind and supporting infrastructure to meet UK climate goals and reduce consumer bills as quickly as possible.

Future-Blind Development

- OTNR aims to develop a regime which anticipates and works towards future offshore wind expansion. Creating expandable and efficient frameworks for a long term market.

Community Impacts

- OTNR aims to work with communities to reduce overall offshore connection infrastructure through coordination. It also places the assessment of community impacts at the core of decision making.

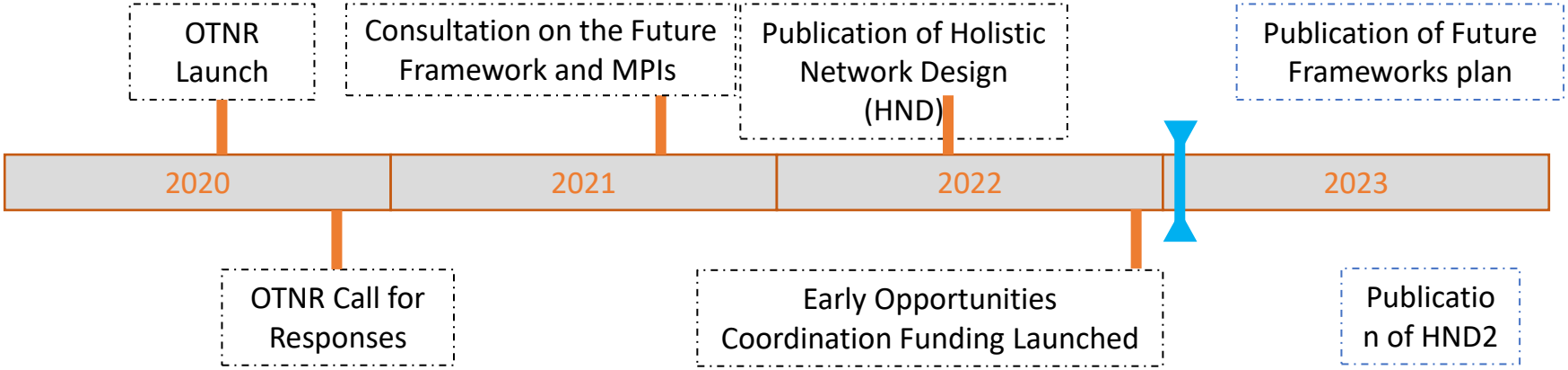
Environmental Impacts

- An overall reduction of planned infrastructure through the OTNR is environmentally beneficial. Planning changes will include an environmental net gain requirement for future projects.

Project background and key milestones

In 2020 then Energy Minister Kwasi Kwarteng launched the Offshore Transmission Network Review (OTNR) to review the existing offshore transmission regime, examining how changes could unblock delivery for significant expansions in offshore wind deployment.

A core aim of the OTNR is to ensure that new offshore wind is delivered in the most **appropriate way,** smoothing delivery and meeting wider targets but also enabling wider factors such as environmental and social impacts to be considered in detail. Coordination of infrastructure between developers is a key tool to achieve this.



OTNR workstreams

The OTNR seeks to address the delivery challenges facing UK offshore wind deployment across three different time horizons, each reflecting the challenges posed to projects in different stages of development. Across all timeframes it seeks to add the following:

- A **more strategic approach** to the siting of generation and transmission infrastructure
- **Holistic planning** for a more coordinated onshore-offshore network
- Continued use of **competition** to drive efficiencies and reduce cost to consumers
- **Embedding consideration of environmental and community impacts** at an early stage

Our focus today

Near term
connecting mid-late 2020s

In the near term, we are facing a **trade-off between maintaining deployment speed and delivering early coordination benefits.**
Encouraging developers to come forward with **opt-in coordination proposals.**

Medium term
connecting by 2030

Projects winning seabed leases in 2021-22 will be **required to coordinate. This is a major change from the current approach**
To achieve this, we introduced a **holistic network design** for offshore and onshore transmission infrastructure

Long term
Connecting post 2030

A new Future Framework that takes a more **strategic approach** to windfarm development and considers the offshore transmission system holistically with the onshore network to deliver a more coordinated approach and **reduce the cumulative impacts** of transmission.

Multi-Purpose Interconnectors – Across all timeframes

Environment and Planning – Across all timeframes

The Holistic Network Design: Pathway to 2030

For projects without firm connection agreements but within plans for the 50GW by 2030 target, the Pathway to 2030 workstream aims to deliver greater coordination to speed up delivery and better consider externalities on communities and environments.

This work is collated within the 'Holistic Network Design (HND)' published by ESO in mid 2022. This covers 23GW of projects, aiming to accelerate their connection dates through a coordinated approach.

A follow up design exercise is due to be delivered in 2023, covering an additional 20GW.

Projects winning seabed leases in 2021-22 (connecting by 2030) will be **required to coordinate. This is a major change.**

↓

To achieve this, a **holistic network design** has been introduced for offshore and onshore transmission infrastructure, which will better consider **environmental and social** impacts upfront

↓

Ofgem has recently published decision **on who delivers the coordinated offshore infrastructure**

- Facilitate more anticipatory investment to accelerate connection
- Overcome limitations of bottom-up project-led coordination
- Assess which onshore reinforcements could be delivered offshore

Benefits of Holistic Network Design:

- **Net consumer savings of £5.5bn. Increased capital cost (£7.6bn) offset by reduced curtailment costs (-£13.1bn).**
- **1/3 reduction in footprint of offshore cables through increased use of HVDC.**
- **Reduced curtailment by 32TWh (2030-2040)**
- **Associated reduced CO_2 emissions of 2MT 2030-2032 by displacing gas generation**
- **Allow better consideration of and reduction in community and environmental (incl. cumulative) impacts early on.**

Building the Future Framework

Aims to design and deliver a new, more strategic approach to connecting offshore wind for projects coming through yet-to-be-planned seabed leasing rounds, not captured by Pathway to 2030 workstream

Key questions underpinning Future Framework choices:

1. Is there a need for **upfront strategic planning** of offshore wind?
2. Is there a need for **holistic network design** and what are the fundamental design choices?
3. What should the **timing of transmission delivery** be?
4. What are the **possible delivery models**?

Focus is on early parts of project development process such as the deployment planning process, its integration with network planning and 'front-loading' assessments of environmental impact and opportunity in both network and deployment planning.

Enduring regime **changes would be introduced on a rolling basis**, with clarity on applicable arrangements set out for each 'group' of projects

It is not intended to be 'fixed' until 2050 – we expect it to evolve with each new seabed leasing round.

Where are we now?

- Consulted in Q4 2021, aiming for decision and recommendations publication Q1 2023;
- Have carried out extensive bilateral and multilateral stakeholder engagement to finalise recommendations and secure commitment to provide support in delivery

Key emerging recommendation:

Introduction of a strategic planning framework to enable upfront, integrated planning of networks and deployment and earlier consideration of cumulative impacts.

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Alice Etheridge

Head of Offshore Coordination

National Grid ESO

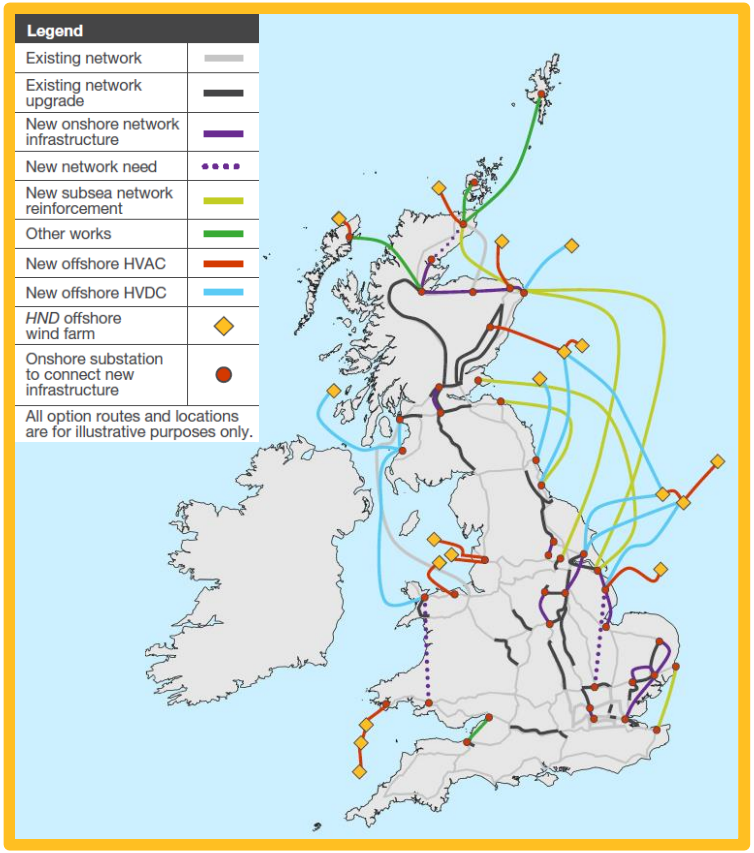
Getting Grid Right

Alice Etheridge
Head of Offshore Coordination

ESO

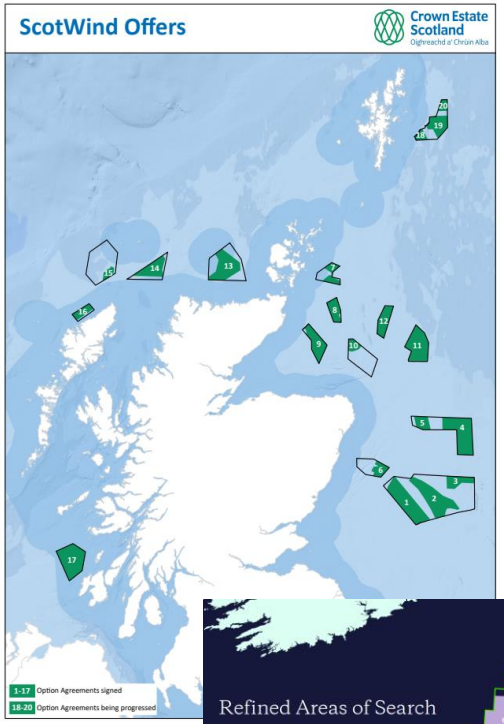
The Holistic Network Design is a first and significant step in centralised strategic network planning

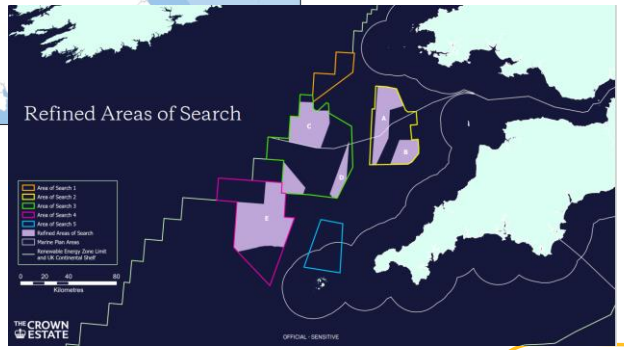
- The holistic network design helps get Great Britain towards achieving the ambition of **50 GW of offshore wind by 2030.**
- **A first of its kind, integrated approach** for connecting 18 in scope offshore wind farms (23 GW) to Great Britain and transporting the electricity generated to where it will be used.
- **Balances the four objectives** of cost to consumers, deliverability and operability and impact on the environment and on communities.
- Identifies and distinguishes **onshore transmission projects** that are **required to facilitate the 2030 ambitions**.
- Includes **£54 billion network investment** onshore (£22bn) and offshore (£32bn).
- Ofgem's Accelerated Strategic Transmission Investment (ASTI) process aims to **accelerate the key onshore transmission projects** required to deliver 50 GW offshore wind by 2030.



The HND Follow Up Exercise extends this further to incorporate more offshore wind

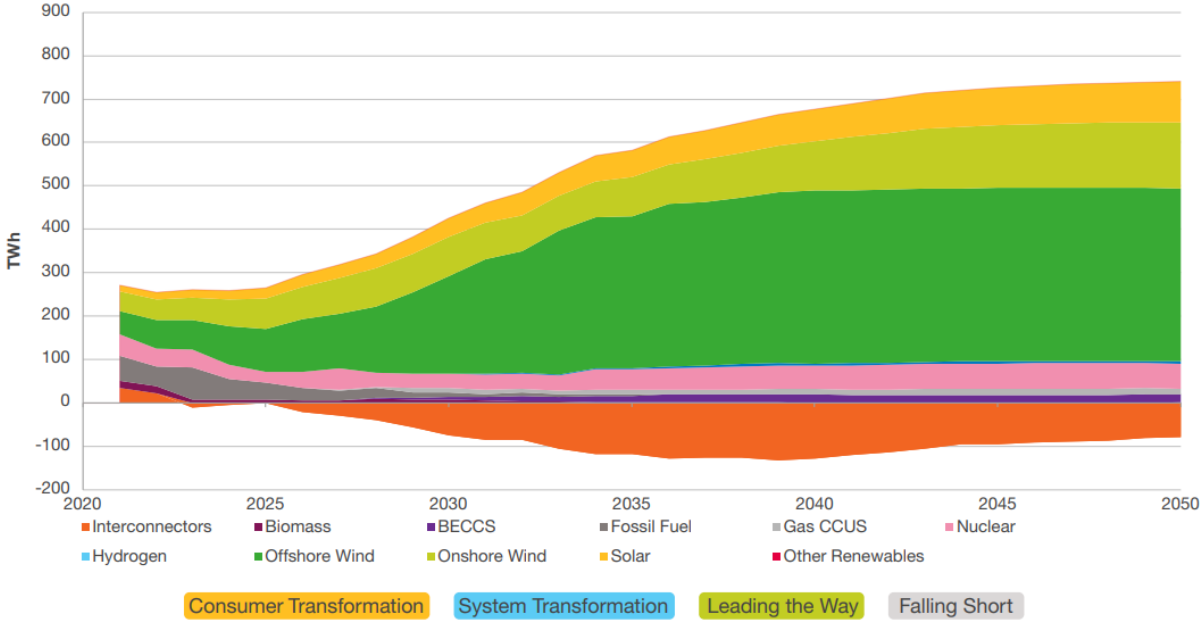
- The HND Follow Up Exercise is considering an additional **21 GW of ScotWind,** which was not in scope for the initial phase.
- It is also considering an **additional 4GW of floating offshore wind projects** anticipated in the **Celtic Sea.**
- Brings the **total offshore wind** with connections to **78.5 GW.**





A more strategic approach to network planning will be needed to connect the generation required to meet net zero

Figure ES.E.07: Electricity generation output by technology (TWh) in Leading the Way



Key change projects will be vital to the transmission network being an enabler to net zero, including:

- Ofgem's Electricity Transmission Network Planning Review
- OTNR Future Framework
- ESO Connections Reform
- Future system operator
- Changes to the planning regime

And supported by the right regulatory framework.

Source: National Grid ESO Future Energy Scenarios, July 2022

ESO

SESSION SPONSOR

wsp

Bless Kuri

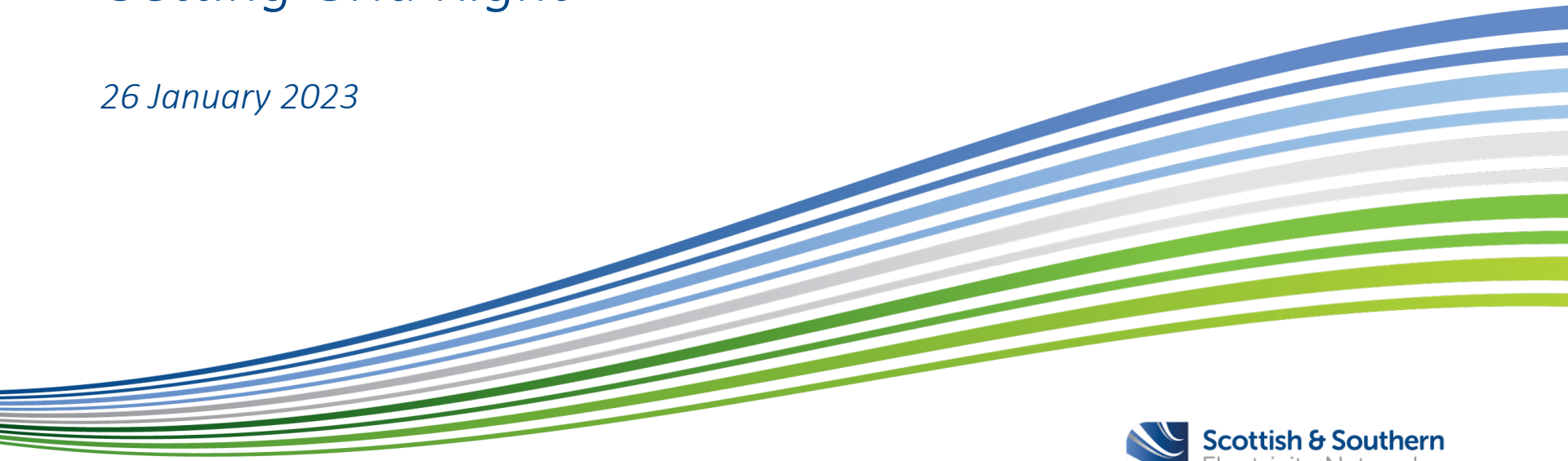
Head of System Planning and Investment

SSEN Transmission

Scottish Renewables, Offshore Wind Conference

Getting Grid Right

26 January 2023



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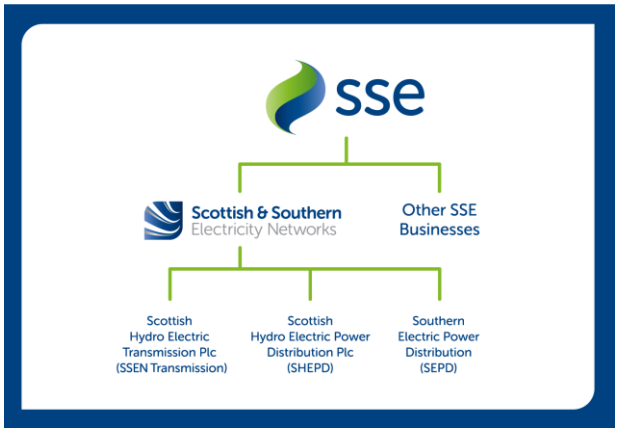
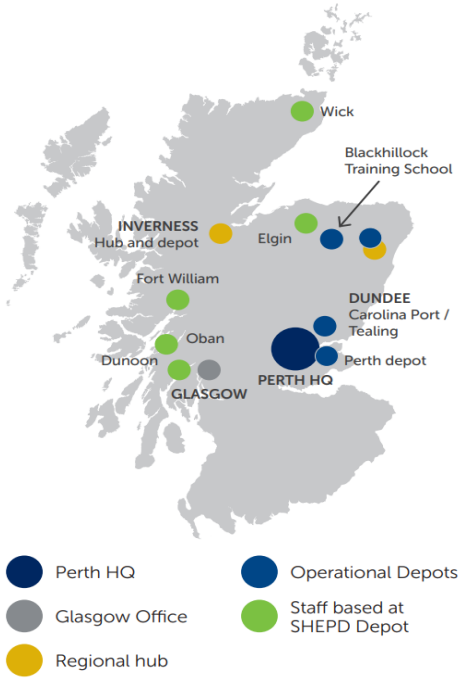
About SSEN Transmission

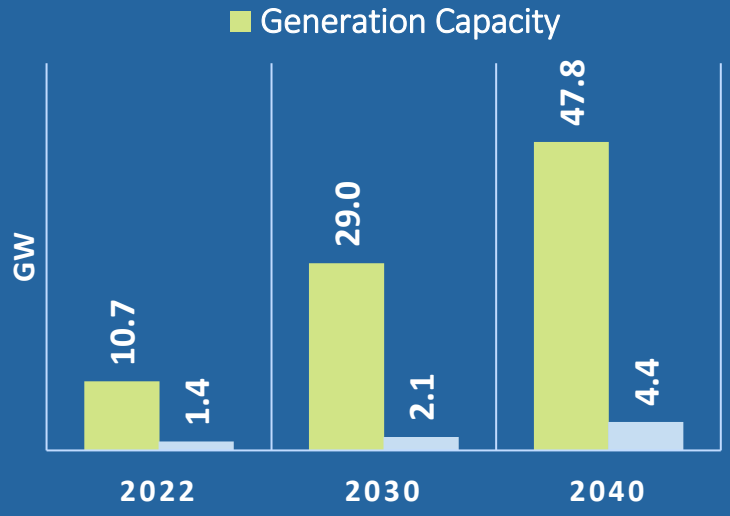


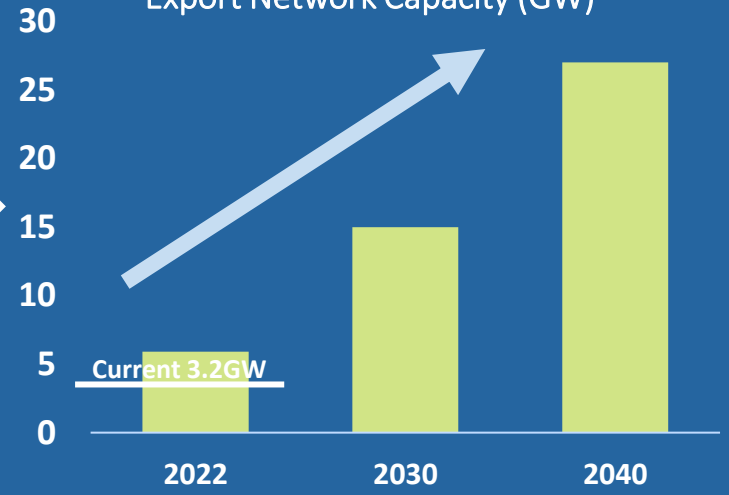


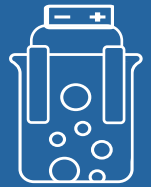
Office and operational locations

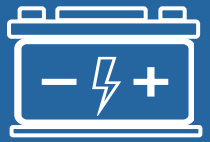
Scottish & Southern Electricity Networks
TRANSMISSION

SSEN Transmission – Growth Drivers









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Main north of Scotland Electricity Transmission Network in 2030

Investments currently in discussion with Ofgem

1. Argyll 275kV strategy
2. Fort Augustus to Skye 132kV upgrade
3. Orkney 220kV AC subsea link

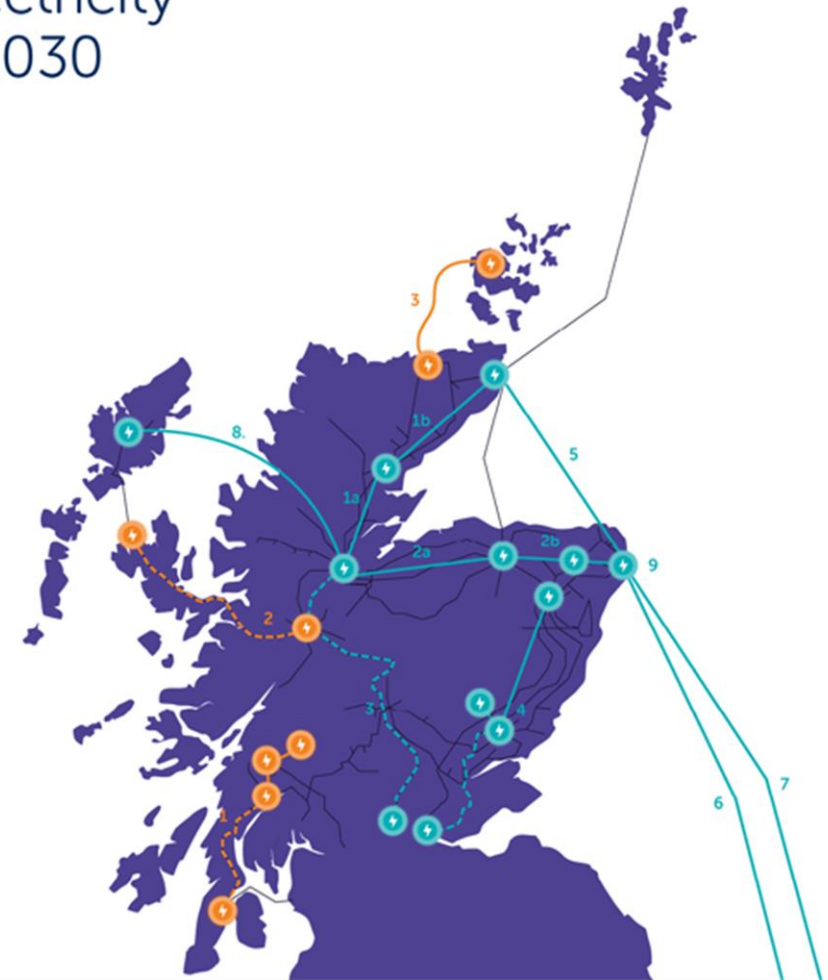
Pathway to 2030 Investments

1a. Beauly to Loch Buidhe 400kV reinforcement
1b. Loch Buidhe to Spittal 400kV reinforcement
2a. Beauly to Blackhillock 400kV double circuit
2b. Blackhillock and Peterhead 400kV double circuit
3. Beauly to Denny 275kV circuit to 400kV
4. East Coast Onshore 400kV Phase 2 reinforcement
5. Spittal to Peterhead 2GW HVDC subsea link
6. Peterhead to Drax 2GW HVDC subsea link (EGL2)
7. Peterhead to South Humber 2GW HVDC subsea link (EGL4)
8. Arnish to Beauly 1.8GW HVDC Western Isle link
9. Aquila Pathfinder - Peterhead DC switching substation

Public Consultation to Inform Project Development

All new reinforcements remain subject to detailed consultation and environmental assessments to help inform route and technology options

More detail on these projects, including how to sign up for updates, will be made available on SSEN Transmission's website, www.ssen-transmission.co.uk



New Infrastructure (Routes shown here are for illustrative purposes)

Upgrade/Replacement of Existing Infrastructure

Existing Network

Forecast as at 16 Sept 2022

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Pathway to 2030 Economic Benefits

Delivering a Network for Net Zero

£10 Billion Investment
Programme for SSEN Transmission alone, equivalent to building **5 Queensferry crossings**

Our investment programme is expected to deliver **£6.2bn** Gross Value Add (GVA) to the **UK** economy, **£2.6bn** of which will be in **Scotland**

Support over **20,000 jobs** in the **UK**, over **9,000** of which in **Scotland**

Carbon displaced through the connection of renewables: **30MtCO2e**, approx. equivalent to **removing a 1/3 of all cars** on UK roads

Accelerating Development

Aug 2022
- Ofgem consultation on accelerating onshore electricity transmission investment

Sep 2022
- Initial 2030 delivery plan submitted

Dec 2022
- Ofgem decision on Accelerated Strategic Transmission Investment (ASTI) regulatory framework expected

Dec 2022
- Updated 2030 delivery plan submitted

KEY CONSIDERATIONS

- Detailed network design
- Consents & planning
- Market Resource & Capacity
- Outages

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Detailed Network Design

Local network capacity requirement for

Generation

Demand

Bulk power transfer capability requirement

Coordinated at regional level

Coordinated within our licence area

Coordinated at GB level

System operability

System stability

System restoration

Asset condition

Coordinated Load and Non-Load requirements

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Planning and Consents

Section 37

The Scottish Government

Town & Country Planning

Local Authority.

Compulsory Purchase Order (CPO)

The Scottish Government
Planning and Environmental Appeals Division

Bird Surveys

NatureScot
Scotland's Nature Agency
Buidheann Nàdair na h-Alba

Assumptions and actions:

- Section 37 timescale reduction to 9-12 months – engagement with ECU
- T&C Planning timescale maintenance of no more than 12 months – continued engagement with local authorities
- Compulsory Purchase Order timescale reduction to 9-12 months – engagement with the Planning and Environmental Appeals Division (DPEA)
- Bird Survey Periods to 12 months – engagement with key stats
- Marine consents targeting 10 month determination period – engagement with Marine Scotland
- Offshore consents

We are pro-actively engaging across each of these groups.

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Working with the Supply Chain

To address global supply chain constraints, we need to think differently to accelerate delivery

- Pre-qualification Questionnaire (PQQ) commenced for 2030 supply chain, due to complete early 2023
- Early appointment of Key Contractors in Development Phase with transition to Delivery
- Utilising SSE Early Contractor Involvement model with incentives offered to contractors for innovative design and construction approach
- Advanced construction activities
- Supply chain commitment
- Strategic land purchase
- Early enabling works/early physical works
- Stimulating the employment market

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wsp

Fiona Townsend

Associate Consultant

WSP

Our Role in Supporting the Holistic Network Design and Follow Up Exercise

Fiona Townsend
Associate Consultant

WSP

- WSP has worked with ESO during Holistic Network Design and Follow Up Exercise (HND1 and HNDFUE)
- Supporting ESO teams in delivering different aspects of the project for over a year

WSP Role in HND1

Supporting environment, community and overall design appraisals

Supporting offshore network strategy team

Engaging with developers

Contributing to reports and documenting process

Producing SLDs to conceptualise designs, describing size and number of physical assets

HNDFUE Methodology

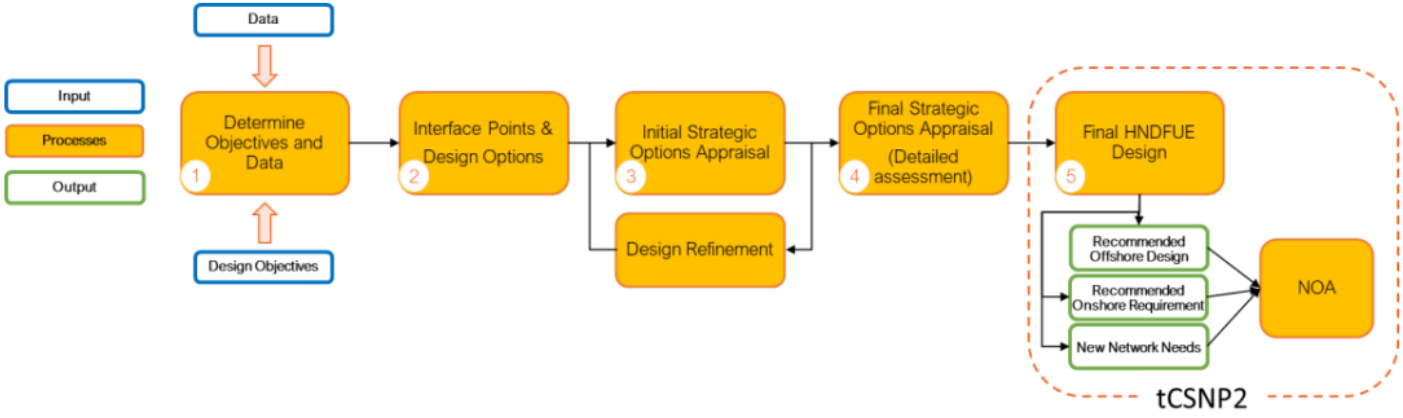

Diagram taken from Holistic Network Design Follow-Up Exercise Methodology Version 3.0 November 2022, ESO

WSP Role in HNDFUE

WSP working within Design Optimisation Team across both Scotwind and Celtic Sea regions

Supporting environment and community appraisals, and overall appraisals considering 4 objectives

Supporting the delivery of internal workshops to appraise options with team and to discuss pros and cons of different options

Contributing to reporting around design appraisal and selection process

Engagement with stakeholders including Transmission Owners, environmental bodies and The Crown Estate

Design Review Workshops

Reviewing all designs created by design teams

Ensuring appraisals across the 4 objectives are completed and considered equally

Representatives from all teams brought together in regular meetings

Discuss each design, compare against other designs and performance against objectives

Deciding whether to take forward, refine or discount options

Morag Watson
Director of Policy, Scottish Renewables

Amanda Webb
Head of Future Offshore Networks, BEIS

Alice Etheridge
Head of Offshore Coordination, National Grid ESO

Bless Kuri
Head of System Planning and Investment,
SSEN Transmission

Fiona Townsend
Associate Consultant, WSP

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OFFSHORE WIND CONFERENCE

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Crown Estate Scotland
Oighreachd a' Chrùin Alba

CONFERENCE DRINKS RECEPTION & LANYARD SPONSOR

OW OCEAN WINDS

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MUIR MHÒR OFFSHORE WIND FARM
A joint venture between Fred.Olsen Seawind & Vattenfall

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PORT OF CROMARTY FIRTH

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STROMAR
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West of Orkney Windfarm

IN ASSOCIATION WITH

CATAPULT Offshore Renewable Energy

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Global Underwater Hub

Wind EUROPE

OFFICIAL MEDIA PARTNER

reNEWS

MEDIA SUPPORTER

OGV ENERGY

All things INTOG - Innovation and Targeted Oil & Gas

Chaired by Ralph Torr, Head of Floating Wind, ORE Catapult

Thibaut Cheret

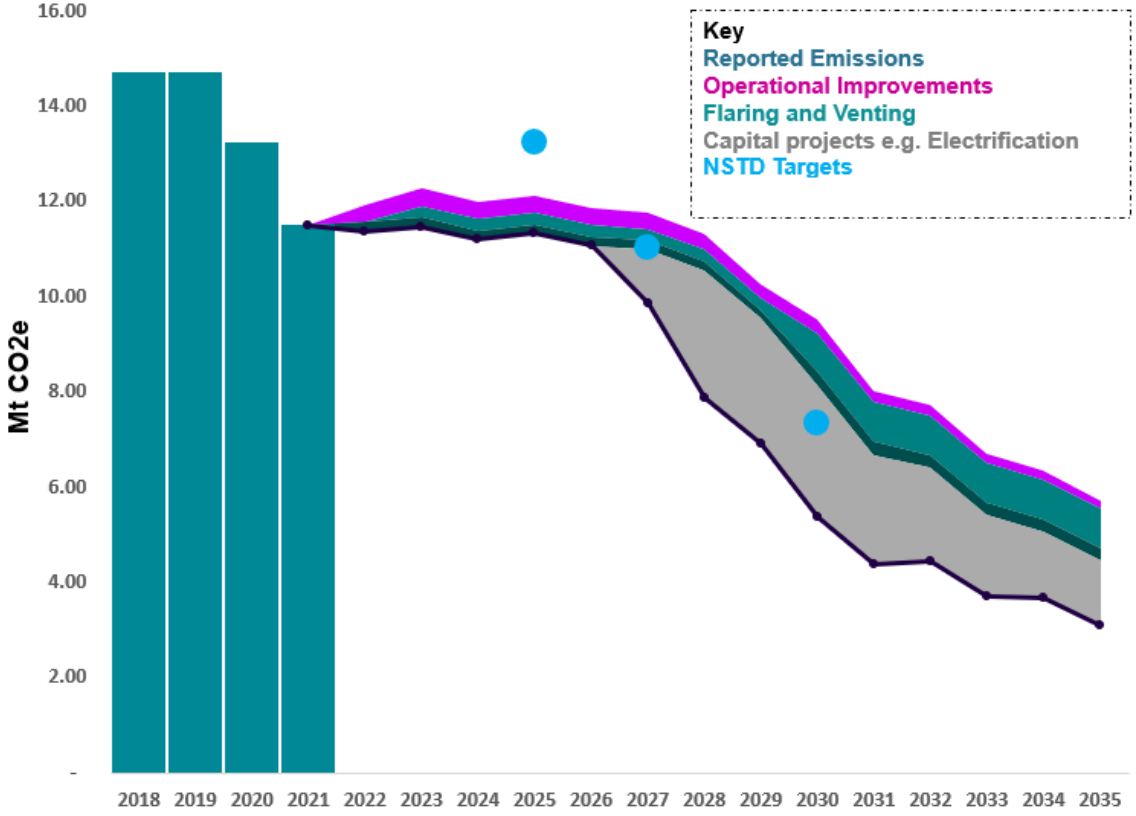
Wind and Renewables Manager

OEUK

Introduction to INTOG

Thibaut Cheret

Oil & Gas Supply Decarbonisation



- In all transition scenario the UK will produce less than half its consumption.
- Indigenous production reduce import and overall emission.
- North Sea Transition Deal commit the UK O&G industry to reduce its emission of 50% in 2030.
- Electrification is required to meet the 2030 target.

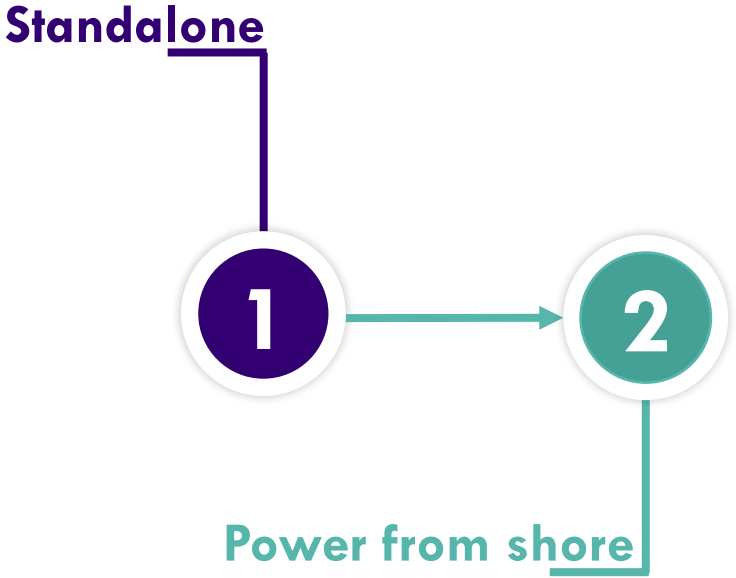
Electrification Concepts

Standalone

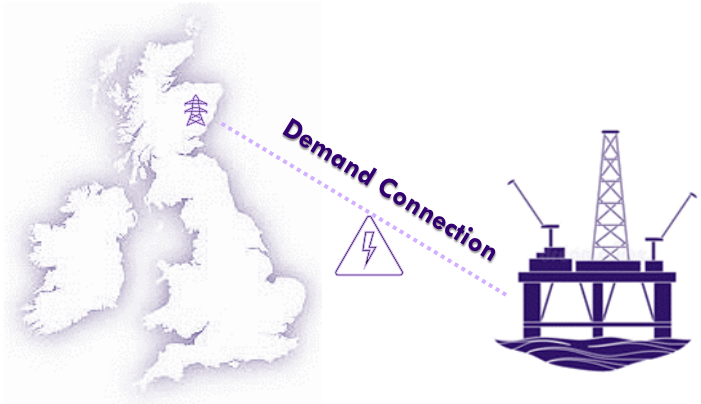
1

- Partial electrification
- Dual fuel
- Low decarbonisation
- Wind power surplus unused

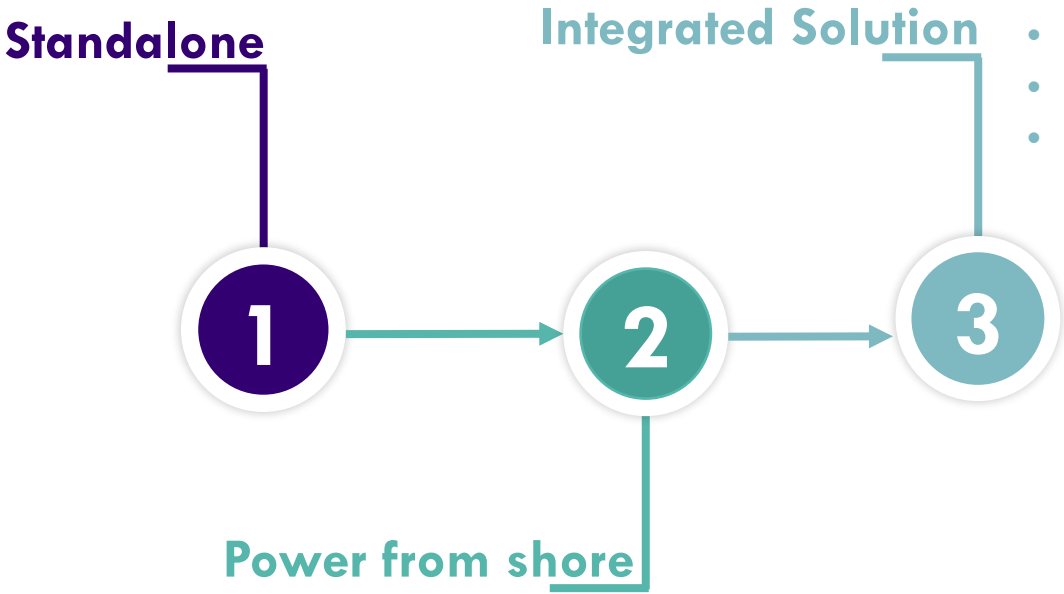
Electrification Concepts



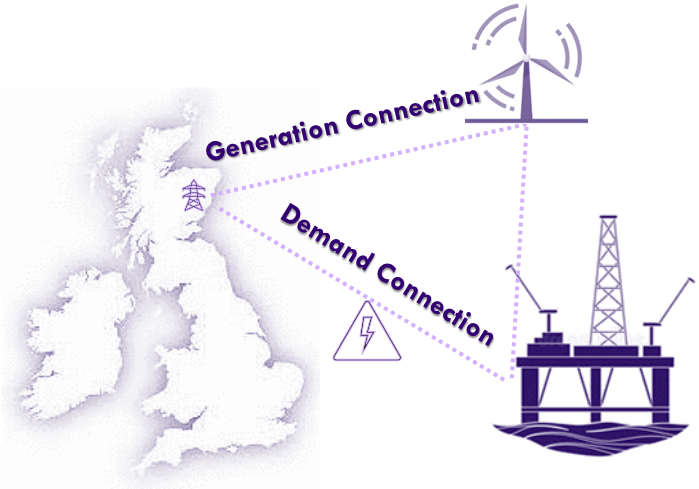
- Full electrification
- Scope 2
- High electricity cost



Electrification Concepts

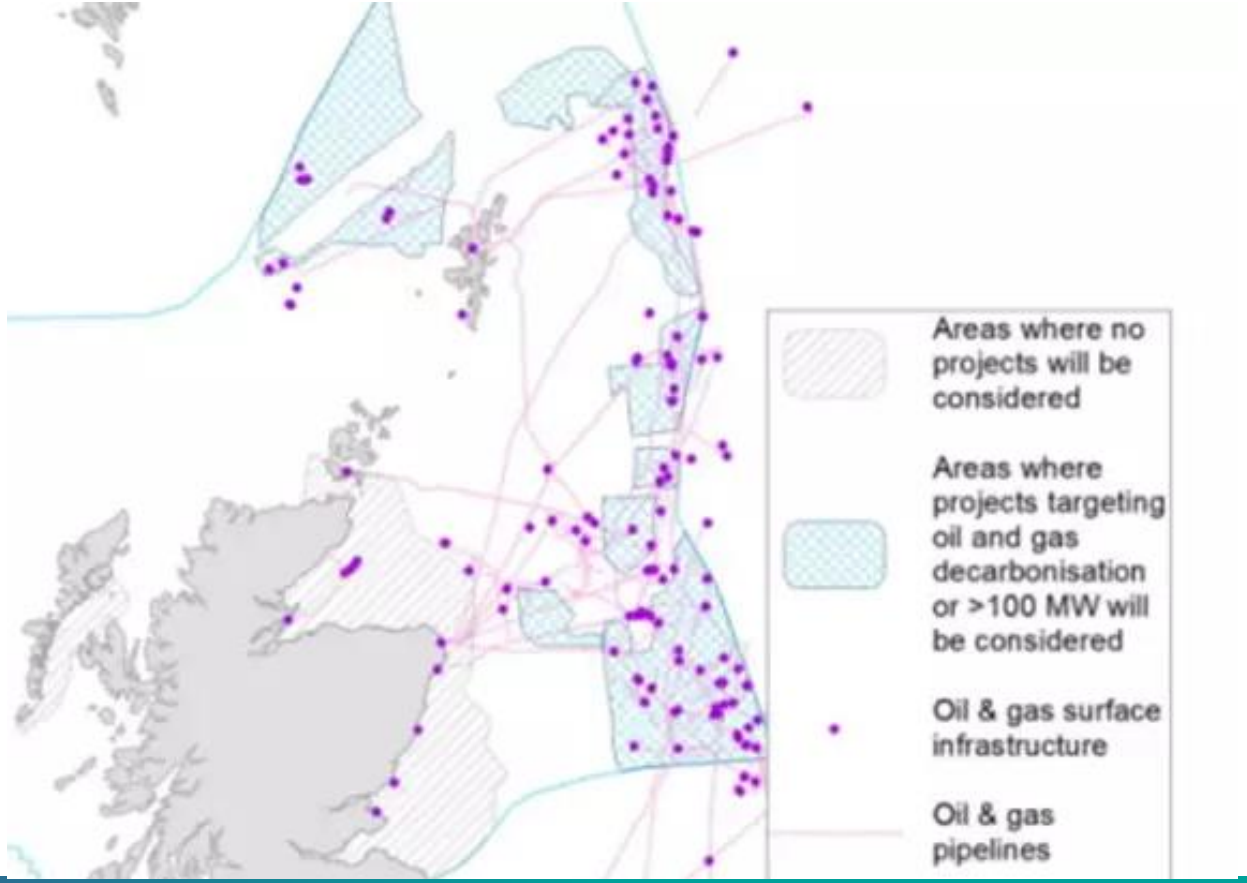


- Full electrification
- Leverage floating wind farm
- Optimum UK energy decarbonization
- Higher level of complexity



INTOG round – Deep Water

Award in Q1 2023



Challenges

Government asks:

- Clarity on the regulatory regime of different components
- Permit streamlining
- Grid connection readiness
- Decarbonisation allowances (EPL)

Access to grid

- Generation connection required before 2030
- Grid bottlenecks

Complexity

- Require regulatory alignment and stakeholder requirements
- Limited precedent: Beatrice (UK), Norway

Timeline

- Diminishing returns of decarbonisation with time
- Supply Chain bottleneck

Affordability

- High retrofitting cost
- High electricity price

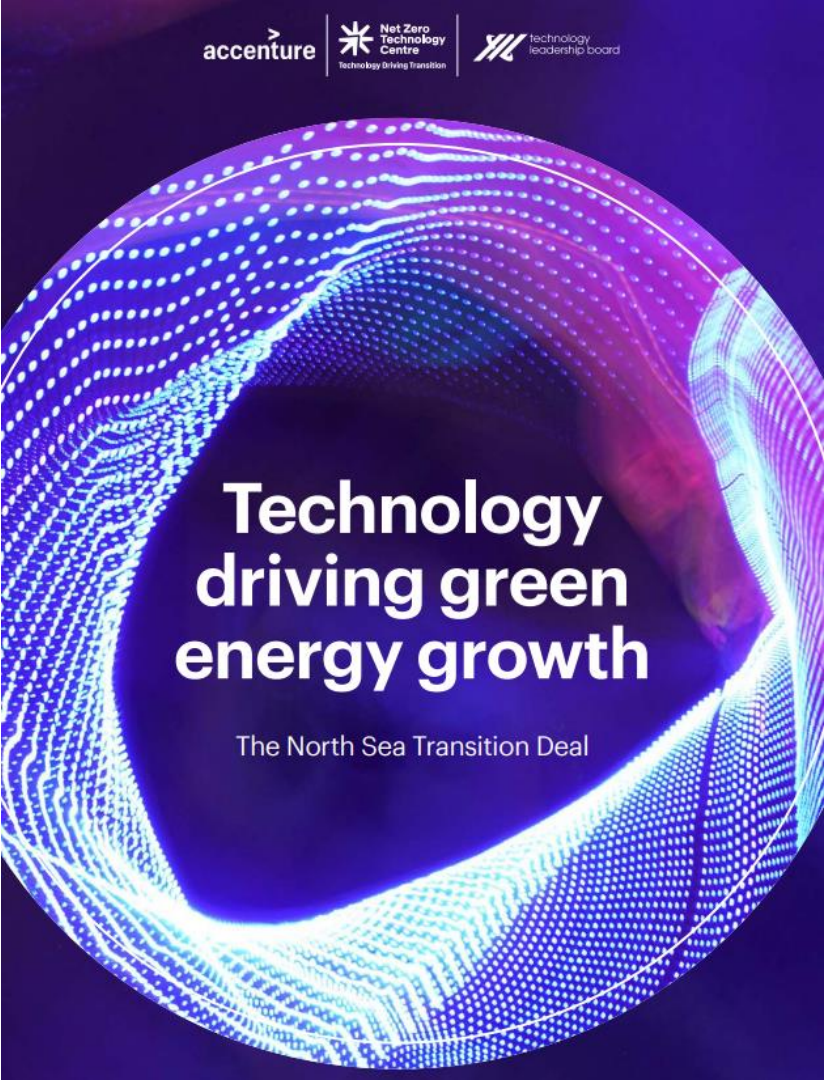
Graeme Rogerson

Senior Project Manager - Integrated Energy Systems

NZTC

51	Oil and gas	BEIS/ NSTA	2023	Greater transparency and data from industry on the carbon intensity of oil and gas (O&G) imports, and also from the North Sea Transition Authority (NSTA) and industry on O&G that is produced.
52	Oil and gas	BEIS	2024	Government should publish an offshore industries integrated strategy by the end of 2024 which should include roles and responsibilities for electrification of oil and gas infrastructure, how the planning and consenting regime will operate, a plan for how the system will be regulated, timetables and sequencing for the growth and construction of infrastructure, and a skills and supply chain plan for growth of the integrated industries.

Net Zero Technology Centre
Technology Driving Transition



Key findings

FOW must be scaled to unlock larger 50% cost reductions.

5%–10% overall cost reduction potential in the next 5–7 years.

5%–15% installation cost reductions available.

15%–25% cost reductions available from anchoring and mooring design improvements.

Supply chain expansion opportunities available within anchoring and mooring.

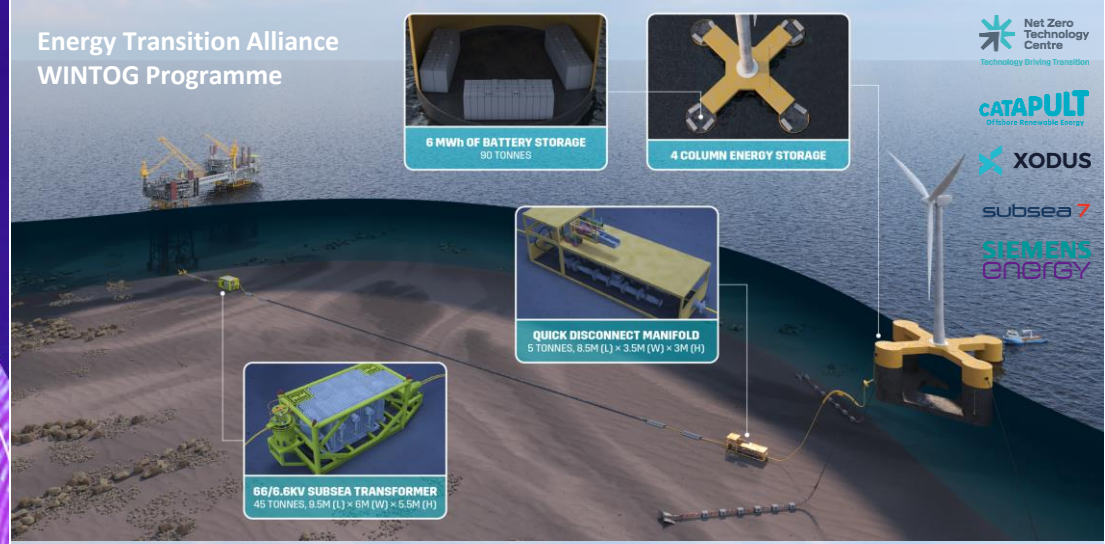
Key Recommendations

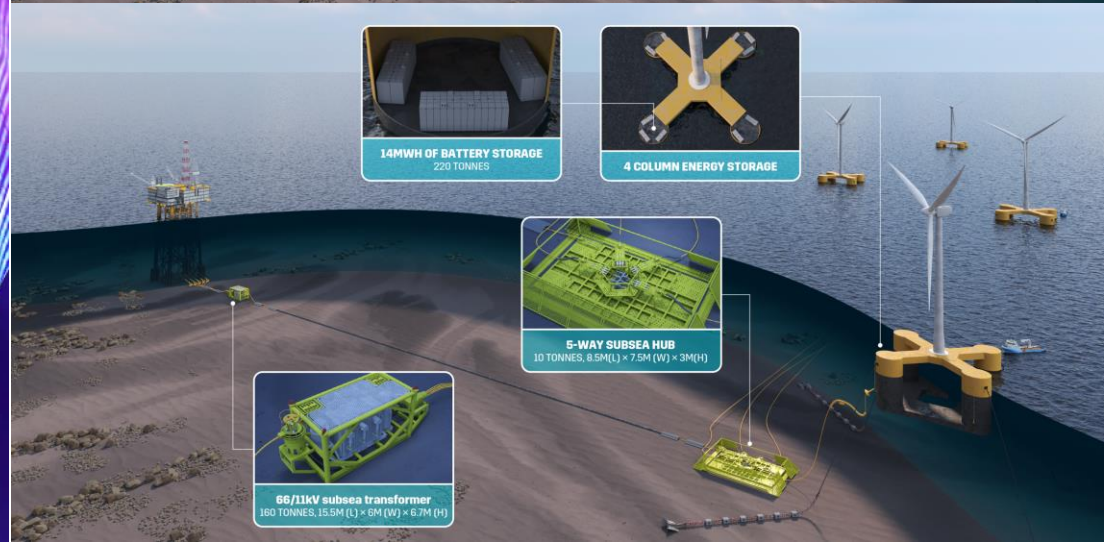
- Deploy and test multiple designs in the next **five years**
- Leverage the demo opportunities of **offshore electrification** projects
- UK globally recognised as a **test centre** for FOW substructures and moorings
- Champion **modular substructure solutions** to support UK facilities and capabilities

accenture | Net Zero Technology Centre | technology leadership board

Technology driving green energy growth

The North Sea Transition Deal





Alexander Quayle

Project Director

Flotation Energy

FLOTATION ENERGY

vårgrønn

INTOG – Energising Floating Offshore Wind

25 Jan 2022

Our Partnership

FLOTATION ENERGY

- Flotation Energy has pioneered floating offshore wind as well as oil and gas decarbonization
- Experienced team that developed and delivered the Kincardine 50MW wind farm
- 12 GW pipeline across UK, Ireland, Australia, Japan and Taiwan

vårgrønn

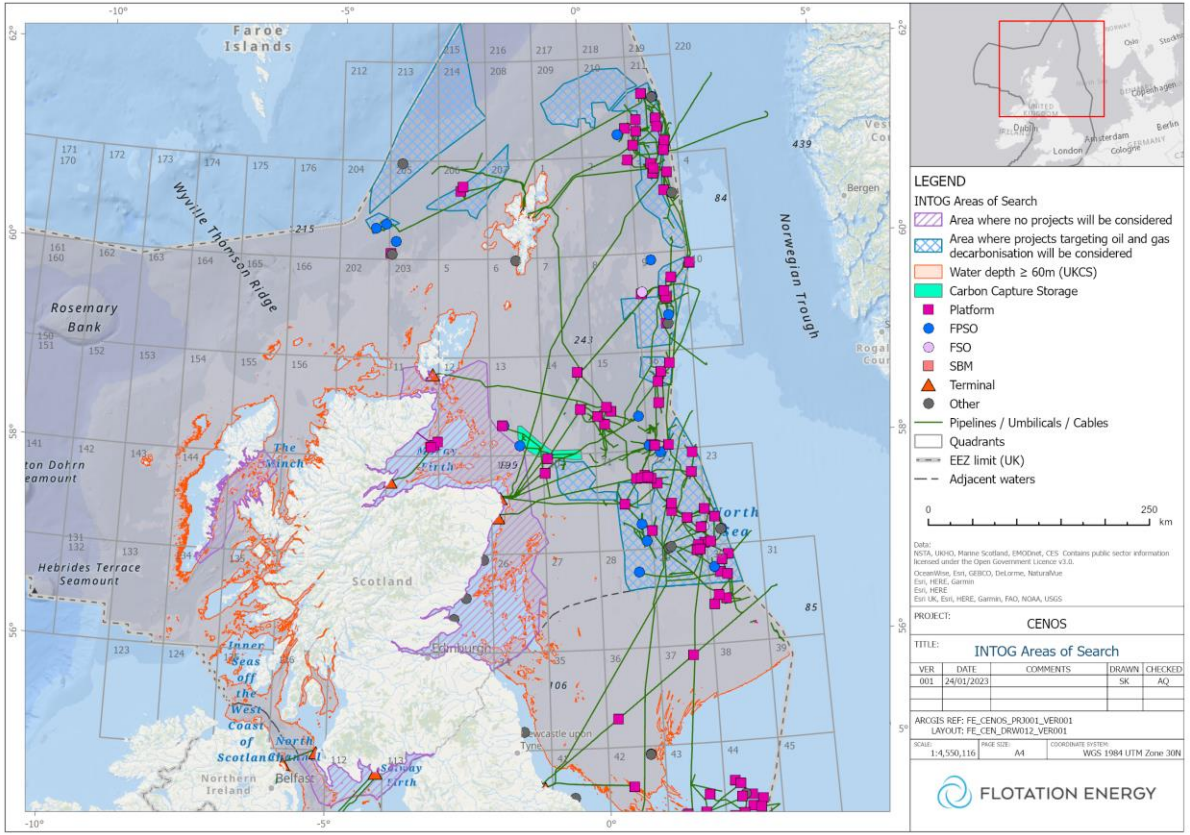
- Vårgrønn is an agile, Norway-based offshore wind company owned by Plenitude (Eni) and HitecVision
  - A strong team highly experienced in North Sea offshore developments
  - Shareholder backing to execute large-scale offshore wind developments
  - Equipped with governance and systems to accommodate large offshore projects.

- An exceptionally strong partnership, leveraging collective strengths
- Developing truly credible decarbonization projects that address a real challenge

INTOG brings together policy goals

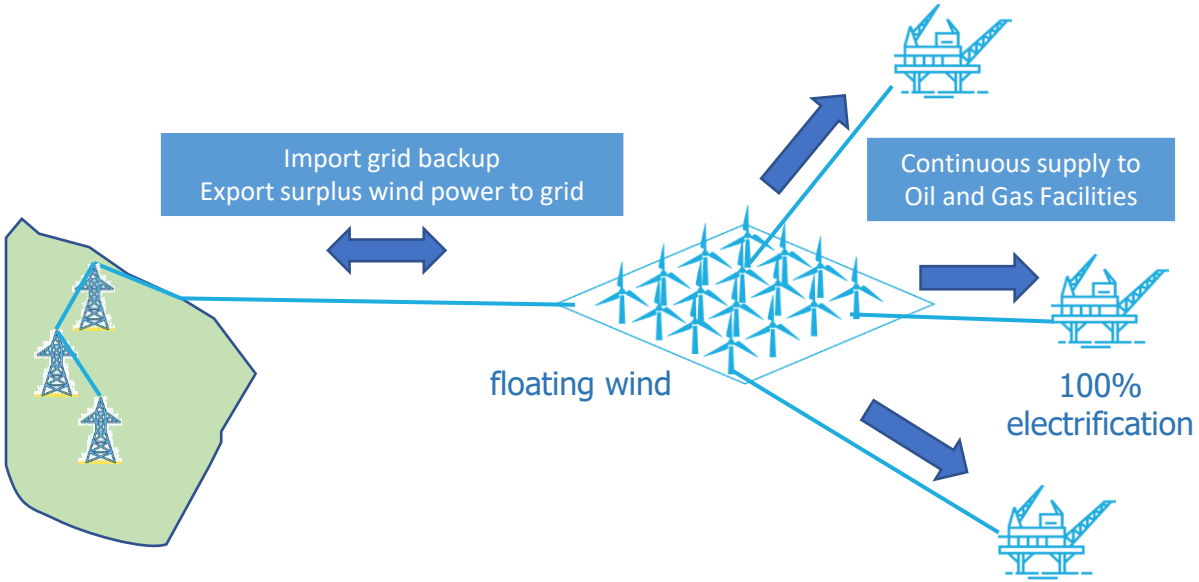
- Offshore emissions are circa 14Mt CO_2/year
  - 70% from power generation
- North Sea Transition Deal
  - 50% emission reduction by 2030
  - Only possible by addressing the emissions scope of offshore power
- Key moment of opportunity
  - Floating offshore wind accelerates
  - O&G production starts to decline
  - Establishing world-leading Scottish offshore wind supply chain

Innovation and Targeted Oil and Gas - INTOG

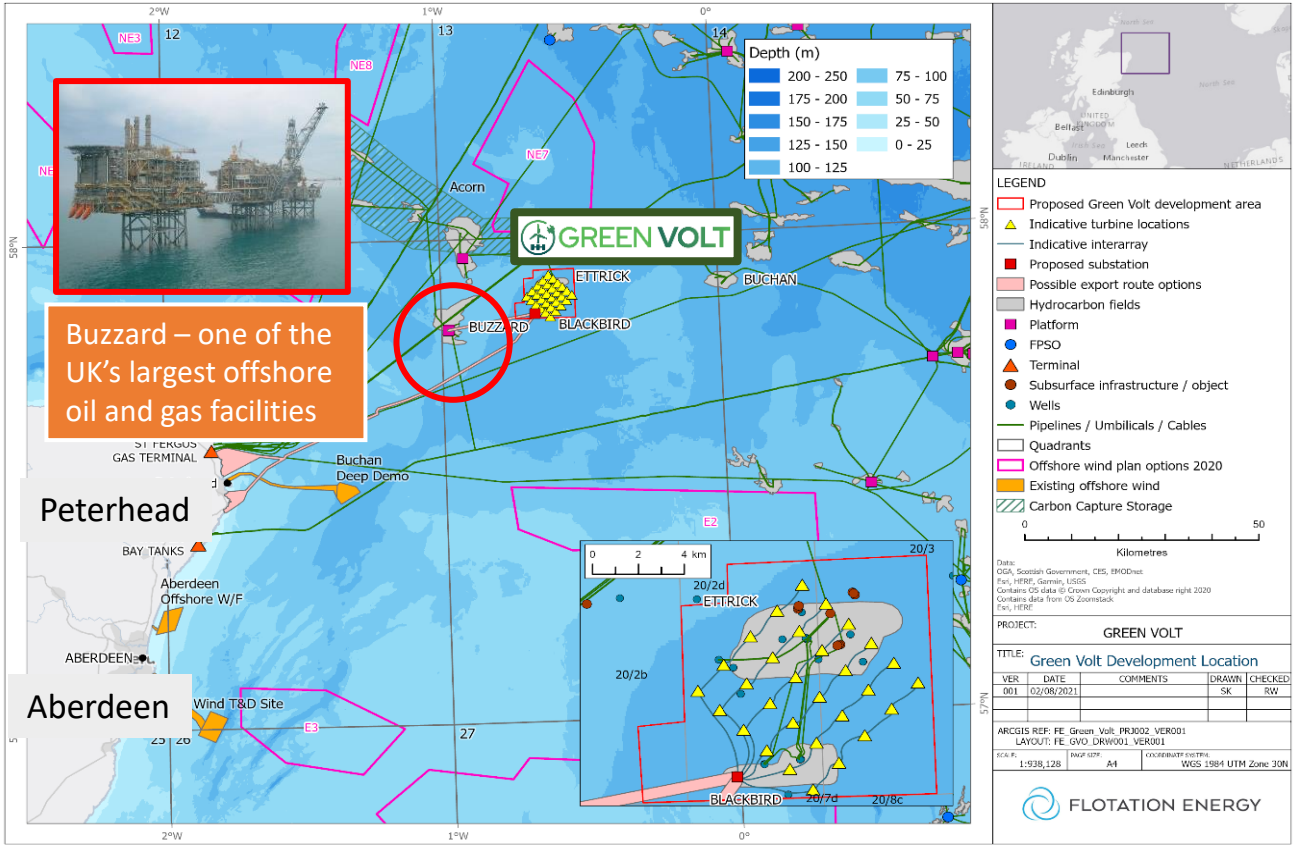


Electrification – Our Concept

- Grid connected floating offshore wind farm
- Green field components (wind farm, export transmission and export cable) retained by the wind farm
- 100% retirement of onboard power generation
- Leverage offshore and onshore demand to stimulate floating offshore wind growth

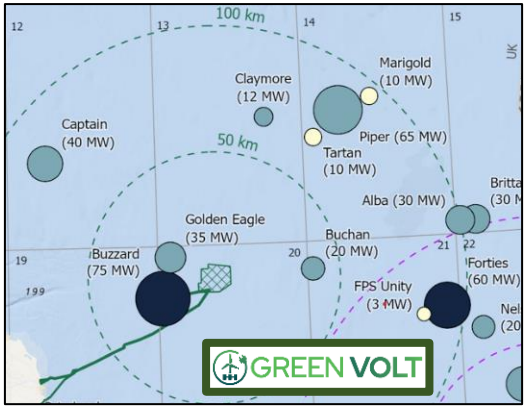


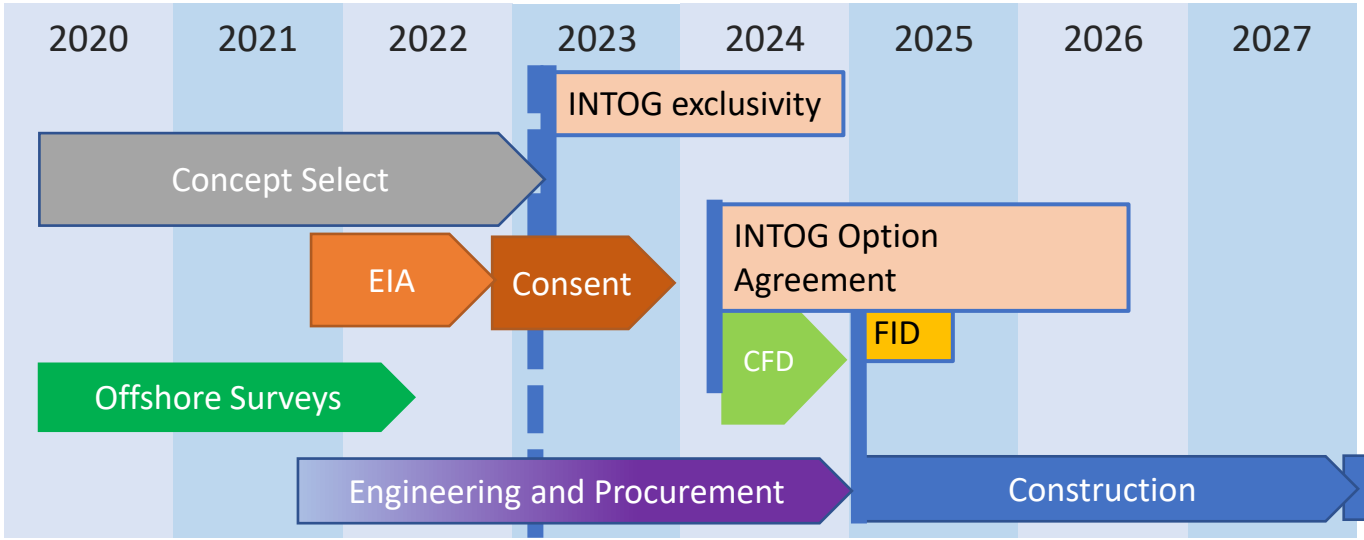
- ✓ 100% electrification
- ✓ Rapid deployment
- ✓ Maximum decarbonisation
- ✓ Grid availability / reliability
- ✓ Fully eliminate GTG opex and downtime
- ✓ No late life gas buy back
- ✓ Optimal CapEx – retained by the wind farm
- ✓ UK offshore wind growth targets



Key Opportunities

- Brownfield, de-risks environmental and engineering scopes
- 100m depth (floating wind)
- Grid access from 2025+ for electrification





Key milestones:

- Offshore Scoping submitted November 2021
- Offshore EIA submitted January 2023
- INTOG submission completed November 2022
- Onshore Consultations ongoing

Key challenges:

- INTOG timing vs CfD
- OTNR / HND delays
- Marine Scotland capacity

INTOG - Opportunity

- INTOG provides a unique opportunity to move floating offshore wind to commercial scale
- Flotation Energy and Vårgrønn are working together to maximise its potential
- Our solutions are well positioned to move quickly and address the critical constraints for O&G decarbonisation:
  - Cost effective
  - Grid connected
- Floating offshore wind requires an extensive local supply chain, creating early opportunities for Scotland and for Scottish Renewables

Stuart Brown

Associate - Floating Wind

EMEC

Supported by:
Interreg North-West Europe
AFLOWT
European Regional Development Fund

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

EMEC's FOW Test Centre bid into INTOG

Innovation to help prove, de-risk and refine performance for gigawatts of floating offshore wind

Scottish Renewables Offshore Wind Conference
27th January 2023, Glasgow

Stuart Brown
Associate – Floating Wind

EMEC Introduction

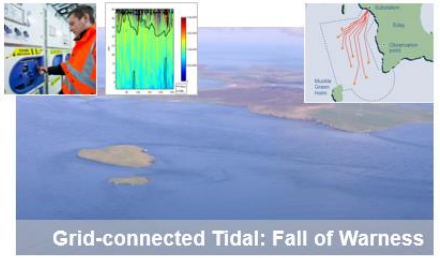
EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

- 20 yrs of T&D site operation
- Wave, tidal, hydrogen
- 35 devices, 22 clients, from 11 countries
- Strong team, great supply chain
- World's only accredited ocean energy T&D facility

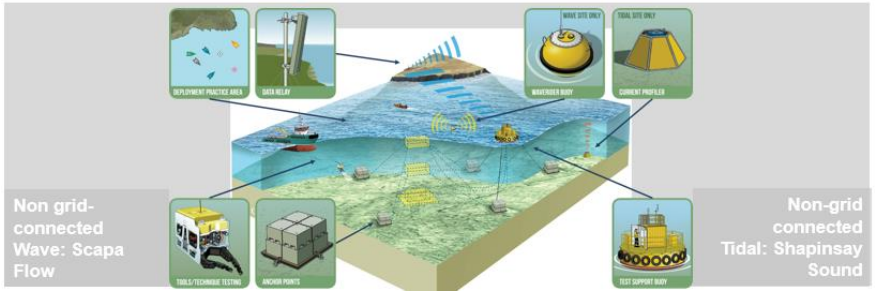
REDUCING THE TIME, COST AND RISK

OF OFFSHORE TESTING AND DEMONSTRATION

Grid-connected Wave: Billia Croo



Grid-connected Tidal: Fall of Warness



Non grid-connected Wave: Scapa Flow

Non-grid connected Tidal: Shapinsay Sound

Floating T&D Site (1)

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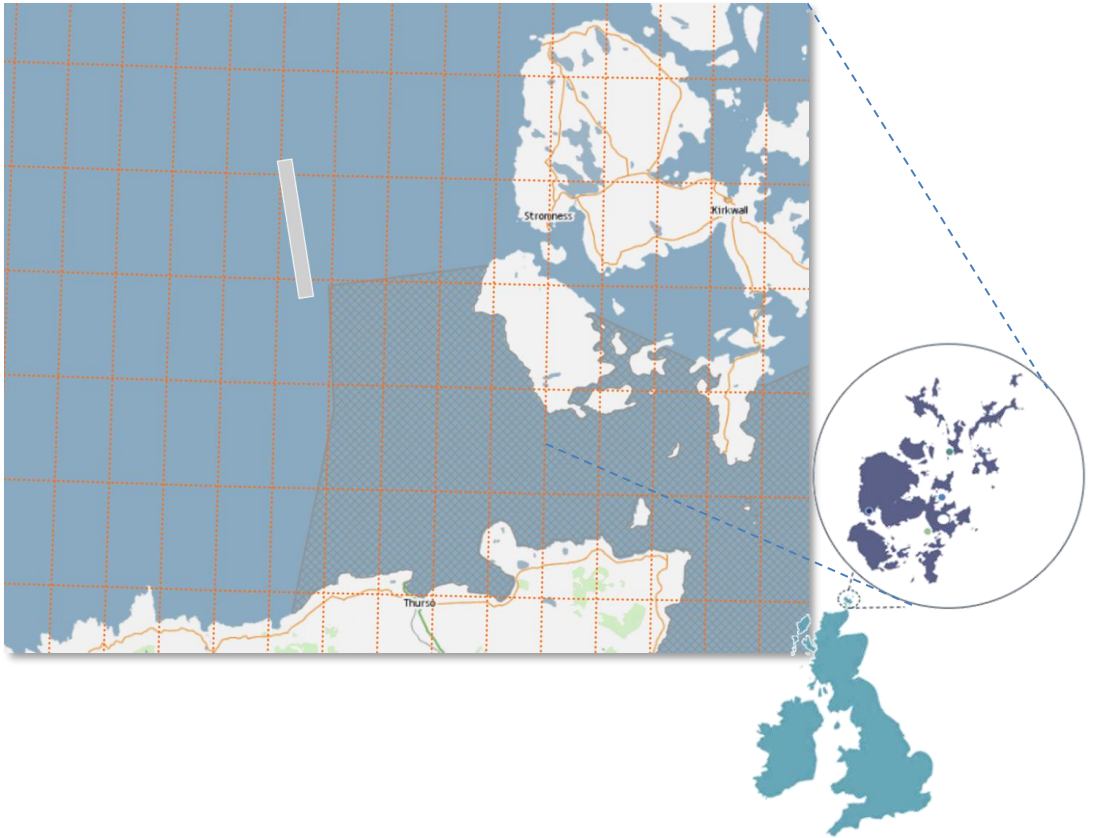
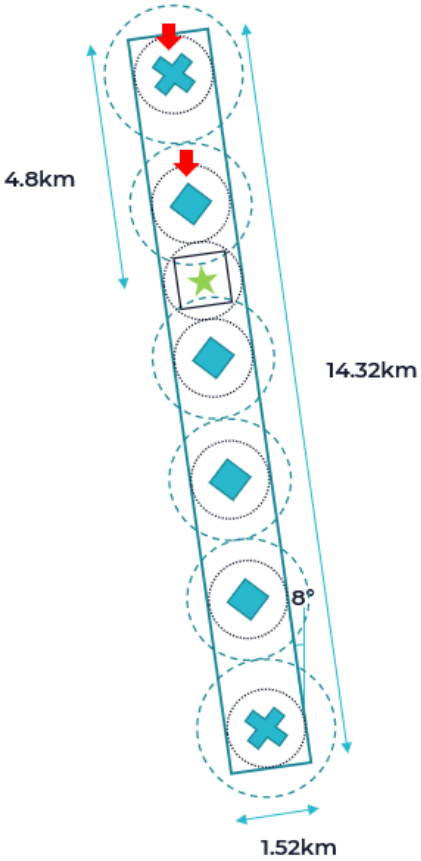
THE EUROPEAN MARINE ENERGY CENTRE LTD

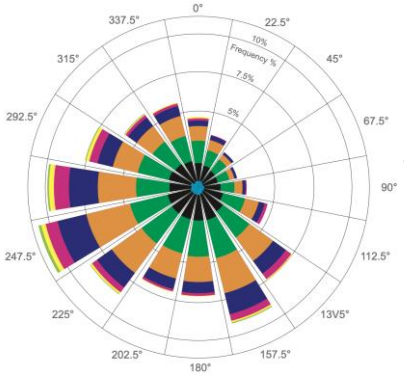
- ~20 km West of Orkney
- 6 berths
- WTGs up to 20 MW
- 80-95 m water depth
- High energy site
- ~22 km from Scapa Flow



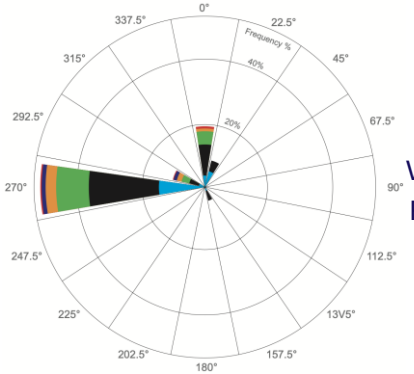
Floating T&D Site (2)

- 4x Grid connected berths
- 2x Alternate offtake berths
- 1x ‘Offshore socket’ platform
- Cable & flowline to shore
- Clean wind orientation
- Consistent wave direction





Wind Rose

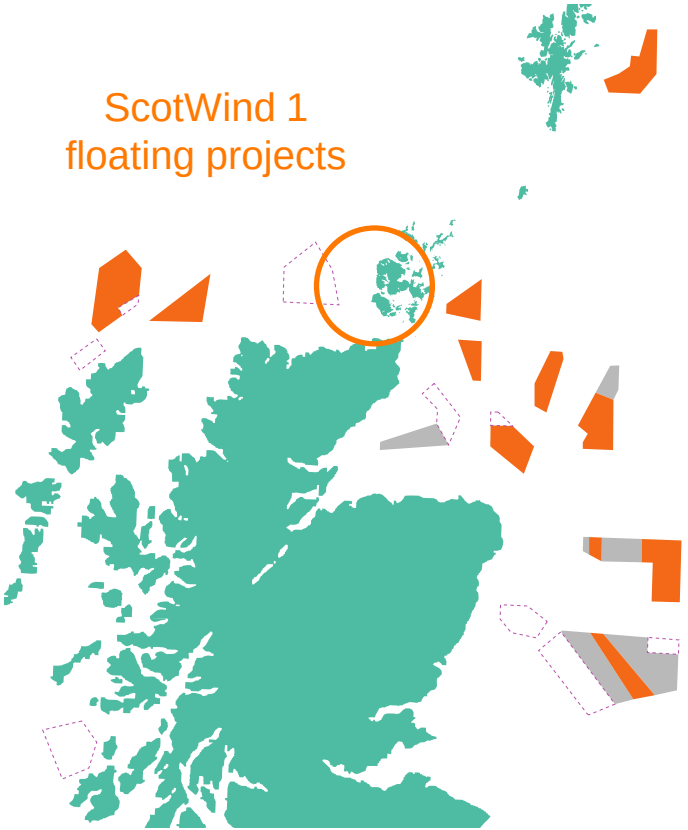


Wave Rose

Location! Location! Location!

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

- ScotWind ‘Arc of Opportunity’
- 17.8 GW of FOW projects
- >10.7 m/s mean windspeed
- > 2.2 m significant wave-height
- True ScotWind conditions!
- Experienced local supply chain



Benefits of Testing at EMEC

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

- Practice deployments & learn
- Iron out bugs & anomalies
- Refine performance & tweak
- Gain fleet leader insights
- Failure is less public, no contractual penalties
- Test in true ScotWind metocean conditions

Diligence & Insurance

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

- Avoid getting DD red flags
- Get believable evidence of storm survivability
- Get 8,000 hours of ‘Normal Operations’
- Avoid ‘Prototypical’ insurance basis
- Reduce deductibles and get generation revenue insurable

Opportunity & Efficiency

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

- Our metocean & timing is great for de-risking ScotWind
- Also Celtic Sea, TOG projects, USA, subsequent rounds, etc
- Great export opportunity for Scottish expertise/supply chain

"Tested in Scotland... deployed around the World."*

(without requiring further testing)*

A Final Thought…

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THE EUROPEAN MARINE ENERGY CENTRE LTD

Westwood Global Energy Group

About Sectors Commercial Advisory Energy Tran

Floating is not a done deal

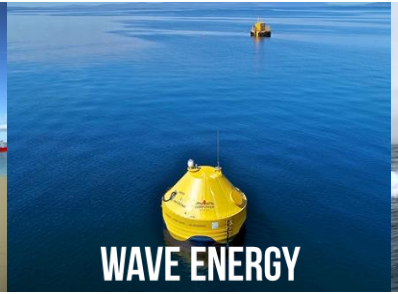
One potential risk to the floating wind pipeline is the lack of developer experience. As mentioned earlier there is a considerable pipeline of floating capacity being tracked, most of which are in the concept and planning stages. It is important to recognise that a lot of the capacity proposed is being put forth by developers who do not have offshore wind experience. If considering only the 1GW+ (large scale) floating projects that Westwood tracks, the majority (68%) is being proposed or led by developers that do not have offshore wind experience. A further 21% have a fixed-bottom track record only and the remaining 11% is led by developers that have a floating wind track record.

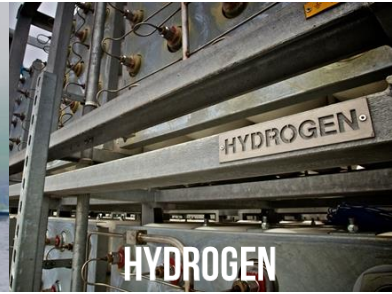
WESTWOOD ENERGY – 22 June 2022
https://www.westwoodenergy.com/news/westwood-insight/westwood-insight-near-15gw-of-floating-wind-capacity-expected-online-by-2030

Supported by: Interreg North-West Europe AFLOWT European Regional Development Fund

EMEC's work for the floating wind test and demonstration site has been supported by the Interreg North-West Europe AFLOWT project which aims to accelerate market update of floating offshore wind technology.

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD





Thank you | pop past stand **G4** in the exhibition

info@emec.org.uk
stuart.brown@emec.org.uk

Stuart Brown
Associate – Floating Wind

Follow us:

Ralph Torr
Head of Floating Wind, ORE Catapult

Thibaut Cheret
Wind and Renewables Manager, OEUK

Graeme Rogerson
Senior Project Manager - Integrated Energy Systems, NZTC

Alexander Quayle
Project Director, Flotation Energy

Stuart Brown
Associate - Floating Wind, EMEC

OFFSHORE WIND CONFERENCE

25 & 26 JANUARY 2023 **GLASGOW**

IN ASSOCIATION WITH | CATAPULT Offshore Renewable Energy

IN ASSOCIATION WITH

CATAPULT Offshore Renewable Energy

Innovation for the nation - how new thinking and new technology can conquer the seas

Chaired by Alex Louden, Senior Technology Acceleration Manager, ORE Catapult

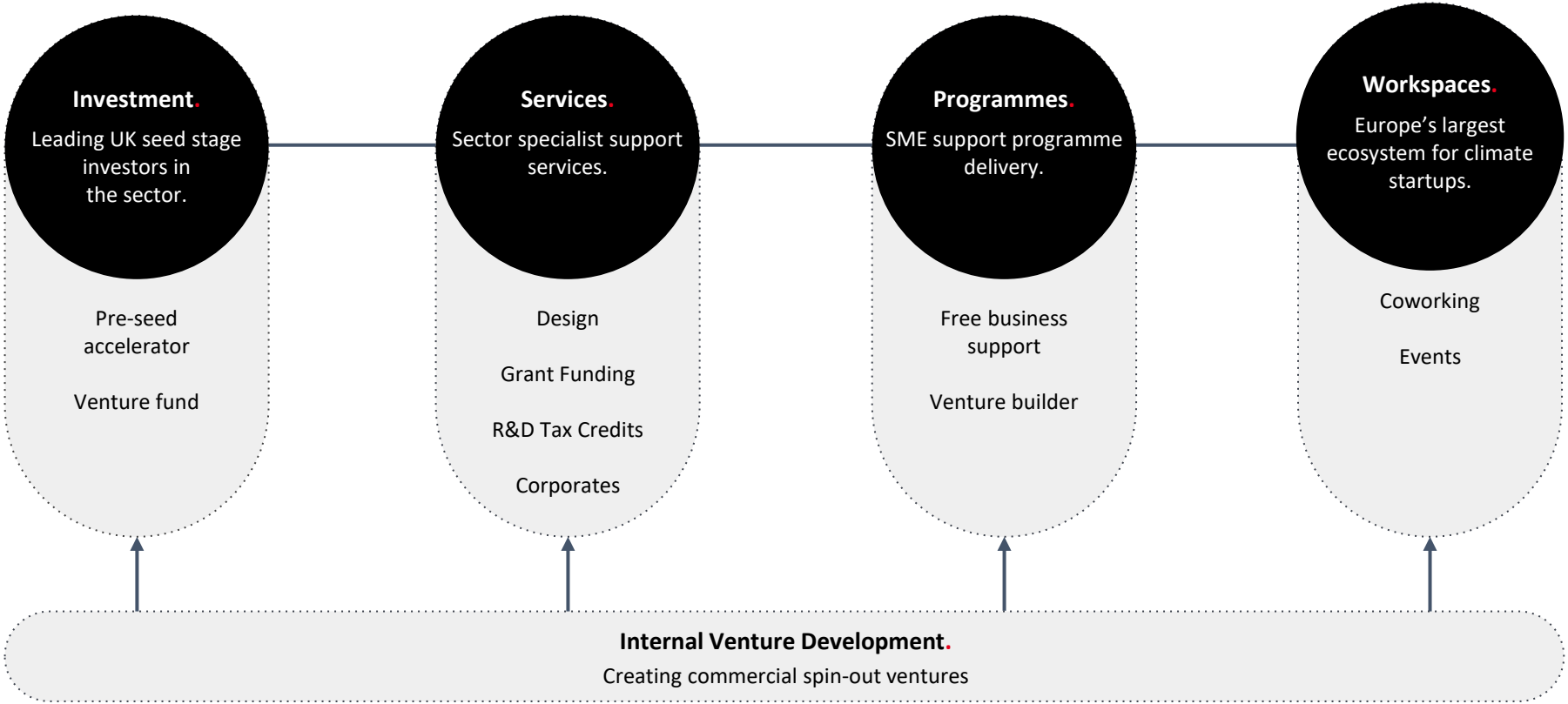
IN ASSOCIATION WITH

CATAPULT
Offshore Renewable Energy

Stuart Ferguson

Investment Partner
Sustainable Ventures

Sustainable Ventures Ecosystem



IN ASSOCIATION WITH

CATAPULT Offshore Renewable Energy

David Bould

Lead R&D Specialist

Ørsted

IN ASSOCIATION WITH

CATAPULT Offshore Renewable Energy

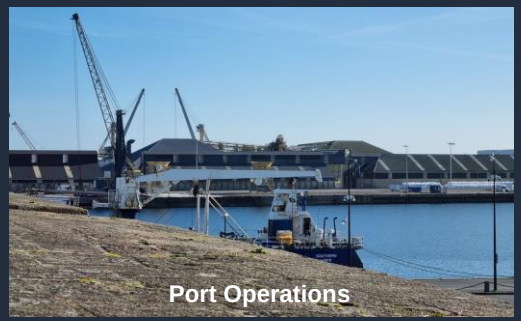
Izzy Taylor

Head of Business Development and Marketing

Jet Connectivity

JET Connectivity

Secure, reliable, and robust 5G connectivity at sea, supporting:



Safe and Secure | Sustainable | Smart Operations

IN ASSOCIATION WITH

CATAPULT Offshore Renewable Energy

Andy Tipping

Head of Commercial

Zelim

INCREASING THE PROBABILITY OF RESCUE

FIND

SARBOX DETECTION

RECOVER

SWIFT RECOVERY

PROTECT

UNMANNED RESCUE VESSELS

IN ASSOCIATION WITH

CATAPULT
Offshore Renewable Energy

Alex Louden
Senior Technology Acceleration Manager, ORE Catapult

Stuart Ferguson
Investment Partner, Sustainable Ventures

David Bould,
Lead R&D Specialist, Ørsted

Izzy Taylor
Head of Business Development and Marketing,
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The long view - ScotWind project updates

Chaired by Morag Watson, Director of Policy, Scottish Renewables

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Bellrock OFFSHORE WIND

Jack Farnham

Development Director

RIDG Power

THE WEST OF ORKNEY WINDFARM

Jack Farnham, Development Manager

26th January 2023

Project partners and vision

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

Fast-tracked timeline

West of Orkney Windfarm

March Public consultation event 1

November 22 Pre-Application Consultation

March 23 Pre-Application Consultation

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 EIA preparation

Onshore consents application

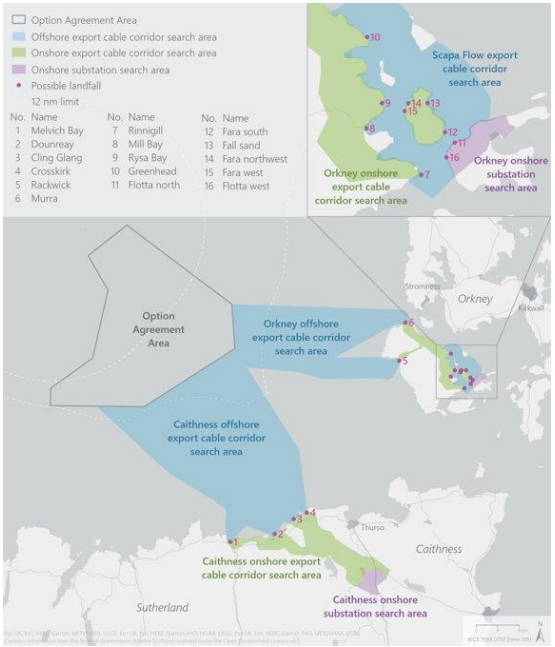
Consent determination

Commence construction

First power

Project refinement - 2022

West of Orkney Windfarm



Consent for Orkney cables aligned with Flotta Hydrogen Hub development programme

Scoping Report, March 2022
Fixed and Floating

Red Line Boundary, Offshore Consent
Fixed only, to accelerate delivery

Development services

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
Collision risk modelling

MacArthur Green
Ornithology

Land Consultancy Services Ltd
Land agent

Engineering and Technical

OWC An ABL Group Company
Engineering Coordinator

SPECTRUM OFFSHORE
Nearshore and landfall hydrographic

MMT An Ocean Infinity Company
Offshore geophysical, benthic and shallow geotechnical

oldbaum Reaching for the Wind
Wind resource assessment

FUGRO
Onshore geotechnical

VAISALA
Scanning Lidar

Measurement Services
Ground-based Lidar

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

Legal, Commercial and Comms

SHEPHERD+WEDDERBURN
Legal

JOHNSTON CARMICHAEL
Accounting

aurora design studio
Web design

McMILLAN
Public Affairs

NEILDAVIDSON Low Carbon Communications
Public Relations

Facilitating Change
Public consultation and engagement

Supply chain and skills development

West of Orkney Windfarm

OWPL will directly invest into early supply chain, innovation and skills initiatives

- **£21.5m in the first three years on infrastructure, innovation and skills:**
  - Ports and harbours (Scrabster and Scapa Deep Water Quay)
  - Technical collaboration studies with key Scottish and UK suppliers
  - Exclusive EMEC innovation partnership around next generation technologies
  - Local skills development programme (UHI - STEM, college/university and vocational training)

- **£33.5m in advance of CfD award into a supply chain investment fund to:**
  - Build on early collaboration and capability studies that identify specific areas for development
  - Enhance the capability and competitiveness of key suppliers in advance of CfD award
  - Used to leverage match funding from third parties who will invest alongside the project

- **£50m pre-FID CAPEX to:**
  - Support key supplier investment and readiness

Alignment Partners (to date)

University of the Highlands and Islands
Oilthigh na Gàidhealtachd agus nan Eilean

GLOBAL ENERGY GROUP

PORT OF CROMARTY FIRTH

Scrabster Harbour
YOUR GATEWAY TO THE NORTH

ORKNEY ISLANDS COUNCIL Harbour Authority

Harland & Wolff

EMEC ORKNEY
THE EUROPEAN MARINE ENERGY CENTRE LTD

ESP

JGC

West of Orkney
Windfarm

www.westoforkney.com

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Bellrock OFFSHORE WIND

Tanya Davies

Projects Director (Europe)

Northland Power

Northland Power's Scottish Offshore Projects

Tanya Davies
Project Director

Who are Northland Power?

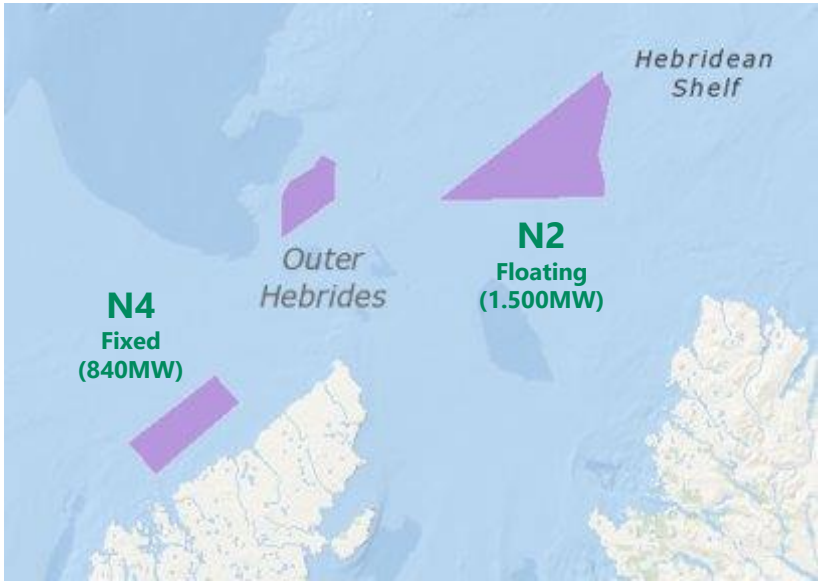
- Northland is an experienced project developer.
- Started in 1987 as Canadian independent power producer.
- Been developing renewable energy projects since 2000.
- Take a long-term view, through build and operation of projects.
- Our Scottish activities are based out of our Glasgow office, together with an office in Stornoway.
- Strong link between the Western Isles and Canada

34+
Years of Sustainable energy solutions

1000+
Employees

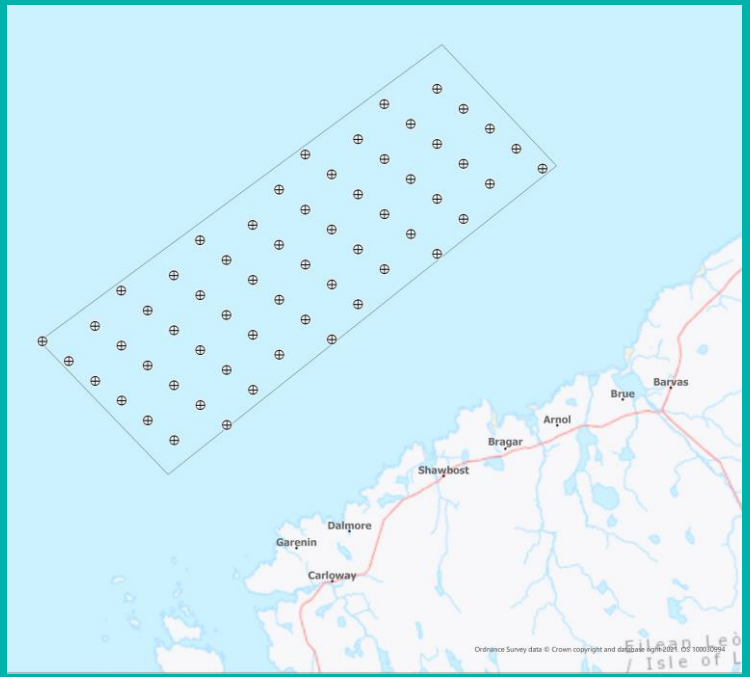
Northland's ScotWind Projects: N2 and N4

- We are proud to have been awarded the rights to develop N2 and N4
- Both projects close to the Western isles / west of Scotland
- Total installed capacity of around 2,340 MW
- N2 (floating) and N4 (fixed)
- Potential to power over around 760,000 homes (N4) and 1.3 million homes (N2)
- Engaging with the island community on Lewis and will be shortly announcing project names with help received from local school children.



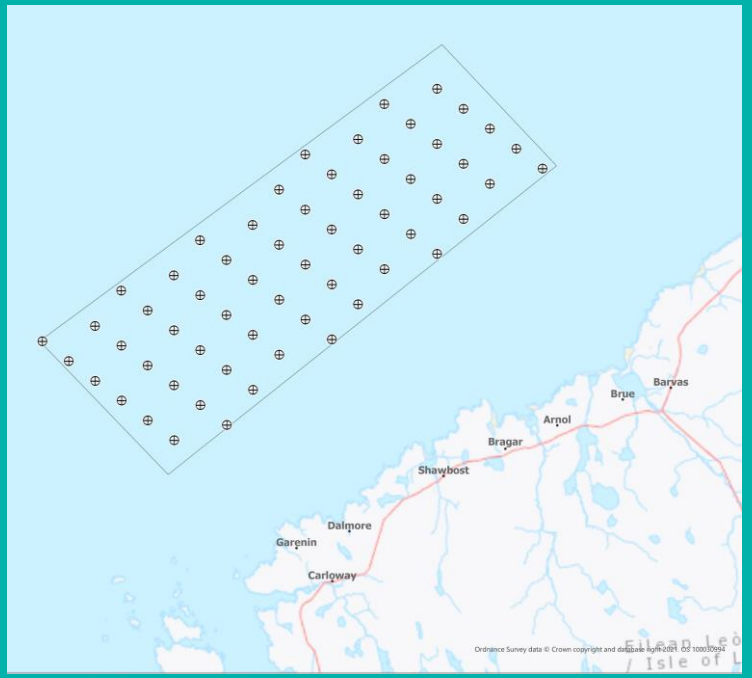
N4 Project Update

- Northland is prioritising the development of N4 first
- Team is growing - 11 appointed in last 12 months – more to come.
- Offices in Stornoway and Glasgow
- Stakeholder and Community Engagement continues with the various statutory and non-statutory consultees
- First public consultation exercise held in May 2022 across 4 days



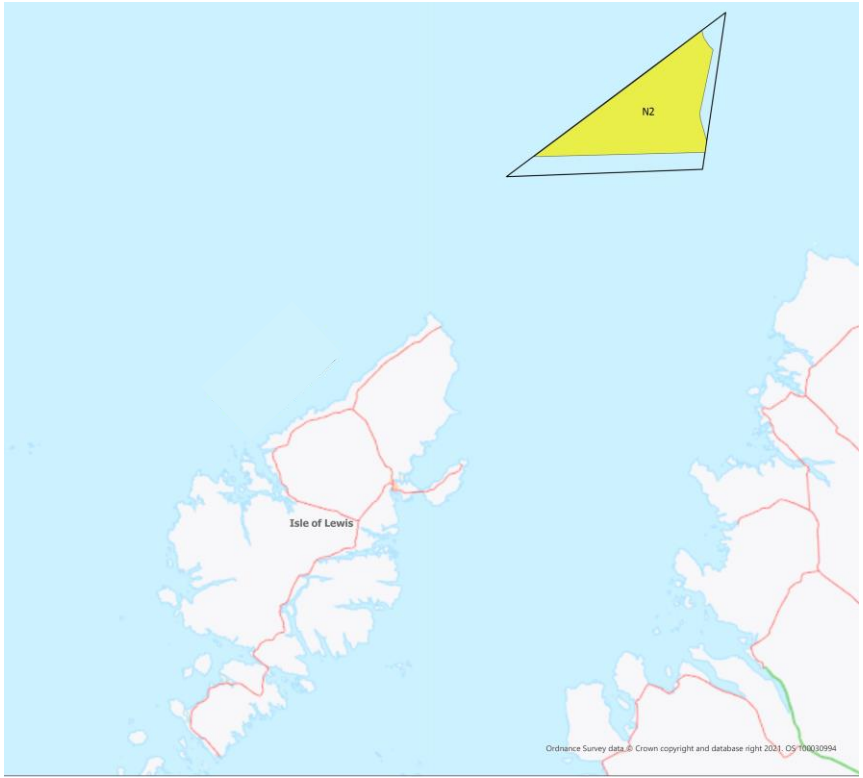
N4 Project Update

- Aerial bird and mammal surveys are currently underway
- EIA Scoping submission Q2 2023
- EIA Tender ongoing
- HND 1 result - Grid connection will be on the Western Isles
- Interconnector will be 1.8GW
- Operational by 2031



N2 Project Update

- Bird surveys to start this year.
- Grid offer accepted to Dounreay – currently a 2033 connection
- Potential to power around 1.3 million Scottish homes
- Expected to be in operation mid 2030's



Thank you!

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Bellrock OFFSHORE WIND

Alasdair MacLeod

Project Director

Buchan Offshore Wind

BUCHAN OFFSHORE WIND

Overview and Key Activities in 2023.

Scottish Renewables Offshore Wind Conference.

Alasdair Macleod

the partnership

Floating Energy Allyance is a partnership of three leading European energy businesses, together they offer a unique breadth and depth of experience and expertise inthe development of floating offshore wind.

BW Ideol is a leading fully integrated platform in floating offshore wind with more than 10 years of experience from design, execution and development of floating wind projects based on Ideol S.A.'s patented floating offshore wind technology and engineering capabilities.

Elicio is a Belgian developer and operator of on- and-offshore wind energy projects. With more than 70 employees, Elicio operates in 4 countries in Europe (Belgium, France, Serbia, Spain). Elicio recognises its people and stakeholder relationships as key assets which enable to deliver development expertise and operational excellence on its portfolio of on- and offshore wind farms across Europe, with a current capacity of 573 equity MW. Our vision is to strive for a more sustainable future by generating clean energy.

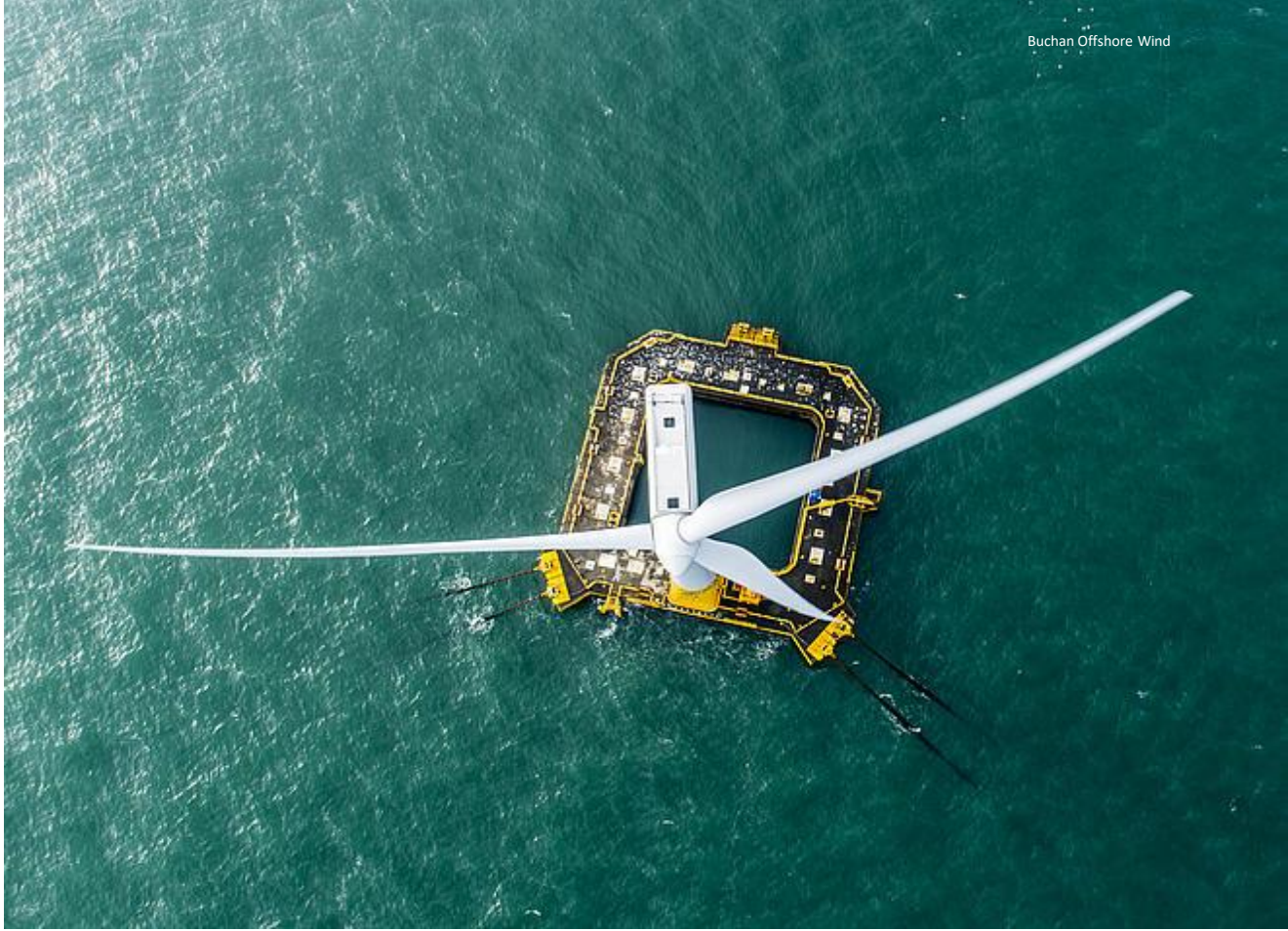
BayWa r.e. is a global renewable energy developer, distributor and energy solutions provider that is part of the dynamic BayWa Group, which generated a turnover of €17.1 billion and an operating profit of €188.4 million in 2019. BayWa r.e. has installed more than 3.5 GW of wind and solar projects worldwide, is the operator of a further 8.5 GW and its development portfolio includes +12.5 GW globally.

map


BUCHAN
OFFSHORE
WIND
Wick
Invergordon
Nigg
Fraserburgh
Peterhead
Ardersier
Inverness
Aberdeen

technology

Our project will deploy BW Ideol's proven and patented Damping Pool® technology, designed to optimise the performance of floating wind turbines, even in extreme conditions. BW Ideol has demonstrated both in France and Japan that its foundation can generate between 85% and 95% of total order value at local level.


Buchan Offshore Wind


Buchan Offshore Wind

Floating Lidar

A Floating Lidar was deployed at the site in November 2022. It will be in situ for two years gathering Metocean data.

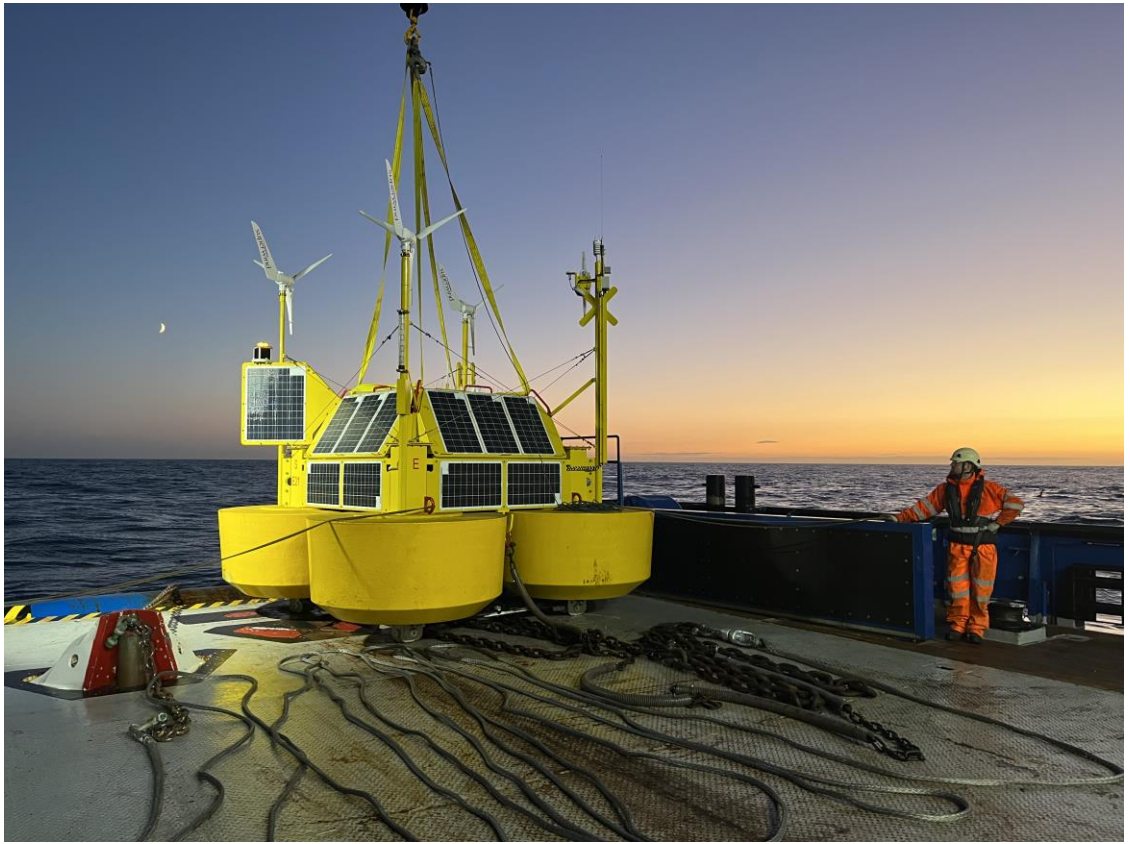
- Windspeed and direction.
- Air and seawater temperature
- Atmospheric pressure
- Wave height and direction
- Water sampling and sediment data

Consultation undertaken with;

- Crown Estate Scotland
- Northern Lighthouse Board
- Maritime & Coastguard Agency

Scheduled Maintenance

- Sea mounted equipment
- Floating Lidar system



Key Activities 2023

- Confirm Grid Connection Q1.
- Progress electrical design options.
- Commence Geotechnical and GeoPhysical Site investigation surveys.
- Progress Onshore & Offshore EIA activity
- Continue stakeholder engagement – offshore and onshore
- Submit EIA Scoping Requests to Marine Scotland
- Update Supply Chain Development Statement for Crown Estate Scotland
- Ongoing participation in SOWEC and SIM (Strategic Investment Model) Stage 1 assessment.

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Bellrock OFFSHORE WIND

Denise Neill

Deputy Project Director

Shell

Working together for a greener energy future

ScotWind floating offshore wind projects

MarramWind
A joint venture between ScottishPower and Shell UK

CampionWind
A joint venture between ScottishPower and Shell UK

SCOTTISHPOWER

MarramWind CampionWind

Intro to the partnership

A Scottish Partnership with Global Floating Expertise

SCOTTISHPOWER

Intro to the partnership

A Scottish Partnership with Global Floating Expertise

The partnership is two joint venture companies owned by ScottishPower Renewables (50%) and Shell New Energies UK (50%) and are set up to develop a major offshore wind farm in Scotland. In January 2022 Crown Estate Scotland awarded SPR and Shell an exclusivity agreement to jointly develop Marram Wind and Campion Wind projects.

5GW

Once built, MarramWind's and CampionWind's floating wind projects could accommodate a **total generation capacity** of around 3 GW and 2 GW, respectively, bringing clean energy to power the equivalent of 6 million homes in Scotland.

70 years

Over 70 years' **combined experience in Scotland**, of which 50 are offshore. Combining our knowledge and capabilities in offshore activities creates a significant opportunity to develop the Scottish supply chain and a Scottish workforce.

15 years

Over 15 years' experience in floating offshore wind

Combined offshore wind portfolio

2GW+

Over 2 GW operational offshore wind

11GW+

Over 11 GW offshore wind in development

700MW

Additional 700 MW of floating wind in development

Scottish supply chain investment

£7.8b

Combined project committed investment in Scotland

£50m

Combined project supply chain stimulus funding

MarramWind CampionWind

www.marramwind.co.uk www.campionwind.co.uk

SCOTTISHPOWER

Attending Today

Denise Neill
Deputy
Project Director

About me:

- Grew up in rural Aberdeenshire
- Witnessed the transition of the North East economy from agriculture to oil & gas first hand
- Studied Chemical Engineering at Edinburgh University
- Joined Shell in 1989
- 30+ years project development and delivery
- Started offshore wind project delivery in May 2022

MarramWind CampionWind

SCOTTISHPOWER

Project Team Leadership & key contacts

Richard Eakin
Project
Director

Denise Neill
Deputy
Project Director

Gayle Morrice
Engineering Manager

David Partington
Deputy Engineering Manager

Charlene Leppard
Supply
Chain Manager

Arron Baxter
HSSE Lead

Catherine Anderson
Development Manager

MarramWind CampionWind

SCOTTISHPOWER

MarramWind CampionWind

Intro to the projects

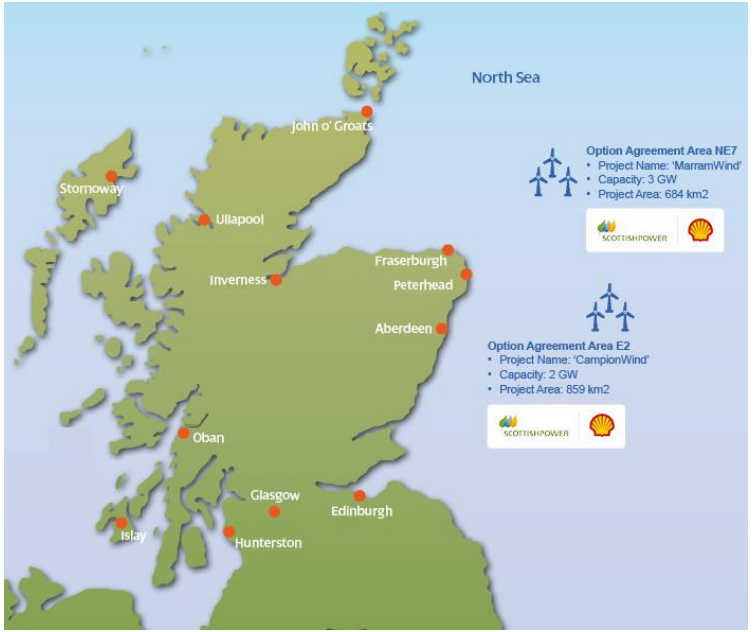
Delivering 5GW of total generation capacity in Scotland

SCOTTISHPOWER

Project Characteristics

Providing cleaner power from floating offshore wind at scale

Key characteristics	MarramWind	CampionWind
ScotWind Plan Option	NE7	E2
Location	Outer Moray / NE Coast	East Coast
Planned Installed Capacity	3 GW	2 GW
Option Agreement Area (OAA)	684 km^2	859 km^2
Onshore Grid Connection Location	Peterhead**	TBC
Offshore Export Cable Route Length	~110 km *	~195 km *
Onshore Export Cable Route Length	~32 km *	~22 km *



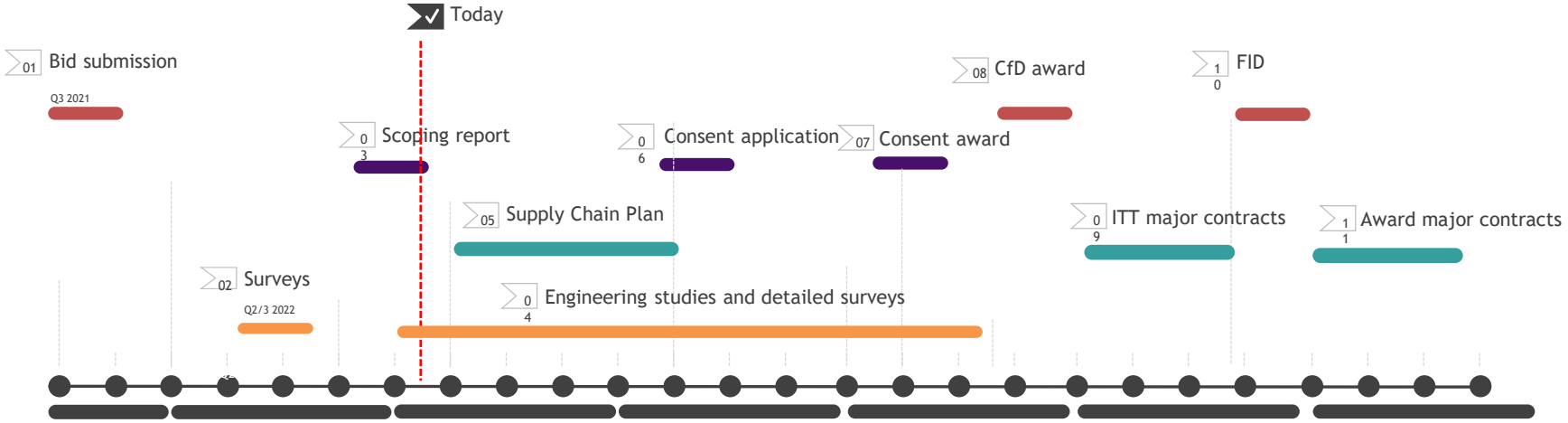
- detailed route subject to further grid study
- **Subject to Holistic Network Design (HND) one

MarramWind CampionWind

SCOTTISHPOWER

Marram expected key activities to FID

Setting the pace in commercial-scale floating offshore wind



- Estimated program to FID between 2021 – 2027 subject to ongoing review.
- Campion project will follow similar path at a later date.

MarramWind CampionWind

SCOTTISHPOWER

MarramWind CampionWind

Supply Chain Strategy

Set to bring new skilled jobs and manufacturing opportunities in Scotland

January 2023

SCOTTISHPOWER

Supply Chain Development Statement

Combined supply chain commitments and stimulus funding

Commitment Table				
	£ Million			
Project Stage	Scotland	rUK	EU	Elsewhere
Development	172.0	53.6	56.4	-
Manufacturing & Fabrication	3,137.8	1,012.1	3.890.5	1,031.0
Installation	201.7	230.4	421.1	-
Operation	1,148.4	95.0	63.4	-

Commitment Table				
	£ Million			
Project Stage	Scotland	rUK	EU	Elsewhere
Development	178.7	55.7	58.6	-
Manufacturing & Fabrication	2,091.9	674.7	2,593.7	687.4
Installation	134.5	153.6	280.8	-
Operation	765.6	63.4	42.2	-

£7.83b
Combined Scottish Expenditure

£1.5M Per MW
Committed Scottish Expenditure

£50M
Combined stimulus funding

MarramWind CampionWind

SCOTTISHPOWER

Supply Chain Development

Aim : Maximise socio-economic opportunities for communities associated with the Marram and Campion Wind Projects

Commitment: £50m in supply chain stimulus funds to support both projects ahead of CfD.
To invest up to **£7bn** in Scotland through delivery of Marram and Campion Wind Projects

Through:

- Identifying local supply chain opportunities
- Creating sustainable local industry & jobs
- Developing a skills strategy
- Supporting development of low carbon/net zero technology

Focus Areas:

Ports/Yards infra

SME's – Supply Chain Development

Skills Planning / Training

Innovation / Technology

Asks:

- What barriers have you seen to date?
- How can we help as developers?

MarramWind CampionWind

SCOTTISHPOWER

Key Project Opportunities & Challenges

Opportunities

- **Scale**: We have the scale to make development of technology viable
- **Capability:** We have the experience and skills that are essential for success
- **Ambition:** We have the ambition to be a leader in the Floating Offshore Wind sector

Challenges

- **Supply chain capacity**: Many suppliers are operating at nearly full capacity and resources to expand are scarce
- **Technology risk**: Developing a new technology at this scale brings significant investment risks that need to be mitigated
- **Grid capacity:** Delivery of our projects is dependent on delivery of major projects to upgrade grid capacity
- **Regulatory environment:** The regulatory context for these projects is evolving and it is difficult to predict or foresee changes
- **Economic context:** Rapidly changing economic conditions make it difficult to create the conditions for investment
- **Environment:** Critical to balance project drivers with impacts on the environment such as ornithological and fishing effects
- **Local content:** Identifying supply chain opportunities early enough to be able to develop in time

MarramWind CampionWind

Summary

- **Strong partnership with the ambition to lead in Floating Offshore Wind development**
- **Moving at speed and scale**
- **Collaborating with our supply chain and stakeholders**

MarramWind CampionWind

Thank you!

Find out more at marramwind.co.uk and campionwind.co.uk

SCOTTISHPOWER

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Bellrock OFFSHORE WIND

Catarina Rei

Head of Development

Ocean Winds

Ocean Winds ScotWind Sites

SR Offshore Wind Conference

January 2023

Catarina Rei

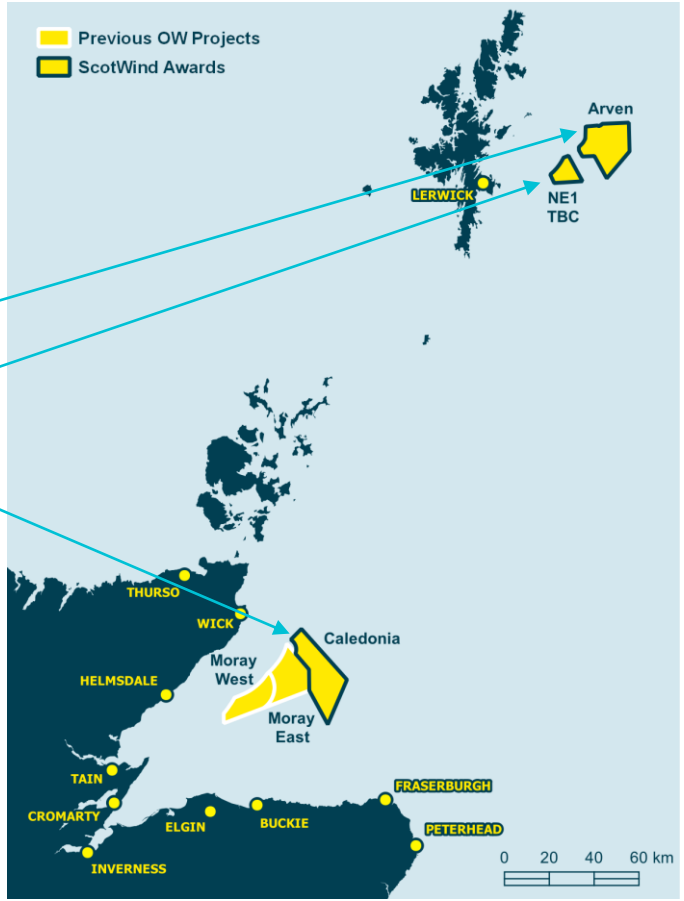
Head of Development, Ocean Winds

Glasgow, 26 January 2023

Ocean Winds sites awarded through ScotWind

Ocean Winds (OW) ScotWind Sites:

1. Caledonia Offshore Wind Farm (100% OW)
2. Arven Offshore Wind Farm (50:50 OW and Mainstream RP)
3. NE1 Project, East Shetland (100 % OW)



Caledonia Offshore Wind Farm

Location: Outer Moray Firth, immediately east of Moray East Offshore Wind Farm (approx. 25km to Wick and approx. 42km to Fraserburgh).

Area: 429km^2.

Water Depth: 40-101m (average approx. 59m).

Foundation: Fixed-bottom, although deeper water to south could support floating.

Project Capacity: 2GW

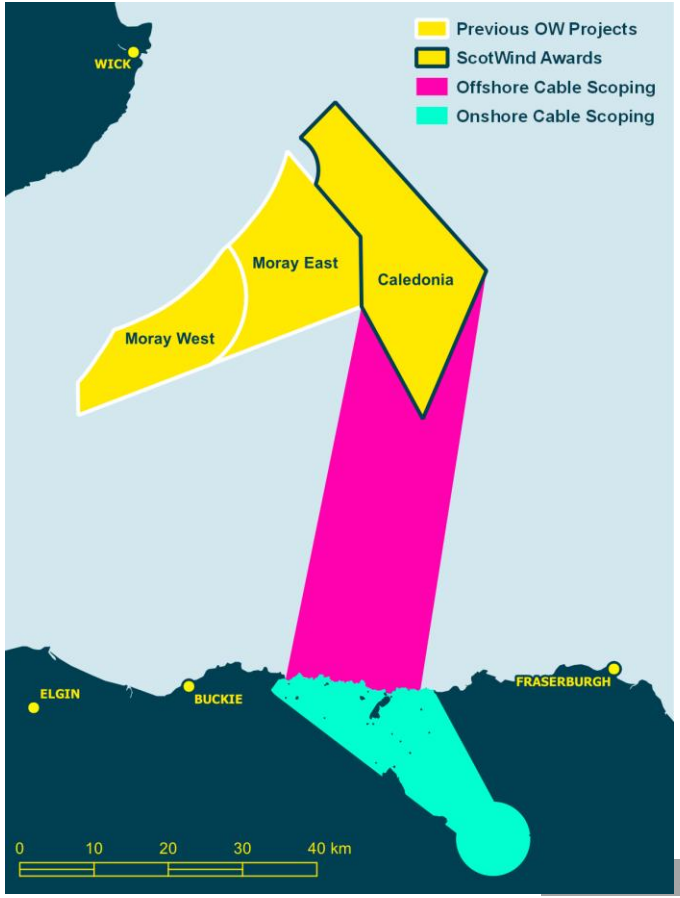
Grid Connection: 2GW offer at New Deer in Aberdeenshire, 1.5 MW by 2030, 500MW awaiting outcome of HND2

Progress to date:

- Offshore Scoping - submitted in Sep-2022 and Scoping Opinion received in Jan-2023.
- Onshore Scoping - submitted in Nov-2022 and Scoping Opinion expected on 30 Jan-2023
- First round of public consultations (related to offshore) held November 2022.
- Geophysical surveys – 2022 campaign successfully completed, focused on the wind farm site. Surveys in 2023 will focus on the export cable route.

Key Project Milestones:

- Consent applications submission – 2024
- Consent award 2025
- Start of construction – 2027/28
- Full operation – 2030, subject to HND2



Shetland Offshore Wind Sites

MAINSTREAM RENEWABLE POWER

OW OCEAN WINDS

Project: Arven Offshore Wind Farm

Location: East of Shetland.

Area: 362km^2.

Water Depth: 99-138m.

Foundation: Floating.

Project Capacity: 1.8GW.

Exploring different routes to market, including grid connection.

OW OCEAN WINDS

Project: Project name TBC

Location: East of Shetland.

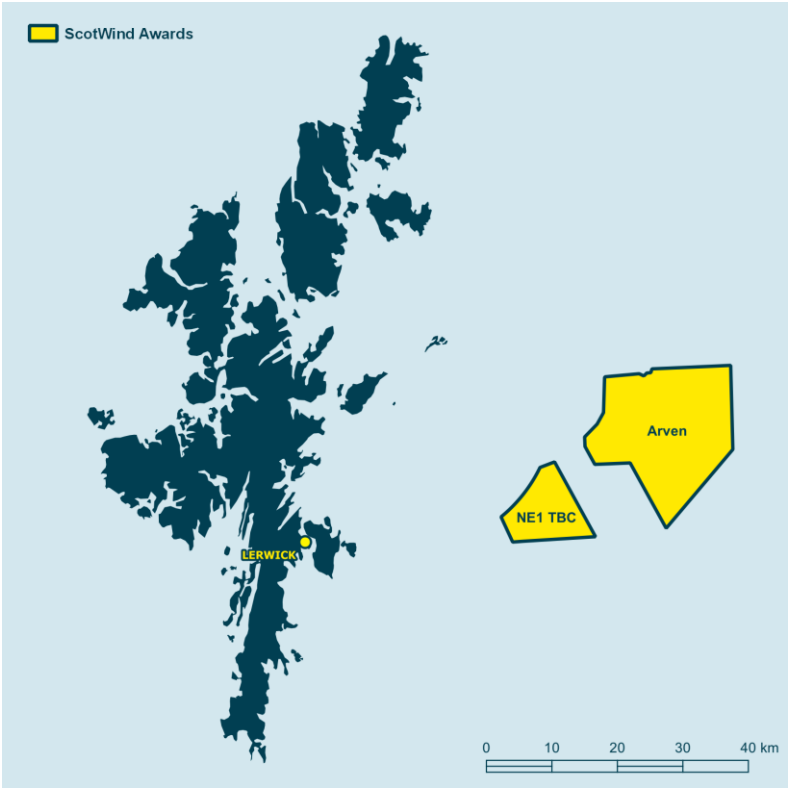
Area: 100km^2.

Water Depth: 105-134m.

Foundation: Floating.

Project Capacity: 500MW.

Exploring different routes to market, including grid connection.



Enabling the acceleration of projects:

1. For these projects to move forward at speed a route to market needs to be developed, including the ability for these projects to be grid connected, hydrogen or e-fuels [Shetland].
2. De-risking projects that can be delivered by 2030 are crucial to develop the supply chain [Caledonia].
3. Consents: clear guidance on strategic compensation and the methodologies of cumulative / in-combination assessments is required [all projects].

SESSION SPONSOR

Bellrock OFFSHORE WIND

David Robertson

Project Director

Bellrock Offshore Wind

SESSION 6B
THE LONG VIEW

BELLROCK AND BROADSHORE
PROJECT UPDATES

PROJECT INFORMATION

BlueFloat ENERGY
Renantis
PARTNERSHIP

PROJECT INFORMATION		Bellrock OFFSHORE WIND	Broadshore OFFSHORE WIND
	Ownership	50/50 JV BlueFloat Energy | Renantis	50/50 JV BlueFloat Energy | Renantis
	Capacity	1200 MW	900 MW
	Nº WTGS	TBC	TBC
	Foundation type	Floating Steel, Concrete or Hybrid Technology Agnostic	Floating Steel, Concrete or Hybrid Technology Agnostic
	Offtake	HVDC – HND 1 collocated offshore connection	HVAC - subject to HND 2
	Area (KM²)	280 km²	134 km²
	Distance to Shore	120 km	50 km
	Water depth	70-100 m	70-100 m
	Average Wind Speed	10.5 m/s	10.5 m/s

KEY PROGRAMME ACTIVITIES

BlueFloat ENERGY
Renantis
PARTNERSHIP

Details	Bellrock	Broadshore
Total Capacity	1200MW	900MW
Current Main Activities:		
Recruitment	Ongoing recruitment of the core project team	
Environmental Surveys	Bird and Marine Mammal surveys	
Metocean Campaign	Floating LIDAR and Metocean deployment	
Site Investigations	Geophysical & Geotechnical Surveys	
Stakeholder Engagement	Key stakeholder engagement	
Grid Connection	Holistic Network Design & Alternatives	
Supply Chain Engagement	Supply Chain Development Commitments	
Design Envelope for Scoping & Consent Application	• Wind Turbines • Floating Structures • Moorings & Anchors	• Offshore Substations • Subsea Cables • Electrical Systems

Project Development Timing					
Wind Farm Development Area Consent Application: mid-2020's	Onshore Transmission Development Area Consent Application: TBC	Offshore Transmission Development Area Consent Application: TBC	FID: late-2020's	Construction: late 2020's / early-2030's	Commercial operation: early 2030's

Supply Chain Registration

www.bellrockwind.co.uk

www.broadshorewind.co.uk

- Supply Chain page:
  - Supply Chain Registration
  - Procurement Opportunities
- **Supply Chain Registration:**
  - Contact details
  - Development phase / Geography
  - Anticipated level of Scottish content
  - Select services/products of interest

BlueFloat Renantis PARTNERSHIP

SESSION SPONSOR

Bellrock OFFSHORE WIND

Kevin Murphy

Project Manager

Marubeni

Project Update

Scottish Renewables' Offshore Wind Conference

26th January 2023

Ossian Project Overview

Credit: CES

Joint venture between:
SSE Renewables
Marubeni Corporation
Copenhagen Infrastructure Partners

Up to **3.6 GW** Capacity

Minimal seabed mobility

Anticipated mean wind speed – 11.4m/s

Well understood seabed composition

Range of well situated East coast O&M bases

Approximately **84 km** to shore at nearest point

Water depth range of **60m-154m** (73m average)

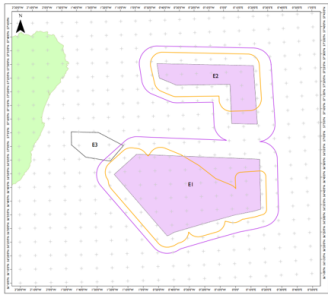
HVAC / HVDC transmission infrastructure

Site Area 858 km^2

Located in Sectoral Marine Plan Option Area E1

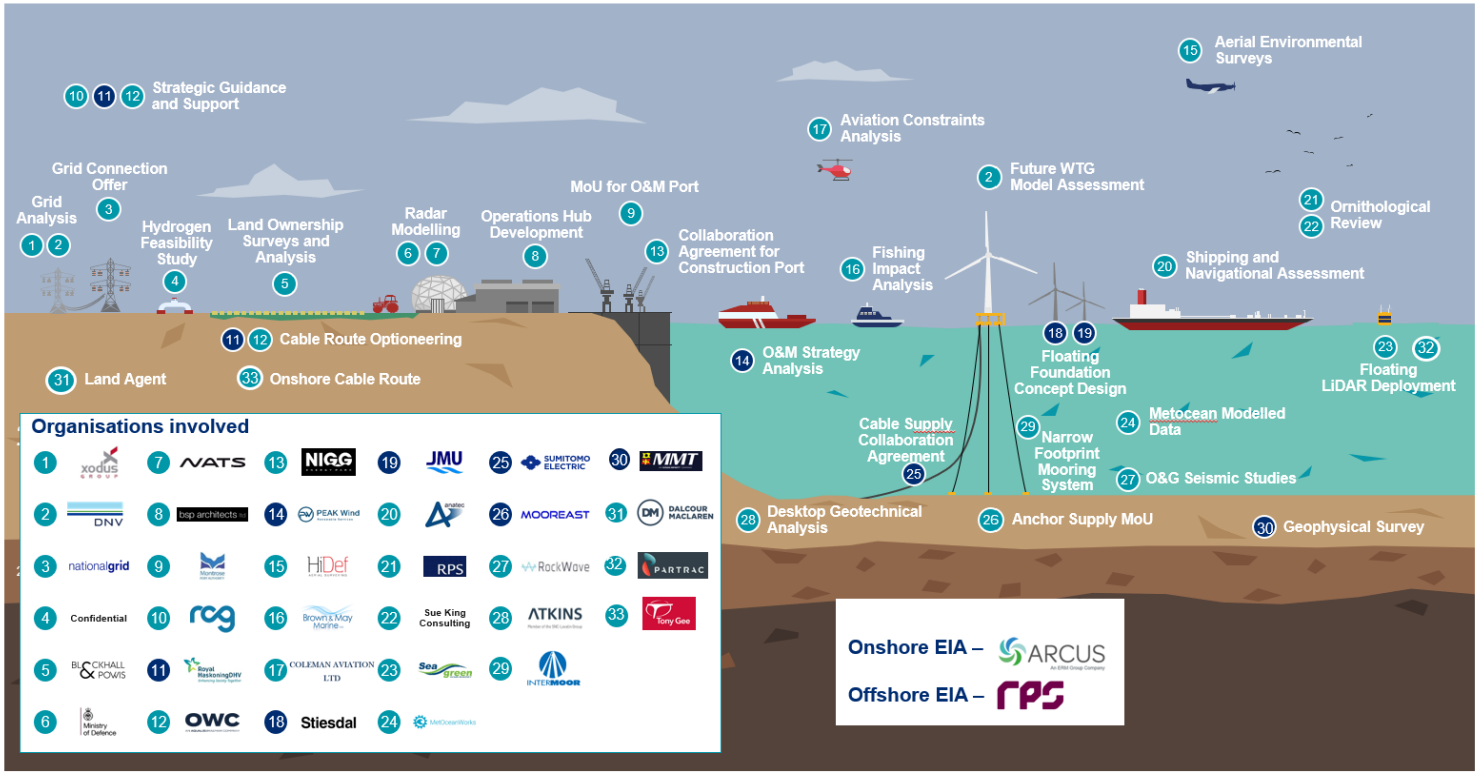
Progress to Date – Site Investigations

Ornithology and Marine Mammal Surveys	• Aerial ornithological and marine mammal surveys of the project area are ongoing, with surveys due to conclude in Q1 2023. • One year of regional ornithological surveys (covering the E1 and E2 sites with a 12km buffer zone) due to complete in February 2023.



Wind and Metocean Measurement	• Partrac appointed to deploy two floating FLiDAR devices and three metocean measurement buoys. • Devices deployed at project site in August 2022 following successful floating LiDAR offshore validation.
Preliminary Geophysical and Geotechnical Surveys	• The wind farm preliminary geophysical survey mobilised in March 2022 and was completed in July 2022, including benthic sampling. • Project is tendering for offshore export cable route preliminary geophysical and benthic surveys and wind farm preliminary geotechnical investigations to be performed over Spring / Summer 2023.
Vessel Traffic Surveys	• The winter vessel traffic survey carried out in December 2022. • The summer vessel traffic survey will be completed in early Summer 2023.

Progress to Date



>60 Contracts signed

>20 Stakeholders engaged

40 Team members and growing

Speaking with **>70** suppliers

Ossian Project Overview

The project partners have **projected spending over £8bn in Scotland over the life of the project**, of which £3.8bn is expected to be realised during development, construction and the first six years of operation.

Development	• Local suppliers in Scotland and the wider UK have strong existing capabilities to provide a wide range of development services. • Development phase services include studies, surveys, and analysis, and the personnel resources required to obtain planning consents.
Manufacturing and Installation	• There is great potential for a high level of Scottish and wider UK content across significant scopes during the manufacturing and installation phase. • Fabrication opportunities being explored include: Wind Turbine Generator blades and towers; Floating foundation fabrication and assembly; moorings and anchoring solutions; Inter-array cables manufacturing; Onshore and offshore substation fabrication; Operations base construction. • Installation opportunities being explored include: onshore Wind Turbine Generator and floating foundation assembly works; onshore export cable civil works; mooring and floating foundation installation.
Operations	• A high degree of Scottish and UK content is expected during the operations and maintenance phase, with much of this activity centred around the project's local operations base.

With the Strategic Investment Model now open for applications, Ossian is engaging with the supply chain for possible candidate projects and welcomes input from suppliers.

Supply Chain Activity in 2023

Q1 2023	Q2 2023	Q3 2023	Q4 2023
Supply Chain (Primary Contractors) RFI	Electrical concept design and analysis	Interim Wind Farm Geotech	Harbour Design
Onshore targeted ground investigation (pre-FEED)	Floating WTG Assessment	Installation Concept Assessment	Substation Concept Development
Onshore topographic survey (pre-FEED)	Offshore G&G Survey Enabling Works	Floating structures (pre-FEED)	
Floater Concept Design	Ground Model		

Contracting and Suppliers	Project is contracting services through a mixture of frameworks and competitive tenders. **Suppliers should register with SSE: sse.com/potential-suppliers/ and contact the Ossian Wind Farm team: Scotwindsuppliers@sse.com**
Request for Information	We are currently finalising tenders for cable route geophys, benthic, pre-FEED work, and ground model development over coming months and are very keen to hear from companies in those fields. Supply Chain RFIs will focus on EPC items – WTG, floating foundations, array cables, export cables, substations, T&I, mooring/ anchoring and ports and harbours.

OFFSHORE WIND CONFERENCE

25 & 26 JANUARY 2023 **GLASGOW**

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Consenting - the road to realisation

Chaired by Colin Innes, Partner, Planning and Environment, Shepherd + Wedderburn LLP

Colin Innes
Partner, Planning and Environment, Shepherd + Wedderburn LLP

Jon Abbatt
Lead Consents Strategy Manager, SSE Renewables

Nancy McLean
Head of Consents, Bellrock Offshore Wind
(BlueFloat Energy | Renantis Partnership)

Debbie Harper
Associate Director, Arup

Zoe Crutchfield
Head of Marine Scotland Licensing Operations Team,
The Scottish Government

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