New Danish calls for offshore wind farm tenders

Information on the Thor offshore wind farm tendering procedure

October 2019

North Sea

Thyborøn

Thorsminde

Denmark

Ringkøbing

Danish Energy Agency

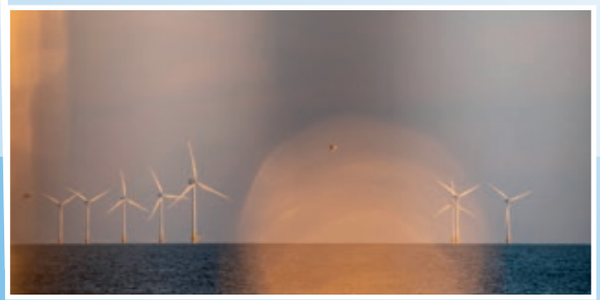
We welcome you

Investment opportunities in offshore wind

As part of the Energy Agreement of 2018, all political parties in the Danish Parliament decided that three new offshore wind farms are to be established in Danish waters by 2030. These new offshore wind farms will expand the supply of energy from offshore wind by at least 2,400 MW. If technologically and economically feasible, even larger farms can be established.

The parties behind the Energy Agreement also agreed to launch a large-scale screening of Danish waters. The screening has identified locations for up to 12.4 GW offshore wind capacity, establishing an extensive selection of attractive offshore wind farm sites for further future expansion of offshore wind[1]. The parties also called for an offshore wind analysis with a view to providing optimum market conditions for the fastest possible commercial exploitation of offshore wind potential, as well as an examination of potential new offshore wind solutions, such as hubs.

This publication outlines the overall setup and tendering procedure for the first of three planned call for tenders for these wind farms, the procedure for Thor offshore wind farm.



1: https://ens.dk/ansvarsomraader/vindenergi/fakta-om-vindenergi

Before turning to the Thor offshore wind farm procedure specifically, it is relevant to briefly address the context and Danish energy policy. The three offshore wind farms comprise one of the key elements in the Energy Agreement of 2018, where Denmark set a goal to have 55% of total energy consumption based on renewable energy by 2030. The new government (June 2019) has pledged to introduce binding decarbonisation goals and strengthen the 2030 target to reduce emissions by 70% below the 1990 level.

In addition to the 2030 target, Denmark has a long-term policy target to transform Denmark into a low-carbon society, independent of fossil fuels by 2050. For these reasons, there will be a need for further offshore wind expansion in Denmark, in addition to the three offshore wind farms already decided.

With this expansion of Danish offshore wind power, the Danish Energy Agency (DEA) is now inviting all interested parties to participate in the coming tendering procedure, and to invest in Danish offshore wind deployment.

Offshore wind deployment in Denmark

What can Denmark and the DEA offer interested offshore wind developers, and what are the opportunities? To begin with, Denmark, and in particular the Danish part of the North Sea, has remarkably good physical conditions for offshore wind – wind resources with an average speed of above 10 m/s, less than 50 m sea depth in most areas as well as good seabed conditions for establishing foundations for wind turbines. Moreover, as a pioneer in the offshore wind sector, Denmark has extensive experience in developing best-practice framework conditions with minimal risk, minimal regulatory constraints and minimal coordination costs for developers (one-stop-shop). Moreover, the DEA uses a transparent and dialogue-based tendering procedure. It is expected that all of these factors will ultimately facilitate competitive bid prices. Finally, smooth and effective offtake of power from wind farms will be managed by the highly experienced Danish TSO, Energinet.

There is now an opportunity for interested parties to take part in the tendering procedures of the first of the three wind farms decided with the Energy Agreement 2018, Thor offshore wind farm, with a tendered capacity of 800-1,000 MW.

The tendering procedures for the second and the third offshore wind farms are planned to be launched in 2021 and 2023, respectively.

Preliminary analyses addressing possible locations, wind and seabed conditions, basic environmental assessments, grid connection, etc. have already been carried out for the three offshore wind farms[2].

In summary:

- Long-term and solid political commitment to offshore wind in Denmark
- Expansion of at least 2,400 MW offshore wind by 2030
- Launch of the preliminary phase of the first offshore wind farm tender for Thor offshore wind farm with a market dialogue on 25 November 2019
- Launch of the two next offshore wind farm tenders in 2021 and 2023.

2: https://ens.dk/en/our-responsibilities/wind-power/ongoing-offshore-wind-tenders/thor-offshore-wind-farm/other-relevant

The Danish track record

Solid experience with offshore wind

Denmark was an early adopter and pioneer of onshore and offshore wind energy production. In 1991, Denmark built the first offshore wind farm in the world at Vindeby in Southern Denmark (decommissioned in 2016). Since then, 13 additional offshore farms have been built and another three are currently under construction at Vesterhav Syd (170 MW), Vesterhav Nord (180 MW) and Kriegers Flak (600 MW). With approx. 2,650 MW of offshore wind connected to the grid in 2023[3], Denmark is among the most experienced developers of offshore wind on a global scale.

3: This number includes all windfarms being build under the Energy Agreement 2012

As a result of this expansion, Denmark has developed a strong wind power cluster:

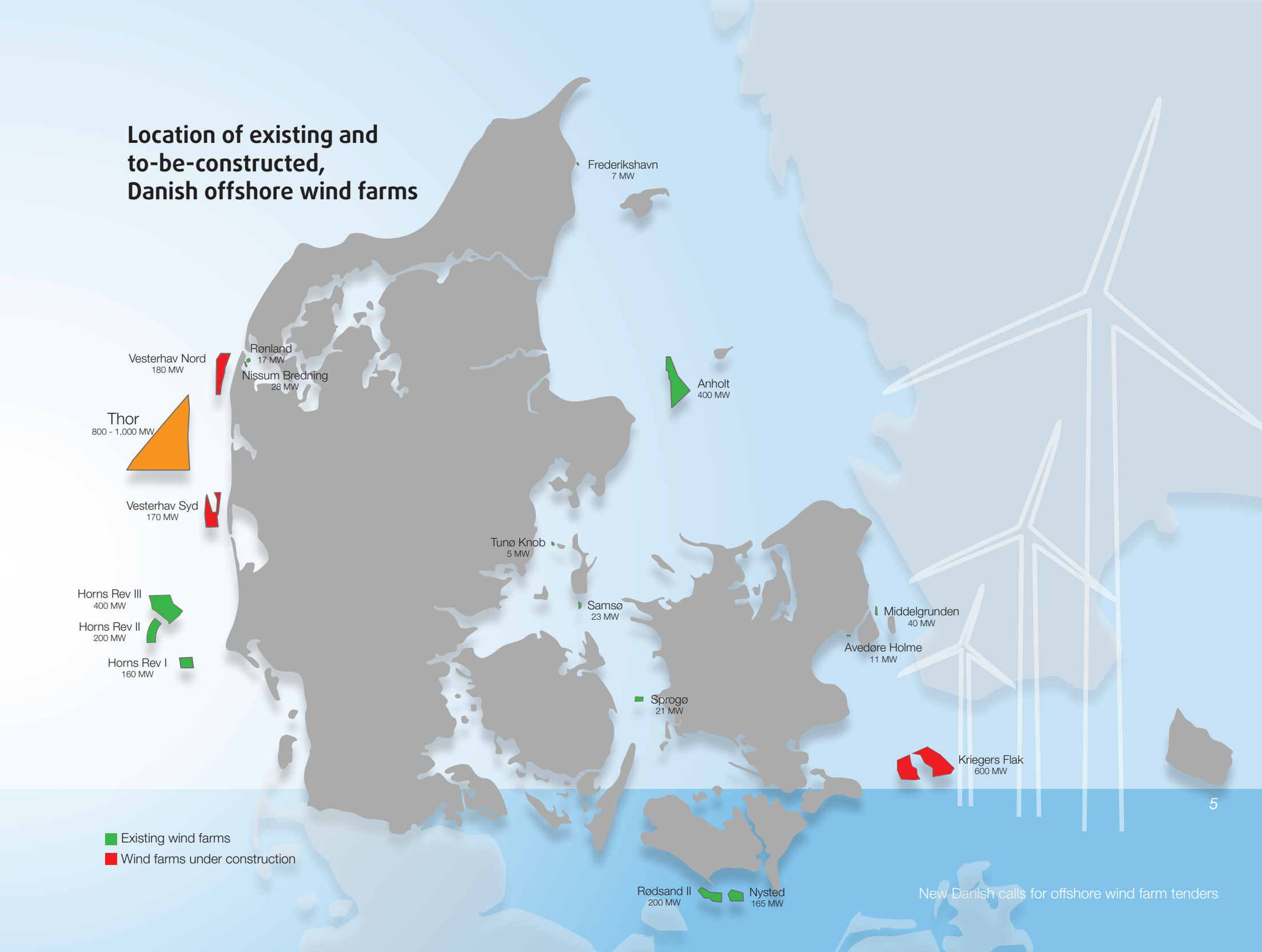
Access to a complete value chain of suppliers and professional services

Access to a highly qualified and experienced talent pool – 33,000 people employed in the wind power sector in Denmark

Access to universities with cutting edge know-how, extensive experience in collaborating with industry, and world-class research and test centres, including the national test centre for large offshore turbines in Østerild (Northern Denmark) and Lindøe Offshore Renewables Center (LORC) at Funen.

Access to the leading turbine developers in the world. A total of 80% of the world's offshore wind turbines are either produced in Denmark or contain Danish components. The majority of the leading global companies have R&D activities in Denmark.

Location of existing and to-be-constructed, Danish offshore wind farms



The Danish offshore wind model

Why establish offshore wind farms in Denmark

The Danish model for tendering new offshore wind farms is the result of many years of experience in setting up large-scale wind farms. The strength of this model lies in the following elements, which ensure low risk in Danish offshore wind projects:

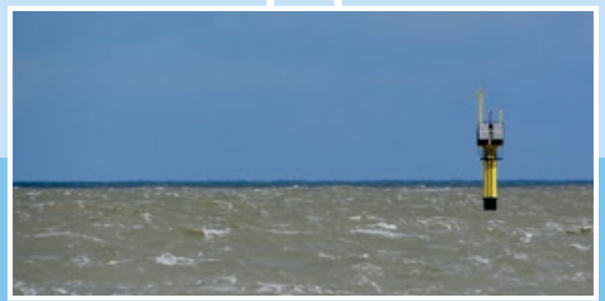
Long-term, stable and broad political commitment to offshore wind.

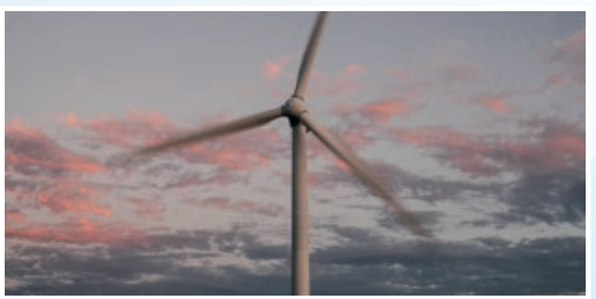
Price is the primary bidding criteria.

If support is necessary, support will be granted for a period of 20 years.

Preliminary investigations and de-risking of the site including geophysical and geotechnical analyses of the seabed as well as MetOcean data collection. Moreover, preliminary environmental assessments will be carried out, but the winning bidder will have to undertake project-specific Environmental Impact Assessments in accordance with European and Danish legislation.

Before the submission of tenders, the results of the preliminary investigations of wind resources as well as wave conditions and current conditions (MetOcean data) will be published. These will provide tenderers with the opportunity to submit a qualified bid price for the offshore wind farm.





Before the submission of tenders, the result of the preliminary survey of the geological conditions will be published, including geophysical and geotechnical surveys of seabed conditions.

The DEA will function as a one-stop-shop for all necessary licences. This means that the DEA will facilitate the necessary licences in cooperation with all relevant authorities. Licences in draft form will be provided as part of the tender material.

The initial technical dialogue on the scope and depth of the planned site investigations will enable tenderers to influence the outcome of the investigations, thereby lowering the site risks (the technical dialogue on site-investigations was held on 13th May 2019 and was open for all potential developers and relevant experts).

The market dialogue to be held on 25 November 2019, which will focus on key elements of the preliminary tender conditions, will provide tenderers with the opportunity to influence the design of the tender specifications, thereby lowering commercial risks.

The negotiated tender approach following the first bid round will enable pre-qualified bidders to optimize their bid, benefitting the bidder as well as the DEA.

Full flexibility to design the wind farm, including offshore substation and export cable, as well as to choose an individual park-layout within the awarded site[4].

Priority access to the grid provides assurance to connected generators of renewable power that they will be able to sell and transmit their power in accordance with connection rules at all times.

An efficient and transparent electricity market where market data is made easily available by the Danish TSO Energinet.

4: Provided that EIA permit can be granted.

We are ready

The Danish Energy Agency as a one-stop-shop

In order to ensure a smooth and administratively lean process, the DEA serves as a one-stop-shop. The company, or consortium, which wins the concession, will use the DEA as a single-point-of-contact for assistance on issues related to relevant licences and procedures, etc. The concession agreement will be signed with the DEA, and the DEA will supervise conditions in the licences granted by the DEA all the way through to end-of-life and decommissioning of the wind farm[5].

The tender material will provide drafts of licences granted by the DEA needed for constructing, owning and operating the offshore wind farm, i.e. the pre-investigation licence, construction licence (de facto the environmental permit) and the authorisation to produce electricity.

5: However, the Danish Environmental Protection Agency will have authority with regard to the environmental permit for the grid connection onshore.

In summary:

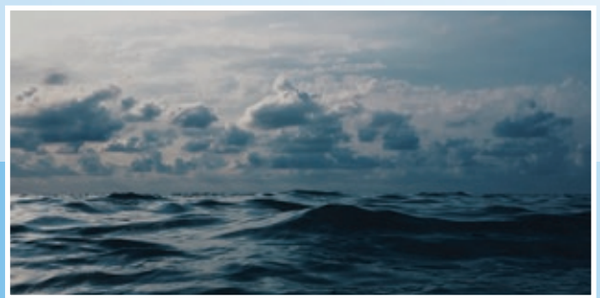
- The DEA acts as a one-stop-shop
- The DEA provides or acts as contact point for all necessary licences
- The tender material provides drafts for all licences needed from the DEA, thus ensuring early transparency on licence conditions

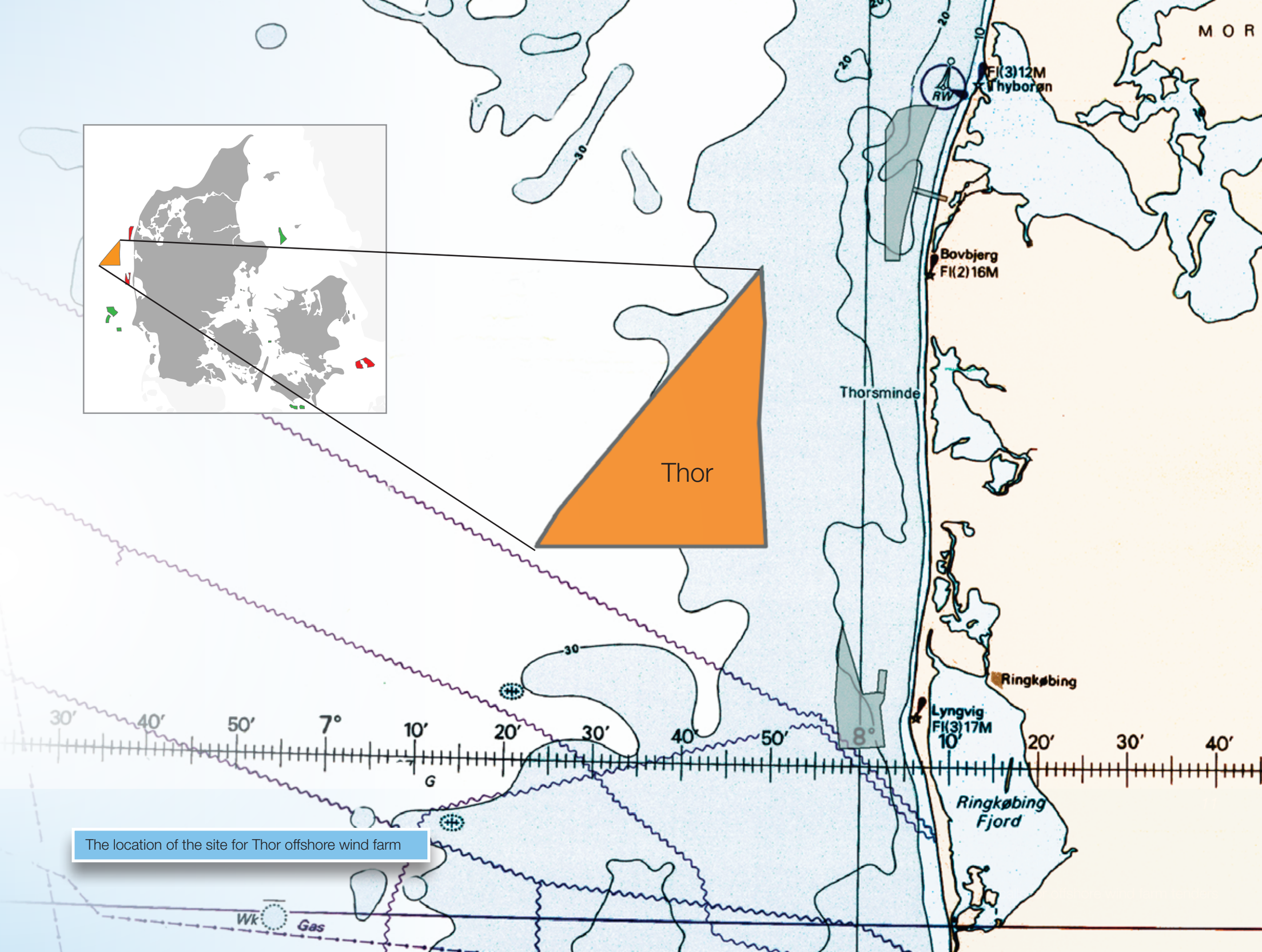
Thor offshore wind farm

Overview of Thor offshore wind farm

The first of the three confirmed offshore wind farms has been dubbed “Thor” after Thorsminde, the nearest fishing village on the west coast of Jutland. The dedicated gross area of 440 km^2 currently being site-investigated (geoscience, MetOcean, environmental assessments) for Thor is located in the North Sea west of Nissum Fjord at a distance of 20 km from the shore. Thor will have a capacity of minimum 800 MW and maximum 1,000 MW. This makes Thor offshore wind farm the hitherto largest wind farm in Denmark.

Thor will be the sixth offshore wind farm to be located in the Danish part of the North Sea, approx. 55 km north of the offshore wind farms Horns Rev 1, 2, and 3 and approx. 15-25 km southwest of Vesterhav North and northwest of Vesterhav South. The latter are two nearshore wind farms and they will be constructed over the next couple of years. This means that the area has developed a wide network of suppliers, offshore ports and other offshore infrastructure.





The location of the site for Thor offshore wind farm

Thor offshore wind farm

Details about the site for Thor offshore wind farm

The coordinates for the 440 km^2 currently under site investigation for Thor are presented to the right. The area has been reserved and cleared from possible restrictions by other authorities. Moreover, the area has undergone a preliminary screening – the fine-screening mentioned in section 1, which has addressed wind and seabed conditions, basic environmental impact assessments, grid connection possibilities, etc. The site ultimately to be put out to tender will consist of approx. 180-220 km^2, using the usual turbine distance of 4.54 MW/km^2 used for Danish offshore wind tenders. The current process of site investigation[6], including bird surveys and other environmental aspects, aims at screening out any potentially problematic areas and still ensuring 180-220 km^2 in the awarded site.

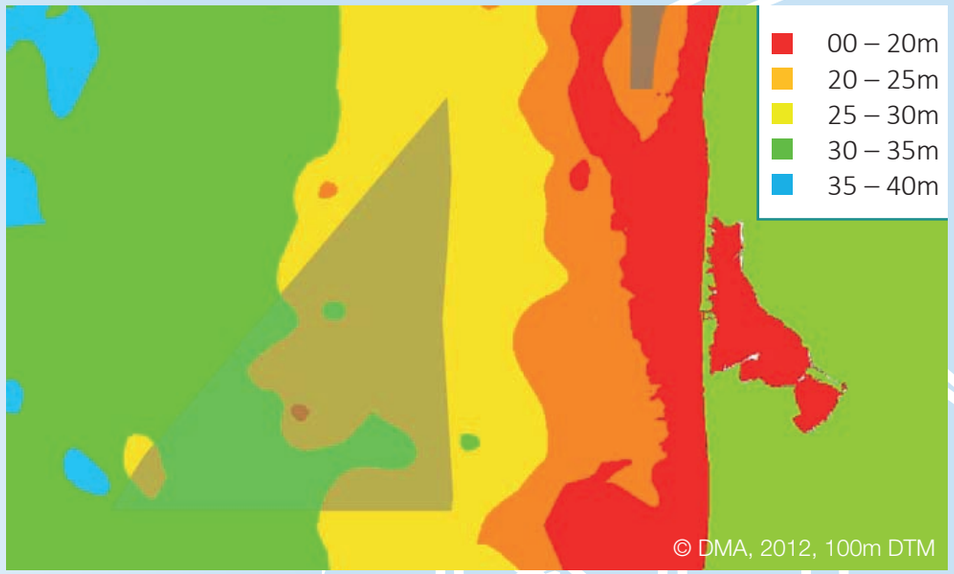
	ETRS89 DD		ETRS89 DD.MM.mmm		ETRS89 UTM32N M	
ID	Longitude	Latitude	Latitude	Longitude	East	North
1	7,37527	56,22516	56° 13.509’	7° 22.516’	399264	6232328
2	7,41794	56,26474	56° 15.884’	7° 25.076’	402011	6236670
3	7,79156	56,51981	56° 31.188’	7° 47.493’	425649	6264590
4	7,79809	56,46552	56° 27.931’	7° 47.885’	425945	6258540
5	7,79548	56,42317	56° 25.390’	7° 47.729’	425702	6253830
6	7,79030	56,36382	56° 21.829’	7° 47.417’	425266	6247230
7	7,79809	56,30639	56° 18.383’	7° 47.885’	425636	6240830
8	7,80765	56,24053	56° 14.431’	7° 48.458’	426100	6233490
9	7,80559	56,23007	56° 13.804’	7° 48.335’	425953	6232328

6: The program for site investigations is described here: https://ens.dk/sites/ens.dk/files/Vindenergi/2_program_seabed_investigations_20190513.pdf

Characteristics about the site (approximate figures)

Distance to shore	Minimum 20 km to the west coast of Jutland
Distance to harbour	Esbjerg 100 km Thorsminde 20 km Thyborøn 45 km Hvide Sande 45 km
Mean wind speed	10.3 m/s
Sea depth	25 – 35 m
Tide	0 - 1 m

Water depth (m)



Seabed surface geology

We think in new ways

Grid connection to be included – a new approach

As a new approach, the offshore substation and the grid connection from the offshore substation to the point of connection in the onshore substation will be included in the tender. This means that it is the responsibility of the winner to construct, own and operate these installations. There will be two onshore substations, one to be build and owned by the developer and one to be build and owned by the TSO. The point of connection will be in the second offshore substation owned by the TSO. Thereby, besides owning the wind farm itself, the owner of the concession will own the offshore substation and the grid connection to the point of connection in the onshore substation (see figure page 15).

The owner of the concession will be responsible for development etc. of the onshore areas needed for the land cables up to the first onshore substation.

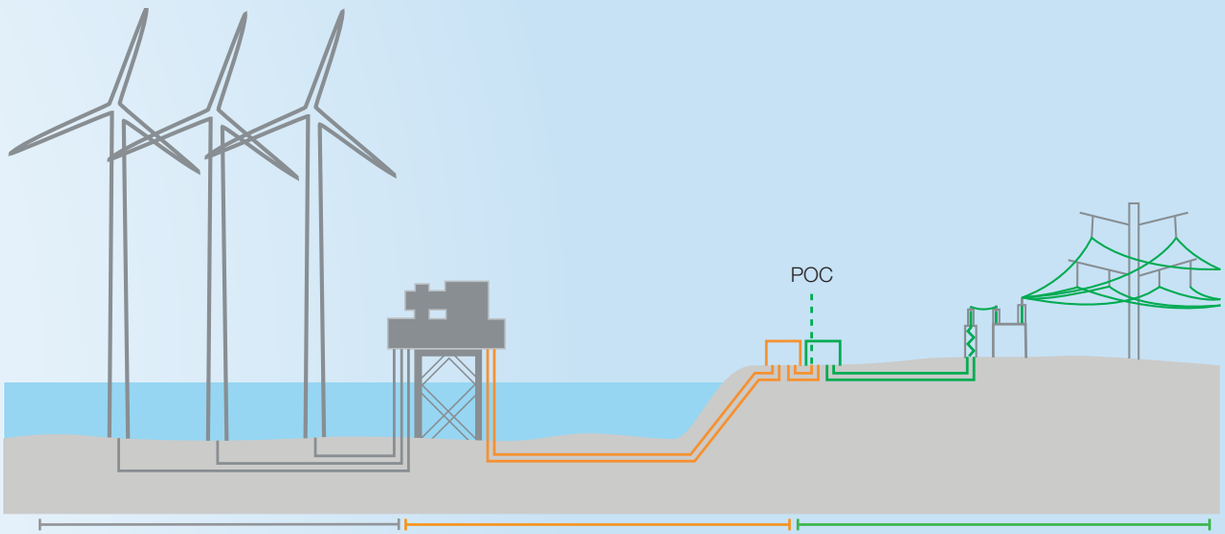
The rationale behind the political decision to include the grid connection in the tender is to stimulate critical innovation in design, construction and operation of the grid connection, and ultimately to lower total cost of the entire offshore wind farm project as much as

possible. As part of this decision, the duration of the licence for electricity production for the wind farm will be expanded from 25 to 30 years in order to align the expected technical lifetime of the turbines and the grid connection even further[7].

The TSO, will construct and operate the onshore grid connection from the second onshore substation to the overall transmission grid. The onshore grid connection will be connected to the transmission grid at Idomlund, which is east of Nissum Fjord.

Energinet is obliged to finalise construction of the onshore grid connection within a period of 30 months from when the winner has been appointed.

Further details about the grid connection, will be presented as part of the coming market dialogue.



7: This requires amendments to the Renewable Energy Act, and these are currently in progress.

Thor Offshore Wind Farm

Environmental assessment – a new approach

The environmental assessments will follow a new approach, which is described in more detail in a guideline posted on the Thor offshore wind farm website[8].

The approach chosen is based on undertaking a Strategic Environmental Assessment (SEA) of the plan for the offshore wind farm prior to final bids. The plan to be assessed consists of the political decisions regarding the Thor offshore wind farm project, namely, the Energy Agreement 2018 and related decision concerning the tender (the selected site, capacity of the wind farm in MW, and the decision to include the grid connection in the tender).

In addition to the SEA, Energinet will also carry out a range of environmental assessments as has been practiced previously. The purpose of these additional assessments is to provide critical data for as much risk-mitigation as possible for the Thor offshore wind site. These additional assessments focus on bird sur-

8: https://ens.dk/sites/ens.dk/files/Vindenergi/uk_guidelines_for_completing_environmental_assessment_thor_10sept2019.pdf

veys, safety of navigation, radio links and radar, fisheries, marine archaeology, noise and cumulative impacts.

After the deadline for bidding, the concession winner will carry out the Environmental Impact Assessment of the project at sea - i.e. wind farm, offshore substation and export cables forward to the landfall. In addition to this, Energinet will undertake Environmental Impact Assessment of the concrete project on land, that is, from the landfall and onwards to the onshore substations, the onshore substations themselves as well as onwards to the 400 kV transmission grid at Idomlund.

Further details about the environmental assessments will be presented as part of the market dialogue.

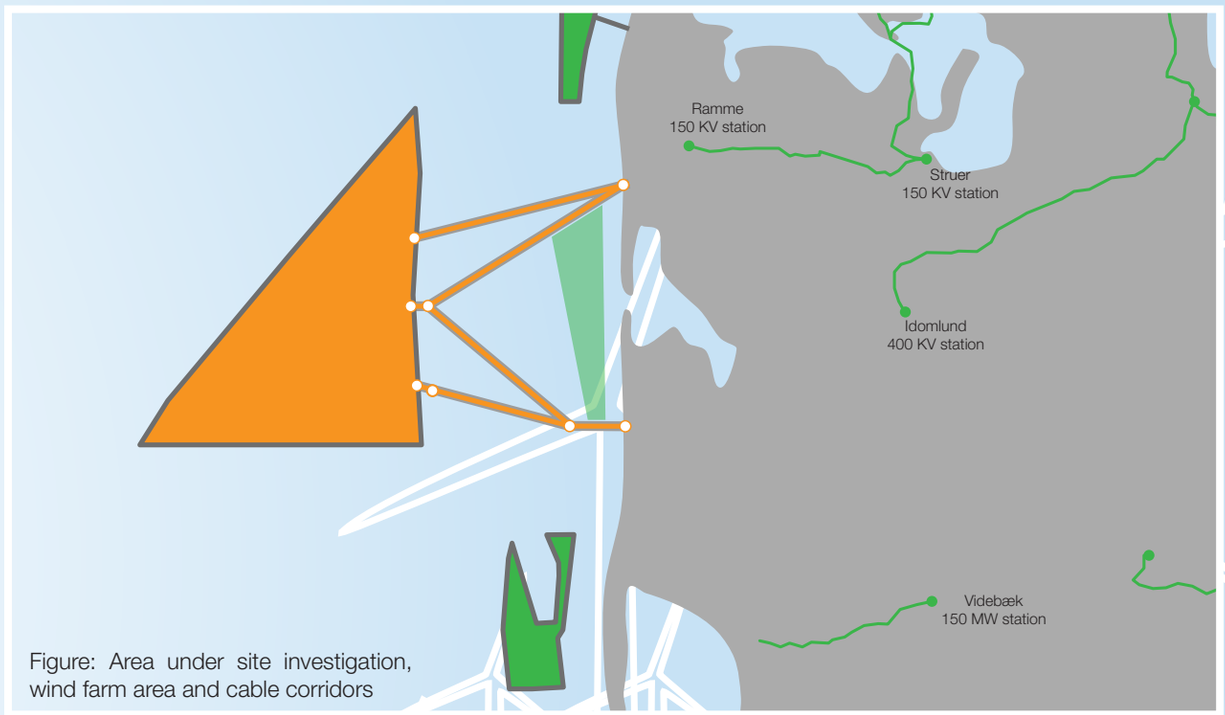
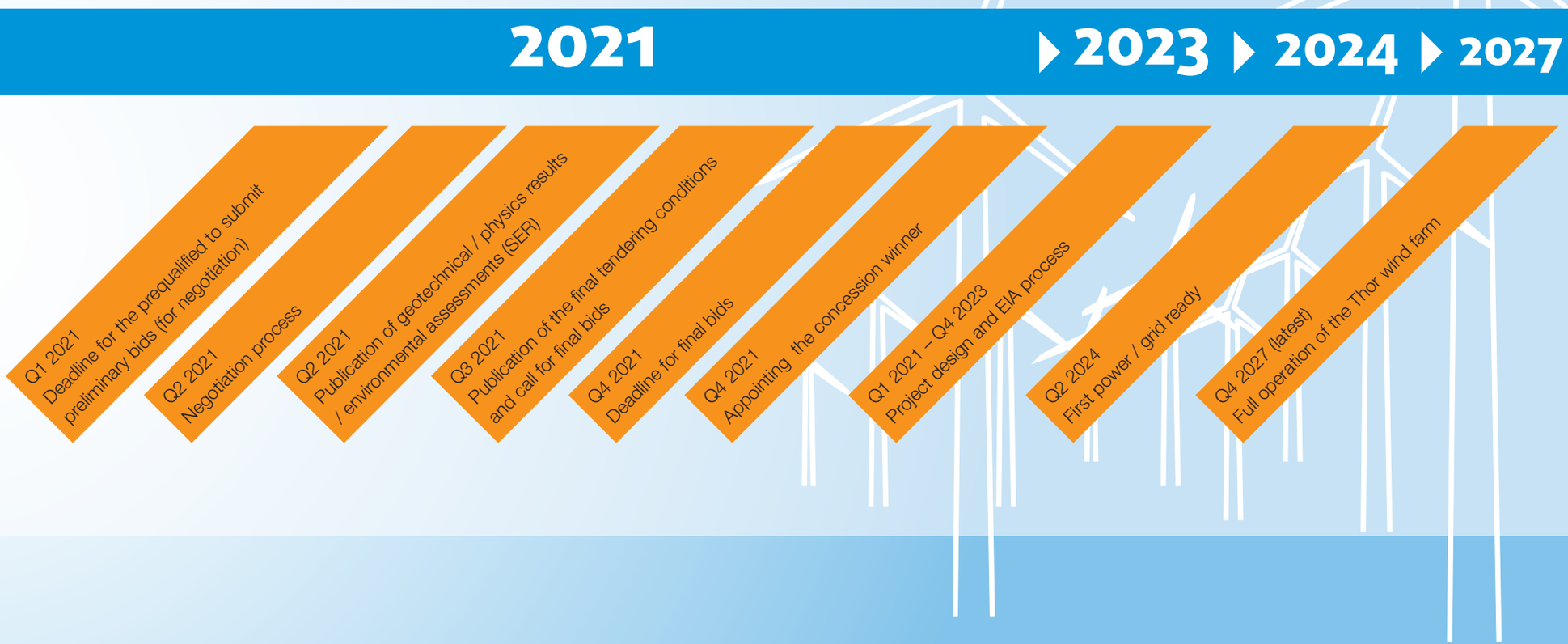


Figure: Area under site investigation, wind farm area and cable corridors

We are organized

Timetable

The timetable for the tendering procedure is outlined briefly in the following. It is important to emphasise that the current timetable can be amended in order to accommodate the needs of developers based on the upcoming market dialogue in November 2019.


2021
2023
2024
2027
Q1 2021
Deadline for the prequalified to submit preliminary bids (for negotiation)
Q2 2021
Negotiation process
Q2 2021
Publication of geotechnical / physics results / environmental assessments (SER)
Q3 2021
Publication of the final tendering conditions and call for final bids
Q4 2021
Deadline for final bids
Q4 2021
Appointing the concession winner
Q1 2021 – Q4 2023
Project design and EIA process
Q2 2024
First power / grid ready
Q4 2027 (latest)
Full operation of the Thor wind farm

We are committed

Tendering procedure and time table

The tendering model will be a negotiated procedure with prequalification and with a preliminary technical dialogue as well as market dialogue with potential tenderers and investors like in previous Danish offshore tenders. This process has proved successful in allowing tenderers to influence the tender conditions, thus ensuring optimal sharing of risk and ultimately achieving extremely competitive bid prices. The tendering procedure and the corresponding timetable is briefly outlined in the following. It must emphasized that the current timetable can be amended in order to accommodate the needs of developers based on the market dialogue.

Market dialogue

In order to ensure that potential tenderers can offer their views on the tender conditions and contribute to make the content of these conditions attractive, the DEA will conduct a market dialogue on 25 November 2019. The market dialogue will be organised around a number of themes for which the DEA will ask the market specific questions. At the same time, the potential tenderers will be invited to contribute with supplementary ideas and suggestions. Possible mistakes can thereby be corrected early on in the tendering process, and will provide an important input into the tendering material.

A market dialogue on site investigations was held in Copenhagen in May 2019 providing important input into how seabed-investigations (geotechnique and geophysics) as well as MetOcean data collection should be carried out by the responsible party, Energinet.

Prior Information Notice, Prequalification, Contract Notice

A Prior Information Notice, which specifies the overall nature and scope of work, will be published in Q1 2020. Later on, in Q3 2020, a Contract Notice describing the basic terms and conditions for the call for tender will be published together with the tendering material and the prequalification material - this will officially launch the tendering process with an application period of 120 days. The deadline for submission of applications for pre-qualification is set at Q4 2020. The tendering material comprises a complete set of tendering conditions, including draft concession agreement, draft licenses, etc., though yet not approved in terms of state aid (European Commission).

Together with the publishing of the Contract Notice Q3 2020, the DEA will provide information on all relevant and existing data and reports available at the time. Since some of the data and environmental assessments will be published after the prequalification, the DEA will also provide a list of expected conditions concerning all elements of site-investigations and environmental assessments at the time of publishing the Contract Notice (e.g. results of completed geotechnical and geophysical surveys, MetOcean data collection as well as the environmental assessments, which are supplementary to the Strategic Environmental Assessment).

Preliminary bids and negotiated procedure

Having identified and announced the prequalified bidders, prequalified tenderers will be invited to take part in the negotiations of the tender conditions in Q1 2021. The purpose of these negotiations is on the basis of a confidential dialogue with each individual prequalified bidder to adjust relevant parameters in the tender conditions.

Results from geotechnical and geophysical surveys, MetOcean data collection as well environmental assessments

The final results of the site-investigations as well as the reporting on the Strategic Environmental Assessment (SEA) will be made available by DEA by April 2021, in due time for the prequalified bidders to take these inputs into account before finalizing the final bid.

Final tendering conditions and final bid

On basis of the result of the negotiated procedure planned to begin in Q1 2021, the final tendering conditions will be published in Q3 2021. This will give tenderers three months to complete to meet the deadline of the final bid. It is important to stress that the tendering conditions can be modified in accordance with the negotiation procedure based on confidential dialogues with each individual pre-qualified tenderer.

The state aid aspect and legislative amendments

Notification of state-aid to the European Commission will be carried out from Q1 2020 to Q2 2021 on the basis of a standing dialogue between the DEA and the European Commission. The tender will therefore be conditional upon the approval of the European Commission, since any support design stipulated in the tender must be compatible with EU state aid regulations. The DEA expects this approval process to be finalized at the time of publishing the final tendering conditions in Q3 2021.

In addition, the tender will be conditional on legislative amendments with regard to certain conditions for the concession. The DEA expects these legal amendments to enter into force in January, 2021. As all political parties have agreed on the changes (e.g. including grid connection in the tender), which these legal amendments take their point of departure in, no major issues are foreseen in this legislative process.

When to start construction of Thor offshore wind farm

Shortly after the concession winner has been appointed, the winner will obtain the licence to pre-investigate the site for the offshore wind farm in order to carry out detailed site investigations and the Environmental Impact Assessment (EIA) for the project. When the concession owner has completed the EIA process and delivered all other necessary documentation, the DEA will – provided that the EIA can be approved – issue the construction licence. The owner of the concession is thereafter obliged to establish the wind farm before the end of 2027, when the last turbine must be connected to the collective grid. In parallel, Energinet will build the onshore grid connection allowing for possible first power by Q2 2024.

Contact and further information

New Danish calls for offshore wind farm tenders

Jeppe Lundbæk - project management: JEL@ens.dk + 45 3392 7553

Søren Dale Pedersen – technical questions: sdp@ens.dk + 45 3395 4323

Go to www.ens.dk/thor to learn more and get updates on the tender of Thor offshore wind farm.

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