Finland, Helsinki, wind power, renewable energy

Based on the EU 2020/2050 energy strategy Finland plans to increase the use of renewable energy from 30% to 38% by 2020. This goal should be reached by increasing the usage of wind energy, biomass and other renewable energy sources. In order to reach the target, approximately 600 new wind turbines have to be built within 7 years.

The aim of this sector analysis is to present the characteristics and trends of the wind energy sector in Finland as well as evaluate its attractiveness from a Danish perspective.
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1. Introduction

According to the EU 2020/2050 strategy, member countries jointly have to reduce their carbon dioxide emissions by 80-95% before the final deadline of 2050. The EU objective for 2020 is to reduce greenhouse gas emissions by 20%. Finland's climate and energy strategy lines out an increase in renewable energy from 30% to 38% until 2020 (for comparison: in Denmark from 17% to 30%). This means an increase of 38 TWh in renewable energy, of which 6 TWh is planned to be produced with wind power. This requires new wind power capacity of 2,000 MW. The Finnish government has set the target to an even higher level of 2,500 MW by the end of 2020. At the end of 2013 the capacity was 448 MW. Feed-in tariffs for wind power were introduced in 2011, and will be received by the first 2,500 MW of the installed wind power capacity.

2. Market Indicators

2.1 Installed Capacity

The still small Finnish wind energy sector is growing fast at the moment. The installed wind power capacity increased from 257 MW to 448 MW (211 turbines) under 2013. 0.9% of the total electricity consumption in Finland is produced by wind power at the moment.

The slow development compared to other European countries is due to lack of state support for wind power investments until 2011, difficulties in zoning, environmental issues, flight obstacle restrictions and opposition from local population. Finland has traditionally produced most of the electricity by nuclear power and hydro power, and by renewable biomasses.

The Finnish wind power industry had a capacity of 448 MW with 211 wind turbines at end of 2013. During the spring 2014 more wind power capacity has been built. The capacity is estimated to reach 650 MW by the end of 2014. The largest new turbines installed in Finland have a capacity of 4.5 MW, but the average capacity of a turbine in Finland is still 2.1 MW. In future, larger turbines with
capacities of around 7-8 MW are likely to become more common, especially at off-shore sites. Following manufacturers had installed turbines in Finland end of 2013:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>No. of wind turbines in Finland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vestas</td>
<td>38</td>
</tr>
<tr>
<td>Nordtank</td>
<td>13</td>
</tr>
<tr>
<td>NEGmicon</td>
<td>9</td>
</tr>
<tr>
<td>WindWorld</td>
<td>1</td>
</tr>
<tr>
<td>Winwind</td>
<td>33</td>
</tr>
<tr>
<td>Siemens</td>
<td>26</td>
</tr>
<tr>
<td>Bonus</td>
<td>23</td>
</tr>
<tr>
<td>Enercon</td>
<td>22</td>
</tr>
<tr>
<td>Gamesa</td>
<td>16</td>
</tr>
<tr>
<td>Nordex</td>
<td>12</td>
</tr>
<tr>
<td>Alstom</td>
<td>7</td>
</tr>
<tr>
<td>Hyundai</td>
<td>5</td>
</tr>
<tr>
<td>Harakosan</td>
<td>3</td>
</tr>
<tr>
<td>Lagerwey</td>
<td>1</td>
</tr>
<tr>
<td>Sundwind</td>
<td>1</td>
</tr>
<tr>
<td>Mervento</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>211</strong></td>
</tr>
</tbody>
</table>

### 2.2 Wind Power Industry in Finland

Relevant Finnish wind turbine manufacturers are WinWinD and Mervento. WinWinD manufactured and wind turbines with capacity of 1 and 3 MW. The company went bankrupt 2013, but is possibly becoming active again managed by the new owner BCI. Mervento has developed an advanced direct drive 3.6 MW wind turbine power plant. The pilot turbine was erected in 2012.

Besides the turbines, the wind power industry in Finland manufactures turbine gears (Moventas Gears Oy) and other components such as generators (ABB Oy),
turbine blades and engine covers (Ahlstrom Oyj). Also, there are manufacturers of
turbine hydraulic pitch control systems and brakes (Hydroll Oy), wind power
aggregates (Hollming Works Oy), magnets and pole elements (Neorem Magnets
Oy), filters, reactors and transformers for wind turbines (Trafotek Oy) and magnet
generator (PMG) and full-power converter (FPC) packages (The Switch
Engineering Oy / Yaskawa).

Further, the wind power industry in Finland includes engineering companies
providing welding automation solutions (Pemamek Oy), steel and steel
construction (Ruukki Metals Oy / SSAB) and steel towers (Levator Oy). There are
also companies offering energy applications (Powernet Oy), engineering and
consulting (Pöyry Finland Oy) and energy infrastructure (Destia Oy).

In Finland, the local energy companies are usually responsible for coordination and
execution of the wind park project. It is common to set up a special purpose
company that owns the wind turbines and acts as the project coordinator. These
companies are jointly owned by various energy companies and municipalities.
Further, there are wind turbine projects in Finland that are managed by public and
private limited companies such as Taaleritehdas Oyj and Tuuliwatti Oy. These
companies are owned by private investors and companies.

3. Market Trends

3.1 Climate and Energy Strategy

The goal set by Finland’s climate and energy strategy was approved by the
government in March 2013. The annual wind power production was planned to
reach 6 TWh by the end of 2020 and 9 TWh by the end of 2025. However, in
2013, only 0.771 TWh were produced by wind power in Finland. In order to reach
the targets, approximately 600 new wind turbines have to be built within 7 years,
provided that the capacity of the turbines remains between 2-4.5 MW.

The regulatory environment in Finland has not been supportive towards newer
methods of electricity production, such as wind power. Positive changes in the
regulatory environment have started to take place recently. Feed-in tariffs for wind power were introduced in 2011. The feed-in tariff is designed to support economically both the use and development of wind power in Finland. The building of wind power parks will be further accelerated by developing the authorization process of building permits so that the permits can be received faster.

Further, the Energy Efficiency Directive (EED) was enforced 4 December 2012 in order to support energy-efficient economy and encourage innovative energy solutions. The related legislation was enforced in Finland 5 June 2014. The legislation obliges Finland to increase the use of renewable energy. Consequently, the Finnish wind energy market is likely to experience remarkable growth.

### 3.2 Feed-in Tariff

The level of support for wind energy in Finland is defined by the Ministry of Employment and the Economy. The producer is paid a feed-in tariff, which is the difference between the target price and the spot market price (last 3 months’ average) in accordance with the amount of electricity produced in a wind power plant that is approved for the feed-in tariff system. The support is EUR 105.30/MWh (ca. DKK 784/MWh) until the end of 2015, and after that EUR 83.50/MWh (ca. DKK 622/MWh).

The tariff can be applied after a new wind turbine is erected and connected to the grid. The tariff will be paid over a period of 12 years from the beginning of production. Only the first 2,500 MW of the installed wind power capacity will receive the support. The companies included will be monitored by the Energy Authority.

Finland have reserved state subsidies for wind energy EUR 73 million (DKK 544 million) for 2013, EUR 100 million (DKK 745 million) for 2014 and EUR 120 million (DKK 894 million) for 2015. So far 37 wind power plants have received the support.
3.3 Wind Power Projects

The feed-in tariff for wind power entered into force 25.3.2011 in Finland. As a result, the wind power capacity increased by 59 MW (30%) under 2012 and by 190 MW (74%) under 2013. Under 2014 the wind power capacity is estimated to increase by 200-230 MW.

In September 2013 there were over 8,000 MW on-shore and 3,000 MW off-shore projects in different phases of planning, comprehending all projects from feasibility check phase to construction. So far the projects have been smaller on-shore wind parks or even individual turbines, but the size of the projects is growing towards 20-50 MW on-shore parks. Also the first steps towards off-shore wind parks have been taken, but this development is still slow. At the moment there are only few near-shore turbines on fabricated islands close to the coast, large scale off-shore parks are still to come. Some test projects are on-going. One challenge is the icy winter conditions.

Several areas in Finland are suitable for wind power, including coastal sites, coastal waters of the Baltic Sea, and the exposed fells of Finnish Lapland. According to the Baltic Sea Region Energy Co-operation (BASREC) report, 66 of the 99 most suitable areas for offshore wind power generation in the Baltic Sea are located in the Finnish sea area. The study ranks possible offshore wind farm locations according to wind speed, water depth and distance to the shore. According to the study, Finland’s “golden areas” benefit from shallow waters and high wind speeds. The Gulf of Bothnia coast in Northern Finland has the highest wind power potential in the Baltic Sea region with 31,200 MW, followed by South Finland with 27,400 MW. Central Finland has a potential capacity of 11,100 MW, and South-East Finland 2,000 MW.

Receiving the needed permits for building a wind power plant can take 1.5-3 years. The bureaucracy is heavy, including spatial planning, assessment of environmental impacts, handling of possible complaints and also applying for the actual building permits.
4. The Potential for Danish Companies

The Finnish market for wind energy solutions is growing. There is a projected demand for approximately 600 new wind turbines within the next seven years in Finland. In order to increase the wind power capacity from the current 448 MW by 2,052 MW to 2,500 MW by 2020, the Ministry of Employment and the Economy is improving the conditions for wind energy development in Finland and removing structural obstacles of wind energy production. For example, the process of getting a building permit for a wind farm is simplified. The state subsidies and feed-in tariffs are available for Finnish as well as foreign operators. As a result, a phase of rapid growth in the Finnish wind energy market is expected to continue at least until the 2,500 MW is reached.

The future developments in the Finnish wind energy sector include offshore wind farms and arctic technologies. The Finnish waters of the Baltic Sea have a considerable potential for offshore wind farms. It is possible to build at least 5-6 large offshore wind farms in Finnish marine locations.

Finnish wind energy market needs strong companies with stable economies. Danish wind energy companies with their world leading technologies could provide solutions for Finnish market. The Finnish market for wind power solutions has potential for:

- Project developers / coordinators
- Investors
- Engineers
- Energy Companies
- Wind turbine suppliers
- Component and solution suppliers
- Service and maintenance companies

When compared to other Nordic countries, Finland has many advantages. Finland has a fixed state support for wind power whereas in Sweden and Norway the value of the support is influenced by market fluctuation. Further, the costs of wind park investments are lower in Finland than in Norway. In addition, Finland has a
number of available sites and new wind power projects in different phases of planning.

The Danish Embassy in Helsinki has the resources to help your organization enter the Finnish market. We can provide partner search, residence events with the ambassador, information search, market launch event, etc.

5. Sources


6. Contact Information

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