

FabricAir

# Maximize Your Wind Turbine Performance

**BorealisWind**  
Ice Protection System



# Consistent energy production in cold climates

In cold climates, winter months produce the highest wind energy yield due to the higher air density and faster wind speeds. Being able to consistently generate wind power at low temperatures is critical to ensure revenue targets and investment returns are met. Furthermore, under-production can result in significant penalties.

Once winter sets in and colder temperatures take hold, the energy produced by wind turbines can be seriously disrupted by ice forming on the blades. A light icing event can reduce energy production by 15-30%. Harsh conditions can reduce energy production up to 80% or result in the wind farm shutting down.

## Ice Protection Systems that work

The BorealisWind IPS prevents ice formation on wind turbine blades to ensure continuous energy production for wind farms in cold conditions.

Thanks to our patented technology, the system solves both anti-icing and de-icing issues. It heats the blade from the inside, shedding the ice from the exterior of the blade. This prevents unanticipated shutdowns of wind turbines and ensures stable energy delivery during winter when energy costs and financial returns are the highest. Removing the ice from the blade also reduces wear on the turbine and reduces the safety risk caused by ice build up.

BorealisWind IPS is DNV certified to meet IEC 61400-22.

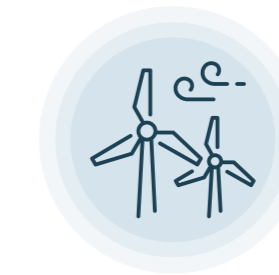
## Benefits



### REVENUE RECAPTURE

Icing events make the wind turbine blades less aerodynamic, significantly reducing the power output and impacting the wind turbine's energy production.

The BorealisWind IPS helps you maintain consistent energy production through the winter resulting in as much as a 10% increase to annual energy production.



### PREVENT DAMAGE

The IPS prevents ice-related damage to your turbine blades, avoids harmful ice induced downtimes, and extends your turbine life. Mangled entrance stairs, crushed transformers and junction boxes, and even severe damage to the nacelle and rotor illustrate the destructive power of icing events.



### IMPROVE SAFETY

Ensure safe working conditions for your maintenance crews and the public at large. Falling and thrown chunks of ice from wind turbines can lead to workplace injuries for which the owner can be held responsible.



# How does it work?

Our system continuously monitors ice formation and intelligently activates to remove ice and ensure continued operation to maximize performance and financial returns.

The system, installed inside the blade a ensures that warm air circulates within the leading edge of the blade heating the tip, which is a critical icing area. The control system integrates with the turbine safety chain and collects data from the SCADA system. The ice detection sensor detects icing events as they begin, ensuring that the blades are heated before ice buildup starts.

- NO METAL GRIDS INSTALLED
- NO ADDITIONAL EROSION
- NO RISKS TO BLADE STABILITY
- NO CHEMICALS OR OTHER POLLUTIVE ELEMENTS USED



## EASY TO INSTALL

No need to use cranes to remove the blades, no need for rope access, and no lost production.



## DETECTS ICING EVENTS BEFORE THEY START

Using the Icetek Ice Conditions Monitoring System we are able to detect icing events before they begin to ensure that the blades are heated before ice accumulates.



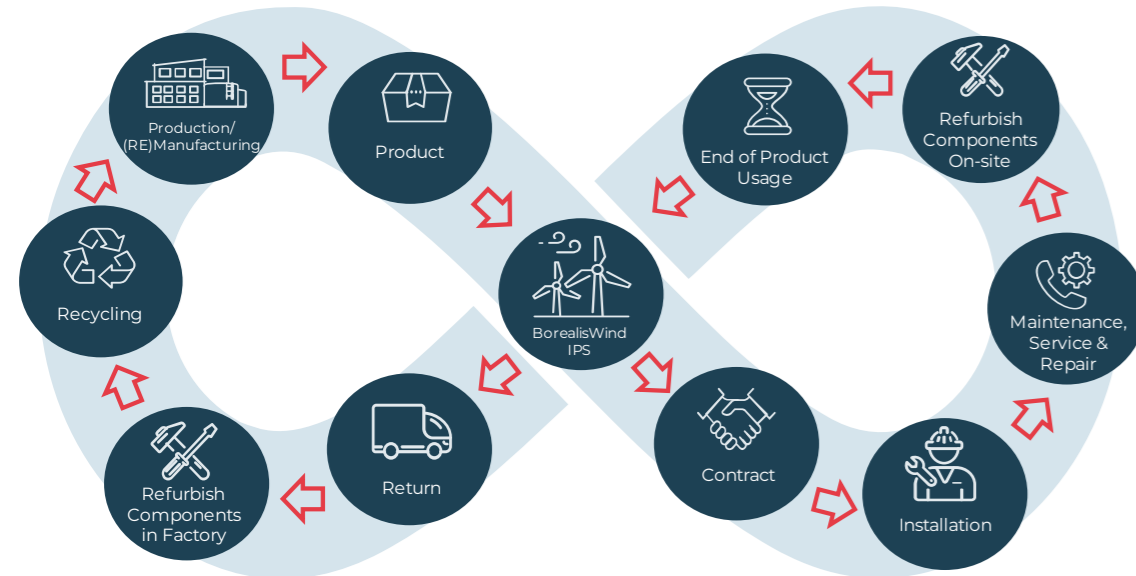
## REMOVES ICE IN JUST 30 MINS

By proactively heating the blades, our system removes any ice build-up in a matter of minutes, not hours!

# System as a service

The BorealisWind Ice Protection System is offered based on a "system as a service" financial model for a yearly flat fee. This includes rental of the Ice Protection System and a comprehensive installation, maintenance, and service plan to maximize turbine performance in cold conditions for the whole turbine life cycle.

Our "system as a service" model allows you to free up capital and generate ROI. It also avoids system maintenance burdens and supports your ESG objectives. We take complete responsibility for the system performance so you can focus on your core business.



## DNV CERTIFIED SYSTEM CONSISTS OF:

- Blade heating system
- Blade control cabinet in each blade
- Hub control cabinet
- Nacelle control cabinet
- Customized electrical integration
- Ictek Ice Conditions Monitoring System

## SERVICE PLAN INCLUDES:

- Complete installation
- Change or refurbish components on-site
- Preventive maintenance
- 24/7/365 monitoring of the system
- Critical issue elimination on-site within agreed SLA
- Access to BorealisWind Monitoring Software
- System availability warranty
- Annual reports

# Get instant ROI!



## TURN CAPEX INTO OPEX

No upfront capital investments! Distribute your investment with a predictable fixed payment model to minimize large up-front cash outlays and ongoing servicing and maintenance fees.



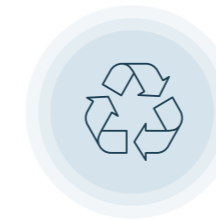
## RECAPTURE REVENUE

The IPS improves the efficiency and reliability of your wind turbine. By reducing downtime by 80%, the system pays for itself!



## GET TURBINE LIFECYCLE SERVICE

Reduce service burdens! We take responsibility for system maintenance, service, predictive malfunction insights, and repairs for the turbine's full lifecycle as part of the agreement.



## BE SUSTAINABLE

The BorealisWind system as a service concept is based on a 100% circular business model, that positively influences your ESG reporting. We retain responsibility for re-using or recycling the system components to reduce the environmental footprint and minimize waste.

## DISCOVER MORE

Find out how the BorealisWind Ice Protection System can decrease downtime and increase revenue generated by your wind turbines. Contact our experts to discuss how to maximize your wind farm's performance.

# FabricAir

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