OFFSHORE WIND –

AN INDUSTRIAL PERSPECTIVE

Policy recommendations for large-scale deployment of offshore wind power in Europe by 2020

Klaus Rave, EWEA Vice-President

Offshore Wind Energy – Good for our climate, bad for our seas?

The International Foundation for the Law of the Sea - (IFLOS), Hamburg

14 March 2008
What is the European Wind Energy Association?

EWEA is the voice of the wind industry, actively promoting the utilisation of wind power in Europe and worldwide for the past 25 years.

Resources are focussed on lobbying, communication and policy activities, and responding to enquiries from our member organisations.
Investitionsbank Schleswig-Holstein

- Public Development Bank for the federal state of Schleswig-Holstein
- IB business segments: SME Financing, Housing, Municipalities
- Basic data (2007)
  - Balance sheet total of 12,8 Bill. €
  - New business volume of 1,8 Bill. €
  - 406 employees provide approx. 60 products and services
- Several special activities, e.g.
  - Energy Agency
  - IB.Europe as the EU advisory centre for Schleswig-Holstein
  - PPP Centre of Competence
Technical improvements in the past

<table>
<thead>
<tr>
<th></th>
<th>1980</th>
<th>2007</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotor size</td>
<td>15 m</td>
<td>127 m</td>
<td>8.5</td>
</tr>
<tr>
<td>Installed power largest wind turbine</td>
<td>55 kW</td>
<td>6.000 kW</td>
<td>120</td>
</tr>
<tr>
<td>Wind energy plant capacity</td>
<td>100 kW</td>
<td>736.000 kW</td>
<td>7.360</td>
</tr>
<tr>
<td>Installed power (world)</td>
<td>100 MW</td>
<td>94.112 MW</td>
<td>941</td>
</tr>
<tr>
<td>Contribution to electricity supply (Europe)</td>
<td>0,001%</td>
<td>3%*</td>
<td>&gt;10.000</td>
</tr>
</tbody>
</table>

* 2005

Source: Frank V. Nielsen, R&D Director, LM Glasfiber, European Wind Energy Technology Platform Launch Event (supplemented by own research)
Wind energy in Schleswig-Holstein

- In 2020 Schleswig-Holstein will be a net exporter of wind energy.

<table>
<thead>
<tr>
<th>Year</th>
<th>Installed capacity (MW)</th>
<th>Share in consumption (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1990</td>
<td>7</td>
<td>3.85%</td>
</tr>
<tr>
<td>1990</td>
<td>35</td>
<td>6.10%</td>
</tr>
<tr>
<td>1991</td>
<td>59</td>
<td>7.61%</td>
</tr>
<tr>
<td>1992</td>
<td>92</td>
<td>9.53%</td>
</tr>
<tr>
<td>1993</td>
<td>153</td>
<td>12.81%</td>
</tr>
<tr>
<td>1994</td>
<td>290.81</td>
<td>13.54%</td>
</tr>
<tr>
<td>1995</td>
<td>448.87</td>
<td>17.23%</td>
</tr>
<tr>
<td>1996</td>
<td>540.14</td>
<td>15.88%</td>
</tr>
<tr>
<td>1997</td>
<td>630.8</td>
<td>23.79%</td>
</tr>
<tr>
<td>1998</td>
<td>745.7</td>
<td>24.28%</td>
</tr>
<tr>
<td>1999</td>
<td>976.3</td>
<td>30.65%</td>
</tr>
<tr>
<td>2000</td>
<td>1177.6</td>
<td>33.89%</td>
</tr>
<tr>
<td>2001</td>
<td>1555.2</td>
<td>34.87%</td>
</tr>
<tr>
<td>2002</td>
<td>1799.3</td>
<td>40.00%</td>
</tr>
<tr>
<td>2003</td>
<td>2174.01</td>
<td>43.87%</td>
</tr>
<tr>
<td>2004</td>
<td>2274.91</td>
<td>44.87%</td>
</tr>
<tr>
<td>2005</td>
<td>2390.51</td>
<td>45.87%</td>
</tr>
<tr>
<td>2006</td>
<td>2522.21</td>
<td>46.87%</td>
</tr>
<tr>
<td>2007</td>
<td>2745.01</td>
<td>47.87%</td>
</tr>
</tbody>
</table>

Sources: Statistisches Amt für Hamburg und Schleswig-Holstein, Ministerium für Wissenschaft, Wirtschaft und Verkehr des Landes Schleswig-Holstein, Bundesverband WindEnergie

* approximate value
Wind energy in Schleswig-Holstein

- Wind energy has become an important and effective instrument for rural development in Schleswig-Holstein.
- Wind power plants are an opportunity for farmers to diversify their business and finance growth.
- Almost 7,000 jobs have been established.
- The annual tax revenue for municipalities in Schleswig-Holstein can reach up to 13,000 € per MW.
The EU members States agreed in June 2007 on a 20% by 2020 binding target for renewables by 2020:

- Offshore wind power will have to play a crucial role in meeting this target

- Offshore wind: a key technology to achieve energy, climate and maritime policy goals of the EU

“Wind could contribute 12% of EU electricity by 2020. One third of this will more than likely come from offshore installations” (Commission’s Energy Package 10 January 2007)
EU 2020 RENEWABLE ENERGY TARGETS

National overall targets for the share of energy from RES in final consumption of energy in 2020

Source: European Commission draft proposal for a Directive on the promotion of the use of energy from renewable sources
Without offshore wind, we will not reach the target

Without infrastructure, we will not meet the target
Wind energy sector today

At the End of 2007, Europe has
- 80% global manufacturing share
- 65% cumulative market
- 50% of annual market
- Annual market value of ~€ 11bn
- 150,000 jobs
- Generates 3% EU electricity
- 40% of the total new power installations came from the wind industry

By 2010 wind is predicted to
- Annual electricity generation of 167 TWh, equivalent to meet the demand of 34m people
- 28% of all new installed generation capacity
- 10.6% of overall generation capacity
- Deliver 50% of the Renewable Directive target
- Meet >30% of the EU Kyoto Protocol commitment
- Avoid €13 billion imported fuel costs,
  - Avoid €10-25 billion external costs
Why going offshore wind

Some of the Benefits...
- Higher wind speeds & huge offshore wind resources
- Land areas constraints in some countries
- Reduced visual impact of offshore wind
- Larger generation output
- Increased interconnection

Some of the Challenges …
- Higher costs (project economics)
- Insufficient confidence in technology to attract participation
- Limited industry experience
- Lack/limited/inconsistent political support
- Grid integration (extension, upgrades and financing)
- Limited knowledge on environmental impacts
- Potential conflicts with other sear users
Offshore wind market today

EU Offshore wind total capacity (2007)
1,080 MW (1.92% of Cumulative wind capacity (56,535 MW))
Where Offshore wind energy? Example of the Germany

North Sea Exclusive Economic Zone of Germany

Baltic Sea Exclusive Economic Zone of Germany

In 2007
No Operating offshore wind farms in Germany
(December 2007)

In 2020 – 2030
Offshore wind capacity in Germany
20 to 25 GW (Source: BMU and BWE)
**Objective**
To achieve industry consensus on the likely future path for offshore wind energy in Europe

**Participants**
EWEA members representing components suppliers, manufacturers, developers, contractors, utilities, service providers, national associations and research organisations

**Outcomes**
- Development of scenarios for the development of offshore wind power in Europe;
- Development of policy recommendations to maximise offshore wind delivery
Policy recommendations report
The report intends to map out the potential development up to 2020, alongside an analysis of the issues and barriers surrounding the sector, and which must be addressed if the potential for offshore wind is to be tapped fully.
Offshore wind market development by 2015

**FIGURE 2: Offshore wind development**
(Annual and cumulative in MW) 2010-2015

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low*</td>
<td>205</td>
<td>645</td>
<td>500</td>
<td>1,000</td>
<td>1,700</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td>2,350</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>900</td>
<td>1,500</td>
<td>3,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cumulative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1,083</td>
<td>1,848</td>
<td>2,228</td>
<td>3,228</td>
<td>10,000</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td>12,000</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>2,628</td>
<td>4,128</td>
<td>15,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For 2009 onwards a low and high estimate had to be developed, so as to reflect the increasing uncertainty over project delivery in this timescale.
Offshore wind market scenario by 2020

FIGURE 3: Offshore wind development 2006-2020 (Cumulative, GW)

- 2006: 0.9 GW
- 2010: 3 GW
- 2015: 4 GW
- 2020: 40 GW
Policy recommendations

**POLICY**

✓ Establishing a European policy framework for offshore wind power (…)

**MARKET**

✓ Establishing stable, coordinated long-term markets for offshore wind in Europe (…)

**RESEARCH AND TECHNOLOGY**

✓ Increasing and prioritising offshore wind R&D calls at EU and national level (…)

**GRID INTEGRATION**

✓ Defining allocation of costs for grid infrastructure mechanisms to ensure that all players have a real incentive (…)

**ENVIRONMENT AND PLANNING**

✓ Encouraging efficient planning procedures which are based on past experiences and are in proportion to the scale and the impact of the project (…)
Final words

Now is the time for the EU to act in a coordinated manner in order to develop offshore wind technology to its full potential and consequently export it around the globe. Only then can it contribute fully to the urgent battle against climate change.

Thirty years ago, North Sea oil came to the rescue of a Europe facing an international oil crisis. We are now faced with a different crisis, and we need offshore wind to help solve it ...
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