
GWF
GEOSPATIAL WORLD FORUM
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Session 5: Enhancing Access to Ocean Knowledge and Impact of Blue Economy

Case Study: Utilising Open Source Data in Geological Ground Models for Offshore Wind

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Geospatial World Forum

16th May 2024

Agenda

1. Introductions
2. Advantages of Floating Wind
3. What is a “Ground Model”?
4. The Challenges
5. (Part of) The Solution: publicly accessible data
6. Case Studies: Portugal and Brownfield UK
7. Summary

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Introductions

1979

Established

moreld

Part of the Moreld Group

Globally recognised brand with a proven track record of delivering services to some of the world's most successful marine and offshore projects

Known for innovation, practical experience, operational and technical excellence and safety

+300

Employees

+16

Countries

+550M

NOK Revenue per year

+20 Offices

Globally

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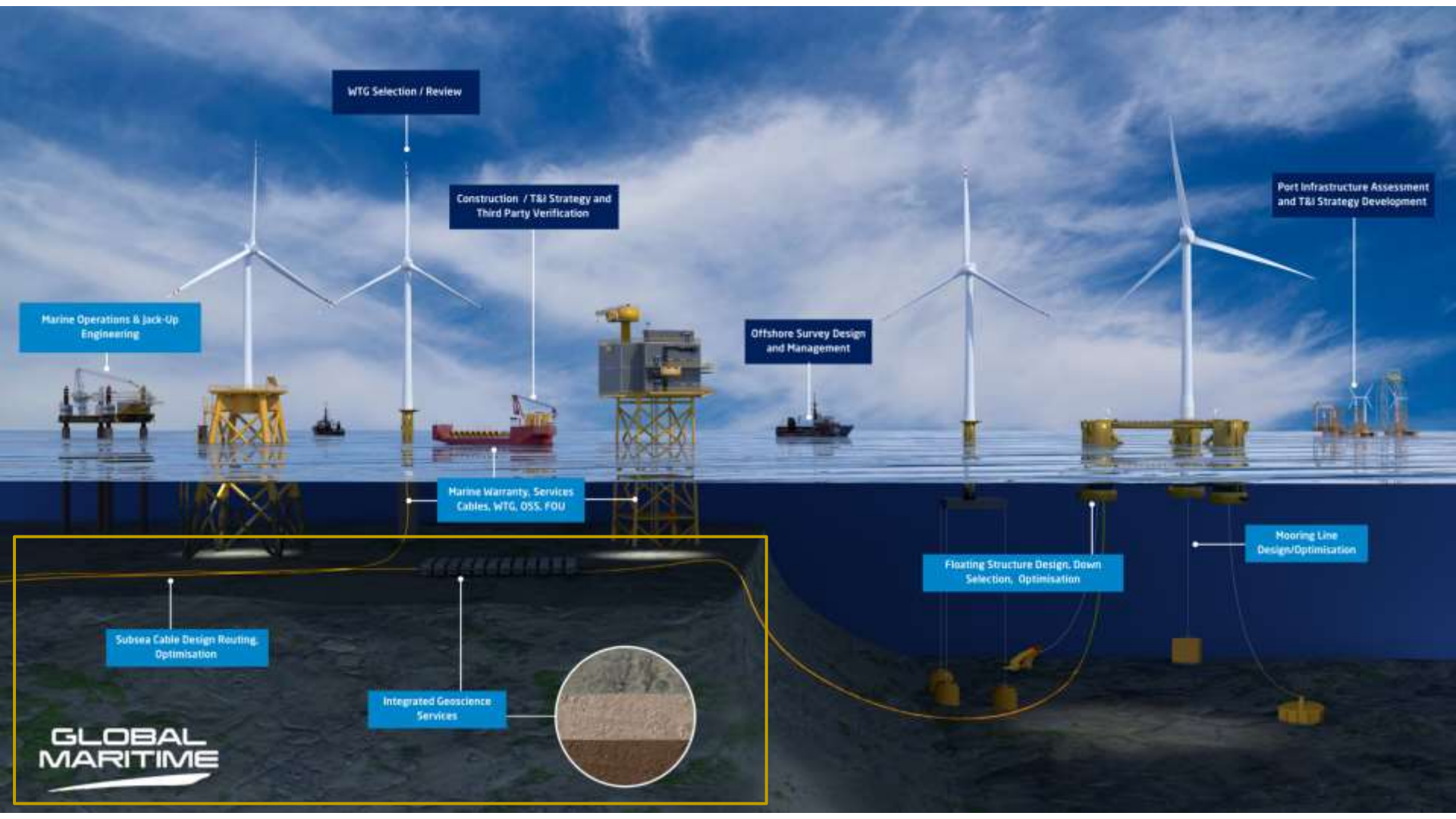
Meeting the Challenges of the Sea


WTG Selection / Review
Construction / T&I Strategy and Third Party Verification
Port Infrastructure Assessment and T&I Strategy Development
Marine Operations & Jack-Up Engineering
Offshore Survey Design and Management
Marine Warranty, Services Cables, WTG, OSS, FOU
Mooring Line Design/Optimisation
Floating Structure Design, Down Selection, Optimisation
Subsea Cable Design Routing, Optimisation
Integrated Geoscience Services
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Geoscience - Principal Services and Solutions

Geotechnical

- Foundation Optioneering
- Survey Design, Procure, Supervise, Manage
- Geotechnical Interp Reporting
- Foundation Design
- Installation Analyses

Geophysical

- Geohazard Studies
- Survey Design, Procure, Supervise, Manage
- Seismic Interpretation, Inversion etc
- Spatial Risk Analysis and Management

Geospatial

- Data Management and Hosting
- Ground Model Curation
- GIS Web Services
- Key Input into:
  - Desk Studies / Geohazards
  - Subsea Cable Route
  - CBRA
  - Ground Modelling

Eng Geol

- Geohazard Studies
- Data Integration
- Ground Modelling
- Seabed Risk Management and Planning
- Cross-Discipline Projects and Management

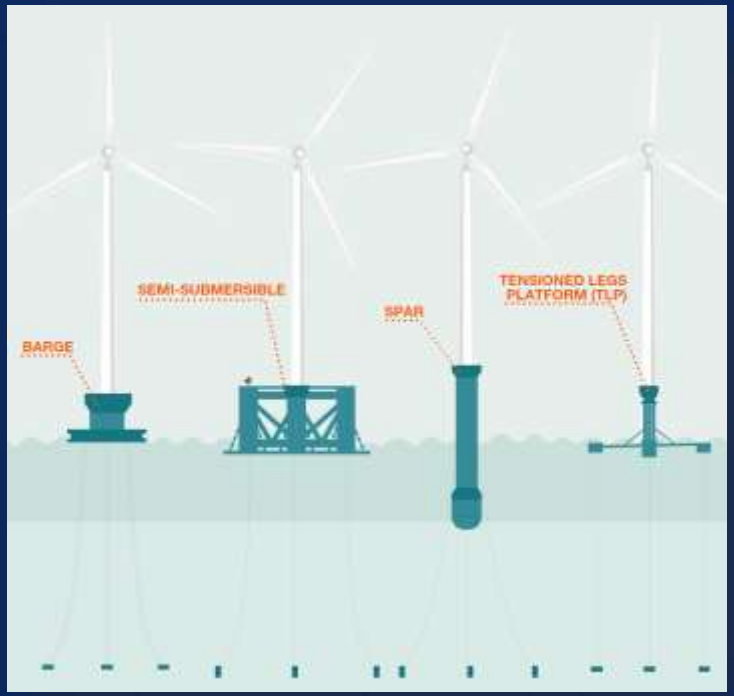
Subsea Cables

- Routing Studies
- Cable Burial Risk Assessment
- Burial Assessment
- Trenching Tool Selection
- Installation Support and Review

INTEGRATED SERVICE DELIVERY

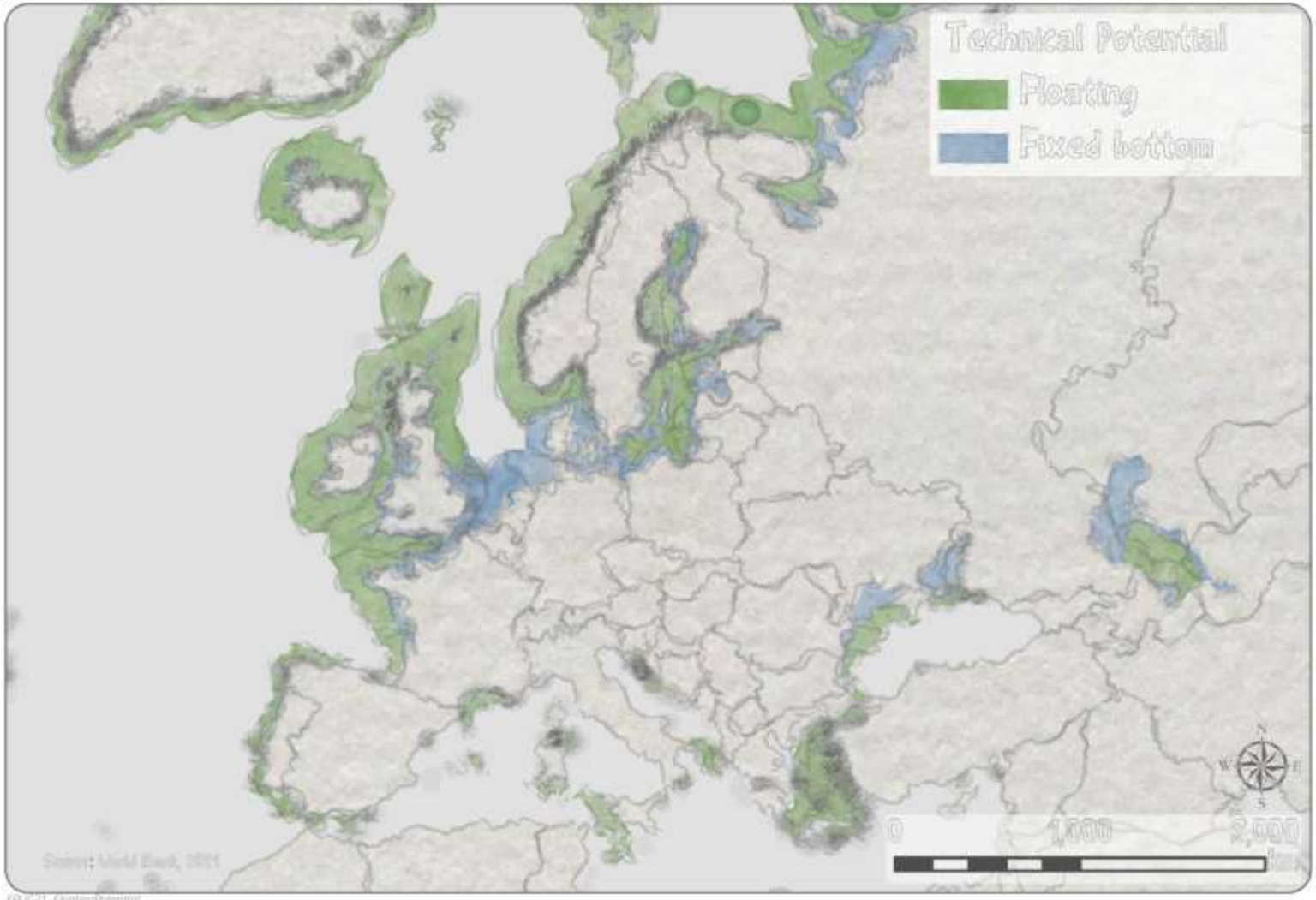
Floating Wind

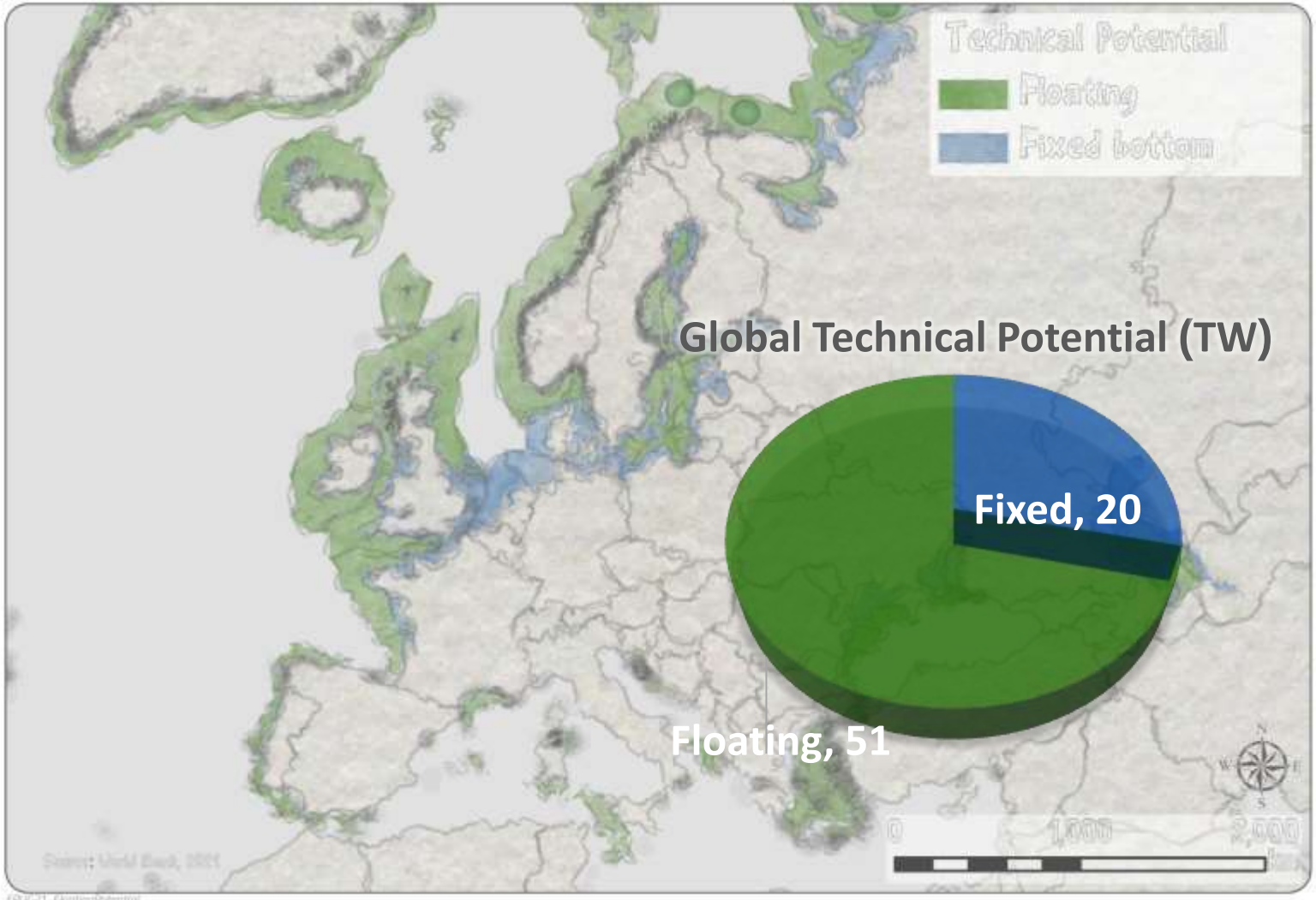
What Is Floating Wind?



Source: Iberdrola

- Offshore wind based on floating structures rather than fixed bottom foundation technologies
- Allows construction farther from shore where wind speeds are higher and there are no visual impacts
- Opens up areas previously ruled out due to water depth and ground conditions


Technical Potential
Floating
Fixed bottom
0
1,000
2,000
Source: World Bank, 2021


Technical Potential
Floating
Fixed bottom
Global Technical Potential (TW)
Fixed, 20
Floating, 51
0
1,000
2,000

What is a “Ground Model”?

What is a “Ground Model”?

- A 'Ground Model' used to be loosely defined but the recent SUT OSIG Guidance Notes (Planning and Execution of Geophysical and Geotechnical Ground Investigations for Offshore Renewable Energy Developments) provide some clarity:
  - A database of available information such as the structural geology, geomorphology, sedimentology, stratigraphy, geotechnical properties and geohazards of a site

- The ground model is no longer a standalone report, nor is it a geotechnical interpretative report (GIR); the Ground Model is a living, breathing constantly updated and curated central geo repository of the most up to date spatial project understanding, data and risk…….. if done properly

- The data inputs are disparate, of differing quality, provenance and type. But are inherently spatial

- Ground models are the pivot point for an array of engineering processes and decisions

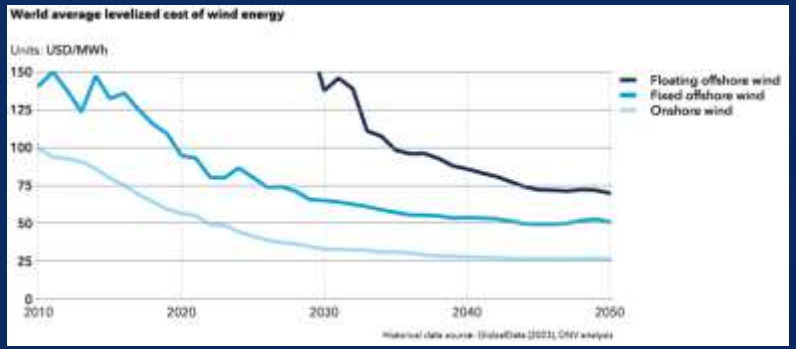
- Stakeholders are diverse, and quite often non-technical, without access to specialist modelling softwares

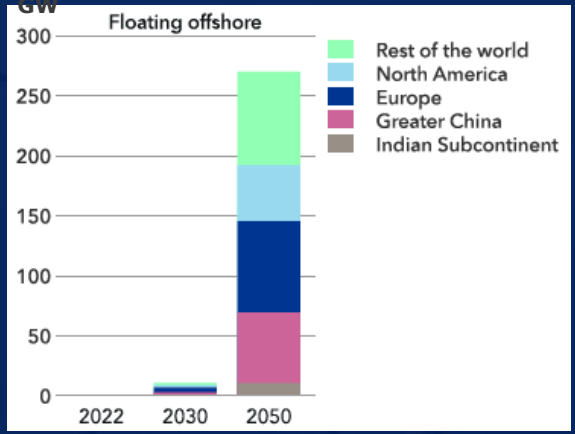
The Challenge

The Challenge

- Floating offshore wind is still fighting CAPEX and OPEX as it seeks to scale and become more viable
- There is a clear driver and need to find CAPEX savings
- Foundations and substructures are significant cost elements
- Broad spectrum of thought in the industry about the future direction of foundation/anchor strategy;
    1. 6+ mooring lines and DEA's per WTG (!)
    2. 3-4 mooring lines to pile/suction caisson per WTG
    3. 3-4 mooring lines to shared anchors per WTG
- But, broad agreement that GI at every location in scenario 1/2 is not viable… at least amongst our developer clients

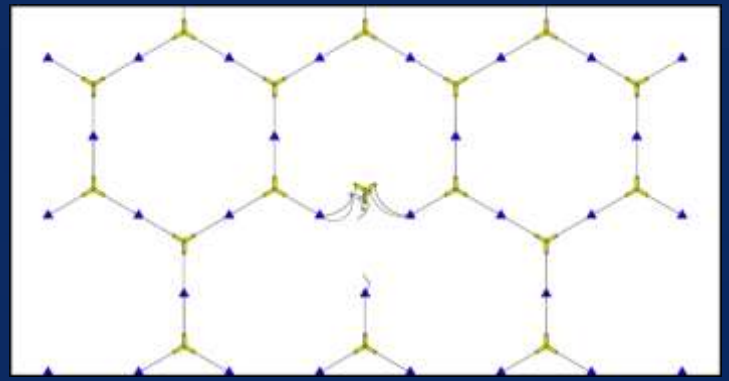
- How can ground models support lower CAPEX and foundation design without location-specific GI?

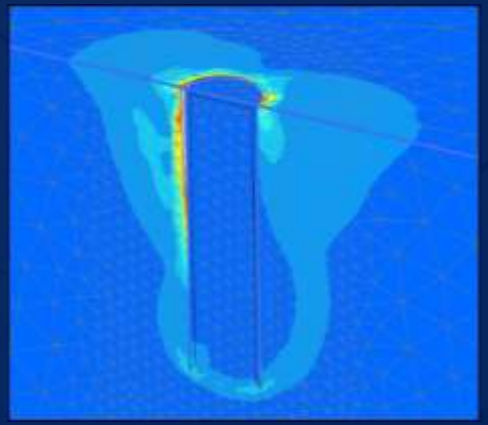




The Challenge

- Existing primary survey data are at a premium
- Areas of interest are often large and impractical to fully survey – especially in a competitive tender
- Historically, access to secondary, tertiary or modelled datasets has proved challenging
- Much higher potential for foundation location changes in floating wind; WTG layout, also mooring line numbers and arrangements
- Changes can occur late in project development
- Difficult to plan for location-specific geotechnical investigations and programme is challenging

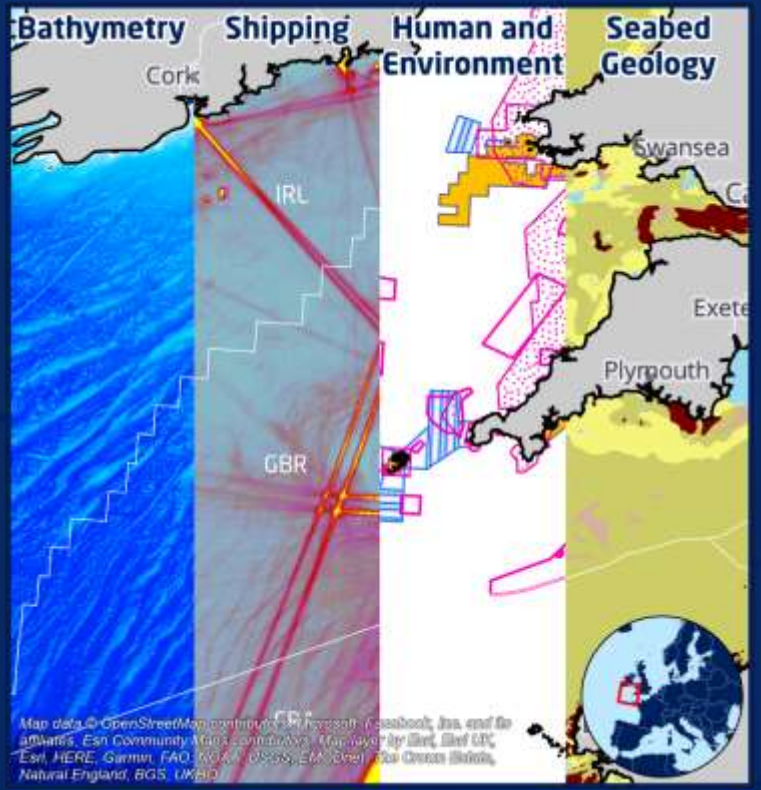




The Solution
(or at least part of it)

The Solution

- Early phases: Utilise Open-Source
- Later Phases: Integrated Ground Model-Based Design



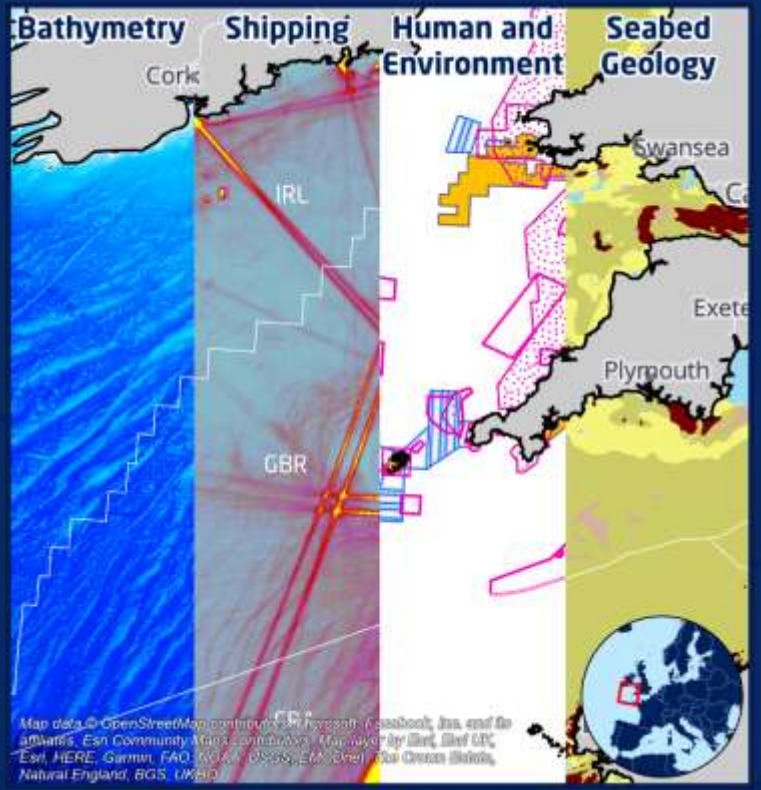
The Solution

- Early phases: Utilise Open-Source
- Later Phases: Integrated Ground Model-Based Design

- Improved technology and changes in data sharing attitudes have opened access to vast amounts of data at no (or low) cost

- Although no replacement for primary surveyed data, this “Leasing Stage” ground model provides early spatial insights

- Essential for early assessment of a site’s development suitability and cost



The Solution

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At GM we maintain a repository of these data sources

Case 1: Portugal Offshore Wind Round 1

Portugal Round 1

- In 2023 DGRM announced the first Potential Development Zones as part of a 10 GW ambition for offshore wind by 2030.
- The Atlantic Coast of Portugal has some of the best wind resource in Europe - annual average mean wind speeds within the PDZ's range from 8 – 9 ms-1 - and so offers great potential for wind development.
- Little historical oil and gas = little existing data
- Developers seeking success in this, and future, auction rounds must define areas of seabed which offer a competitive advantage, and which secure constructability and operability in the long term.

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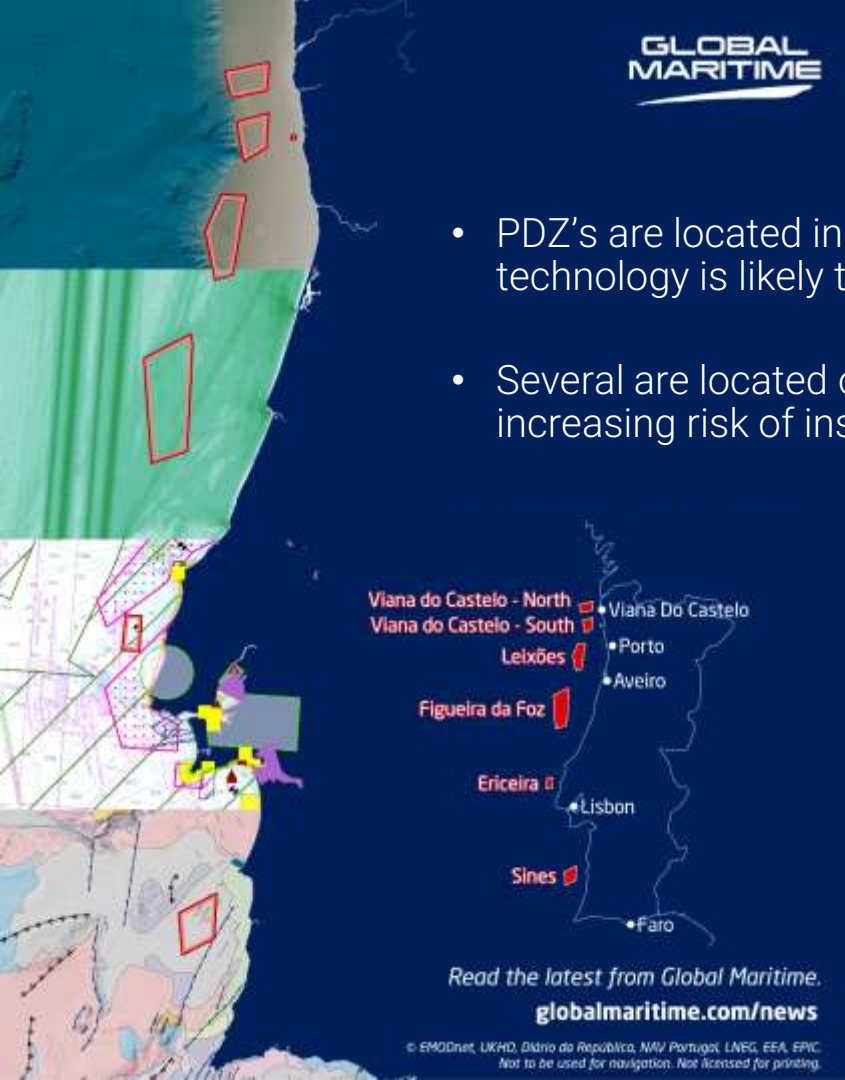
- PDZ's are located in deep waters meaning floating technology is likely throughout
- Several are located on the continental shelf margin, increasing risk of instability/ landslides

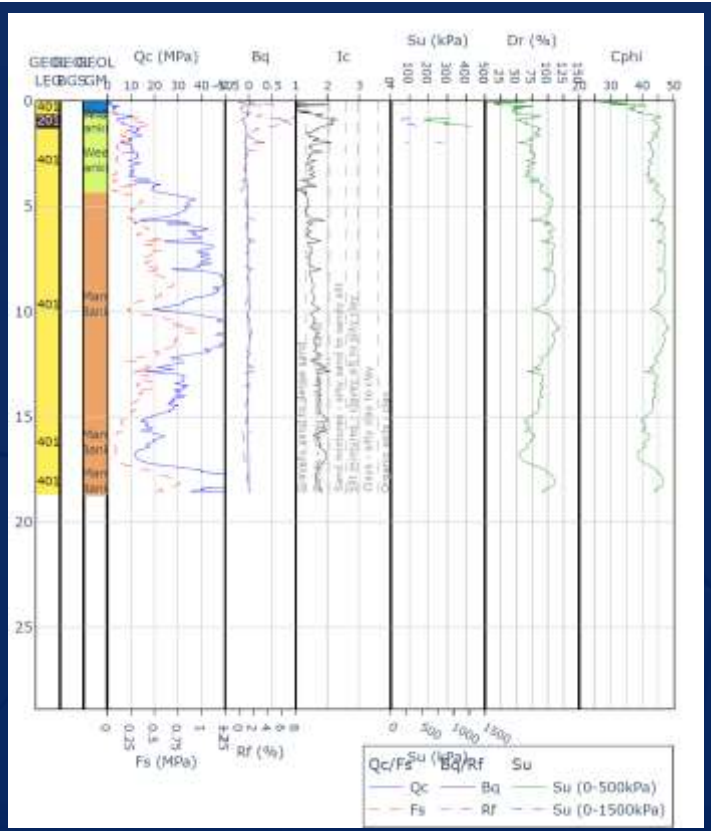


- Based purely on open source and publicly available data, we were able to assess each PDZ in detail for hydrographical, geological, meteorological, socioeconomic and environmental characteristics
- Developers are able to calculate LCOE with more confidence, understanding potential foundation choices and key project risks, without the need for primary survey.

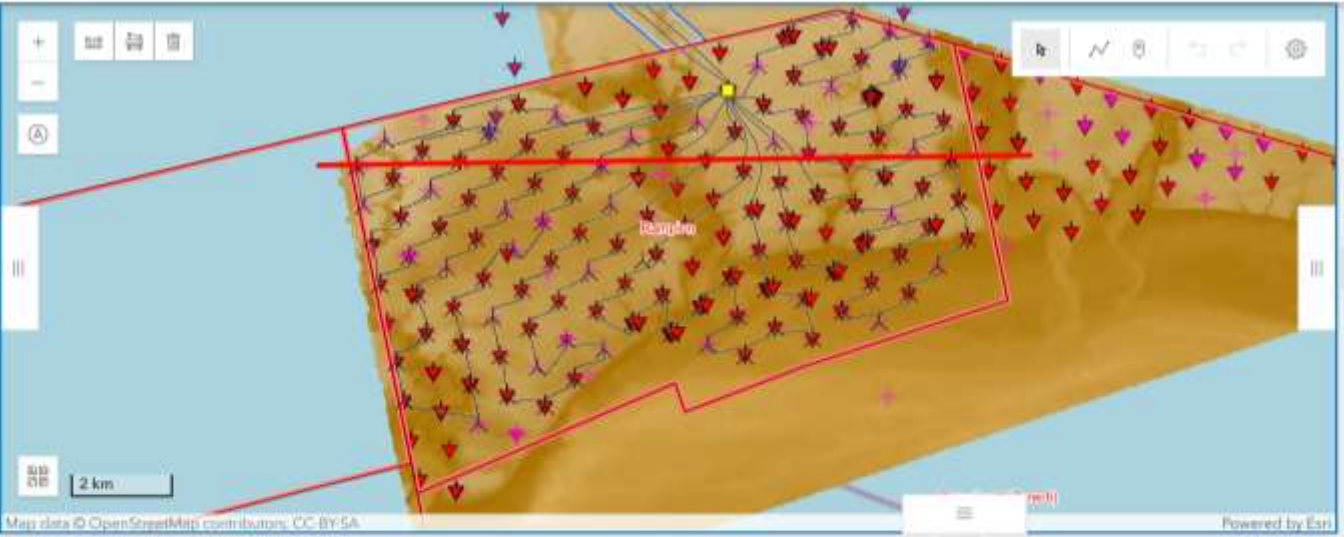
Case 2: Repurposing Brownfield Data in the UK

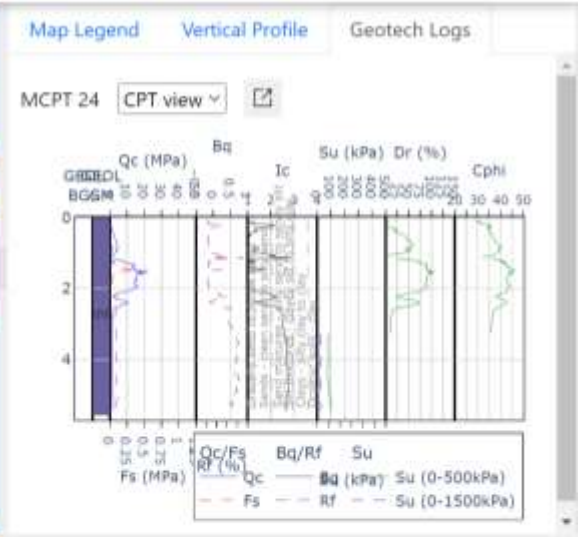
UK Brownfield Data

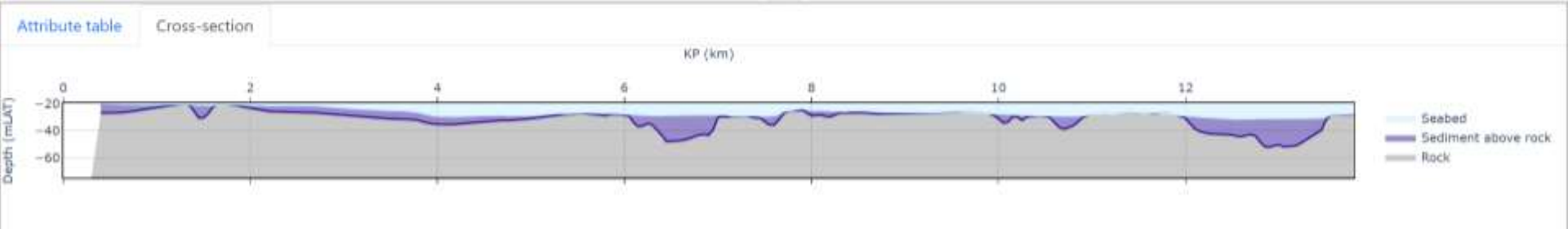
- Since ~2010 The Crown Estate (and Crown Estate Scotland) have made provision of primary surveys a condition of lease for all offshore wind farms
- Surveys are stored in TCE's publicly accessible Marine Data Exchange
- Surveys tend to be released publicly once the project is commissioned and commercial value in the data decreases
- A growing wealth of data if you know where to look, and are prepared for some frustration…
- This becomes of growing relevance for new developments, re-powering, decommissioning, extensions, neighbouring or intersecting cables…



UK Brownfield Data



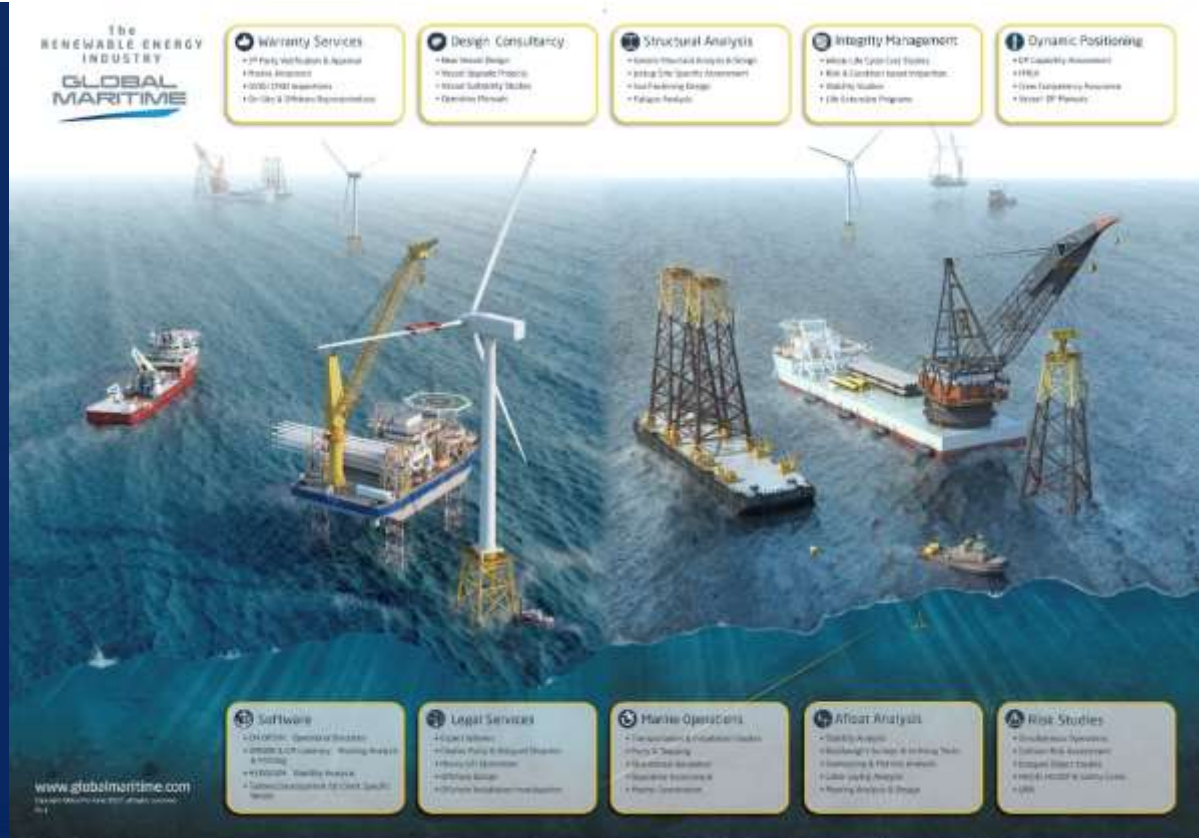




Final considerations

Final Considerations

- Open data are of varying availability and quality globally
- The trend is definitively positive: more and more data are becoming available
- Web services are useful, but please don't forget about the data!
- Although not a replacement for full survey, there is a significant amount if intelligence to be gained, with a little perseverance.



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Thank you for Listening

I welcome any questions throughout the conference

https://www.globalmaritime.com/

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We meet the challenges of the sea