Global offshore wind growth and Japan outlook

SEvision 2020

Orsted

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Ørsted Introduction

Our vision
Let’s create a world that runs entirely on green energy
Ørsted Offshore: Global overview
30 years of experience of developing, building and operating offshore wind farms

The global leader in offshore wind

› 5,600 MW in operation
› 4,300 MW under construction
› 1,150+ turbines spinning
› 25 offshore wind farms in operation
› 2,500 dedicated employees

The world’s first
Vindeby, 1991
5 MW

Firsts outside Europe
Formosa 1 Wind Farm, 2019
128 MW (1st in Taiwan)
Block Island Wind Farm, 2016
30 MW (1st in USA)

The world’s largest
Walney Extension, 2018
659 MW
Global Industry Overview
Offshore wind is experiencing explosive global growth

Global offshore wind installed capacity
GW

Source: Bloomberg New Energy Finance (BNEF), 1H 2019 offshore wind market outlook
The move towards larger projects is a global trend

Capacity of select offshore wind farms under construction
MW

<table>
<thead>
<tr>
<th>Farm</th>
<th>COD Year</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horns Rev 1</td>
<td>COD 2018</td>
<td>659</td>
</tr>
<tr>
<td>Walney Ext.</td>
<td>COD 2018</td>
<td>714</td>
</tr>
<tr>
<td>East Anglia 1</td>
<td>COD 2020</td>
<td>1,200</td>
</tr>
<tr>
<td>Hornsea 1</td>
<td>COD 2020</td>
<td>600</td>
</tr>
<tr>
<td>Kriegers Flak</td>
<td>COD 2021</td>
<td>900</td>
</tr>
<tr>
<td>Greater Changhua 1&amp;2</td>
<td>COD 2021</td>
<td>752</td>
</tr>
<tr>
<td>Borssele 1&amp;2</td>
<td>COD by 2021</td>
<td>800</td>
</tr>
<tr>
<td>Vineyard Wind</td>
<td>COD 2021</td>
<td>740</td>
</tr>
<tr>
<td>Borssele 3&amp;4</td>
<td>COD by 2022</td>
<td>900</td>
</tr>
<tr>
<td>Hornsea 2</td>
<td>COD 2022</td>
<td>1,386</td>
</tr>
<tr>
<td>He Drejht</td>
<td>COD by 2025</td>
<td>1,200</td>
</tr>
</tbody>
</table>

1. Excludes test and demonstration projects.
2. COD may occur earlier, but these are latest allowed commissioning years.

*Kriegers Flak COD is 2021*

World’s largest offshore wind farm today

World’s largest offshore wind farm in 2002
Larger projects allow for increased optimization and unlocks economies of scale benefits.

Larger projects create significant benefits. Indexed LCOE reduction for offshore wind projects.

-20% reduction for 200 MW projects.
-10% reduction for 400 MW projects.

- Often due to large fixed up front costs.

Indexed cost per MW for a 600MW and 900MW project.

- Project development expenditure:
  - 600MW: 100
  - 900MW: 67

- Mobilization & installation cost:
  - Turbine: 89
  - Foundation: 90
  - Cables: 90
  - Substations: 92
Innovative solutions continue to push the boundaries of our industry

<table>
<thead>
<tr>
<th>Technological</th>
<th>Commercial</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>› <strong>15%-20% cost reduction</strong> on foundations with switch from grouted to bolted connections</td>
<td>› CPPAs help <strong>mitigate or eliminate merchant risk</strong> reducing risk and costs</td>
<td>› Move from manual blade inspections to use of drones cut WTG outage time from <strong>1 day to 18 minutes</strong></td>
</tr>
<tr>
<td>› <strong>40% CAPEX reduction</strong> on transmission system by increasing capacity in cables &amp; reducing no. of substations</td>
<td>› Ørsted &amp; Northumbrian Power entered 10-year PPA for <strong>100 GWh/year</strong> in 2019</td>
<td>› Deploying <strong>battery storage systems</strong> with our wind farms (e.g. Burbo Bank) to support production scheduling &amp; provide grid services</td>
</tr>
<tr>
<td></td>
<td>› CPPAs like this point us to the future of <strong>subsidy free offshore wind</strong></td>
<td></td>
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</tbody>
</table>
Offshore wind is already cost competitive in Europe

Levelized cost of electricity in Northwest Europe
EUR$2018/MWh

- Offshore 2012: 167€
- Offshore 2018: 61€
- Onshore 2018: 52€
- Solar PV 2018: 69€
- Natural gas 2018: 83€
- Coal 2018: 93€
- Nuclear: 169€

Source: Bloomberg New Energy Finance – 2H 2018 LCOE Update, current LCOE.
Japan could become a world leading offshore wind market
The window of opportunity is open and offshore wind is gaining momentum in Japan

**Japan needs offshore wind**
- 90% of energy demand is imported
- Lack of space onshore

**Strong political momentum**
- RES target of 24%, including 10 GW wind power by 2030

**2020 will see first offshore wind auction**
- Plans to auction off 1.0-1.5 GW per year
- Competition & visibility will lower costs

**Significant potential**
- Japan’s “good-wind” sites hold 90 GW of fixed bottom offshore wind potential
The following are key to Japan fulfilling its offshore wind potential

**Large scale wind farms**
Offshore wind costs fell by 63% from 2012-2019 in large part due to greater scale

**Fixed targets**
Visibility & pipeline are needed to build supply chain & attract investments

**Flexible frameworks**
Ability to adapt & optimize as well as industry led localization efforts will drive down costs

**Mix of international experience & local expertise**
Reap the benefits of 30 years' experience while adapting to local circumstances