



Blade Monitoring & Optimization



Longer blades mean increased wind loads and, in turn, more mechanical stress on the entire turbine. Icing events can put even more load on your turbine blades, reducing performance and occasionally even causing complete shut-down. To counter these effects, we at Polytech use fiber optics, IIoT measurement technology, and smart data to craft our most intelligent blade monitoring system.

Vibration sensors for ice and condition monitoring

Ice detection and monitoring

If your wind turbines lie in areas with frequent ice events and regulatory obligations, your operations need a bit more attention. By using an ice detection system, you can operate your turbines safely (minimize ice throw), maximize your annual energy production, and avoid unnecessary shutdowns due to ice.

We provide a DNV-certified, rotor blade-based ice detection system using fiber optics technology. The system detects ice during standstill, which allows you to shorten your turbine's downtime during an ice event. And with the available automatic stop/restart function, the system takes care of itself – and your turbine.

Our ice detection system outperforms conventional power curve or anemometer-based systems significantly in terms of reliability and functionality, offering significant increased yields and reduction of operating costs. Using our ice detection system, one of our customers reduced turbines' downtime by 884,000 MWh and gained of more than €70,000 within a week across 26 turbines.

SUMMARY OF SYSTEM ADVANTAGES

- Lightning-resistant and maintenance-free system
- Designed to last the turbine's lifetime
- Holistic approach – from integration/installation to operation
- Modular and scalable measurement platform
- DNV-certified ice detection system
- Ice detection with automatic start/stop function



Our rotor blade-based ice detection system can automatically stop and restart the wind turbine without additional operating costs from visual inspection.

Condition monitoring

We developed the blade condition monitoring system to detect and monitor structural damages to rotor blades and to optimize maintenance and repair planning. We use the same, DNV-certified hardware configuration as in our ice detection system.

Strain sensors for load monitoring

Load monitoring allows you to optimize the whole turbine design for specific locations and operate turbines safely within their limits. You can therefore use the same turbine type for a wider range of wind conditions.

By monitoring loads, you can also reduce the turbine's material costs through designing lighter blades. And together with the individual pitch control system, you can distribute loads across your blades to optimize your energy output and reduce loads on the turbine structure.

Today, more than 60,000 Polytech fiber optic sensors are monitoring loads in wind turbine blades globally.

The technology

Fiber optics

By using fiber optic measurement technology, our monitoring system has several advantages. It is resistant to lightning strikes and electromagnetic interferences, making it possible to use the sensors even at the most lightning-exposed points on the blades. The system can withstand extreme dynamic loads and has long transmission distances. The fiber optic technology leads to a completely maintenance free monitoring system, which, once installed, provides continuous measurements for the turbine's lifetime.

Sensors inside each rotor blade

Sensors in each rotor blade drive the next generation of efficient turbines. By installing sensors inside the blades, you maximize the energy output while min-

Performance of Polytech ice detection system



” The reliability and performance of the Polytech ice detection system are convincing at our wind farms. The systems paid for themselves at our wind farms already during the second winter. ”

MARKUS WINTER, TECHNICAL DIRECTOR
AT WINDKRAFT SIMONSFELD

imizing the risks of damage during operations under all conditions.

The sensors can be installed in the factory or on site within a day without using rope or basket. And by choosing Polytech, you choose a holistic approach: we provide complete solutions and service from integration, installation to operation.

Modular and scalable platform

Combine a wide range of sensors into one system and data platform to measure loads, structural health, ice masses, underperformance, and other key turbine and blade conditions. Such a modular platform allows you to extend monitoring based on your priorities, and access data in a uniform way.