ANTI-ICING

HIGHER YIELDS IN ICY CLIMATES

Proven technology for maximum availability

Nordex
We’ve got the power.
NORDEX ANTI-ICING SYSTEM

Higher yields in icy climates

With the anti-icing system, Nordex customers can rely on secure yields from their wind turbines and maximum availability, even in cold temperature conditions. It is available for the turbines N117/3000 and N131/3000.

The system consists of an ice sensor, mounted on the nacelle, and heating elements contained within the rotor blades at the aerodynamically relevant area of the blades. The sensor continuously monitors ambient conditions and reports the status to the wind turbine’s control system. If data indicates the presence of conditions likely to cause icing, the heating elements are automatically activated. Energy-efficient heating prevents ice from accumulating on the rotor blades. There is no requirement to stop or reduce the operation of the turbine while the anti-icing system is working. Whilst active, the system will automatically switch between off, low power and full power to match the climatic conditions.

If ice were to form during operation, the wind turbine would not need to be shut down. The anti-icing system automatically removes ice that has accumulated along the relevant surfaces of the rotor blade, thereby reducing yield losses and shutdowns resulting from icing. After downtime, e.g. due to grid outages, the system detects icing-driven performance reductions, triggering the anti-icing process, before resuming full operation. The anti-icing system can also be controlled manually for an individual wind turbine as well as for the entire wind farm.
Your advantages at a glance

- Maximum yield even at sites prone to severe icing
- Avoiding ice formation on the blades during operation ensures high availability levels
- Low power consumption of the system equates to even higher power output for the turbine
- Resilient solution integrated into the blade structure

Nordex Anti-Icing-System – Track Record

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015*</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>N100/2500-CCV-AIS</td>
<td>3</td>
<td>16</td>
<td>30</td>
<td>30</td>
<td>9</td>
<td>88</td>
<td>88 WEA / 220 MW</td>
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<tr>
<td>N117/3000-CCV-AIS</td>
<td>1</td>
<td>34</td>
<td>17</td>
<td></td>
<td></td>
<td>52</td>
<td>52 WEA / 156 MW</td>
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<tr>
<td>N131/3000-CCV-AIS</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2 WEA / 6 MW</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td><strong>142 WEA / 382 MW</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Nordex implemented the anti-icing system in the field for the first time in 2010. Since then, 142 wind turbines with more than 382 MW have been fitted with this effective solution, or, are under construction.

* under construction
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