



North Sea Energy Island

Offshore Wind
Technical Market Dialogue



Online OWF MD information meeting, 21 April, 2023

Agenda

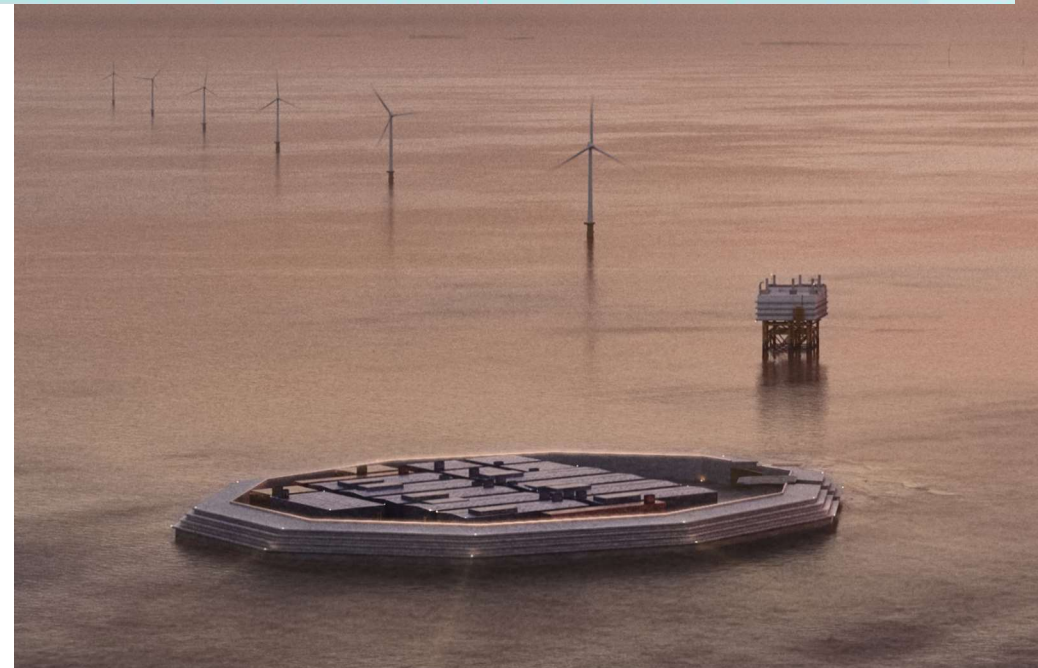
- ▶ Welcome and introduction
- ▶ Background and Purpose of Today's information meeting & OWF technical Market Dialogue
- ▶ General information on the North Sea Energy Island & Tender process
- ▶ Technical background information
 - A possible Energy Island Concept
- ▶ Market Dialogue questionnaire
- ▶ Questions and comments

During the initial presentation you can pose questions in the Skype chat to be addressed in the Q&A session



Purpose of Today and the OWF technical Market Dialogue

- ▶ Tender Processes
- ▶ Overall framework
 - Artificial flexible island – combination of island and platforms
 - 80-100 km off the coast of Denmark
 - Initially 3-4 GW of offshore wind by 2033, full capacity at 10 GW by 2040
 - Island tendered as a Public-Private Partnership
 - Potential area for innovation, but not part of evaluation criteria
- ▶ Purpose and scope of Today
 - Reach out to OWF stakeholders for valuable input to tender process, e.g. requirements, needs and wishes
 - Scope: OWF technical requirements and needs to the island construction and usage of the Energy Island in installation and operation phases.



A flexible and scalable technical concept

- The island will act as **energy hub** collecting and transmitting power from multiple OWFs and feed this directly to several countries
- The island will be constructed as a “**flexible island**,” which provides technological flexibility and helps future-proof it as later platform additions can be tailored to tomorrow’s technological solutions
- The island has to include **infrastructure for logistics and service** such as a helipad and a service harbour, while also being able to house personnel on the island for longer durations
- The island's total area is expected to be between **20-40 hectares**
- Closest OWFs are expected to **be 3-6 km from the island**
- Energinet’s and OWF Concessionaires electrical equipment shall be **protected from harsh weather and overtopping**

Energinet and OWF Concessionaires play a vital role in the project, as they will be primary users of both the infrastructure placed on and around the island as well as the common service facilities.

Therefore, it is expected that a close collaboration between all stakeholders will take place during the design, construction and installation phases.

Examples of expected key requirements



First 3-4 GW power

Timely delivery of first 3 GW power in 2033 as expected and avoidance of costly delays.



Lifetime

The artificial island is expected to have a lifetime of +80 years to sufficiently support ~2 generations of OWF.



Capacity

The island is required to be able to service an initial minimum capacity of 3-4 GW on the island itself and a total connection of 10 GW from offshore wind.



Unobstructed access for Energinet

To enable Energinet to sufficiently setup and operate their infrastructure, it is required for the TSO to have unobstructed access to its equipment.



Access for offshore wind owners

The island is required to give OWF Concessionaires access to go through the perimeter to connect cables to the Point of Connection. The same applies to Energinet’s interconnectors and cables.



Weight

The energy island is required to support the minimum weight required to carry Energinet’s and OWF Concessionaires equipment and ensure efficient operations for all parties.

... Plus compliance with EU taxonomy for **sustainable activities**

North Sea Energy Island Tender Process

- ▶ The combined tender material will include:
 - Procurement Documents
 - Construction Contract including Employers Requirements
 - Plot Lease Agreements (OWF and Energinet)
 - O&M Agreement
 - Investment & ownership documents
 - Appendices, schedules etc.
- ▶ Technical functional requirements in Employers Requirements
 - Today the focus is OWF technical requirements and needs to the island construction and usage of the Energy Island during installation and operation



Note that the scope, appearance and exact features of the island have not yet been determined

Technical background information – Energy Island Concept

Questions are divided into different themes:

► Technical specifications

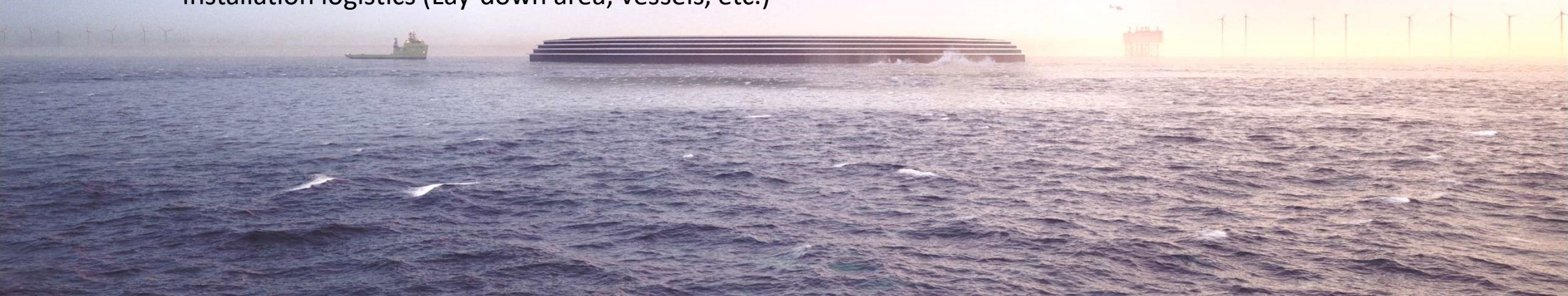
- Construction of the island
- Electrical systems (PoC, power supply, ...)
- Transmission equipment (Transformers, filters, cables, fiber optic cables, etc.)
- Interfaces (Cables conduits, cable entry systems, utilities, etc.)
- Conceptual layout and Area needs
- Installation logistics (Lay-down area, vessels, etc.)

► Operation & Maintenance

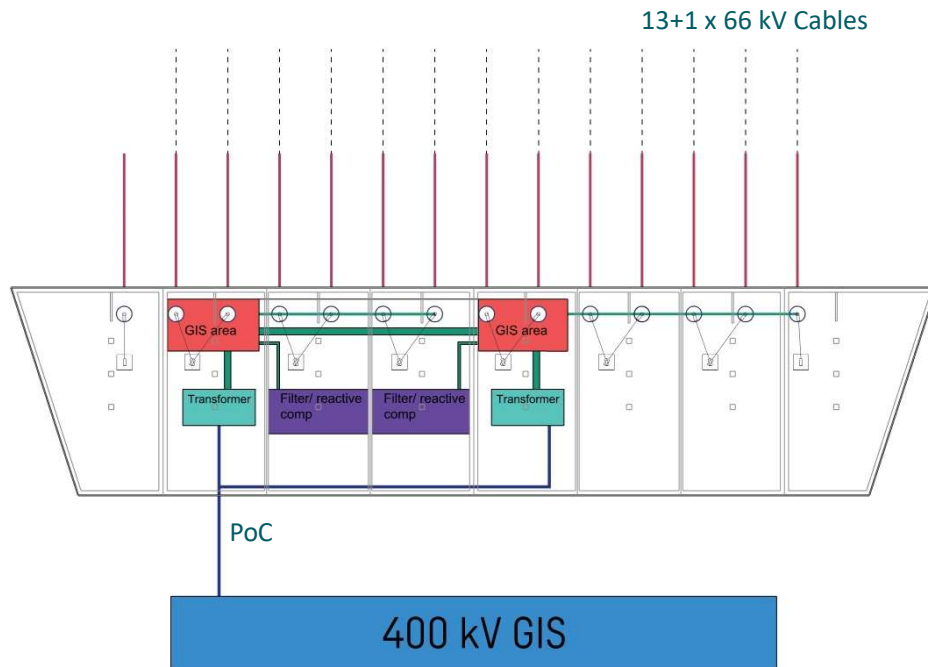
- Personnel and Accommodation needs
- Access to service areas (Harbour, helipad, storage, etc.)
- Logistics and Infrastructure needs

► Environmental impact

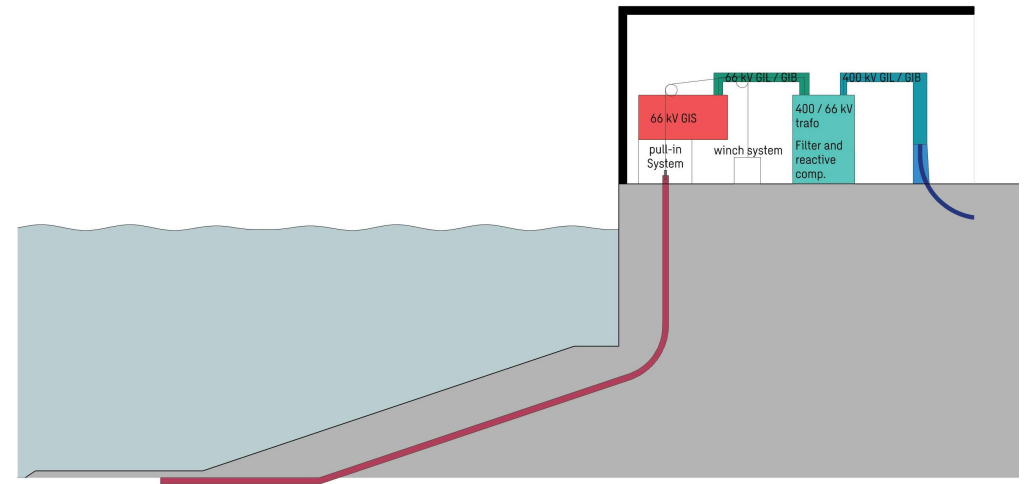
► Other



Technical background information – Energy Island Concept



Illustrative layout of 1GW OWF substation on the perimeter section on the island.



Side view of illustrative layout of OWF substation on the island

Market Dialogue Questionnaire and next steps

- ▶ Background information (pdf) and Questions (excel) can be found on:
 - [TED, EU-Supply](#)
 - [DEA website](#)
- ▶ Deadline for submitting answers and Comments is:

Sunday 7 May, 2023 at 16:00 CET*

- ▶ Answers should be submitted via EU-Supply/TED or send to Energyislands-NEI-OWF@ens.dk
- ▶ General anonymized summary will be published on the DEA website ^(17/5)
- ▶ Answers will be used to finalize tender material related to OWF requirements

Info on participant in the technical dialogue		Priority	Answers and comments
Company name(s) or name of the future consortium			
Contact person's name			
Contact person's email			
Contact person's telephone number			
1. Electrical equipment requirements			
1.01	Equipment: Please list the electrical equipment (incl. Estimated footprint and weights) expected to be located on the island per 1 GW?	High	
1.02	Substation - General. Can you distinguish any other considerations (Electrical), which have been overlooked and needs to be taken into account to accommodate a robust and safe GIS switching station?	High	
1.03	Substation: Is it likely that the OWF-substation will include harmonic filters and power compensation equipment (shunt reactors)? If so, which sizes are expected?	High	
1.04	Transformers: Do you expect Three phase or Single phase power transformers for stepping up the transmission voltage to 400 kV?	High	
1.05	Transformer replacement: Is there a procedure for transformer replacement (plug-in terminations, installation flexibility etc)?	High	
1.06	Voltage level: Do you expect the voltage level, from the OWF to Energy Island, to be 66 kV or 132 kV (or something else)?	High	
1.07	Grid code: Do you expect the OWF to transmit harmonic distortions to the Point of Connection (PoC) on the island? Reactive Power Compensation. How many MVAR do you expect the OWF cables to generate during normal operation? Do turbines include controllers to limit the MVAR exchange (unity power factor at point of connection)?	High	
1.08	Any other recommendations or suggestions?	High	
1.09	Emergency power: Could a battery bank, installed on the island, replace the need for EMD (Emergency Diesel Generators)? What is the estimated footprint/physical size?	Lower	
1.10	Earthing system: Which are the dimensioning factors to limit excessive touch voltages and transferred potential to a minimum?	Lower	
1.11	GIS room: Is it likely that the OWF-substation will be a Double Bus - Double Breaker arrangement or do you foresee other configurations in the OWF-substation?	Lower	
1.12	GIS room: What extra space is required in the GIS-room (apart from required bays) for service, maintenance and	Lower	

*Not 5. May as stated in Q-excel!

Questions & Comments ?

