HORNS REV
OFFSHORE PROJECT

The Horns Rev Offshore Wind Farm is the first of five large-scale demonstration facilities in the Danish waters. With its 160 MW it is the world's so far largest offshore wind energy producer.

By now all the contracts under the multi-contract principle adhered to have been entered and components are being manufactured. The first works are already in progress at the site with the foundations for the substation module being rammed into the seabed during the autumn of 2001 before the winter and the storms set in. Commercial operation is scheduled for end of 2002.

Since green sustainability is a major issue in the energy policy, much attention has been given to the EIA review, which has successfully survived public scrutiny and the regulatory treatment. As part of the environmental survey, a meteorological mast has been recording data on wind regime, wave action and currents on the site since 1999.

Going offshore with wind farming gives a new perspective to operation and in particular maintenance. The recorded data have been used to deduce weather windows and hence the expected accessibility of the site – according to the mode of transport concept. Due to the harsh weather conditions of the North Sea, it will not be possible to rely on boat access equally well at all times, which is why it has turned out to be relevant to consider a helicopter approach as well. As a result of this the substation module will be fitted with a helideck for helicopter landing and every single turbine will have a helihoist platform for discharging/picking up of personnel from the air by helicopter.

The wind farm has been erected by the Danish transmission system operator Energinet.dk, who owns the transformer substation module, the step-up transformer and the submarine cable to the shore, and Denmark's largest heat and power producer DONG Energy.

DONG Energy as owner's engineer
DONG Energy is owner's engineer to both parties and as such deeply involved in all aspects of the project:

Feasibility study	Production estimates
Action plan	Design/operation of met station
EIA review	Development of tender documents
Contracting	Detailed foundation design
Electrical layout	SCADA system
HV cable connections	Wind farm layout
Project management	Testing and commissioning

In our project approach we have paid considerable attention to the green sustainability of the project while at the same looking towards the overall economy. Consideration has also been paid to the wind farm from a green long-term perspective, ie after the lifetime of the wind farm. Recycling of the components is a major concern, otherwise the positive effects of the project will suffer considerably. Research is taking place to look into that problem.

DONG energy

Technical and commercial data

Turbines:	80 x 2 MW
Mean wind speed:	9.7 m/s
Production estimate:	600+ GWh/year
Site location:	17 km into the North Sea
Layout:	In rows 560 m apart, rectangular pattern
Water depth:	6.5-13.5 m
Seabed:	Firm sand and gravel
Costs:	EUR 268 million (of which interconnection to mainland grid: 40 million)
Homepage:	www.hornsrev.dk

Figure 1 Offshore met station with boat landing arrangement

Figure 2 Model of offshore substation module

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