CASE STUDY: WIND POWER SOLUTIONS

Lotnisko - Poland
ECO 110 wind farm

Alstom’s key reference in Poland.

Country: Poland
Project: Lotnisko
Customer: PGE Energia Odnawialna S.A
Scope: Supply, installation and commissioning of ECO 110
Electrical output: 90 MW
Commercial operation: 2015

Alstom signed its first contract with PGE Energia Odnawialna S.A for the supply of 30 ECO 110 wind turbines for the “Lotnisko 90 MW” wind farm, which will be based in Kopaniewo, in Poland.

With a total output of 90 MW and scheduled for commissioning at the end of 2015, Lotnisko is one of the largest projects in the Polish wind power industry, and the first wind power project implemented by Alstom in Poland.

The scope of the contract covers the project management, supply, erection and commissioning of 30 Alstom ECO 110 3 MW wind turbines equipped with a 110 m diameter rotor, a 90 meter high steel tower, and a SCADA remote control system. Alstom will also provide turbines operation and maintenance for 2 years.

Make the most of the onshore wind resource

The ECO 110 range of wind turbines offers a high yield and leading efficiency across all wind turbines. The ECO 110 wind turbine, with a power output of 3 MW, is suitable for high and medium wind (IEC Class II-A, I-S) and has one of the largest rotors available for class I-S and II-A sites to maximise the energy yield of the turbine.

CUSTOMER PROFILE

Spolka PGE Energia Odnawialna SA is a subsidiary of PGE Polska Grupa Energetyczna S.A., which is Poland’s largest power conglomerate and one of the largest power sector players in Central and Eastern Europe.

The Group’s core business consists in the generation of electric power from renewable energy sources and the provision of Ancillary Control Services. The total installed capacity of the Group’s generating units (hydroelectric power plants and wind farms) amounts to approximately 1,723 MW including 333.4 MW in renewable energy source which gives it an approximately 6.44 % share in the Polish market of power generation from renewable energy source.

HARNESSING POLAND’S POWER POTENTIAL

Wind power is a minor but growing source of electricity in Poland. At the end of 2013, total installed capacity was 3,390 MW, which provided 5,822 GWh representing 3.53% of the electricity produced in the country.

PROJECT HIGHLIGHTS

- The wind farm will provide clean energy to more than 20,000 households
- Proven technology with more than 3,500 MW installed or under construction
TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>ECO 110</th>
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<tbody>
<tr>
<td>Rated power output</td>
<td>3 MW</td>
</tr>
<tr>
<td>Rotor diameter</td>
<td>110 m</td>
</tr>
<tr>
<td>Number of blades</td>
<td>3</td>
</tr>
<tr>
<td>Tower height</td>
<td>100 m</td>
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<tr>
<td>Speed Range</td>
<td>7.7 - 13.6 rpm</td>
</tr>
<tr>
<td>Rated wind speed</td>
<td>11.5 m/s</td>
</tr>
<tr>
<td>Blade length</td>
<td>53.2 m</td>
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</tbody>
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FOR A HIGHER ENERGY YIELD

The ECO110 is part of Alstom’s proven ECO100 turbine platform. More than 130 turbines of this type have already been installed in Europe, including Spain, Great Britain, Turkey and Finland. All Alstom wind turbines are based upon the unique and proven Alstom Pure Torque® rotor support concept that protects the drive train from deflection loads, ensuring higher reliability and lower maintenance costs.

ALSTOM PURE TORQUE® TECHNOLOGY

All Alstom’s wind turbines feature the PURE TORQUE® concept, a unique and proven mechanical design that protects the drive train from deflection loads to ensure higher reliability. The rotor is mounted on a fatigue-resistant cast iron hub that transmits the gravitational load and deflection stresses via two sets of bearings to the tower.

Meanwhile, the drive shaft elastically mounted on the front of the hub transfers pure torque (green arrows opposite) to the drive train free of the stresses and strains (red arrows opposite) that can arise due to buffeting.