

Horns Rev 2

Time schedule, Contract strategy and choice of Technology.

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Introduction

In June 2005, Energi E2 was awarded the concession to build an offshore wind farm for commissioning in 2009, and in August 2005, approval was granted for conducting the Environmental Impact Assessment (EIA). The wind farm will have a total installed capacity of approx. 200 MW and will be located west of the existing wind farm at Horns Rev.

E2 will be responsible for the wind farm as such and the inter-array cabling. The substation, export cable and grid connection to the 132 kV transmissions system will be established by the Danish grid company, Energinet.dk.

The Danish concept

Energi E2 was awarded the concession following a tender round where the award criterion was the lowest price for the first 60,000 full-load hours. Subsequently, the wind farm will sell its production at normal market terms. By using this concept, the licence holder obtains fixed and long-term framework conditions, while market forces ensure that "society" does not fix a higher price than demanded by the market.

The grid connection is funded by the grid company, which can develop an overall strategy for grid investments relating to the expansion to be made in the coming years. In this way, investors can avoid heavy losses on uncertain grid connection plans, and project delays, which are quite commonplace in other countries where major offshore expansions are planned, may also be avoided.

Nysted

Energi E2 based its proposal on the lessons learned from Nysted Offshore Wind Farm. The intention is to draw on the know-how gained in the Nysted project when establishing Horns Rev 2, including the following:

- 1: Implementation over two seasons, i.e. foundations and inter-array cabling to be installed the year before installation of wind turbines
- 2: Application of proven technology
- 3: Erection of a completely identical wind turbine on land at least six months before production of the wind turbines for Horns Rev 2
- 4: Multi-contractor principle, with E2 in charge of construction site organisation and management of health, safety and environment
- 5: E2 handles overall operation of the wind farm, and E2 personnel work for the turbine contractor during the warranty period

- 6: E2 operations personnel handle construction management and commissioning.

Horns Rev 2

Horns Rev 2 will be constructed west of the existing wind farm, Horns Rev 1. The exact location will be determined in connection with the EIA surveys. Figure 1 shows the area where surveys will be conducted over the next period.

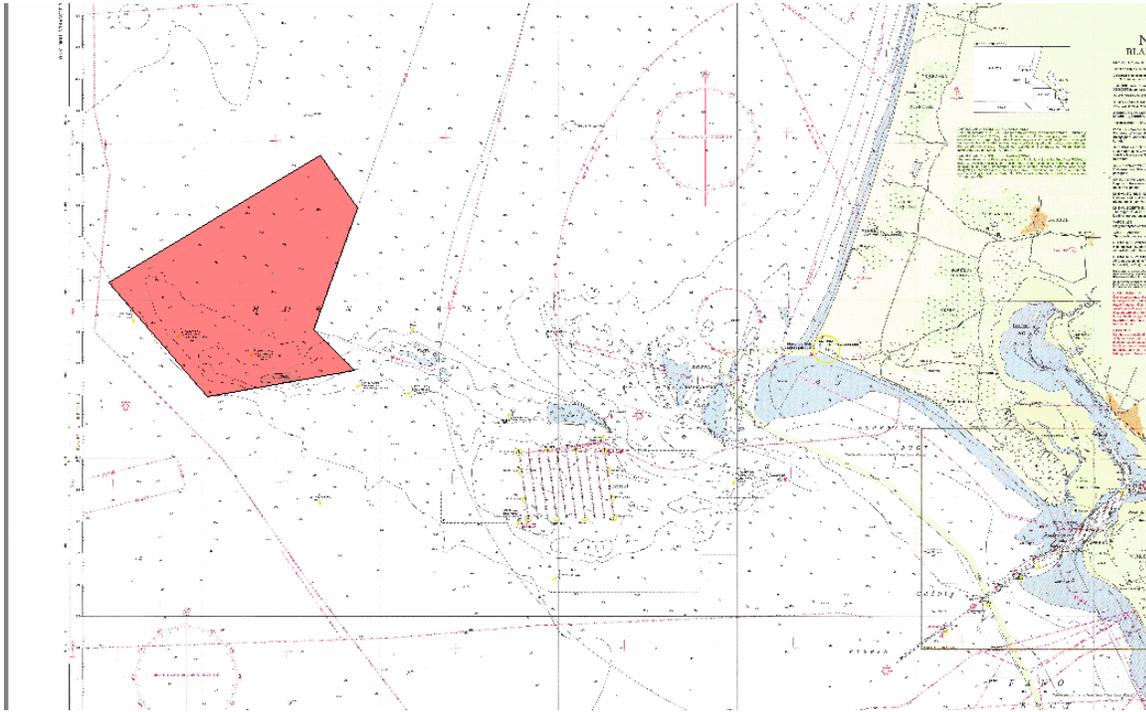


Figure 1. Map of the Horns Rev area. The area marked with red is for pre-investigations and environmental impact assessment.

The wind turbines are expected to be erected within a circular section, and the aim is to erect the turbines in a pattern that offers the best possible production in relation to the size of the designated area. The wind turbines will be in the range of 2.3 MW to 5 MW. The exact capacity will be determined at the final negotiations of the turbine contracts.

Time schedule

The time schedule was set out in the tender documents. The contracting authority originally intended to have the wind farm commissioned in 2008, but since the grid connection would not be finished until mid-2008, E2 only wanted to submit a tender for a wind farm to be commissioned in 2009. This was accepted by the contracting authority.

The master time schedule is shown in Figure 2.

Timetable for Horns Rev 2

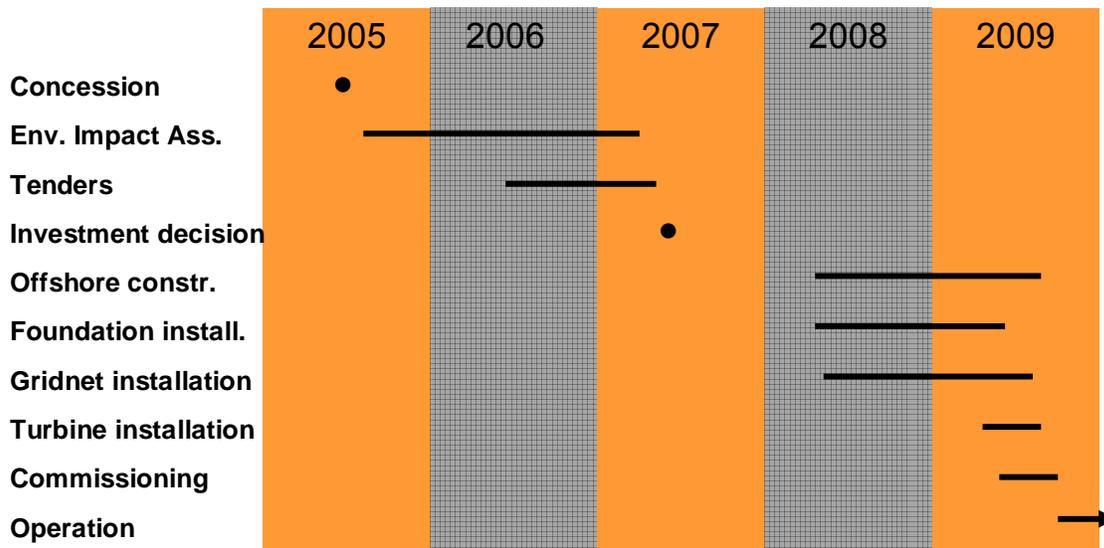


Figure 2. Time schedule for Horns Rev 2.

As shown, the investment decision is scheduled for the summer of 2007. This means that E2 has two years for the detailed planning and design of the wind farm, and for choosing the technologies to apply in relation to turbines, foundations, etc.

Choice of technology

E2 expects to use a wind turbine which is known and has been tested before the investment decision in the summer of 2007. E2 does not want to use a technology that has not been tested, nor do we want to use turbines of a completely new design; accordingly, we currently have four known types of turbines to choose from, and possibly a fifth one that may qualify within the next year or so.

The eligible turbines are:

Siemens Wind Power	2.3 MW	93 m rotor
Vestas V 90	3 MW	90 m rotor
Siemens Wind Power	3.6 MW	107 m rotor
Vestas V 120	4.5 MW	120 m rotor
Repower	5 MW	126 m rotor

The first two turbines are safe candidates, and any variants with a larger generator or rotor may also qualify. Regarding the next two turbines, it is essential that we gain solid experience with both turbines over the next two years before the summer of 2007. If not, we will have to choose between variants of the first two turbines. E2 will not under any circumstances erect turbines that far from the shore without proven data on their reliability and maintenance requirements. For this reason, E2 is planning to erect turbines of both types. We expect and hope to gain experience with the two types of turbines quickly, and that they will both be eligible candidates for Horns Rev 2. Regarding

the Repower turbine, this type still lacks offshore experience, but E2 hopes that also this turbine will be a viable alternative for Horns Rev 2. Unfortunately, there is nothing to suggest that we will have more candidates to choose from. Over the next two years, E2 will make a determined effort to increase the reliability of our existing wind farm with a view to using the know-how in connection with Horns Rev 2.

Regarding foundations, E2 will choose the final solution in connection with tender negotiations. The concrete foundations used at Vindeby, Middelgrunden and Nysted have proved highly successful. Horns Rev 1 is built on monopiles, and we look forward to a competition between these two types of foundations.

Contract strategy

E2 will invite tenders for the wind farm according to the multi-contractor principle, and E2 will be in charge of coordination during the construction, commissioning and operation phases. At Nysted, it was decided to invite tenders for foundations, including installation, as one contract, and turbines, including installation, as another contract. Furthermore, it was decided to purchase the turbines with a five-year warranty and a five-year operation and maintenance agreement. At Horns Rev 2, we will seriously consider purchasing the turbines ex works, and if monopiles turn out to be the most competitive solution, we will also consider buying the monopiles ex works and then invite tenders for installation of turbines and possibly foundations. Commissioning of the turbines will be part of the turbine contract, but we will consider purchasing the turbines without a maintenance agreement and with a normal two-year warranty. Since we have chosen to use a proven and tested turbine, the premium for a five-year warranty may be unreasonably high.

Above all, E2 wants transparent pricing to ensure that E2, the employer and the contractors have a common understanding of who is responsible for the different risks and at what cost.