Challenges for offshore wind in Virginia

Virginia Wind Symposium, Harrisonburg - VA

June, 2010
Agenda

1. Introduction Seawind Renewable

2. Overview of Offshore Wind outside US

3. Challenges for Offshore Wind in Virginia
Seawind is an independent developer of offshore wind projects in the Mid-Atlantic region of the US.

Seawind’s staff has an extensive track record in developing wind projects in US:

- Co-Founder and CEO of Atlantic Renewable; installed more than 650 MW in NY, PA and WV; sold in 2005 to Scottish Power
- Co-Founder of Midwest Renewable; installed more than 360 MW in Iowa; sold in 2007 to Iberdrola

In 2003 Seawind’s staff pioneered offshore wind on the East Coast by conducting a feasibility study for offshore wind in New Jersey under a contract with the NJ Board of Public Utilities.

In 2009 Seawind proposed an offshore wind project off the Virginia shoreline: The Seawind –Virginia project for which it filed an unsolicited application for commercial lease in the third quarter of 2009.
Overview of Offshore Wind outside US

<table>
<thead>
<tr>
<th>Country</th>
<th>UK</th>
<th>Denmark</th>
<th>Sweden</th>
<th>Netherlands</th>
<th>Germany</th>
<th>Belgium</th>
<th>Ireland</th>
<th>Finland</th>
<th>Norway</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nº of farms</td>
<td>12</td>
<td>9</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td>Nº of turbines</td>
<td>287</td>
<td>305</td>
<td>75</td>
<td>130</td>
<td>9</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>1</td>
<td>828</td>
</tr>
<tr>
<td>Nº of MW</td>
<td>882.8</td>
<td>639.15</td>
<td>163.65</td>
<td>246.8</td>
<td>42</td>
<td>30</td>
<td>25.2</td>
<td>24</td>
<td>2.3</td>
<td>2,056</td>
</tr>
</tbody>
</table>

- By the beginning of this year 38 offshore wind farms with a combined capacity of 2056 MW were operational in 9 European countries
- In February of this year the first offshore wind project (102 MW) went into operation in China
- First floating wind turbine in operation in 2009
- More than 17 wind farms with a combined capacity in excess of 3500 MW are under construction in Europe
- More than 100 GW of offshore wind projects are under development in Europe of which 16 GW (52 projects) is fully permitted: most projects are located in UK and Germany
- In 2009 the offshore wind energy industry created more than $1.5 Billion in economic activity in Europe; This will be double in 2010 and is expected to grow in excess of $10 Billion by 2015
- Europe’s goal is to have 50 GW of offshore wind capacity operational by 2020; 150 GW by 2030, Implementation depending on offshore “supergrid”
• Offshore wind in Europe is driven by strong clean energy/carbon policy initiatives
• Offshore wind technology is evolving beyond straight conversion from onshore technology
• Offshore wind projects under construction: average distance to shoreline 30.1 km (2009 – 14.4 km); average water depth 21.8m (2009 – 12m)
• Leading wind turbine supplier is Siemens (more than 50% market share in 2009); Other suppliers are Vestas, Areva, Repower, Bard (Gamesa), GE and emerging suppliers from Far East (Samsung, Hyundai, Sinovel)
• Offshore wind finance is driven by utility ownership (project finance only for 10% of projects)
Challenges for offshore wind in VA

**Regulatory**

- Based upon the current MMS Offshore regulations it will take 7 to 10 years to go through the regulatory process
- Two subsequent NEPA permitting processes
- Regulatory reform required in order for the US offshore wind energy industry to emerge
- MMS in disarray (under reorganization) due to oil spill in gulf which results in delays on the short term
- Solutions:
  - Offshore renewable energy to be separated from oil & gas within MMS
  - Leadership by Atlantic Offshore Wind Consortium
  - Regulatory reform: Initially through pilot program under current regulations
Challenges for offshore wind in VA

Co-existence with DoD operations in VACAPES

- VCERC identified 25 MMS lease blocks feasible for near term offshore wind development (> 3000 MW)
- Following an unilateral process DoD approved 24 (36) MMS lease blocks for offshore wind development, including less than 5 lease blocks that were identified by VCERC
- DoD’s current position jeopardizes near-team offshore wind development and the emergence of an offshore wind supply chain in Virginia
- Solutions:
  - DoD and Offshore wind industry go through a thorough evaluation (and mitigation) process of possible impacts of offshore wind on DoD operations
  - Learn from European experience (as well as Cape Wind experience with Otis Air Force Base)
  - Technical solutions (Lockheed Martin TPS 77 Radar)
  - Wind project and turbine design considerations
- Offshore wind is opportunity for DoD’s compliance with their internal Renewable Portfolio Standard requirements

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Economics

- Offshore wind is (currently) not the low cost option
- Offshore wind should be a strategic energy resource for Virginia:
  - Fixed priced not depending on fossil fuels
  - Diversification in the energy mix
  - Grid reliability
  - Clean
- Cost of offshore wind is (and will be) coming down sharply due to:
  - Maturing industry
  - More offshore wind suppliers and contractors (no seller's market anymore)
  - Domestic supply chain
- Virginia needs to recognize and prioritize offshore wind as long-term strategic resource in order to attract the investments and commitments required for the emergence of an offshore wind industry in Virginia:

Offshore Wind is an Investment in the Future!
Questions

Offshore wind in Virginia: The question is when...