



Celtic Sea FLOW Summit

Sandy Park Conference Centre
27th April 2022

DELIVERED BY



Cornwall FLOW Accelerator



HM Government



European Union
European Regional
Development Fund

Session 1

AMBITION & VISION



Welcome to the Celtic Sea FLOW Summit

Phil Johnston
Celtic Sea Power



Housekeeping

- No fire alarms planned
- Emergency exit
- Toilets
- Covid19



Aim and Format of this Summit

- *Build a Sustainable Regional Industry in the UK Celtic Sea region*
 - Set out the challenge
 - Update on work underway
 - Agree consensus on next steps forward
- “Chatham house” rules
- Key points to be summarized

SESSION 1 – AMBITION & VISION

1000	Welcome & Housekeeping. Set the scene. Aims and Objectives	Phil Johnston, Celtic Sea Power
1010	The Ambition: UK Energy Independence	Steve Jermy, Celtic Sea Power
1030	Vision for Sustainable Regional Industry in Celtic Sea region... How?	Matt Hodson, Celtic Sea Power
1045	Open Forum	All
1100	Coffee	

SESSION 2 – PORTS, ENGINEERING AND INFRASTRUCTURE

1115	The ports working group position paper – an introduction.	Richard Ballantyne, British Ports Association
1140	Open forum discussion into key challenges and potential solutions, with ports representatives on the panel and input invited from the room.	All
1230	Lunch	

Agenda - Afternoon

SESSION 3 – GRID

1330	The grid challenge for Celtic Sea: What could the future look like for Offshore Transmission?	Brad McKay, Offshore Renewable Energy Catapult
1345	MOSS: an example of how to streamline cable-routing /grid connectivity	Piers Guy, Celtic Sea Power
1400	Open forum	All

SESSION 4 – WORKFORCE DEVELOPMENT

1415	The challenges of developing a workforce for Celtic Sea FLOW.	Justin Olosunde, University of Exeter
1425	Lessons from other sectors to apply to workforce development for FLOW in the Celtic Sea	Matt Higgs, Babcock Marine
1435	The challenge/opportunity to ensure diversity in future Celtic Sea FLOW workforce	Kerry Hayes, Simply Blue Group
1445	Open forum	All

SESSION 5 – SPATIAL PLANNING & CONSENTING

1500	The challenges of consenting and the need for actionable data. Update on Poseidon.	Alex Banks, Natural England
1515	Pre-consent surveys in the Celtic Sea for FLOW development	Graham Moates, The Crown Estate
1530	Celtic Sea data collection campaigns and data sharing initiative.	Neil Farrington, Celtic Sea Power
1545	Open forum	All

SESSION 6 – RECAP AND NEXT STEPS

1600	Summarise today's summit.	Matt Hodson, Celtic Sea Power
1630	Close	

The Ambition: UK Energy Independence

Steve Jermy
Celtic Sea Power



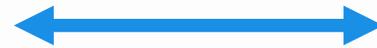
Britain's Energy Transition



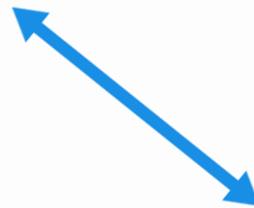
Nuclear



Renewables



Fossil Fuels



“Leading the (2nd) Green Industrial Revolution.”

STRUCTURE

1. Global Energy Context
2. British Energy Security Strategy
3. Celtic Sea FLOW Regional Strategy

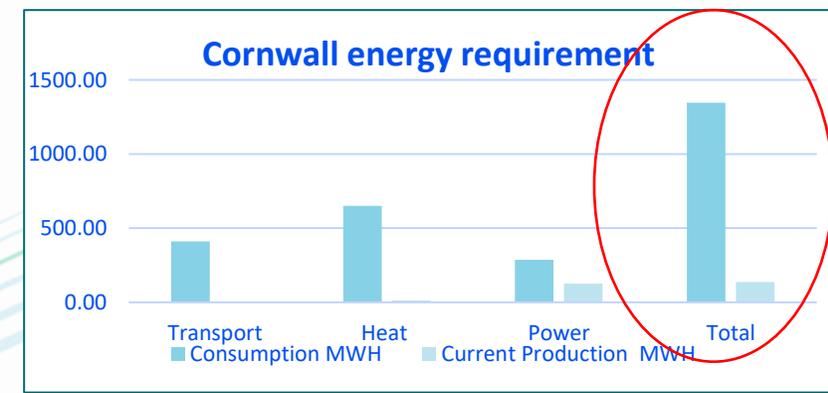
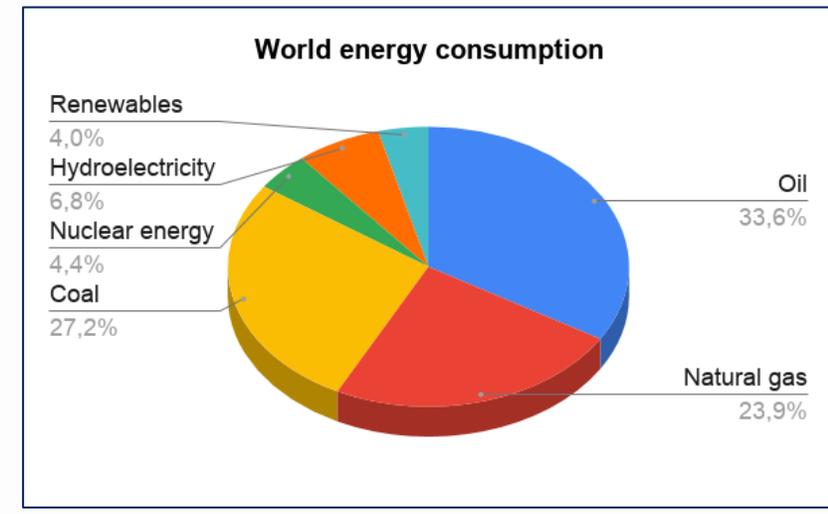
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1 – GLOBAL ENERGY CONTEXT

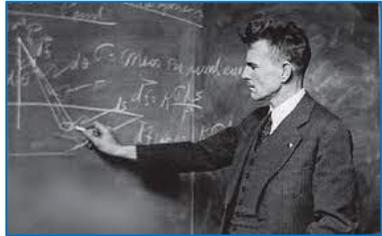
The Context – “So What?”

- **Oil Supply?**
 - 1964 – Peak global oil field discovery
 - 1984 – last time we discovered more oil than we used
- **Conventional v Unconventional Oil?**
 - Conventional = Plentiful, High Quality, Cheap
 - Unconventional = Scare, Low Quality, Expensive
- **Renewable Energy?**
 - Scale – struggle to replace 80% primary energy supply
 - Nature – challenge to produce substitute fuels needed to replace diesel, marine diesel and aviation
 - Price – more expensive as oil prices rise

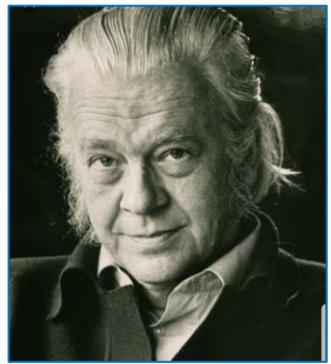


“Welcome to the Energy Transition.”

1 – GLOBAL ENERGY CONTEXT

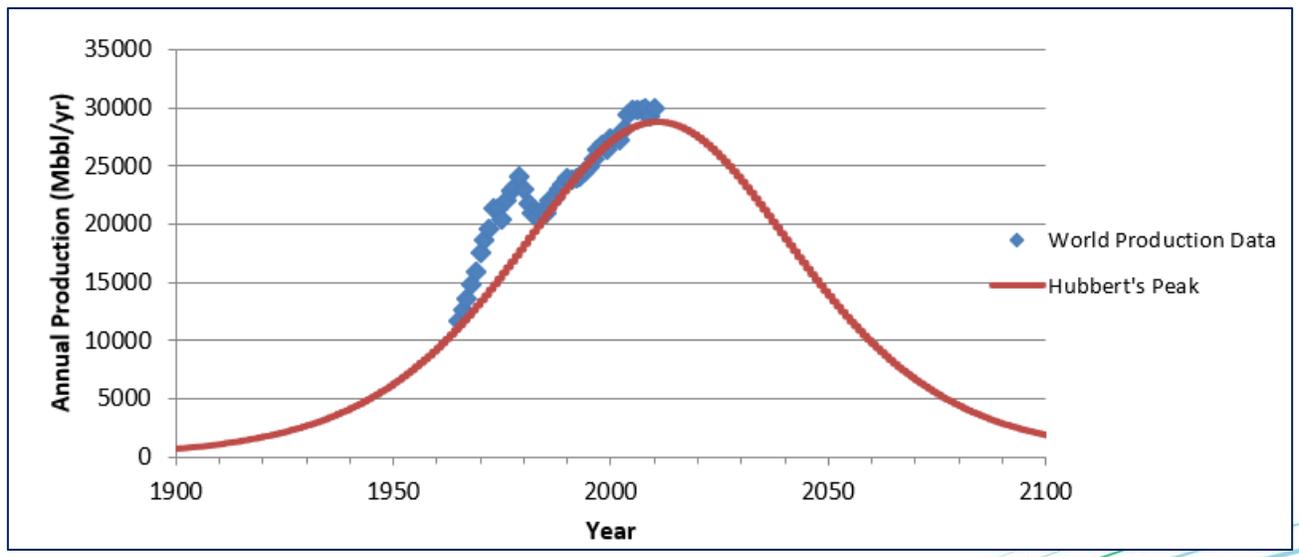


Hubbert King



Schumacher

The Cause – “Peak Oil”



Campbell



Laherrère

“Oil supply is beginning to reduce ... thus the era of cheap and plentiful energy is over.”

Predicaments or Problems

- Economics – **global recession**, debt defaults; fiat currency collapses; banking system failures
- Politics – increasing volatility; rise of the left & right; failure of neo-liberalism
- Societal – mass migration; blaming of the “other”; reversion to localism, **end of globalisation**
- International – periphery to core; middle income fail first; energy importers fail first

1 – GLOBAL ENERGY CONTEXT

Context: “The impact of world events?”

- **Pandemic – 2020-21**
 - Global recession reduced oil & gas demand
 - Oil companies reduced upstream investment
- **Russo-Ukrainian War – 2022**
 - Russia produces 10% of world’s exportable oil
 - 50% of Germany’s gas
 - 40% of Europe’s refined diesel
 - Putin has time on his side
 - Russians insulated from energy & food price rises
 - Western energy crisis
 - Most likely outcomes will be:
 - best case = oil stutter;
 - worst case = world’s 3rd Oil Shock.



“Be prepared for the World’s 3rd Oil Shock.”

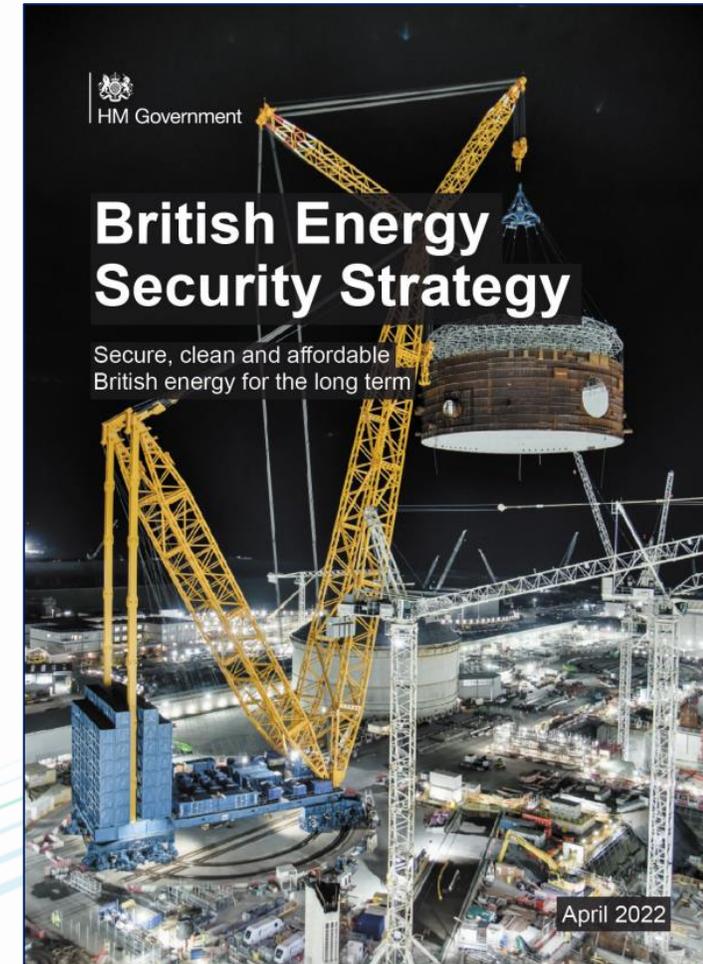
STRUCTURE

1. Global Energy Context
2. British Energy Security Strategy
3. Celtic Sea FLOW Regional Strategy

2 – BRITISH ENERGY SECURITY STRATEGY

The BESS – Global Energy Context

- **Phases:**
 - 2022-25 – *Acute* – Energy Crisis – Denial & Anger
 - 2026-2030 – *Chronic* – Energy Transition – Negotiation & Acceptance
- **Economy:**
 - Cost of living crisis – energy crisis
 - Rising inflation – driven by energy price rises
 - Rising renewable energy prices – due to rising diesel prices
- **Responses:**
 - Economic stimulus – this won't work
 - Energy Transition - this might work, but not quickly
 - National Repositioning – will eventually occur around the idea and need for national energy transition

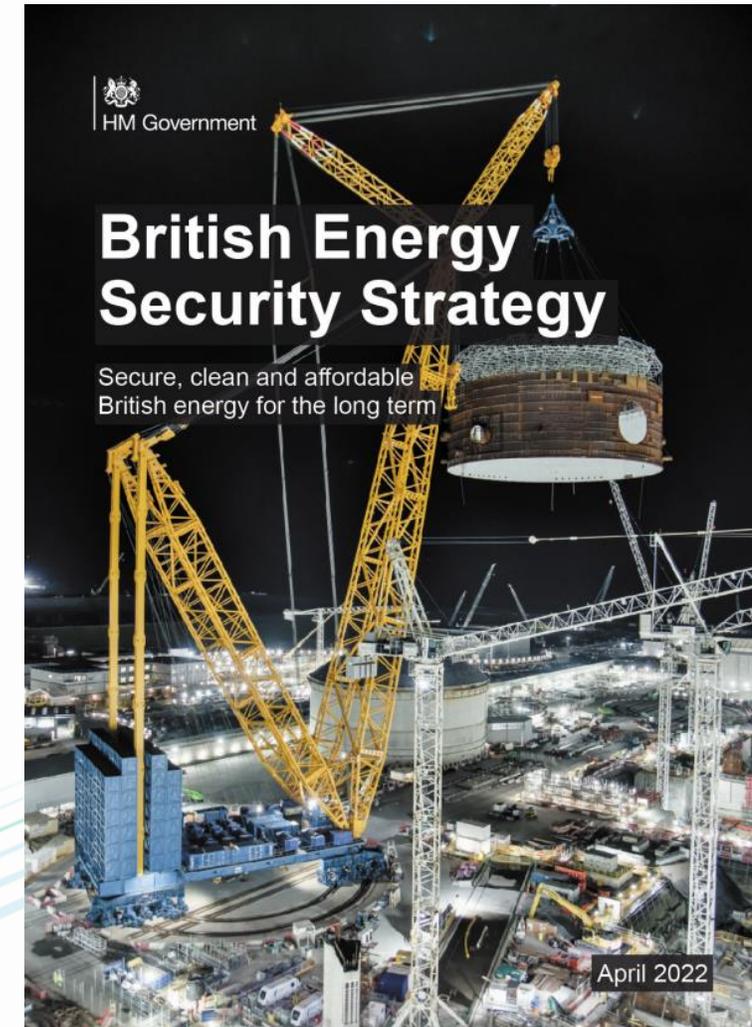


“Energy transition will become the national priority.”

2 – BRITISH ENERGY SECURITY STRATEGY

The BESS – FLOW Policy Objectives

- **Installed Capacity:**
 - 50GW of FXOW & FLOW by 2030
 - 5GW of FLOW by 2030
 - 2.5GW of Celtic Sea FLOW by 2030
- **Planning, Development & Environment:**
 - Offshore Development – why 8 to 13 years?
 - Offshore Consent – from 4 to 1 year
 - Offshore Environment – review HRA process and implement a new Offshore Wind Environment Improvement Package
- **Industry & Infrastructure:**
 - Offshore Wind Acceleration Task Force – to work with HMG, OFGEN & National Grid
 - Ports Investment - £160M by end 2022
 - SRI Investment – £31M for R&D



“Energy transition will become the national priority.”

STRUCTURE

1. Global Energy Context
2. British Energy Security Strategy
3. Celtic Sea FLOW Regional Strategy

3 – STRATEGY

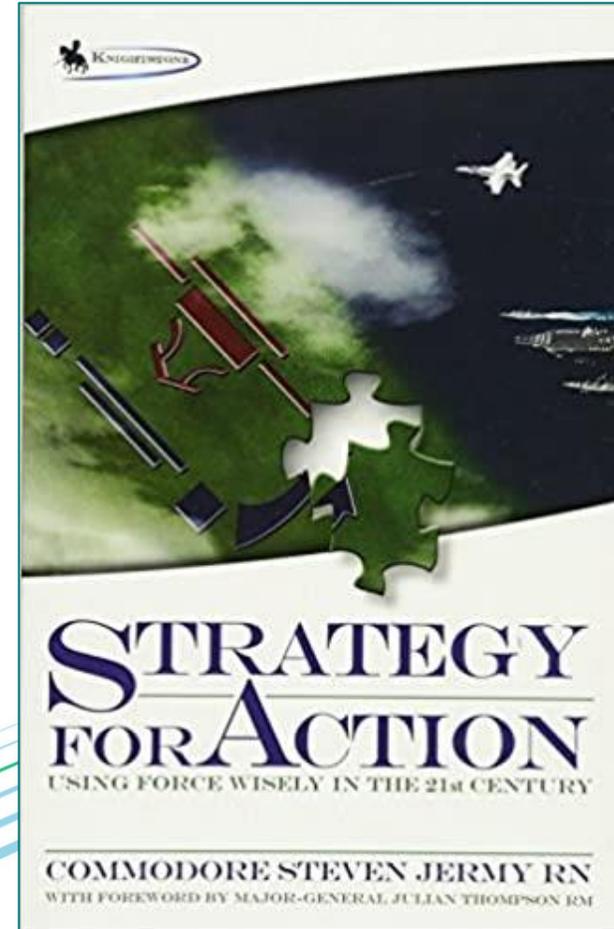
What is Strategy?

Strategy answers the critical question:

“How are we going to do this?”

Effective Strategy answers these questions

1. What is the energy **context**?
2. What is the strategic **objective**? And why?
3. What **resources** are available to execute the strategy?
4. What **courses of action** are available to us? Which one should we chose?
5. With what **spirit** should we execute the strategy?



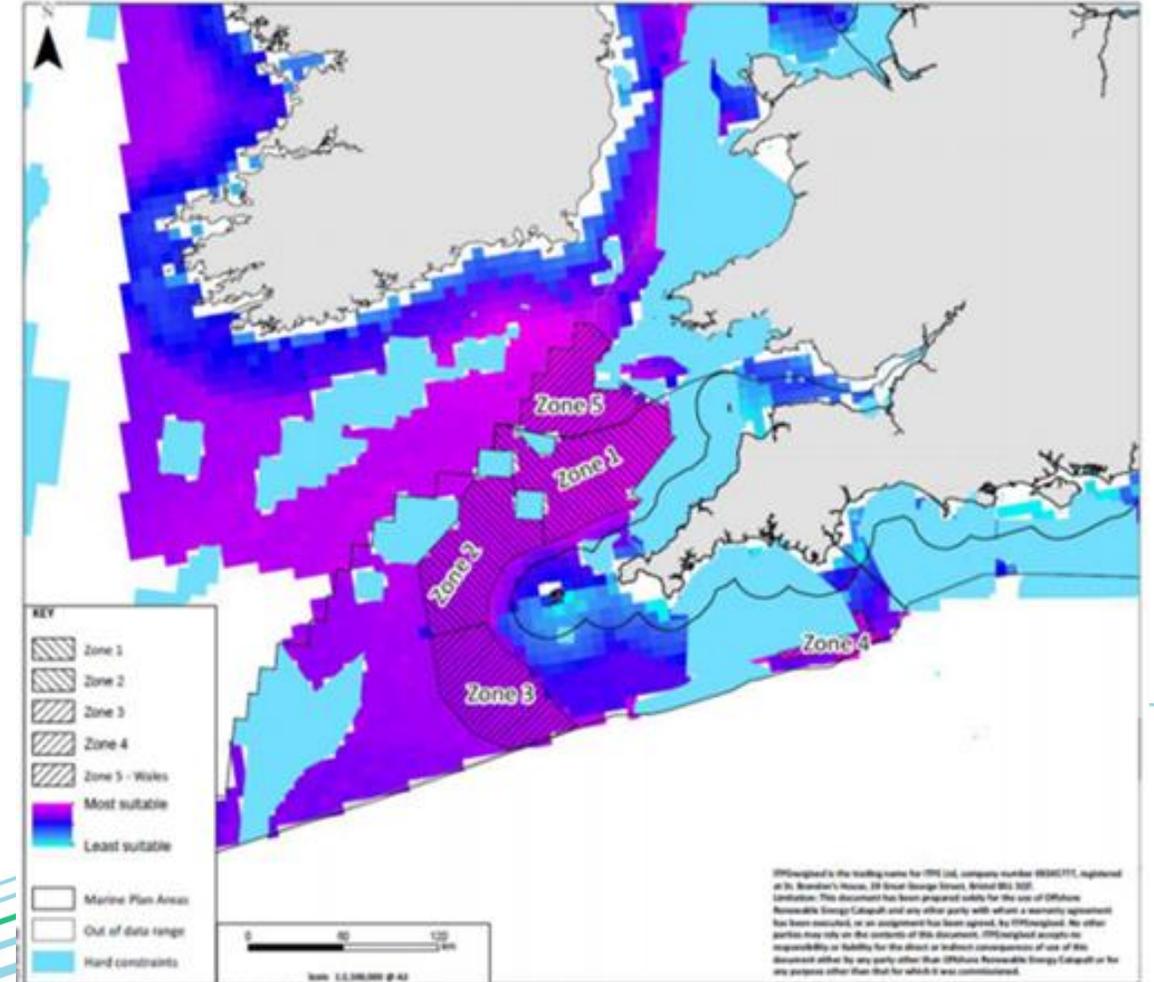
3 – CELTIC SEA FLOW REGIONAL STRATEGY

1. Celtic Sea Opportunity:

- 100GW plus:
 - 80% - Cornwall
 - 15% - Welsh Coast
 - 5% - Devon Coast
- Outstanding Supply Chain Potential
 - Cornwall – offshore renewables cluster
 - South West – broader supply chain cluster
 - Wales – S Wales Heavy Industrial Cluster

2. Clear Regional FLOW Strategy

- Phase 1 – 2018-19 – Policy Engagement
- Phase 2 – 2020-21 – Market Creation
 - CFD Subsidy Regime – Allocation Round 4
 - Project Pipeline – Crown Estate Leading Round @ 300MW
- Phase 3 – 2021-2022 – Accelerate Industrialisation



3 – CELTIC SEA FLOW REGIONAL STRATEGY

1. Lead Region:

- Policy Engagement
- Strategy Execution

2. Refine Market:

- Zonal Planning
- Lease & Subsidy Regimes

3. Accelerate Industrialisation:

- Regional Concept Modelling
- Regional Infrastructure Design

4. Develop Cluster:

- Capability & Capacity
- Network & Accreditation

5. Integrate Enterprise Support:

- RD&I, Skills & SME Support
- Inward Investment & Exports



Energy Security Strategy

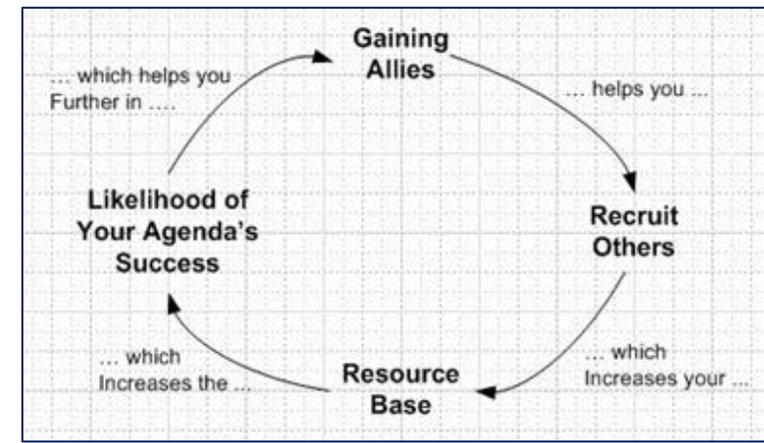


LEVELLING
UP

3 – CONCLUSION

Celtic Sea FLOW Opportunity:

- A track record of policy success
- A clear strategy with bold ambitions, supported by a track record of credible actions
- Clear industrial potential:
 - Cornwall – offshore renewables cluster
 - South Wales – S Wales industrial cluster
 - South West – broader marine & materials clusters
- Empowered X-region governmental support and with a X-sector pioneering spirit



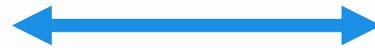
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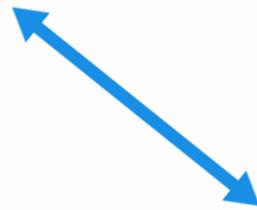
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“Leading the (2nd) Green Industrial Revolution.”

Sustainable Regional Industry

Matt Hodson
Celtic Sea Power



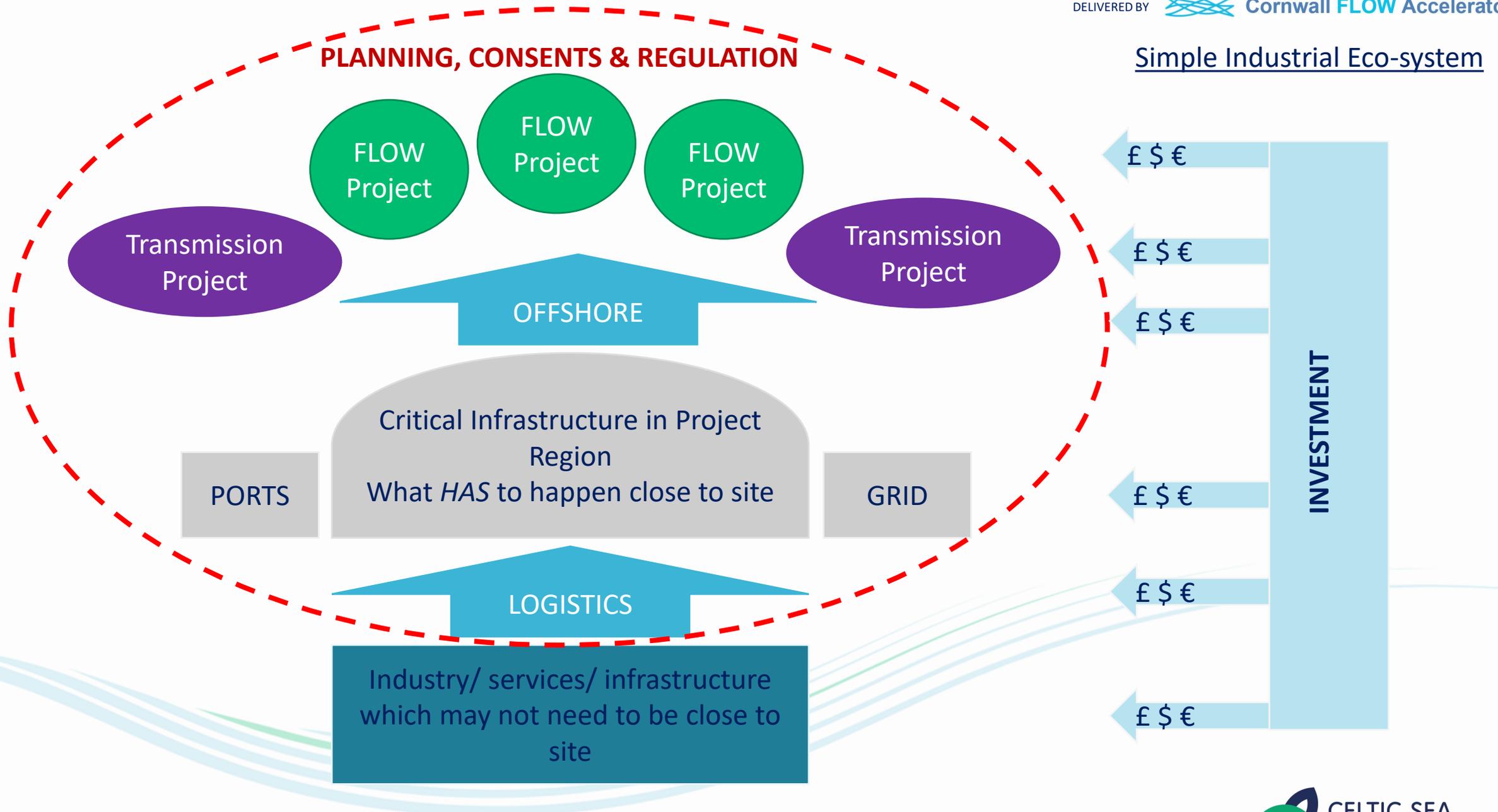
Sustainable Regional Industry

What do we mean?

- Long term, regionally anchored - adding value to the region
- Realistic, pragmatic and deliverable – adding value to the industry
- Bold, ambitious, collaborative and disruptive. A once-in-a-generation opportunity to lead the world – adding value to UK PLC

Do we have an option?

- We have heard about UK urgency and ambition
- There is similar urgency and ambition around the world, including elsewhere in the UK, in Ireland, in France etc
- In order to deliver on the ambition, we **MUST** come together in order to develop an Industrial Eco-system
- If we don't, we face the spectre of capacity bottlenecks delaying UK build out of FLOW, missing net zero/ energy security targets and losing investor confidence in the UK market



Questions for discussion in the room

- What does have to happen close to site? What are the “must-haves”?
- Every element of the “eco-system” needs investment to develop, grow and deliver on the ambitions of the UK energy security plan. Who goes first?
- Is the vision of a co-ordinated planning, consenting and regulatory system which considers the industrial eco-system as a whole “a bridge too far”? How else can we drive FLOW consenting times down to one year (as per UK energy security plan)

Session 2

PORTS, ENGINEERING AND INFRASTRUCTURE



The Celtic Sea Ports Working Group: Position Paper

Richard Ballantyne



BRITISH PORTS
ASSOCIATION

Celtic Sea Cluster Ports Working Group

Participants in the “Ports, Engineering & Infrastructure – Driving the Celtic Sea FLOW opportunity” working group session on 17th November 2021.

The event brought together 45 individuals from 23 organisations to address the key question, how will we deliver and maintain multi-GW’s of Floating Offshore for multiple developer clients within a timeframe commensurate with net zero targets and the UK achieving first mover advantage. The group was able to consider a range of issues against a context of The Crown Estate’s ambition to deliver 4GW in the Celtic Sea by 2035. There were two key outcomes;

- Establish a follow-on Celtic Sea Cluster working group led by Ports, Engineering and Infrastructure owners/operators and facilitated by Cornwall FLOW Accelerator
- Work towards discussing initial outcomes with the Celtic Sea Developers Alliance and other stakeholders at a Celtic Sea Summit on the 27th April 2021 at Sandy Park, Exeter.

Celtic Sea Cluster Ports Working Group

A follow-on Celtic Sea Cluster working group chaired by British Ports Association and including

- Port of Milford Haven
- Associated British Ports
- The Bristol Port Company
- A&P Group
- Harland and Wolff
- Local Partnerships
- Cornwall FLOW Accelerator (Celtic Sea Power and Offshore Renewable Energy Catapult)

Has developed a position paper based on these initial outcomes

Introduction – why?

- Floating Offshore Wind in the Celtic Sea represents a once-in-a-generation, transformational opportunity for the region and the wider UK.
- UK ports provide hubs for offshore renewables in terms of assembly, mobilisation, operation, and maintenance but there are also possibilities for a greater role in the construction, manufacturing, engineering and training activities. Unlike some of our competitors, UK ports are wholly independent of government in terms of Government and funding.
- Based on 42% of direct spend in the UK, it is estimated that 4GW of FLOW deployment in the Celtic Sea would result in UK net additional GVA of nearly £5bn by the early 2030's. If half of that spend lands in Wales, Cornwall and the South West of England, then this could create £2.5bn of net additional GVA and over 4,500 jobs in our region. Meeting the Offshore Wind Industry Council target of 60% UK content will have an even bigger impact.
- This is because proximity to the wind resource is key to the successful delivery of this low carbon industry. Our ports and waterside infrastructure are **essential** to unlock the full potential of regionally anchored, sustainable businesses supporting this new market

Collective improvement in port infrastructure is key to ensuring that the region secures *at least 20%* of the direct spend associated with Celtic Sea FLOW. In turn, this will support UK aspirations to secure *at least 60%* of the UK Offshore Wind content and achieve increased export potential by maximising our first mover advantage.

Where we are now

The Celtic Sea Region has a diverse mix of ports, yards, infrastructure, which are strategically and financially independent of government and acting commercially in a variety of markets servicing multiple industries, including long term customers. We are individually responding to early Celtic Sea Floating Offshore Wind project requirements, but are collectively looking at how we can meet the needs of a rapid evolving and increasing market with the potential to last generations.

As of today, we know that;

- There is ambition for large scale Floating Offshore Wind in the Celtic Sea, at least 4GW by the mid-2030's
- No port on its own is ready to support fully industrialised Floating Offshore Wind in the Celtic Sea
- We have combined quay space of around 30,000m with various loadings, depths of water alongside up 17m, combined laydown area of around 500ha and sheltered waters suitable for wet storage. This infrastructure is employed servicing our current customers
- Waterside infrastructure is essential in unlocking the manufacturing opportunity that Floating Offshore Wind presents to the UK
- There is certainty around the need to define a final “specification” for the industry including turbines sizes, foundation technology selection, O&M requirements (long term), business/ contracting models and **“who will be the customer”**? Time from lease to Contract for Difference award to contracting creates uncertainty in determining port infrastructure investment decisions which, in turn, **creates risk that no ports will be ready.**
- We need to collectively understand other potential blockages to achieve pipeline ambition including grid, heavy lift, manufacturing infrastructure, turbine supply, balance of plant and materials to ensure that port infrastructure improvements happen ahead of, or in parallel with, other enabling actions. We need to play our part in evolving a whole system approach to industrialisation.

Where we need to get to

- Optimised infrastructure, workforce and services able to efficiently install and maintain at least 4GW of FLOW in the Celtic Sea by the mid-2030's and beyond.
- A sustainable industry anchored in the Celtic Sea region delivering beyond the initial 4GW, transforming our economic base for generations.
- An industrial eco-system including offshore wind developments, supporting port infrastructure, grid connectivity, manufacturing, assembly, installation and maintenance developed holistically, at a pace which ensures supply can meet demand.
- An ability to deal with competing pressures for infrastructure and capacity. Ports and infrastructure owners being able to justify offshore wind investments for their own businesses.
- An ability to continue to service existing customers and respond to other strategically critical future business (National Ship building Strategy, Defence orders, Low Emission short sea shipping, cargo/ trade/ logistics to meet UK needs in the 2030's).

How we are going to get there

- **Focussed, quantified, front-loaded investment to accelerate collective improvement in port infrastructure across the Celtic Sea region to ensure *delivery* of the industrial ecosystem.**
- An agreed long term ambition for energy in the Celtic Sea **over the next 50 years**, backed up by a pipeline of Floating Offshore Wind projects, providing a steady drumbeat of activity which sustains, but does not outstrip, expanding port capacity
- Focussing on the essential enabling status of waterside infrastructure to accelerate development of the industrial ecosystem through:
 - Ports, yards and infrastructure operators working with each other
 - and working with FLOW developers and key supply chain players
 - Government and industry acting jointly to ensure we don't miss the opportunity
- Understand all the moving parts of the industry to evolve infrastructure and business solutions which maximise capacity in the region. It is becoming clear that there will be a level of public support in financing infrastructure which will help stimulate UK based activities and it is essential that policy makers understand what the sector needs collectively.

How we are going to get there

- Ensure that those designing and developing large scale FLOW fully understand the art of the possible. A maximised and efficient Industrial ecosystem will involve iteration. Where does regional capability, low carbon, and GVA trump low cost from overseas competitors
- The Supply Chain Plan requirements of CfD rounds are an important way of spurring more UK and local value capture. The Government's increasing focus on SCPs is welcome. Looking back to the early stages of fixed wind deployment, an excessively laissez faire approach meant that too much supply chain value (investment, jobs) 'leaked' to other nations. Learning the lessons from this approach, leveraging the capabilities and knowledge that has subsequently developed in the UK and applying this to the scale of the UK's floating wind deployment ambitions is a step change opportunity for boosting value to the UK from domestic supply chain development.
- Aligning and streamlining consenting processes across the offshore, ports and onshore elements to ensure that industrial ecosystem development happens in a logical, streamlined way. Impacts and benefits, including the link with skills, should be considered at a macro level commensurate with achieving net zero targets.

In summary

- No port on its own is ready to support fully industrialised Floating Offshore Wind in the Celtic Sea. However, Focussed, quantified, front-loaded investment to accelerate collective improvement in port infrastructure across the Celtic Sea region will ensure delivery of the industrial ecosystem capable of delivering *at least* 4GW by the mid-2030's
- To unlock this investment, we need to know;
 - That there is an agreed long-term ambition for energy in the Celtic Sea over the next **50 years**, backed up by a pipeline of Floating Offshore Wind projects, providing a steady drumbeat of activity which sustains, but does not outstrip, expanding port capacity
 - “Who will be the customer”? Time from lease to Contract for Difference award to contracting creates uncertainty in determining port infrastructure investment decisions.
 - That there is an ability to continue to service existing customers and respond to other strategically critical future business
- Ports, yards, infrastructure operators, FLOW developers, key supply chain players and Government need to work hand-in-glove to ensure we don't miss the opportunity.

The Celtic Sea Ports Working Group: Position Paper

Panel Q&A



Session 5

GRID





The grid challenge for Celtic Sea: What could the future look like for Offshore Transmission?

Bradley McKay
Research Engineer Electrical (FOW) ORE Catapult
27.04.2022

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Cornwall **FLOW** Accelerator



HM Government



European Union
European Regional
Development Fund

AGENDA

1. Offshore Renewable Energy Catapult
2. Energy Security Strategy
3. Celtic Sea Key Message
4. The grid challenge for Celtic Sea
5. Offshore Transmission Concepts
6. CFA WP4: Task 6: Electrical Infrastructure



About ORE Catapult

Our Mission:

Deliver the UK's largest clean growth opportunity by accelerating the creation and growth of UK companies in offshore renewable energy.

1. Engineering and research experts with deep sector knowledge
2. Independent and trusted partner
3. Work with industry and academia to commercialise new technologies
4. Reduce the cost of offshore renewable energy
5. Deliver UK economic benefit



UK Government Energy Security Strategy

Major acceleration of homegrown power in Britain's plan for greater energy independence - GOV.UK (www.gov.uk)

The Strategy's key measures are:

- Increasing the 2030 offshore wind ambition to 50 GW from 40 GW; this will include a 5 GW target for floating wind
- Doubling the 2030 low-carbon hydrogen target to 10 GW, including at least 5 GW of green hydrogen
- Aim to deliver 95% low carbon electricity by 2030

Energy Security Strategy

Published 6th April 2022

From:

Department for Business, Energy & Industrial Strategy, Prime Minister's Office, 10 Downing Street, The Rt Hon Kwasi Kwarteng MP, The Rt Hon Boris Johnson MP, and The Rt Hon Greg Hands MP

Celtic Sea Key Message

Session 3 – Electrical Infrastructure & Grid

The Crown Estate set the ambition for the Celtic Sea at 4 GW by 2035 for FOW

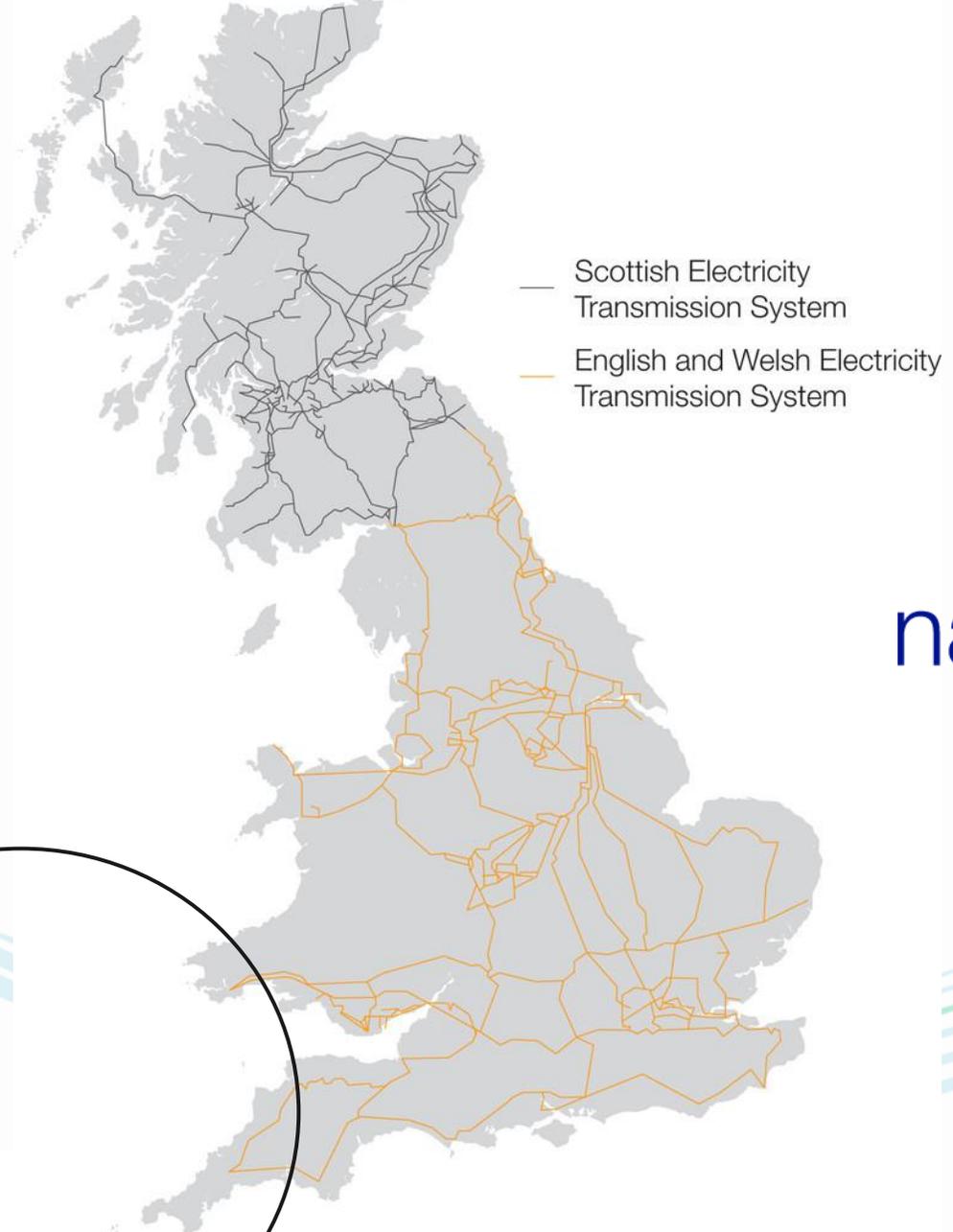
Achieved by a grid strategy everyone buys into is essential to enable the connection of 4 GW of power and planning for hydrogen with expansion capability beyond 2035

We don't have all the answers yet! - however this is a key issue for the Celtic Sea Cluster Board to help coordinate



[ALE Supports First Semi-Submersible Floating Wind Farm in Portugal | Maritime | News \(offshoresource.com\)](https://www.offshoresource.com/news/maritime/a-le-supports-first-semi-submersible-floating-wind-farm-in-portugal)

The grid challenge for Celtic Sea

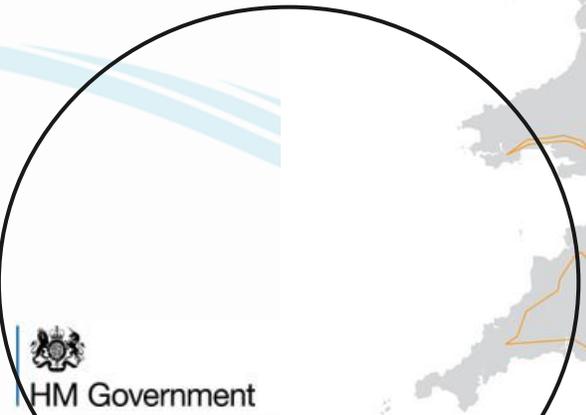


National Grid Network Route Map for Electrical Transmission

<https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/network-route-maps>

nationalgrid

CURRENT TRANSMISSION SYSTEM

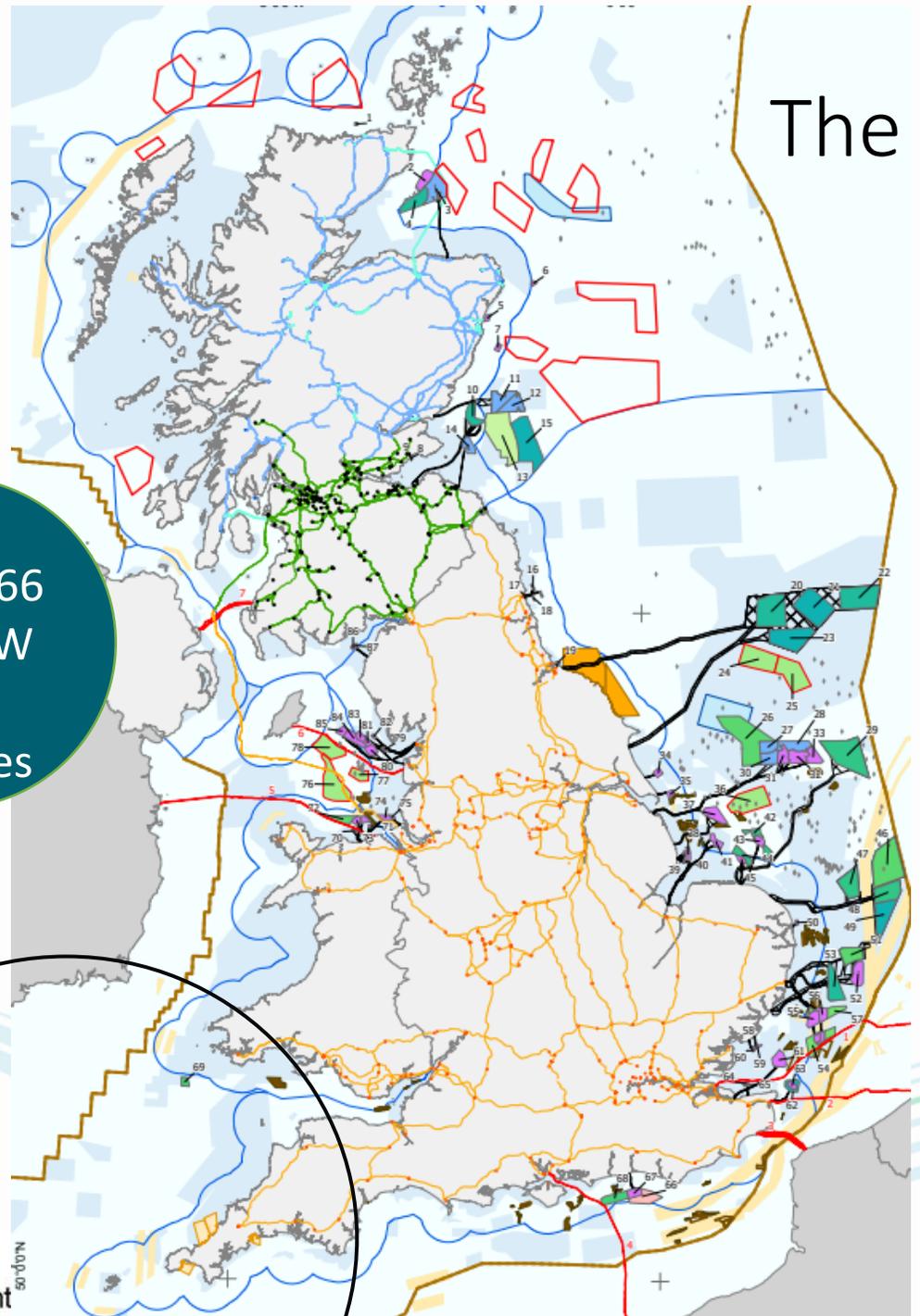


The grid challenge for Celtic Sea

Offshore Transmission Network Review generation map

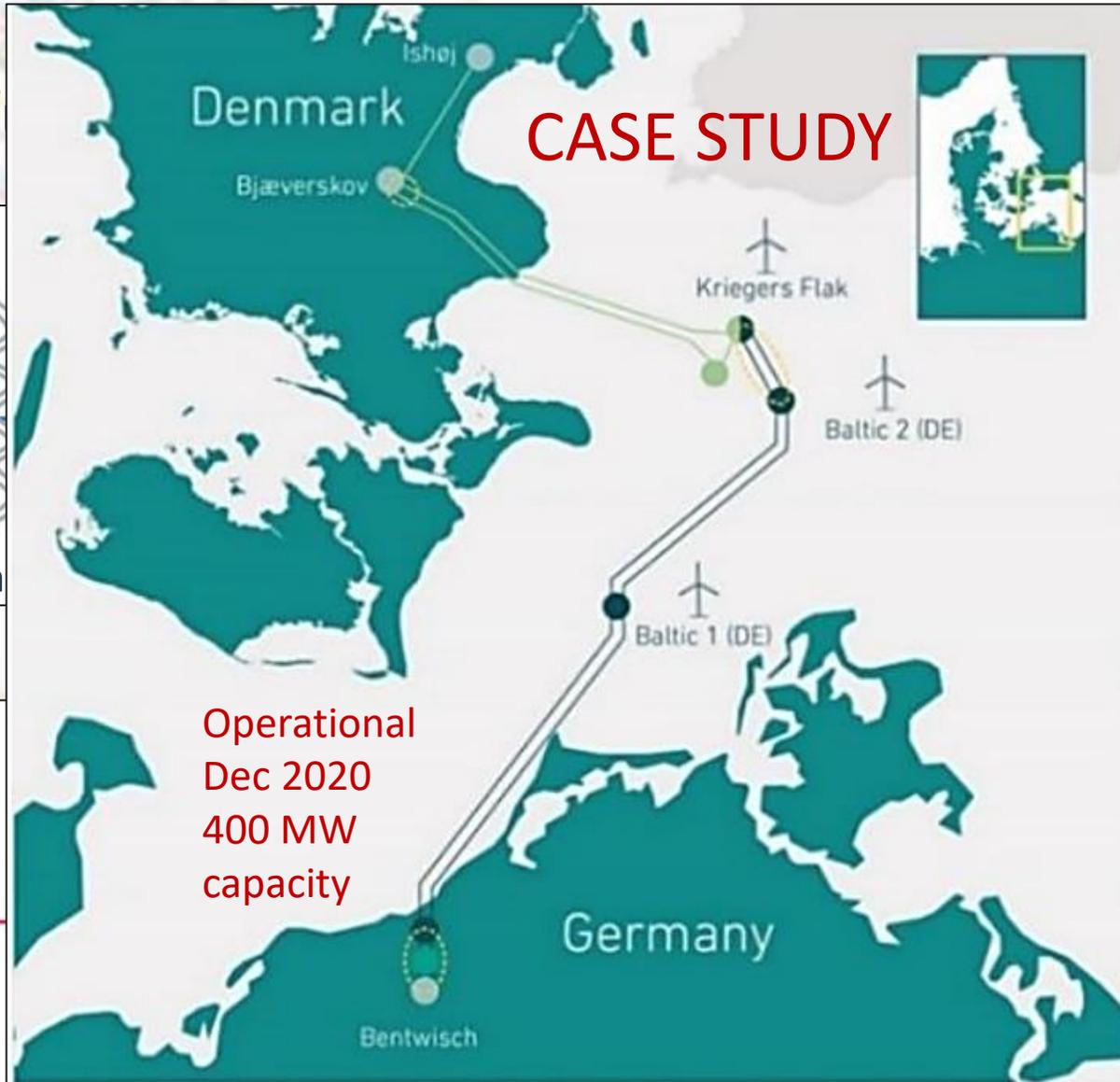
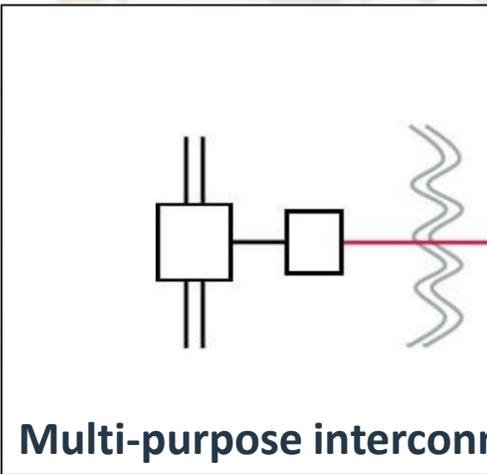
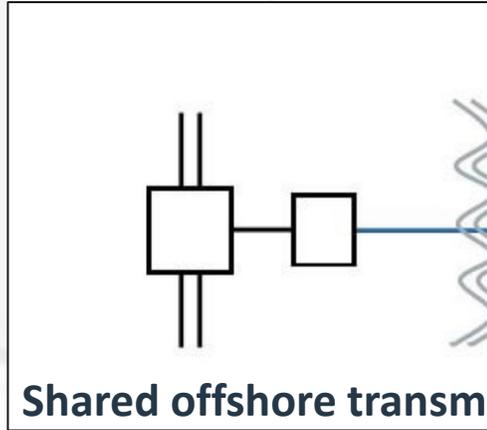
<https://www.gov.uk/government/publications/offshore-transmission-network-review-generation-map>

4GW
Scale 266
x 15MW
FOW
turbines



AMBITIOUS
OTNR
TRANSMISSION
SYSTEM

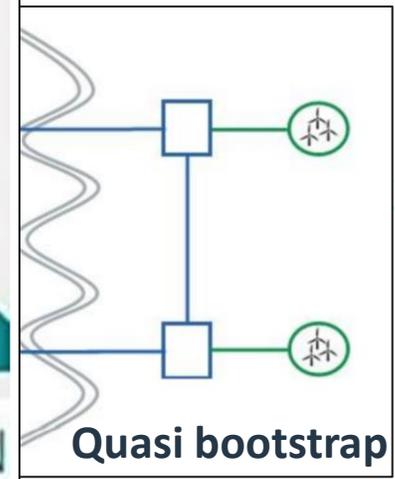
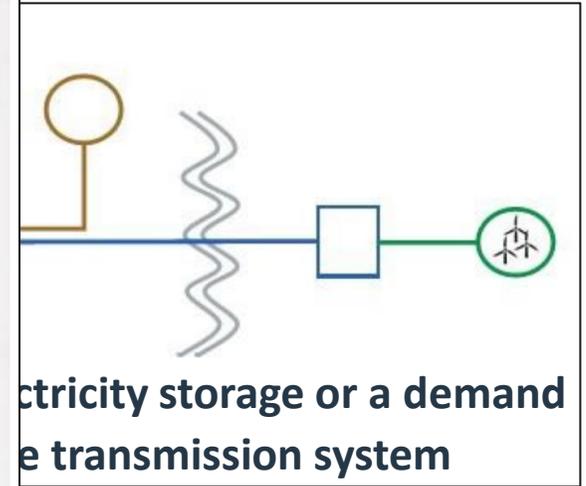
What could the f



KRIEGERS FLAK – COMBINED GRID SOLUTION

- CGS project (interconnector)
- 400 kV substation (AC)
- 150 kV substation (AC)
- Converter station (AC/DC)
- 220 kV substation (AC)
- 220 kV cable
- 150 kV cable

on?



CFA: Work Package 4 - Innovation in low carbon design and manufacturability

Task 6: Electrical infrastructure and grid connections

Quarter 2 2022



ACTIVITY 1

Report 1 - Optimized cable connection options for floating offshore wind (cable connection interfaces)



ACTIVITY 2

Report 2 - Exploring the potential interactions between the floating offshore wind and hydrogen sectors (floating offshore wind & hydrogen)

Quarter 4 2022



ACTIVITY 3

Report 3 - A strategic offshore transmission network for the Celtic Sea (future potential role of offshore multipurpose connector)



ACTIVITY 4

Report 4 - Integrating future floating wind developments into the SW and Wales energy network (SW transmission network & floating offshore wind in the Celtic Sea)

Celtic Sea Grid Summary

Our challenges to upgrade the electrical infrastructure transmission to achieve 4 GW by 2035 and beyond

Reducing landing points with strategic collaboration

OTNR transmission concepts, through shared, bootstrap, multi-purpose interconnectors, that incorporate green hydrogen electrical storage

Cornwall FLOW Accelerator: WP4: T6 – led by ORE Catapult, looks at the electrical infrastructure transmission and connection challenges to upscaling the Celtic Sea FOW initiatives

Scale 266
x 15MW
FOW
turbines



THANK YOU FOR LISTENING

CONTACT DETAILS

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GLASGOW

BLYTH

LEVENMOUTH

GRIMSBY

ABERDEEN

CHINA

LOWESTOFT

PEMBROKESHIRE

CORNWALL

MOSS: an example of how to streamline cable-routing /grid connectivity

Piers Guy
Guy Energy



Pembrokeshire Demonstration Zone

Streamlining Cable and Grid Connectivity

27th April 2022

Piers Guy - Non Executive Director- Celtic Sea Power



CELTICSEAPOWER

PŴERYMŌRCELTAIDD | NERTHMORKELTEK



A CORNWALL
COUNCIL COMPANY

LEADING | INNOVATING | INSPIRING

ARWAIN | ARLOESI | YSBRYDOLI



HWB MOROL
DOC PENFRO
PEMBROKE DOCK
MARINE



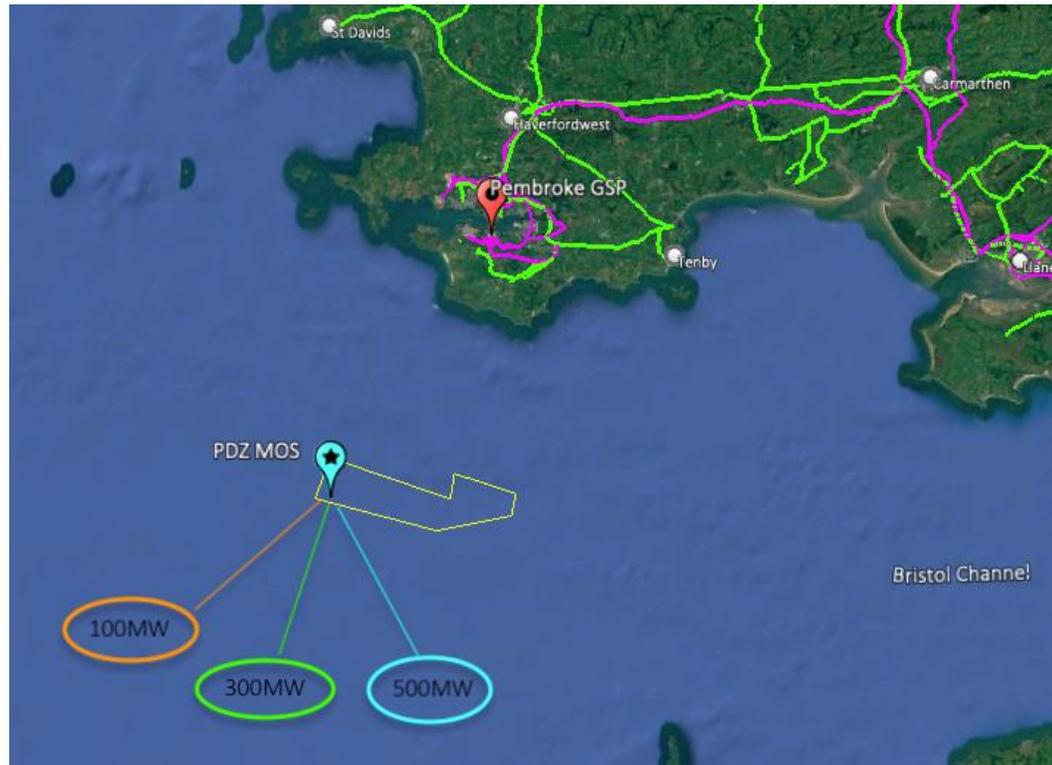
Bargen Ddinesig
BAE ABERTAWA
SWANSEA BAY
City Deal



The Concept

To optimise offshore grid connections for demonstration / pre-commercial floating offshore wind and marine

Develop and deliver a Multi-point Offshore Sub-station (MOS) with a single cable corridor and onshore connection to the Pembroke Grid Supply Point (GSP)



PDZ Illustrative Schematic

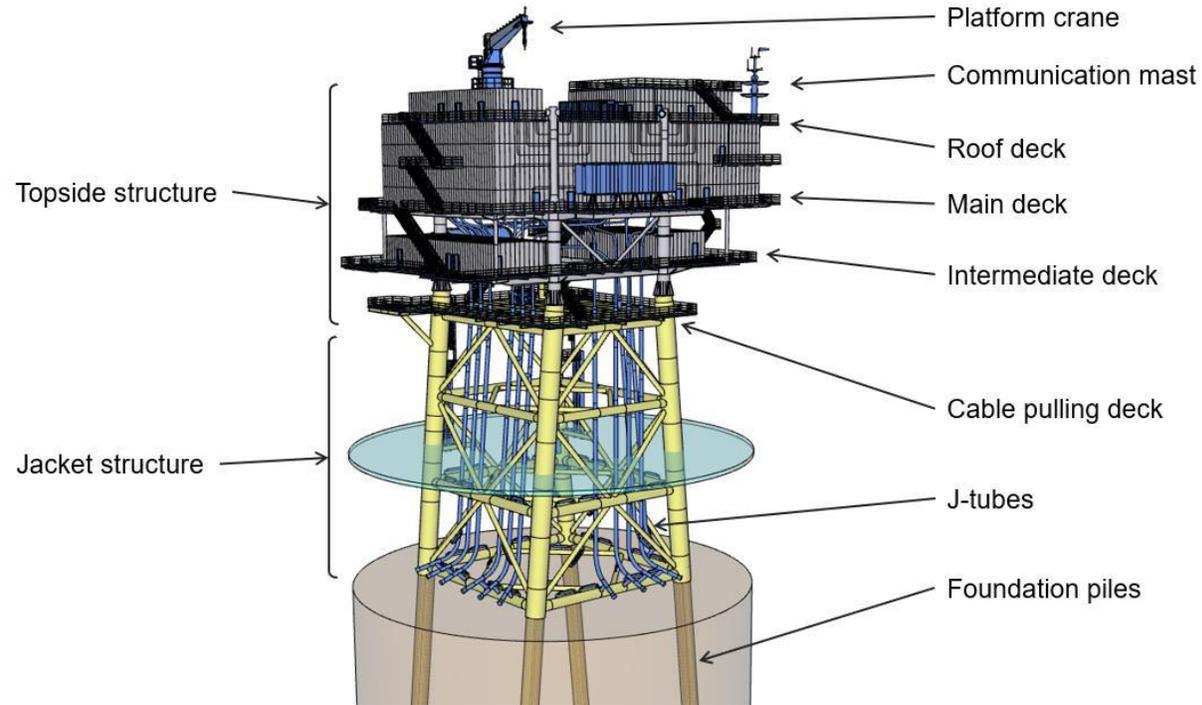
- Connecting offshore projects on a 'point to point' basis is inefficient, expensive and creates an avoidable cumulative impact
- Allows for the connection of multiple smaller projects should reduce their costs & risks and encourage UK Ports and supply chain to capture content in a sustainable way
- New for the UK but standard practice in other parts of Europe



CELTICSEAPOWER

Engineering Concepts

- Ultimate maximum MOS capacity > 1GW made up of 2 or 3 of MOS HVAC Platforms.
- Grid connection – expected to be HVAC 275kV
- Expected that MOS platform(s) will be installed on jacket foundation structures
- Project Connection Voltages 33 – 132kV
- Operation will be NUI (Normally Unattended Installation)



General view of an Offshore HVAC platform (Tractabel Overdick)





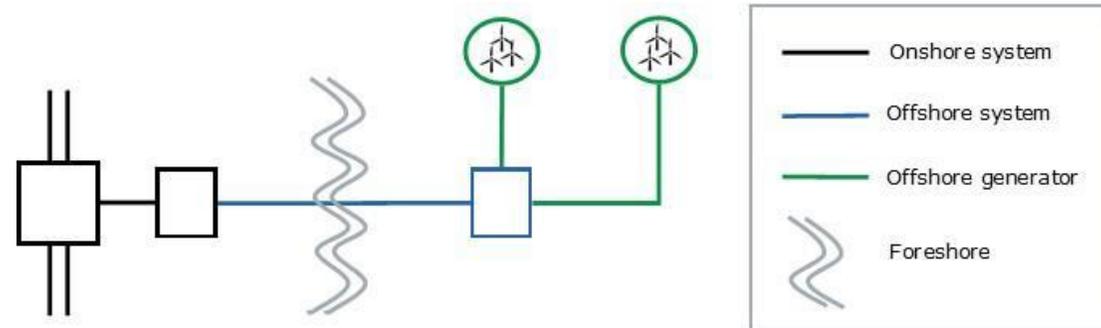
CELTICSEAPOWER

The Changing Regulatory Environment

Achieve net zero - security of supply – environment – coordination – economical - proactive

- Energy Security Strategy – Includes creation of FSO
- Transmission Network Review (OTNR)
 - Early Opportunities Workstream

Shared offshore transmission system



- OFGEM – Consultation on Minded-to Decision of Anticipatory Investment and policy changes and BEIS changes to the CfD from AR6

Anticipate a clear regulatory path for the PDZ MOS to be developer led and ultimately owned and operated by an OFTO



Stakeholder Engagement

CSP have and are engaging across a broad spectrum of OTNR, OFTO stakeholders including National Grid (TO and SO) , developers, NRW, Welsh Govt, BEIS

Developer Questionnaire completed in Feb 22 provided helpful feedback – key themes:

- General Support
- Concerns that delays could impact individual projects
- Connection coordination, connection process, existing offers etc
- Will there be the capacity a Pembroke?
- Is PDZ in the optimum location?
- How is it going to be funded beyond current public funding?

Its critical that the project is fit for purpose so CSP will be seeking ongoing steering support from key stakeholders and potential users.





CELTICSEAPOWER

Current Activity and Next Steps

Focus on a time horizon that matches connecting parties project progress < 1GW HVAC connected before 2030 but maintaining optionality for as long as possible

- Currently tendering
 - Full engineering concept and pre-feed works tendering
 - EIA work scopes
 - Regulatory & Commercialisation scopes
 - Offshore Survey works
- Grid connection application and engagement
- Partnering to move beyond 2023





Thank you

Piers.Guy@guyenergy.co.uk

Tim.James@celticseapower.co.uk



CELTICSEAPOWER

PŴERYMŌRCELTAIDD | NERTHMORKELTEK



A CORNWALL
COUNCIL COMPANY

LEADING | INNOVATING | INSPIRING

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Session 4

WORKFORCE



The challenges of developing a workforce for Celtic Sea FLOW

Justin Olosunde
University of Exeter



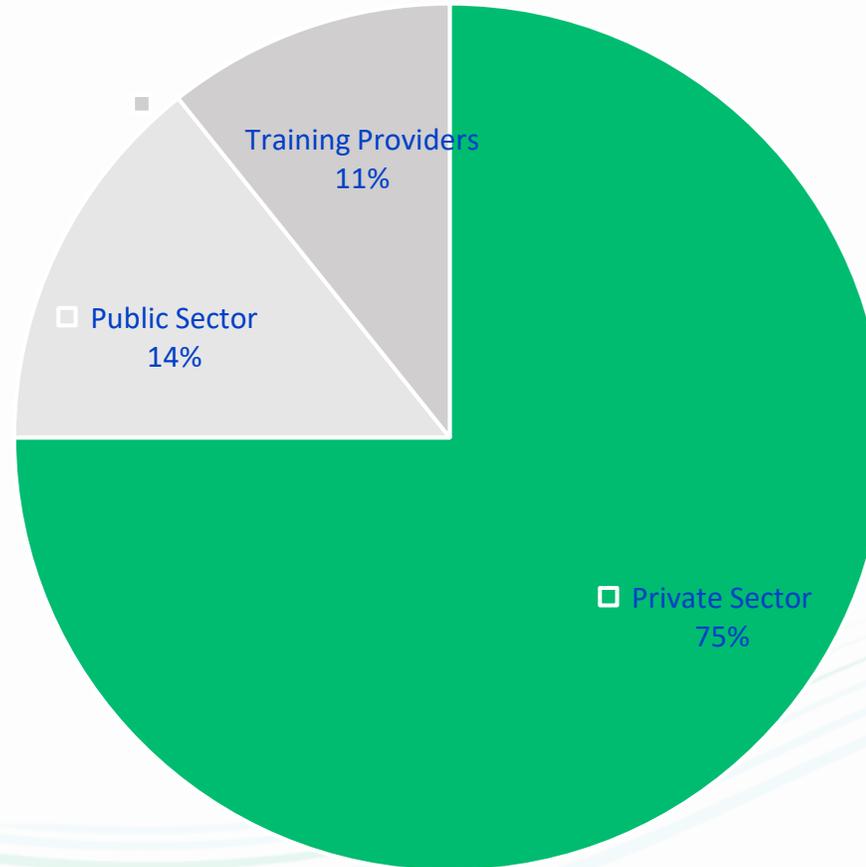
Skills and Labour Requirements of the UK Offshore Wind Industry. 2018 to 2032



- Direct employment in offshore wind could reach 36,000 by 2032
- Employment levels are expected to increase in all phases of the project lifecycle, but particularly in Construction & installation (+6,700) and Operations & maintenance (+6,900). It is not expected that Decommissioning/repowering will experience significant jobs growth in the period to 2032.
- Employment demand will be strongest for technicians and engineers, with an estimated additional requirement of 10,200 by 2032. This represents nearly half of new job creation and reflects the highly-skilled, technical nature of many of the tasks undertaken by the workforce.

CFA Workforce Development Survey....

Who responded?



Great mix of marine operations, infrastructure owners, consultancy, survey specialists, manufacturers etc.

■ Private Sector ■ Public Sector ■ Training Providers ■

Does your current workforce or future workforce have the skills required to participate in the emerging market? And what skills will you need to enter, sustain and grow in the market?

Diverse Requirements

100+ all levels blue & white collar

DCO planning and consenting skills, EIA skills, environmental survey and modelling skills. Stakeholder liaison
Offshore skills, when anything's built

Platform design, turbine interface and operations and maintenance strategy.

Marine operations staff, engineers, geotechnical engineers, commercial staff, 20-40 evening spread skills.

Oceanographic, modelling, understanding of engineering constraints, machine learning, understanding of consenting arrangements, expert business developers

2 to 3 staff will require BOSIET or industry equivalent such as GWO certification as used in fixed offshore wind.

more consenting specialists probably required as there will be a lot of competition from other fixed bottom projects in the UK
Not applicable.

Contract & Project Engineers, Inspectors & Expeditors, QS & Commercial etc
no port related gaps

Resource shortages in general offshore development skillsets (supply chain management and development, consenting). In engineering, shortages in electrical infrastructure in floating wind subsea cables. We are in the process of building our capability and knowledge in seabed fixed offshore wind to deliver floating wind projects, which we see as an evolution of seabed fixed (not a revolution).

Satellite enabled skillsets include Data Science, Earth Observation, Geospatial Intelligence, Remote Sensing, Satellite Communications, PNT, Ubiquitous Connectivity...

Current skill sets will be focused within 5G technologies, system, electrical and PCB engineers. A full team will be required - and we aim to achieve 20 heads by the end of 2022. This will exponentially grow within the sector as we progress and grow alongside the sector.

Replacing skilled Maritime Assistants

Knowledge and information about current affairs and the emerging market are needed as soon as possible. Approximately 30 people could have the required skillset.

As above Marine structural engineers needed as well as Naval Architects and project managers

Gap occurs in the initial issue of knowing how we can help in the FOW sector, how our equipment fits in - clarity is needed, and contacts

Difficult to assess, without understanding the potential market, but welders, platers, pipefitters as a minimum.

marine operations, naval architecture, geotechnical, drilling operations, production, supply management and contract management. Looking to create 20-40 positions over 2-3 years, mainly professional or technical level, but also some skilled administrators.

Currently we would anticipate our current workforce would be sufficient. Skills required are boat handling. If we were to expand services additional expertise to gain associated licences may be required.

Experienced engineers with practical experience in offshore operations. Skilled machinist operators for local supply chain.

Required skillsets in the initial phase of building the business would be primarily to expand our engineering (geotechnical / marine / mechanical) bias.

EU Skills Workforces Needs: Summary Findings

- Asset management
- Project management
- Leadership
- Engineers and technical skills – mechanical, electrical and control & instrumentation, blade and turbine technicians
- Scientists – marine biology, geophysics, hydrography, oceanography
- Advanced first aid and rescue
- Offshore-specific skills – confined spaces, working at heights, team working, team living, etc.



CFA Workforce Development Survey: Initial Findings

Do current providers meet your current or future skills needs?

50:50

Do you perceive a benefit in an industry sector-led or regional-led workforce Academy to support skills development in the new industry?

A Universal “Yes”

How should it be funded.....?

Hybrid

Government & Private Sector working together

Celtic Sea FLOW Workforce Development: Next Steps

- Catapult FOW Centre of Excellence (Opergy) set to release report on FLOW Workforce Development, at national level
- Initiation of two Celtic Sea Working Groups
 - Industry Experts “Demand” – volunteers welcome?
 - Regional Training Providers “supply”
- Recruitment via Cornwall FLOW Accelerator Project to:
 - Conduct research on competency mapping and forecasting future requirements
 - Coordinate above working groups
- Potentially, development of a regional FLOW Academy?

Lessons from other sectors to workforce development for FLOW in the Celtic Sea.

Matt Higgs
Babcock Marine



babcock[™]

Workforce Planning – Lessons From The Defence Sector

February 2022



content

1 Quick Overview – Our Workforce Planning Challenge

2 Lesson 1. – Start with the End in Mind

3 Lesson 2. – Be Clear on What You Need

4 Lesson 3. – Have a Plan

5 Questions

1. Our Workforce Planning Challenge

We have a challenge over the next 10-15 years as our current workforce retires and the demand for our services increases to support the Royal Navy's operations which could be (at peak) circa 3,500 fte.

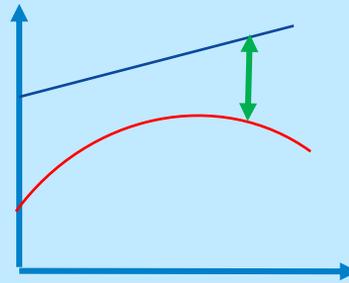
We also face a once in a generation changeover between 1980's & 1990's technology with the next generation of Submarines & Surface Warships (MS-Dos to the Metaverse!)

The Strategic Workforce Planning (SWP) Context

Business Context

Demand & Supply Risk

Our workloads are increasing at the same time our workforce is retiring



Expertise Risk ("SQEP")

We are losing hard to replace capability at all levels



Progression Risk

Our SQEP takes a long time to develop



Market Context

There is a Global Hiring Challenge across all specialisms



The industry-specific SQEP we need is hard to find

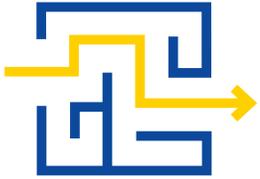


The "Skills Infrastructure" doesn't support much of our requirements



2. Lesson 1. - Start with the End In Mind

(even though you will never get there....)



think outcomes

Outcome & Strategy

What is the clear, shared view of what we are going to achieve and by when?

Are the outcomes of the workforce strategy aligned with the Business / Industry strategy?

Are we clear on where conflicts and tensions between outcomes can arise?

What is our process for review and course correction? How do we iterate and keep the plan relevant?

3. Lesson 2. - Be Clear on What You Need (not what you want....)

The What and The How Many

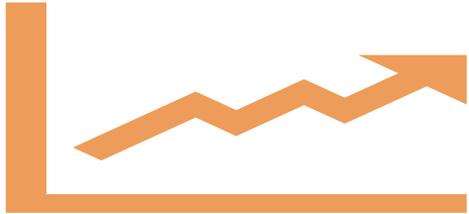
DEMAND		Number of Roles
		Role Functions
		Role Disciplines
		Role Skills Profiles & Career Path
		Value Chain

	Internal	External
SUPPLY	 Current Workforce	 Government/FE/HE Services
	 Planned near-term Recruitment	 Supply Chain
	 Skills Profiles	 Contingent Workers
	 Time to Competence	 Recruitment Market

Where



When



One Version of the Truth based on:

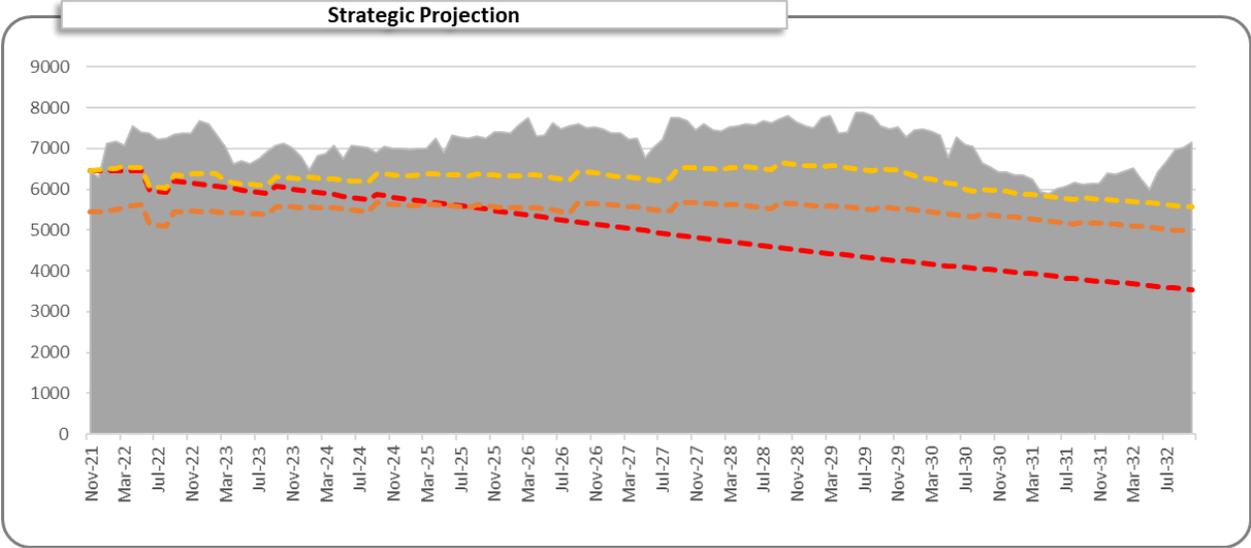
Common Definition of Skills

Common Definition of Roles

Common Definition of FTE

Lesson 3. – Have a Plan (that isn't just doing Plan A again with more shouting....)

9 B	Description	Time Horizon
Buy	Hiring New (external) Permanent Talent from the market	S/M
Borrow	Hiring New (external) Contingent Talent from the market either as contract workers or sub contracted	S
Build	Developing capability for existing employees and through Graduate and Apprentice programmes, or adult upskilling and re-skilling	M/L
Bump	Promotions and succession (identification and development of talent) focusing on both technical and leadership capability	M
Bind	Retaining critical employees, and ensuring knowledge transfer from those leaving	M
Bounce	Either re-locating the work to where there is a large supply of skilled people or re-locating people from those geographies	M
Bail	Removing unproductive workers as well as those whose skills are no longer needed (and can't be easily re-trained onto core skills)	S/M
Bots	Realising the potential of new technology and innovation to deliver increased productivity and new ways of working	M/L
Bargain	We negotiate with the customer to better smooth demand during critical periods to enable a more balanced and sustainable approach to delivery	M



Capability Development	HR Function	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1. Buy (Long Term Hire)	Recruit	0	339	196	134	128	75	62	31	23	2	13
2. Borrow (Short Term Hire)	Agency	1	107	19	55	65	45	147	135	25		
3. Build (Hire/ Train)	Apprentices		179	183	111	27	29	26	27	17	9	4
	Graduates		89	85	78	78	72	56	46	34	26	22
	Adult Up Skilling		27	40	35	35	35	30	15			
	Marinisation/ Cross Industry		10	9	8	1	1	3	1	1	1	
6. Bounce (Re-Locate)	Seconded Out											
	Transfer Out		9	7	7	8	11	6	4	1	27	1
	Seconded In				5							
	Transferred In	2	25	23	21	18	21	16	14	9	8	5
7. Bail (Remove)	Core Employees											
	Agency		204	243	40	17	56	63	5	116	268	20

Questions?



Simply Blue
Group

The floating wind workforce diversity challenge

Kerry Hayes
Project Development Manager
Simply Blue Group



Simply Blue Group

- Pioneer marine development projects
- Advocate for offshore wind power, wave power and sustainable aquaculture
- Engage with coastal communities and support stepping-stone developments
- Collaborate with like-minded partners
- Work with people who value stakeholders, the community and the environment
- First Celtic Sea floating wind developer



Floating Offshore Wind Projects in UK & Ireland

Blue Gem Wind Portfolio: Joint Venture with TotalEnergies

- 400 MW in two stages
- 70 – 90 m water depth
- State of the art OSW turbines
- Due for COD in 2026 & 2029/30

Salamander: Joint Venture with Subsea 7 and Orsted

- 200 MW floating project; hydrogen production
- Stepping stone
- COD 2029/30

Western Star Portfolio: Joint Venture with Shell

- Up to 1.35 GW Floating wind project
- Near Moneypoint Power Station – excellent grid connection
- COD ~ 2030

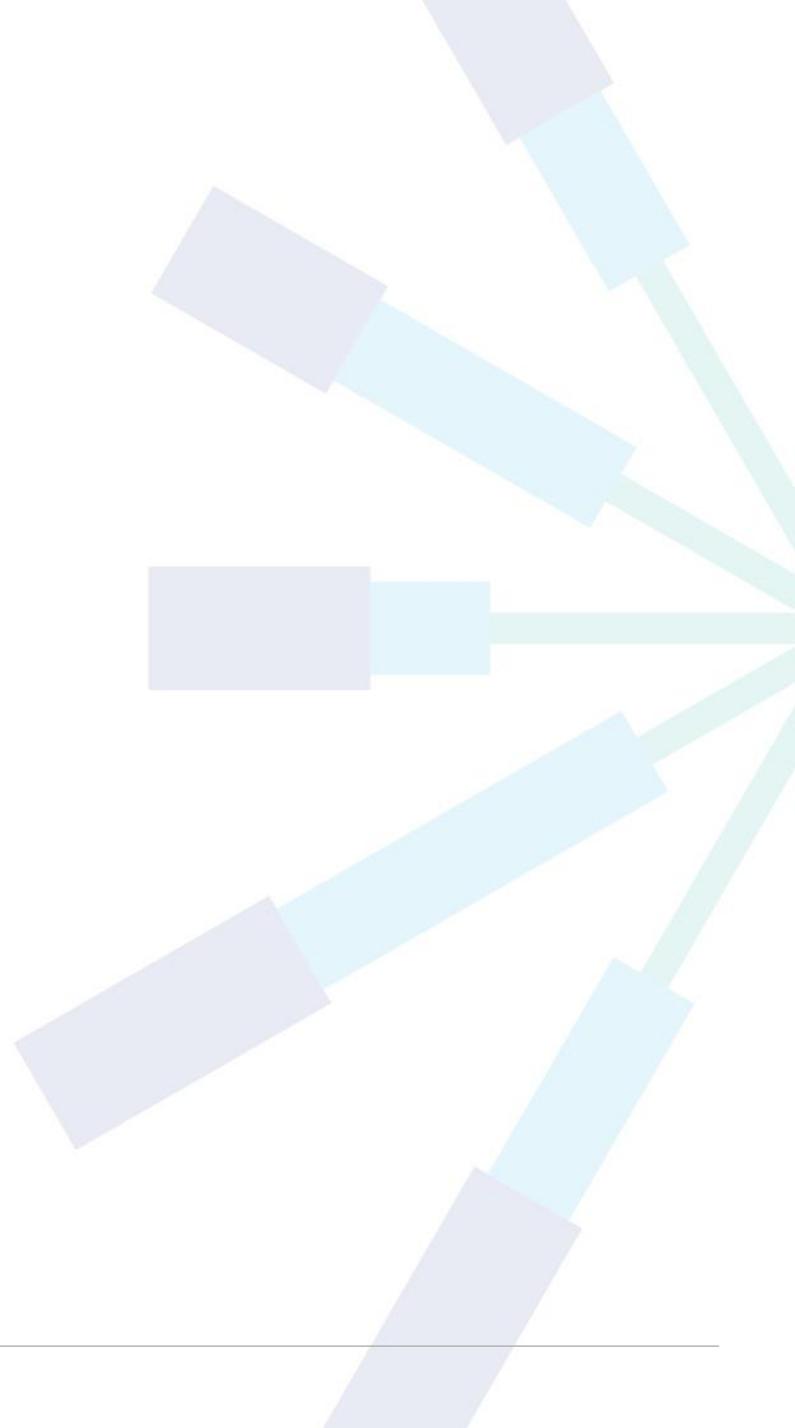
Emerald Portfolio: Joint Venture with Shell

- c. 1.3 GW total capacity in two stages
- ~ 100m water depth; energy transition around the Kinsale gas field
- Floating foundation technology under review
- Infrastructure investment spurred across the region
- COD <2030



Challenges of diversity for a floating wind sector

- What does diversity mean?
- Why is a diverse workforce important?
- Why is attracting a diverse range of talent so challenging?



Define diversity – and where are we now

- **33% women** in offshore wind by 2030 (up from 18%) with ambition to reach 40%
- **9% BAME employees** in offshore wind by 2030 (up from c.5%) with ambition to reach 12%
- **2.5%** of employed workforce from/on apprenticeship schemes by 2030
- Supporting transition training for former **military** personnel
- Developing an '**Offshore Energy Passport**' to facilitate greater job-mobility between offshore industries
- Audited more than **60 apprenticeship standards & frameworks**

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)

Search for a word



diversity

/dʌɪˈvɜːsɪti,dɪˈvɜːsɪti/

noun

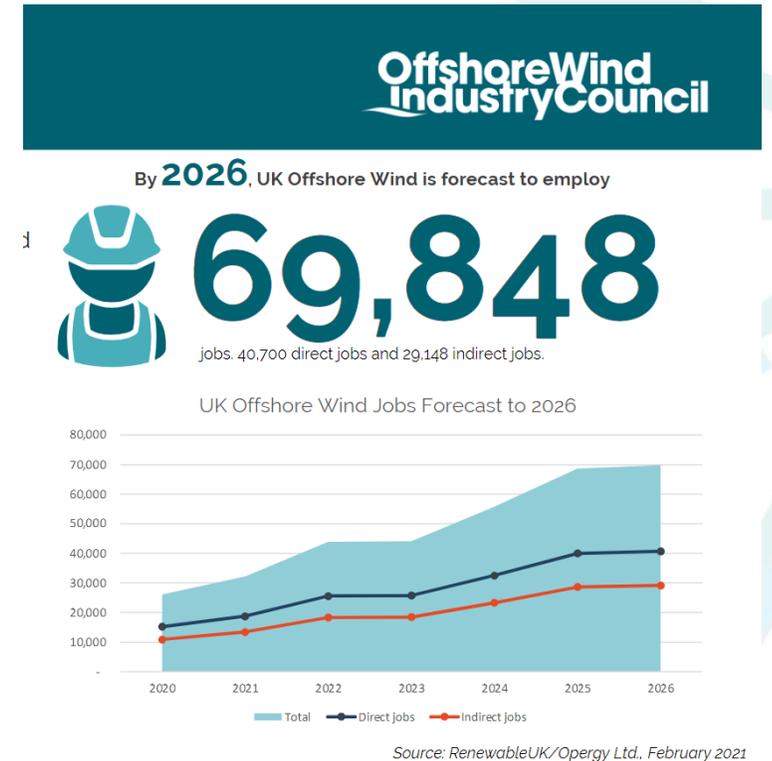
1. the state of being diverse; variety.
"there was considerable diversity in the style of the reports"
2. the practice or quality of including or involving people from a range of different social and ethnic backgrounds and of different genders, sexual orientations, etc.
"equality and diversity should be supported for their own sake"

[Feedback](#)

▼ Translations and more definitions

Why is a diverse (floating wind) workforce important?

- Right thing to do..!
- Challenges as big as combating climate change, and transforming our economy/energy system requires the full weight of the population
- The offshore wind sector is growing at a pace that is not sustained by the existing workforce
- Targets of 5 GW floating wind (45 GW fixed)
- Need to look outside the current talent pools to manage this demand



- (figures estimated in 2020 – based on current pipeline, and a 30GW fixed wind target)

Why is this a challenge...and a risk?

- Floating wind is a new sector, encompassing multiple industries in one –different skills.
- National skills shortage - competition
- Lack of awareness – not attractive compared to traditional industries?
- Lack of visible role models?

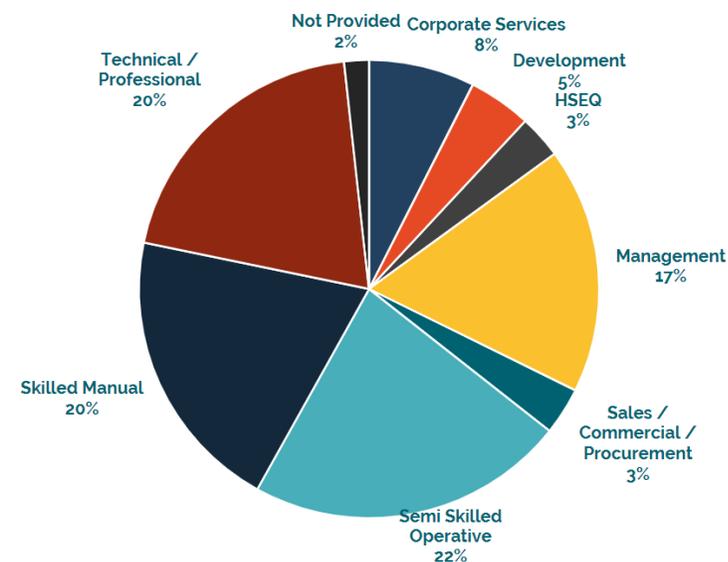


£10.1bn
Average Annual Investment
(2021 to 2026)

The investment forecasts, applied to all future projects, assumes the following assumed profile.

Year 1 – DEVEX
 Year 2 – DEVEX
 Year 3 – DEVEX
 Year 4 – Year 1 CAPEX
 Year 5 – Year 2 CAPEX
 Year 6 – Year 3 CAPEX, Year 1 OPEX (30%)
 Year 7 – Year 4 CAPEX, Year 2 OPEX (60%)
 Years 8 – 33 – OPEX (at 100%)
 Years 33 – 35 – Decommissioning.

Source: RenewableUK/Operry Ltd., February 2021



Source: NSAR Skills Intelligence Model Survey Results/Operry Ltd. January 2021

What to do – how can the Celtic Sea get this right from the start?

- Market is growing at a much faster pace than workforce
- Business as usual is not going to work.
- Need creative, entrepreneurial thinking to highlight the attractiveness of the sector
- Need to be much more inclusive – aim to be the sector of choice for women and underrepresented groups
- Need to make the sector more attractive and help people understand the opportunities
- Huge role for universities, colleges, training providers, schools to play – better awareness, advice
- More role models

The challenge/opportunity to ensure diversity in future Celtic Sea FLOW workforce.

Kerry Hayes
Simply Blue Group



Session 3

SPATIAL PLANNING & CONSENTING



The challenges of consenting and the need for actionable data. Update on Poseidon.

Alex Banks
Natural England





The challenges of consenting: front-loading the process for sustainable development and the natural environment

Alex Banks – Principal Specialist – Ornithology

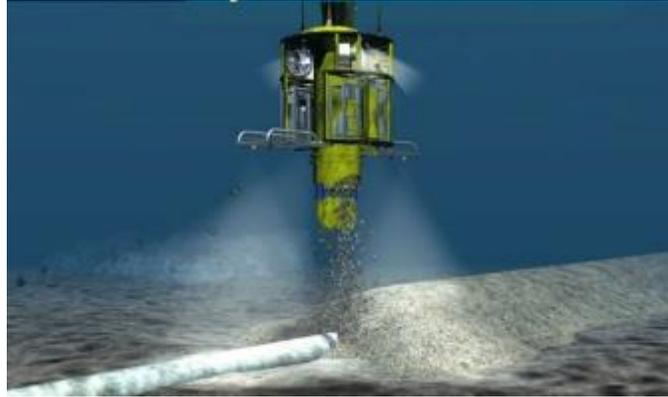
Natural England's role



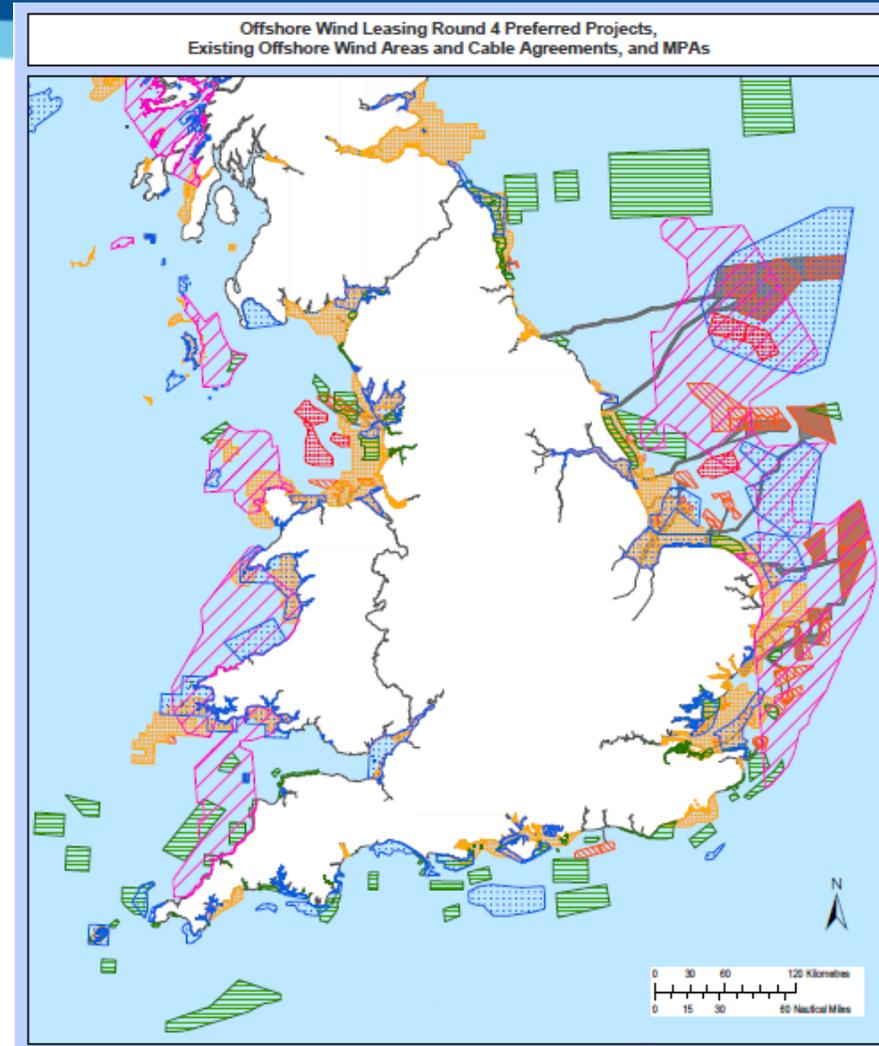
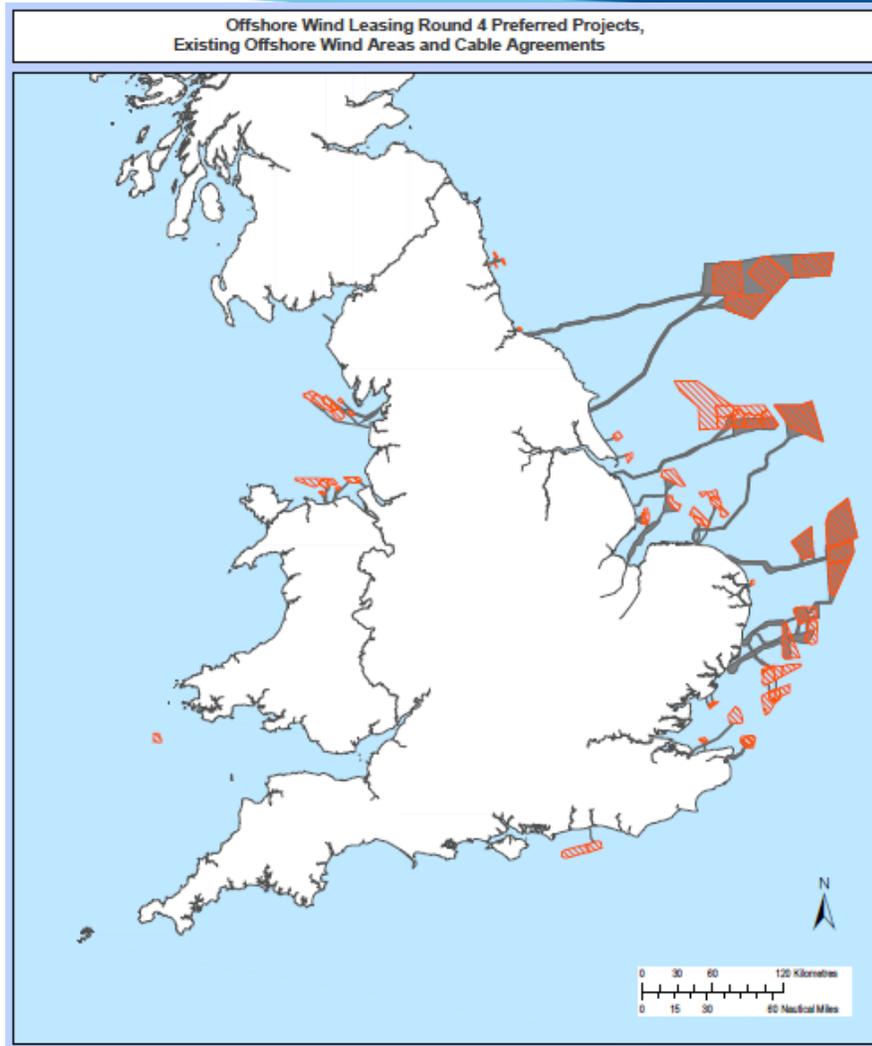
- We're the **government's adviser for the natural environment** in England. We help to **protect and restore our natural world**.
- We engage throughout the **whole development process** (strategic planning to decommissioning), **both informal and statutory**.
- Nature Recovery Networks
- Natural Capital
- Nature-based solutions



Key environmental pressures



Location of current UK wind farms and MPAs



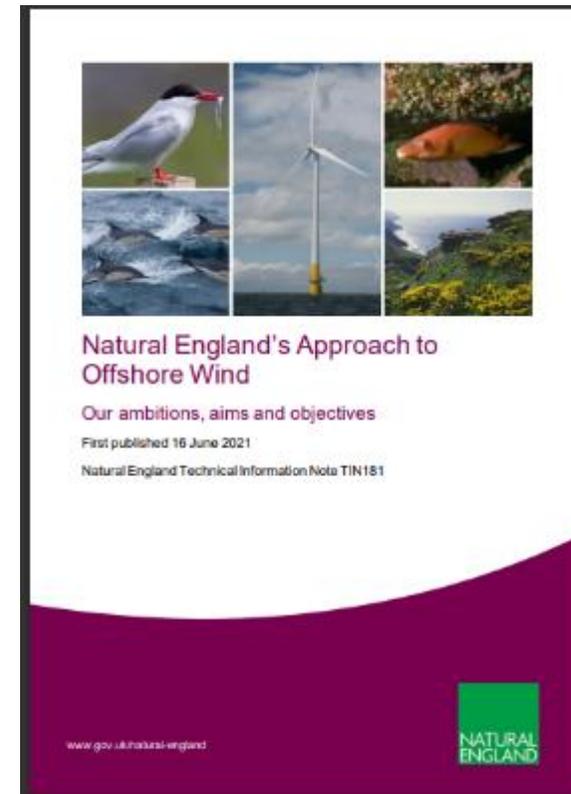
Natural England's Approach to Offshore Wind

NATURAL
ENGLAND

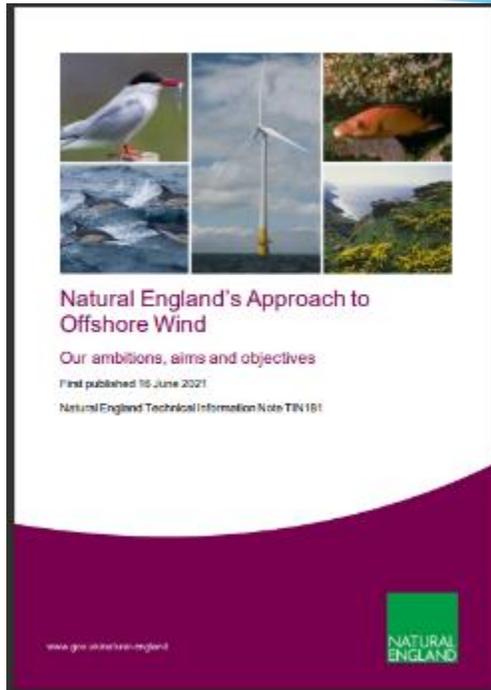
“Thriving marine and coastal nature alongside low impact offshore wind energy, tackling both climate and biodiversity emergencies”

Search:

Natural England's Approach to Offshore Wind: Our ambitions, aims and objectives (TIN181)



Natural England's Approach to Offshore Wind



Strategic aim	Objectives
Avoid irreparable damage	Risk and opportunity map
	Strategic, standardised baseline data
	Accurate sensitivity evidence
Mitigation where impact predicted	Evidence feedback cycles
	Strategic monitoring
	Mitigation solutions
	Low impact decommissioning
Effective, strategic compensation	Evidence of effectiveness
	Strategic compensation system
Development leaves nature in better state	Design for biodiversity
	Net Gain tools

Natural England's Approach to Offshore Wind



- Convene **partnerships** to develop shared goals
- **Set the direction** for our offshore wind engagement
- Provide a guide to **strategic solutions** required
- **Shift** to early, plan-level, working
- Encourage **innovation** – doing things differently
- **Inspire** people to value and invest in nature recovery

Offshore Wind Evidence & Change Programme

NATURAL
ENGLAND



Programme Mission Statement

To facilitate the sustainable and coordinated expansion of offshore wind to help meet the UK's commitments to low carbon energy transition whilst supporting clean, healthy, productive and biologically diverse seas.

In the first year...

Over **£20.8** million invested in **25** projects

3 projects completed

13 projects underway

27 member organisations in the Programme Steering Group including Scottish, Welsh and Northern Ireland government bodies, regulators, NGOs and industry

“Avoid irreparable damage”: POSEIDON

NATURAL
ENGLAND

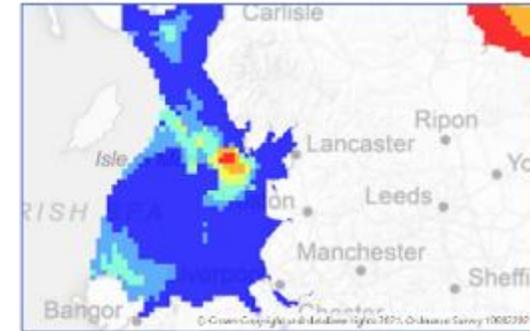
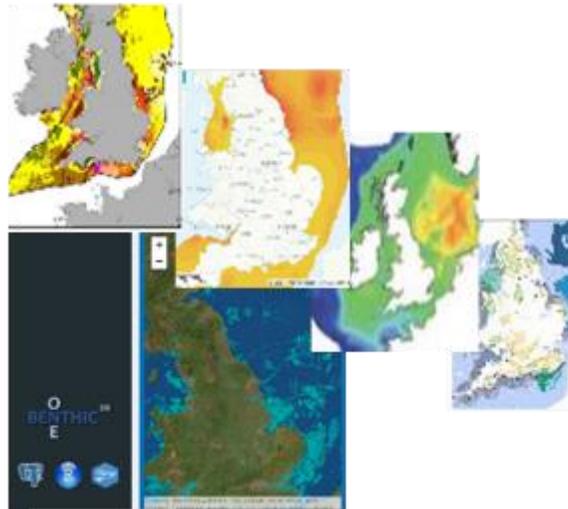


Planning Offshore Wind Strategic Environmental Impact Decisions

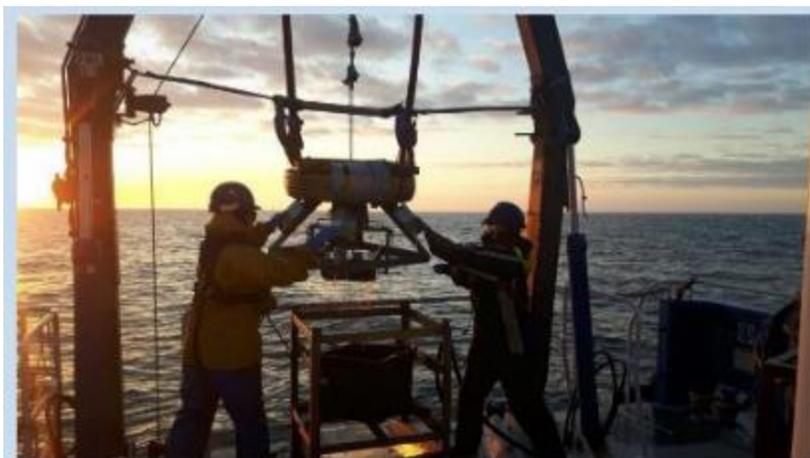


POSEIDON

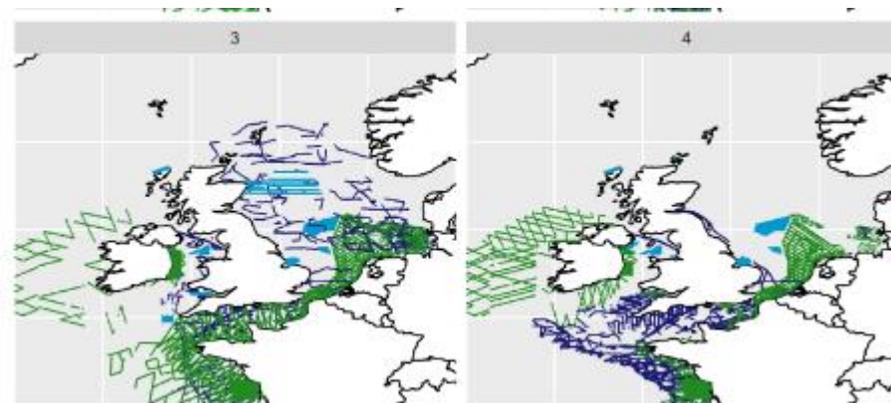
New baseline data → Updated spatial models → Integrated risk map



POSEIDON progress – E&W surveys 2022 - 2024



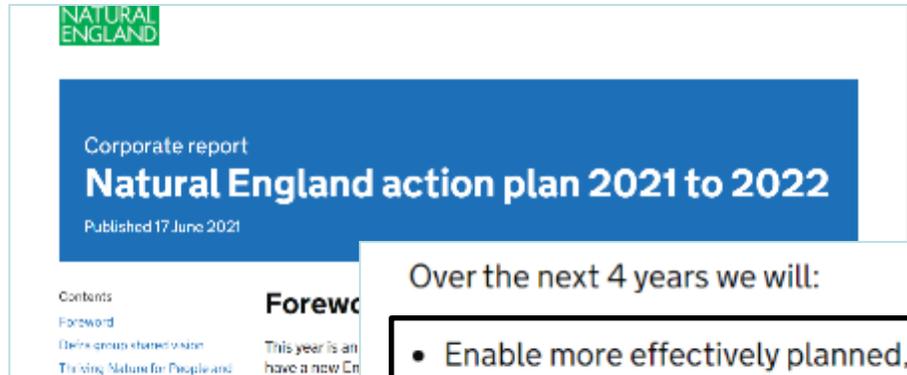
Contributing to our evidence base: Operating a grab.
Photo: Natural England/Mojo Marsh



1. Clear understanding of the **environmental risks and opportunities** for **future offshore wind** developments (embedded into marine planning).
2. **Information** to support **developers, advisors and decision-makers** for current and imminent development rounds.
3. A **comprehensive environmental baseline** platform that maximises existing knowledge and allows **targeted, efficient design of future baseline evidence** requirements at **plan and project** scale.

Natural England strategic direction

NATURAL
ENGLAND



Over the next 4 years we will:

- Enable more effectively planned, high environmental quality development and infrastructure.
 - Not only is this essential for a healthy and resilient environment in the face of climate change, it is also integral to securing the greatest economic benefits from development investment and creating great places to live and work.
 - The environment should not be considered 'nice to have' or as an add-on but as key in providing local solutions for economic and social issues and to build back greener.

Specifically, through our planning advice we will:

- Focus on proactive and strategic advice at plan level, building environmental considerations in early and considering place-based solutions for environmental impacts.

To sum up:

- 1. Front-load (mitigation hierarchy)**
- 2. Strategic characterisation**
- 3. Embed nature in decision-making**



Pre-consent surveys in the Celtic Sea for FLOW development

Graham Moates
The Crown Estate



Celtic Sea data collection campaigns and data sharing initiative.

A regional approach to environmental characterisation of the Celtic Sea for FLOW.

Neil Farrington
Strategic Offshore Development Manager

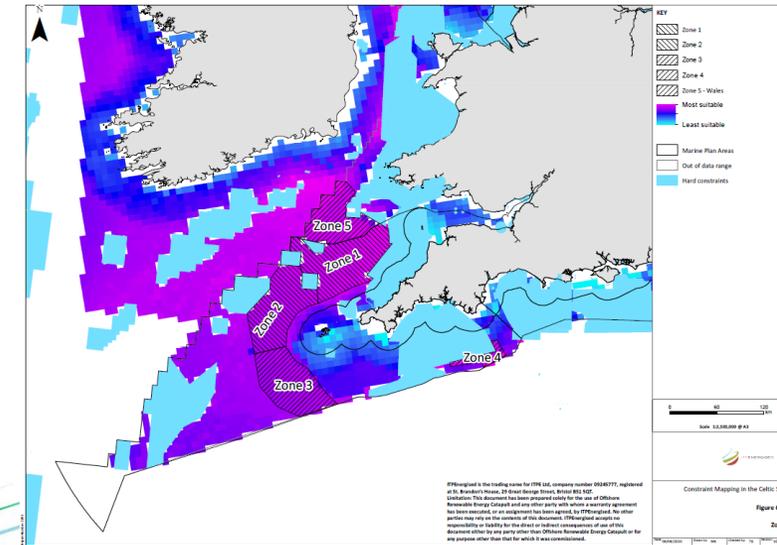


Strategic Data Collection and Evidence Building

- To support a strategic zonal planning approach Celtic Sea Power are scoping and delivering a number of new data collection campaigns.
- Aspirations include targeting key gaps in existing data and evidence to support decision making processes. Alignment with key decision maker requirements is crucial.
- A key goal is to develop a single agreed evidence base to help enable efficient decision making.
- Outcomes are focused on the creation of regional characterisation models with high confidence levels
- Collaborative data sharing and partnership working offers the opportunity to maximise efficiency, minimise replication and decrease conflict.

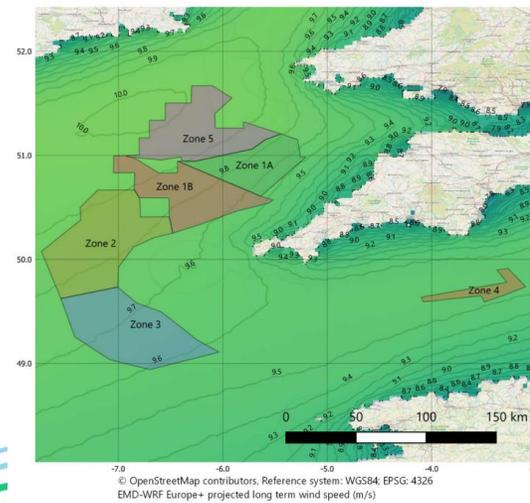
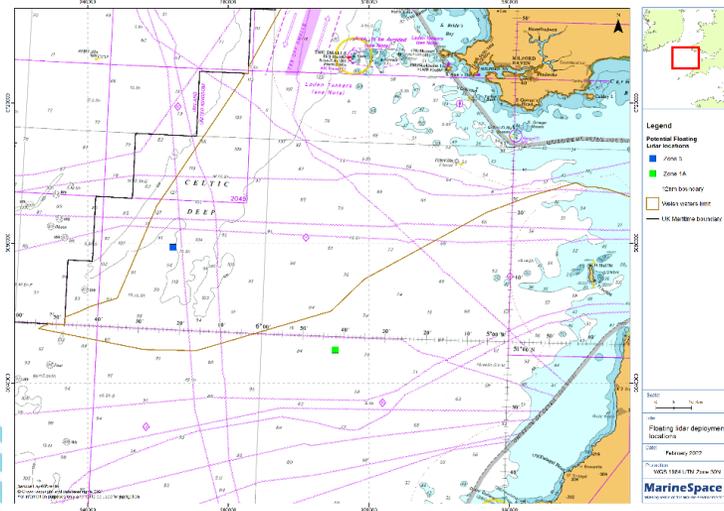
Early Spatial Planning Activity

Hard Constraints	Military Danger Zones	Ramsar Sites	SPA's	SAC's
	SSSI's	MPA's	Existing lease areas	
Weighted Constraints	Military exercise zones	Shipping Routes	Fishing	Wind Resource
	Wave Power	Currents	Bathymetry	Wrecks
	Visual 30km	Visual 45km	NATS radar	
Reference Data	Ports	Transmission grid	Seabed	Comm's cables
	Habitat	Marine Mammals	Nursery Grounds	Spawning areas
	Shellfish waters	Seabird foraging	Heritage	



Wind Resource and Metocean Data

Data/Evidence set	CSP Collection Method	Purpose	Progress	Regional modelling partners
Wind Resource and metocean data	2 x Floating LiDAR systems	Creation of a bankable regional wind resource model	Launch May 2022	Wood PLC



Ornithology

Data/Evidence set	CSP Collection Method	Purpose	Progress	Regional modelling partners
Ornithology	Digital Aerial Surveys	Increase evidence base to understand potential interactions. Creation of a Celtic sea bird distribution and density model.	Scoping almost complete. Survey planned June 2022	POSEIDON project (Natural England, JNCC & expert consultants).

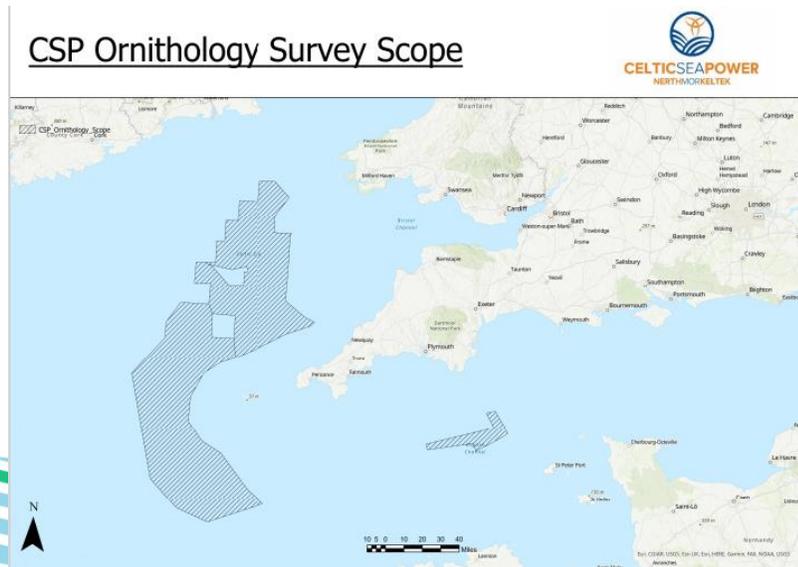
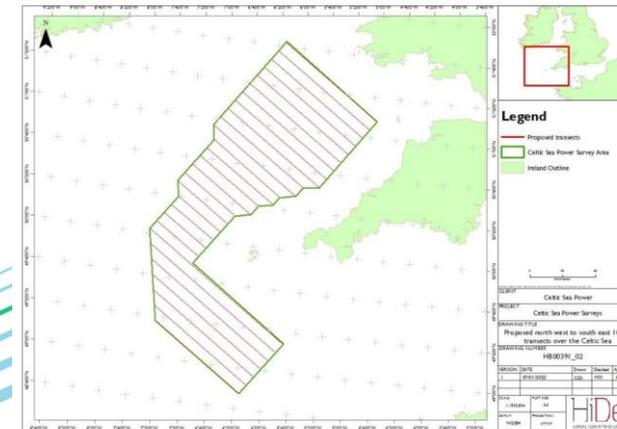
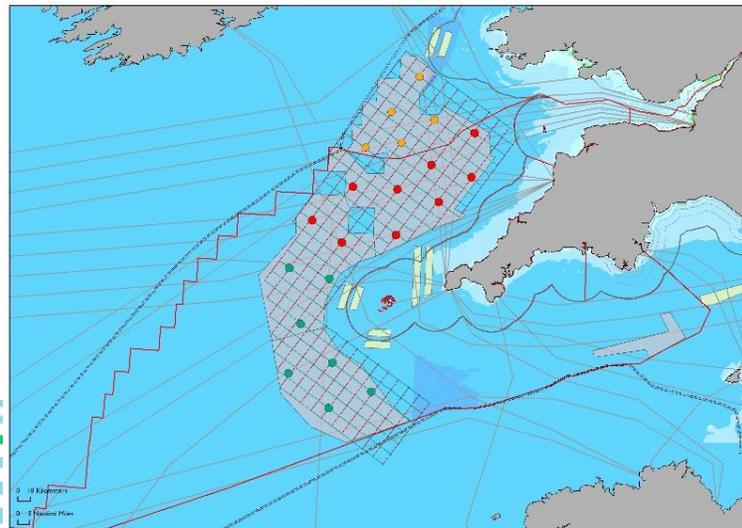


Figure 7 Celtic Sea project area, 10 km transect spacing, no buffer, and direction of proposed transects (Option 2)



Marine Mammals

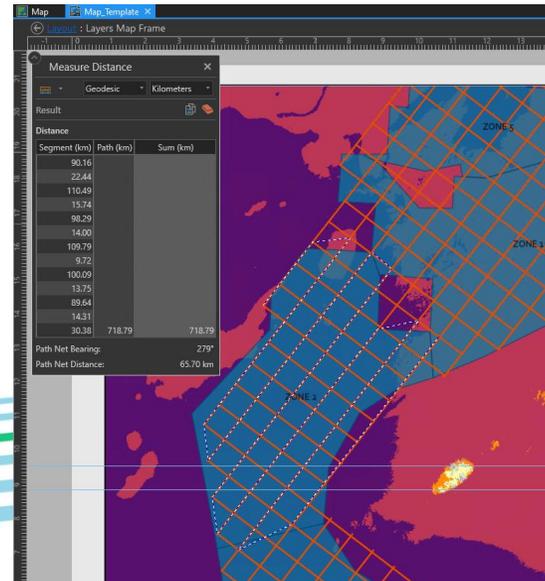
Data/Evidence set	CSP Collection Method	Purpose	Progress	Regional modelling partners
Marine Mammals	Digital aerial surveys and a potential sub sea acoustic monitoring network.	Increase evidence base to understand potential interactions. Creation of a Celtic sea marine mammal distribution and density model.	Data baselining. Scoping of a sub sea acoustic monitoring network complete. Survey planned June 2022.	POSEIDON project (Natural England, JNCC & expert consultants). Subsea acoustic design supported by Dr Matt Witt (UoE / PrePARED)



A Celtic Subsea acoustic network?

Geophys and Geotech

Data/Evidence set	CSP Collection Method	Purpose	Progress	Regional modelling partners
Geophys & Geotech	Survey vessel deployment and/or Autonomy	Creation of a Celtic Sea ground model to support FLOW design	Scoping complete. Geophys Autumn 2022 Geotech TBC	University of Plymouth



Fisheries Activity

Data/Evidence set	CSP Collection Method	Purpose	Progress	Regional modelling partners
Fisheries activity	AIS/VMS tracking. Data loggers and fixed spatial interest.	To create a spatial representation of key areas of fishing activity (static gear, dredging, mobile gear)	Data baselining/early scoping. Engaged in TCE fisheries activity.	TBC

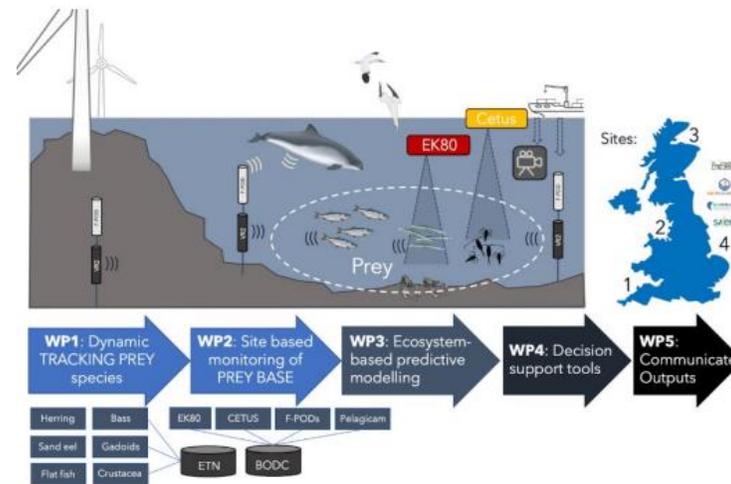
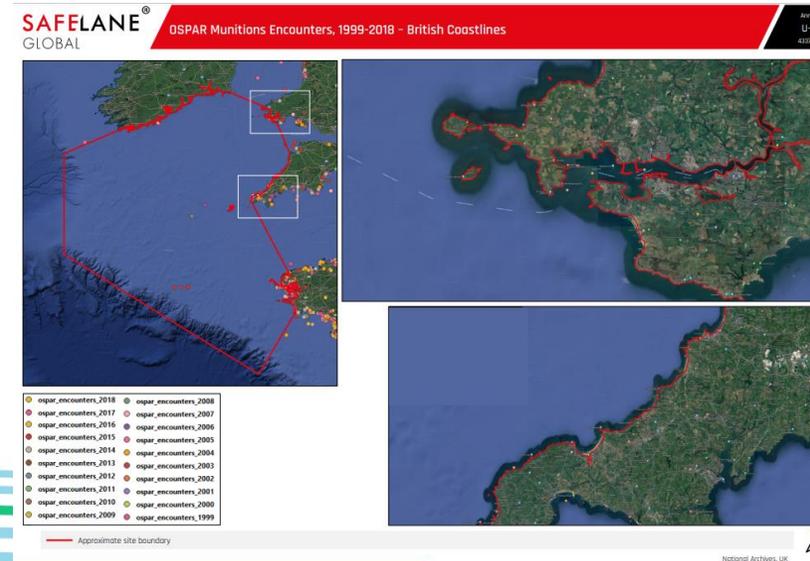


Figure 1 - WINDProof. Schematic showing multi-sensor / multi-platform science programme to identify OWF influence on predator and prey. WINDProof will have access to four UK sites (1-4)

UXO Threat and Hazard Assessment

Data/Evidence set	CSP Collection Method	Purpose	Progress	Regional modelling partners
UXO	Initial threat and hazard assessment	To better understand risks and potential necessary mitigations	Complete April 2022	Safelane Global





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Session 6 SUMMARY





Celtic Sea FLOW Summit

Sandy Park Conference Centre
27th April 2022

DELIVERED BY



Cornwall FLOW Accelerator



HM Government



European Union
European Regional
Development Fund