Ørsted U.S. Offshore Wind

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PJM Footprint Roundtable
April 24, 2019
Ørsted Offshore overview

Ørsted offshore wind global footprint

North America
- Bay State Wind
- Revolution Wind
- South Fork
- Block Island
- Ocean Wind
- Garden State
- Skipjack
- Coastal Virginia

Europe
- Walney Extension
- Isle of Man
- Barrow
- Burbo Bank Ext.
- Burbo Bank
- West of Duddon Sands
- Hornsea 1 & 2
- Hornsea 3 & 4
- Horns Rev 1 & 2
- London Array
- Borssele 1 & 2
- Gode Wind 3
- Hornsea 1
- Hornsea 2
- Hornsea 4
- Race Bank
- Westermost Rough
- Lincs

Asia Pacific
- Formosa 1.1
- Formosa 1.2
- Greater Changhua projects
- Anholt
- Vindø
- Nysted
- Borkum Riffgrund 1
- Borkum Riffgrund 2
- Gode Wind 1
- Gode Wind 2
- Gode Wind 4
- Hornsea 1
- Hornsea 2
- Hornsea 3

Unparalleled experience and track record

1991 - 2019
- 25+ years of experience and track record in the offshore wind power sector
- 26 offshore wind farms in operation
- 3 offshore wind farms under construction
- 5.6 GW Constructed capacity
- 3.4 GW under construction
- ~1,150 turbines
- World's leading operator
- 13 million people with clean electricity
- ~2,450 Dedicated employees
- 4 U.S. states
- America's leading developer
Ørsted U.S. Offshore Wind
Our geographically diverse portfolio can serve the East Coast with 8-10GW

Most advanced project portfolio in America

In Operation

- **Block Island Wind Farm**: operational since December 2016. 20-year PPA, starting price USD 236/MWh and 3.5%

Projects with revenue contracts (secured or soon to be secured)

- **South Fork Wind Farm**: COD expected in 2022. 20-year PPA with LIPA (130MW); 50-50 JV with Eversource
- **Skipjack Wind Farm**: COD expected in 2022. 20-year OREC contract, starting price USD 171/MWh and 1% price escalator (120MW)
- **Revolution Wind**: 704MW (400MW to RI, 304MW to CT) Long-term PPAs currently under negotiation in Rhode Island and Connecticut; 50-50 JV with Eversource
- **Coastal Virginia Offshore Wind**: 12MW (EPC contract)

Development projects

- **Ocean Wind**: up to 3.5GW
- **Garden State Offshore Energy**: up to 1GW; 50/50 JV with PSEG
- **Bay State Wind**: up to 1GW; 50-50 JV with Eversource
- **Sunrise Wind**: up to 1GW; 50/50 JV with Eversource
Europe has approached the question of OSW transmission assets in two main ways

The “segmented” approach

Examples.. (DK far from shore auctions)

Managed outside tender (TSO/DSO)

Competitive tenders enforce price pressure (Developer)

The “full scope” approach

Examples.. (DK nearshore auctions)

Managed outside tender (TSO/DSO)

Competitive tenders enforce price pressure (Developer)
In Germany transmission delays led to offshore wind farms being stranded without grid connection for up to several years

3 challenges of a “segmented” approach

1. Interface issues
   - Managing the interface between two complex interdependent, yet separately led, processes proved a challenge and source of big delays

2. Sub-optimal risk allocation
   - Risks were not allocated to the player best able to deal with them (the developer), and managing them proved a challenge to the TSO

3. Complexity
   - The German set-up introduced more players but had an unclear distribution of responsibilities and compensation
     - This complexity led to “gridlock” according to one government representative

Splitting the scope prevents developers from optimizing size, solutions and life-time of transmission assets and the wind farm

Sources: Hertie School of Governance, ‘Offshore Wind Power Expansion in Germany’; Netztransparenz 2013 & 2014; AURES

Cost increase due to transmission delays

<table>
<thead>
<tr>
<th>Delay Duration</th>
<th>Cost Increase (USDm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 year</td>
<td>117</td>
</tr>
<tr>
<td>1 year</td>
<td>235</td>
</tr>
<tr>
<td>1.5 year</td>
<td>360</td>
</tr>
<tr>
<td>2 years</td>
<td>486</td>
</tr>
</tbody>
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First 8 German OSW farms experienced
- Delays of 6-24 months (average of 13 months)
- Cost overruns of up to 93%
- Delayed transmission assets built by TSO were major driver of this
- Cost of compensating developers for lost revenues = $1.3 bn
  - This was funded by extra levy on rate payers

1. Cost calculated by increasing construction time in LCoE model by 6-24 months for 2023 COD. Conservative estimate as it doesn’t include increased OPEX or CAPEX
Source: DONG Energy; Hertie School of Governance