Offshore Wind Tendering in Denmark

Polish Delegation 09 April 2019

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Outline

1. About DEA
2. Political Agreements driving offshore
3. The Danish model at a glance
4. Prices
5. Allocation of risks
6. Case: Auction process for 600 MW Kriegers Flak
7. Time for Q&A
Organisation

Established in 1976
An agency under the Ministry of Energy, Utilities and Climate
Approx. 410 employees
The Danish Energy Agency (DEA)

- Agency under the Ministry of Energy, Utilities and Climate
- Established in 1976
- Responsibilities:
  - Energy production and supply & economic regulation of water and waste sector
  - Energy consumption
  - Energy economic and scenario analysis
  - Climate
  - Telecoms
Danish offshore wind power
The Agreement applies for the period 2018-24 - based on a broad political agreement

The target is:
- 55% renewable energy in 2030
- Net zero CO2 emissions by 2050

Principles of the Agreement:
- The market shall, as far as possible, conduct the green transition
- The ambition is that the green transition can take place on commercial terms in a few years
- Electricity will be the dominant source of energy
Initiatives

Tenders for 3 new offshore wind farms of at least 800 MW

Tenders of support for solar and wind power on land – 215 MW expected annually

Continued financial support for biomass plants and expansion of biogas and other green gases
Denmark Probing New Offshore Wind Sites

The Danish Energy Agency (DEA) has contracted COWI A/S to screen parts of the North and Baltic Seas to find new potential locations for offshore wind farms to be built.

COWI is in charge of investigating an area of more than 3,200km² to identify possible different locations for offshore wind projects in the four sites the Danish Energy Agency marked as having relevant potential.

The screening will include discovering which areas are most attractive in terms of obtaining the lowest bid price, as well as whether they should be part of a single tender to increase competition between bidders and territories or whether only a single area will be offered, DEA said.

The Lyngby-based company is expected to complete the work by the end of the year.

According to DEA, the screening is an important step towards the development of the plans to build offshore wind farms by mid-2020s.

The Danish parliament recently approved a new energy agreement which includes building three new offshore wind projects by 2030 with a total capacity of at least 2.4GW.

Four areas were selected as having the potential for accommodating offshore wind farms, including a site in the North Sea off the Swedish west coast, one in the Jutland fjord, one at Helsingør Fjord and one at Helgoland.
The Danish government has selected a site in the North Sea as the first 800MW zone for its upcoming offshore wind tenders. The area, dubbed Thor, is located 20km off Nexø on the country’s eastern coast and was chosen ahead of a portion of the Stingray-Flink site in the Baltic Sea.

Officials believe the project will unlock the lowest cost of energy. The tender for the rights to develop the Thor site will be held this year with power due online between 2024 and 2027.

A further two 800MW tenders are also planned at later dates.

“We have kept the municipalities’ wishes against our obligation to make the green transition as cheap as possible, and I think the location in the North Sea strikes a good balance,” said Energy Minister Lars Christian Lilleholt.

“The forthcoming offshore wind farm will be our largest and it will make a major contribution to local growth and the green transition.

“Offshore wind is a Danish specialty, and the North Sea is well on its way to becoming a Silicon Valley for offshore wind.”
# The Danish Tender Model – The low risk approach

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<td>Dialogue and negotiation with potential bidders</td>
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*Grid connection financed by the TSO is only available in Denmark.
Prices for 50,000 FLH without grid

- Anholt – 1.05 DKK/kWH
- Kriegers Flak – 0.372 DKK/kWH
Through a transparent dialogue with the industry…
... a front-loaded de-risking approach

In a Danish offshore wind tender, Energinet - the Transmission System Operator (TSO) - is responsible for:

- Establishing the offshore grid connection infrastructures
- Performing the Environmental Impact Assessment (EIA)
- Acquiring metocean and soil conditions data

- The costs are refunded by the winner of the tender.
- Energinet is liable to pay compensation if delays occur.

 ➔ Lowest possible risk for the developer
Risk allocation

Who Should Bear The Risk?
The Party Least Able To Refuse Or The Party Best Able To Manage The Risk?
Policy Framework is a Tool

Defines:
- Competition
- Potential
- Cost

De-risking as central tenet
One-stop-shop

- Single point of entry: Danish Energy Agency
- Simplifies:
  - Licensing
  - Permitting
  - Authorisation
- De-risking for developer
Offshore can be challenging

- Offshore projects affect several areas:
  - Defense
  - Environment
  - Energy
  - Transport
  - Citizens
  - Public acceptance
Spatial Planning
Spatial Planning

Economic Selection of Sites
The case of Kriegers Flak – 600 MW
From the Energy Agreement to the prequalification

- March 2012
- September 2015

- Energy Agreement
- UXO Geophysics
- Technical Meeting
- Prequalification
- Area Screening
- Geotechnics
- Contract Notice Publication
- Bilateral Meetings
Area Screening
Preliminary Studies

TSO to develop the gross area
- Environmental impact assessment (EIA)
- UXO
- Geological investigations
- MetOcean: Wind, waves, tide, ice
- Content and scope are discussed in meetings

The costs are paid by the winner of the auction
Prequalification
Minimum requirements (for 600MW)

**Financial Capacity**
- Annual turnover of minimum 2.3 billion USD as an average for the last 3 years, and
- Equity-ratio of 20% or long debt rating BBB (Standard & Poor’s and Fitch) or Baa3 (Moody’s)

**Technical Capacity**
- Documented experience in development and management of construction of at least one offshore wind farm of 150 MW (project completed)
From the draft of the tender conditions to the awarding

October 2015  ⏳  ⏳  ⏳  ⏳  ⏳  ⏳  ⏳  ⏳  ⏳  ⏳  ⏳  ⏳  ⏳  November 2016

- Tender Documents (Draft)
- First Indicative Offer
- Negotiation Meetings
- Lowest price
- Best and Final Offer
- Tender Documents (Final)
- Q&A
- Q&A
- Q&A
Negotiated Procedure: Discussions Enable Competitive Bids

- Constant interaction with developers
- Some topics discussed:
  - Award criteria
  - Penalties and deadlines
  - Timetable
  - Support scheme format
  - Designated areas
Tender conditions for
Kriegers Flak Offshore Wind Farm

Final tender conditions - June 2016
Latest revised 18 October 2016
From the Concession Agreement to the full operation of the wind farm

November 2016 ➤ December 2020

Concession Agreement  ➤  Scheduling  ➤  Detailed Project Plan  ➤  Licence and Permit  ➤  Installation  ➤  Licence and Authorization
Licences and permits

- Licence to conduct pre-investigations
- Licence to exploit the Wind power from the Electric power Generating plant
- Licence to construct An electric power Generating plant
- Authorisation to Produce electricity
The Result

Vattenfall record low at Kriegers
€50/MWh secures rights to build 600MW Baltic project
A second perspective
Auction Design

- Prequalification

- Invitation to Dialogue

- Environmental Impact Assessment

- Preliminary Studies

- Penalties & Award
Prequalification

- **Financial and technical** assessment (no local content)

- **Transparency and Risk**

- 7 companies prequalified (*2 from Denmark*)
Invitation to Dialogue

- Understand the reality of industry
- Topics discussed:
  - Prequalification requirements
  - Award criteria
  - Penalties and deadlines
  - Timetable
  - Designated areas
Preliminary Studies

TSO to develop the gross area

• Environmental impact assessment (EIA)
• Geological investigations
• MetOcean: Wind, waves, tide, ice

The costs are paid by the **winner of the auction**
Environmental Impact Assessment

- Broad EIA by the TSO
- EIA is a hard stop for any project
- Effects on:
  - Birds, Fish, Mammals…
- Publicly available
Environmental Impact Assessment

- Can be followed by further EIAs by the project developer
- Construction, operation, cabling, transformers, turbines, etc.
- Considers many possible technologies and solutions

Environmental Monitoring: Informed decision-making
Environmental Monitoring: Horns Rev and Nysted

Carried out by

• Danish Forest and Nature Agency
• Danish Energy Agency,
• Vattenfall + DONG Energy.

Supervised by:

• Expert Panel on Experiments on Marine Ecology (IAPEME)

Considers:

• Before, during and after construction
Penalties and fees

• Discussed **before** the tender
• Associated to fulfilling milestones of the project
• Financial **prequalification** important!
Auction

- **Price** per kWh (Feed-in-tariff) is the only criterium
- Bids received 8th November 2016
- Winner announced 9th November 2016
Other sources of inspiration for design of auction systems
Levelized offshore wind prices

Source: BloombergNEF. Notes: Figures refer to an estimated levelised price, taking into account tariff price and length, inflation, a merchant tail assumption and a 25-year project lifetime.
Global cumulative installation forecast

Cumulative installations (GW)

Source: BloombergNEF. Note: ‘Other’ -- Sweden, Ireland, Norway, Finland, Portugal, Spain, Italy.
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Backup slides
# Permitting – front loaded or back loaded?

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<th>Permitting element</th>
<th>Front loading benefits</th>
<th>Back loading benefits</th>
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</thead>
<tbody>
<tr>
<td>Spatial planning, uncovering conflicts and ranking project economics</td>
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<tr>
<td>EIA for offshore wind farm</td>
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<tr>
<td>EIA for offshore platform/grid</td>
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<td>Implications for auction price</td>
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<tr>
<td>Socio-economic national optimal solution</td>
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</tbody>
</table>
# Allocation of risks case

<table>
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<tr>
<th>Risk</th>
<th>Authorities</th>
<th>Developer</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Design of efficient auction process</td>
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<tr>
<td>Permitting of wind farm (EIA etc.)</td>
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<tr>
<td>Permitting of offshore transformer and grid to shore (EIA etc.)</td>
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<tr>
<td>Permitting of onshore substation (EIA etc.)</td>
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<tr>
<td>Construction plans</td>
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<tr>
<td>Execution of construction plans</td>
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<tr>
<td>Weather risks during construction</td>
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<tr>
<td>Weather risks during operation</td>
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<tr>
<td>Detailed design of wind farm, choice of</td>
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Auction principles, definitions

**Forward auction**: buyers compete to obtain goods or services by offering increasingly higher prices.

**Reverse auction**: the sellers compete to obtain business from the buyer and prices will typically decrease as the sellers underbid each other. (Often closed bids).
Renewable Energy Policies in a Time of Transition

Figure 4.6. Trends in the adoption of FITs/FIPs and auctions, 2004-16

Source: REN21, 2006-17.
Note: FIT = feed-in tariff; FIP = feed-in premium.

Figure 4.7. Average global prices resulting from solar PV and onshore wind auctions, 2010-16

Source: IRENA, 2017b.
Note: MWh = megawatt hours.
Other sources of inspiration for design of auction systems

Wind auctions destroying the industry, says industry body in SC petition opposing Gujarat auction

Small scale renewable energy developers are being squeezed by the relentless fall of wind energy tariffs in successive auctions, according to the petition filed by the Indian Wind Energy Association (IWEA) to the Supreme Court. The petitioner is yet to be decided on Wednesday.

The petition, opposing the IREDA wind energy auction Gujarat's power group on 11 February 11, 2017 (IA/70) wants to hold the written statement at the hearing, maintaining that the petition is not contrary to law because the Centre had not set such guidelines on the conducting of such auctions, as required by Section 12(2) of the EIA Act, 2003, and