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ENERGINET CONTRIBUTION ABOUT INVESTIGATIONS TO THE DANISH ENERGY AGENCY FIRST MARKET DIALOG ON ENERGY ISLANDS

1. Background

The Climate-, Energy- and Supply Minister has ordered Energinet to initiate investigations for the Energy Islands, the Offshore Windfarm Areas and the cable connections, which are parts of the decisions in the Climate Agreement in June 2020. The investigations shall include a SEA supplemented with environmental surveys for the decided plan, relevant seabed investigations and metocean investigations. The investigations performed by Energinet are scheduled to be completed no later than Q1 2024.

The Energy Island in the Baltic Sea is the existing Island Bornholm, and the Energy Island in the North Sea will be new construction. Therefor seabed investigations for the Energy Island in the Baltic Sea are not relevant. Regardless of this difference, the seabed investigations for the Windfarm areas and for the offshore cables and the SEA will be conducted using similar procedures for both planned projects.

The following chapters outlines the investigations.

2. Energy island – North Sea – Metocean investigations

Energinet will conduct metocean field investigations with the aim to characterize the metocean conditions. A desktop study to assess risks and derive metocean parameters for the design and construction of the Energy Island will be undertaken. The content and detail of the field investigations and desktop studies will meet the specifications instructed by the Danish Energy Agency to Energinet and these activities overlap to a significant extent with the offshore wind farm characterization efforts, which are not fully described here.

The metocean measurement campaign will utilize buoy systems to characterize the wind, wave, current and water level variations near the Energy Island and in the greater North Sea project development area. Deployment of two floating LiDAR buoys are planned for the project development area, whose data will be also used for subsequent wind farm development. There is also a possibility to deploy dedicated wave buoys at the proposed locations of the island, in order to capture the possible effect of wave shoaling and considerably reduce uncertainty and optimize the design and installation criteria for the caisson structures and the overall island construction.

The metocean desktop study will be issued based on a hindcast data from validated numerical model and the field measurements. This study will focus on detailing specific operational and extreme metocean conditions along the island perimeter using joint probabilistic methods. Long-term hindcast time series for metocean parameters across the site will be available to allow more detailed analyses by bidders.

3. Energy island – North Sea – Seabed investigations

For the artificial island in the North Sea, a geophysical and geotechnical site investigation program will be performed to enable developers to assess the soil risk, decide on foundation concept and evaluate installation methods. The investigations will be of preliminary nature but to a level and quality allowing developers to prepare a proposal. The content and detail will meet the specifications instructed by the Danish Energy Agency to Energinet (*"DK: Pålæg"*).

The geophysical investigations will provide full coverage of one geographical location identified in advance to have water depths less than 30 meter. The geophysical investigations will be performed as part of the overall survey of the larger offshore wind farm site. One location will be subject to further and detailed geophysical investigations including UXO survey as well as 3D seismic mapping of an area planned to span 2500 m x 2500 m.

The geotechnical investigations will include a program with boreholes and seabed CPTs. Furthermore, classification tests, Oedometer tests and triaxial tests will be included in a laboratory test schedule. The geotechnical investigations will be performed to a level and detail to evaluate the soil conditions in a 2500m x 2500m area determined on basis of the geophysical mapping.

Finally, the geotechnical investigations will be subject to a joint interpretation process also covering the geophysical results to form an integrated 3D soil model of the area spanning 2500m x 2500m.

The geotechnical investigation will be a preliminary investigation with respect to a specific location of the energy island, and it is expected that the winning bidder shall perform detailed geotechnical investigations for the final location of the energy island.

The marine activities of the geophysical and geotechnical investigations are planned to be performed during 2021 and 2022. Results are intended to be published consecutively, as they are completed.

4. Environmental assessments

The Danish Energy Agency's instruction to Energinet relating to the environmental assessments for Energy Island North Sea and Energy Island Baltic Sea includes the following:

1. Before Q1 2024: Completion of a SEA of the plan for Energy Island North Sea and the plan for Energy Island Baltic Sea that meets the requirements in the Act on the Environmental Assessment of Plans and Programmes (Danish SEA Act).
2. Before Q1 2024: Completion of environmental baseline surveys and studies together with sensitivity analyses of individual environmental and socio-economic parameters. The sensitivity analyses provide critical data and documentation that enable risk-mitigation as early possible for the Energy Island projects.
3. Before Q1 2024: For each Energy Island project: Completion of an EIA of the onshore project from the export cable landfall to the national transmission grid connection point.

   Not part of the Danish Energy Agency's instruction to Energinet relating to the environmental assessments for Energy Island North Sea and Energy Island Baltic:

4. The Energy Island concessionaire is to carry out and complete the project-specific EIA offshore for the island.

The EIA report must comply with current regulations in the Environmental Assessment Act, and there must be relevant consultations, etc. An approved environmental impact assessment report is required before the Danish Energy Agency can issue a licence for construction for the Energy Island projects.

For the Energy Island Baltic Sea

It should be noted that Energinet will undertake the EIA of the onshore solution, even though the OWF concessionaire is to finance, own, design, construct and operate the cabling from the landfall up to the transformer/converter station on the Energy Island (POC).

The OWF concession owner will have to finance, own, design, construct and operate a sub-station expected to be located adjacent to the converter station on Bornholm owned by Energinet.

Changes to the onshore EIA

If the concessionaire considers that their planned specific project for the onshore installation cannot be covered by the EIA report and the EIA approval prepared by Energinet, the concessionaire will have to apply to the Danish Environmental Protection Agency for a change to the

technical project in accordance with the regulations in section 18(1) or (2) of the Environmental Assessment Act. Should such a situation arise a screening of the proposed changes to the project will be required so as to determine the necessity to prepare a supplementary EIA will have to be prepared describing the environmental impacts of the changes to the project. If changes to the project are related to the substation, it may be necessary to change the district plan and possibly the addendum to the municipal spatial plan, which will require a new planning process with the planning authorities.

5. Planned time schedule

Energinet has initiated tender processes to acquire the necessary Consultant services and offshore survey contracts. Most of the tender processes will continue throughout 2021 before contracts will be awarded. The time schedules for the surveys and for the reports are not ready. In order to achieve the target dates in the order from the Danish Ministry, Energinet has prepared a preliminary overall time schedule for the surveys and measuring campaigns. At this very early stage, the time schedules for the North Sea and the Baltic Sea are identical except for the fact, that there will be no sea bottom surveys for an artificial island in the Baltic Sea.

Year	2021				2022				2023			
Quarteer	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Geophysical*		X	X	X	X	X	X					
Geotechnical*			X			X	X	X				
Bentisk flora and fauna*						X						
Sea Mammals: C-POD survey			X	X	X	X	X	X	X	X	X	X
Birds and Bats			X	X	X	X	X	X	X	X	X	X
Fish og fish populations						X		X				
F-Lidar measurements**				X	X	X	X	X	(X)	(X)	(X)	(X)
Metocean desktop studies***				X	X			X	X			

*The Year 2023 may be used in case of delays, i.e. due to bad weather conditions.
** (X) indicates possible extension of the LiDAR measurement campaigns to two years
*** Desktop design studies to include first year of measurement data for model validation purposes

The table below gives an indication to the duration of the individual activities. The area in the North Sea has volatile and often violent weather conditions, and for that reason relative long periods are included for each activity.

Activity	Expected duration of activities
Geophysical Survey with 2D UHRS	6 – 12 months
Geophysical Survey with 3D UHRS	1 month for the energy Island
Geophysical Survey with passiv magnetometer	1 month pr. Offshore windfarm area
Geophysical Survey med ROV / Subsurface robot	1 month for the energy island
Geotechnical Investigations	2 – 4 months pr. Offshore Windfarm area
Marine Environmental Surveys	
Bentic flora and fauna	3-5 uger Q1-Q2 - 2022
Sea Mammals (C-POD)	up to 24 months
Birds and bats	up to 24 months
Fish and fish populations	3-5 weeks Q1-Q2 - 2022 3-5 weeks Q3-Q4 - 2022
F-Lidar measurements	12 months Q4 2021 – Q4 2022

Note on Acquisition of rights and expropriation

Before the onshore cables can be installed, the concessionaire must secure the rights to do this through voluntary agreements with the landowners. Likewise, the concessionaire must secure the rights to install any relevant substation through agreements to purchase or rent the land. If a voluntary agreement cannot be negotiated with landowners, and there is a need to carry out expropriation, the concessionaire will have to apply to the Danish Safety Technology Authority.

The authority having jurisdiction for expropriation is stated in section 27 of the Act on the safety of electrical plants, electrical installations and electrical equipment, see Consolidating Act no. 26 of 10 January 2019 with later amendments (the Electrical Safety Act). Expropriation is against full compensation for any losses incurred by landowners.

If the expropriation process takes longer than expected and this is due to circumstances for which the concessionaire is not responsible, the concessionaire has the option to apply for an extension of the time limit for commencement of construction work, and the time limit for connection of the entire offshore wind farm. If expropriation cannot be achieved, the concession agreement will be cancelled.

However, the DEA and Energinet assesses that it should be possible for the concessionaire to secure rights to land, including expropriation, within the given timeframe.

Best regards

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