Unlock Winter Energy with BorealisWind IPS

Proven Ice Protection System for Maximum Energy Production

The Winter Energy Loss Problem

Ice accumulation on wind turbine blades isn't just a inconvenience - it's a serious performance and revenue issue. In cold climates, turbines can experience heavy icing that forces them to slow down or shut off, cutting energy output dramatically. Studies show that ice on blades can reduce a turbine's power production by up to 80%. This means a single turbine might lose hundreds of megawatt-hours in just a few days of downtime, potentially up to 350 MWh in one week - a huge financial hit for wind park operators. Beyond lost energy sales, icing causes increased wear-and-tear and safety risks from ice shedding.

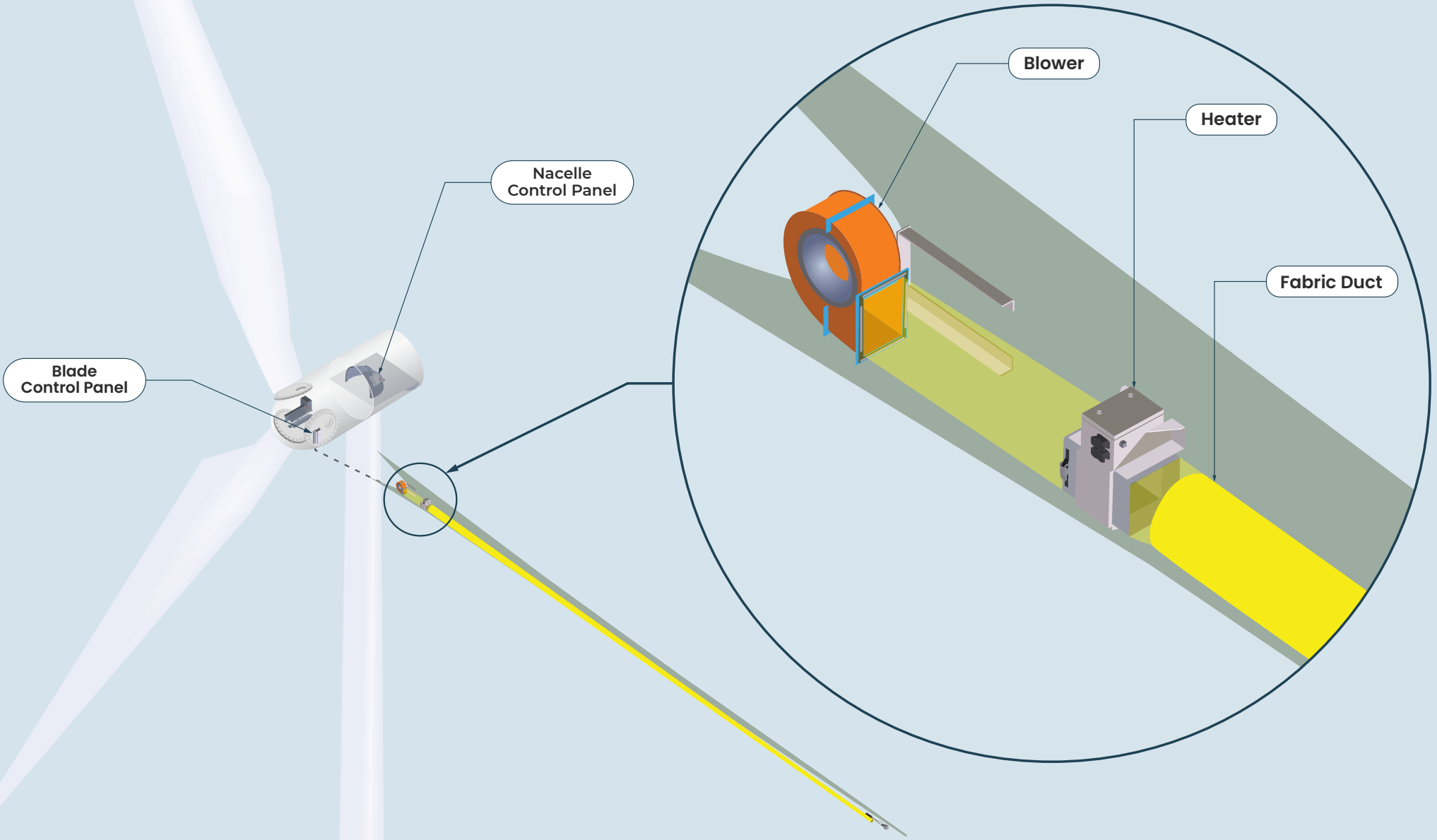
Ice on blades can reduce a turbine's power production by up to

80%

What is the BorealisWind IPS?

BorealisWind's Ice Protection System (IPS) is an internal blade heating solution designed to keep wind turbines generating power through winter weather. The IPS is retrofittable to existing turbines (or installable on new ones) and mounts inside each blade - safely protected from the harsh conditions (lightning, erosion, blade flex).

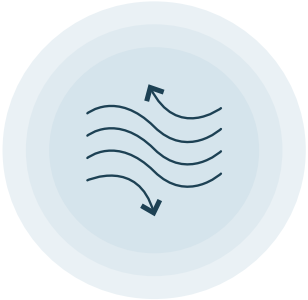
Once installed, the system continuously monitors for icing, automatically activates at the first sign of ice, and circulates warm air throughout the blade from root to tip to prevent ice buildup. By actively preventing ice accumulation along the blade's leading edge, BorealisWind IPS ensures turbines can keep spinning and producing energy even in freezing fog, snow, or ice storms. The system is custom-engineered for each turbine model and site, and is available for all modern wind turbines >1 MW.



BorealisWind IPS unlocks your lost winter energy by keeping your blades ice-free and aerodynamic, maximizing energy production during icing events.

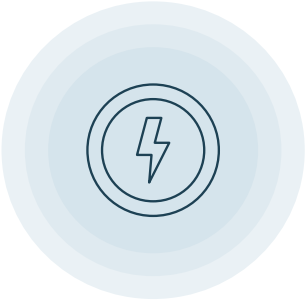
What sets our system apart?

The BorealisWind IPS offers unique advantages that translate to reliable icing protection and greater energy output without compromising your turbines.



OPTIMIZED AIRFLOW & HEAT TRANSFER

The airflow is engineered to compensate for internal pressure forcing cold air to the tip of the blade. This ensures balanced flow and effective thermal delivery even at the tip of the blade. With the use of turbulent flow and millimeter scale perforations in the fabric duct we maximize heat transfer through the leading edge.



BLADE-FRIENDLY, LIGHTNING-SAFE DESIGN

Constructed with non-conductive materials, and fit entirely within the blade's lightning protection system, we ensure full compliance with lightning safety. The light weight fabric duct moves with the blade, without altering blade stiffness, mass distribution or balance, preserving the blades performance.

LIFETIME WARRANTY

With BorealisWind IPS, your investment is protected for life of the turbine. Unlike other de-icing systems that offer only limited warranties, we stand behind our technology with a lifetime warranty on the system. This means that any system repairs or replacements are our responsibility and you can operate your turbines with complete confidence year after year.

RETROFIT-READY & LOW MAINTENANCE

Designed for field retrofits performed up-tower, taking as little as 1 day per blade. No cranes, no rope access, no blade swaps. Your turbines spend more time generating power, not sitting idle.

System Performance & Measurable Results

BorealisWind's Ice Protection System is engineered for consistent, high-impact performance. Its reliability and effectiveness have been validated through independent assessments, real-world benchmarking, and third-party verification - delivering measurable gains across various turbine types and icing conditions.

>95%
winter availability

10%
winter AEP gain

95%+ SYSTEM AVAILABILITY

Operates reliably - even during harsh icing events. System availability and performance are contractually agreed.

3RD-PARTY VALIDATED PERFORMANCE

Results verified using IEA Task 19 methodology and independent assessments from ice detection specialists.

VERIFIED ENERGY GAINS

Net increases in energy production confirmed through benchmarking against non-protected turbines.

PROVEN IN THE FIELD

Performance measured across multiple turbine types and icing classes in real-world conditions.

All-in-One Ice Protection: System+Service

BorealisWind IPS is more than just a technology - it's a fully supported solution backed by a lifetime warranty for the life of your turbine. Every installation includes both the high-performance Ice Protection System and a comprehensive service package that covers installation, 24/7 monitoring, preventive maintenance, and rapid support. Whether you choose to purchase the system or rent it through our "System as a Service" model, you get end-to-end support designed to maximize turbine uptime and winter energy production with zero operational hassle.

Ice Protection System

- Blade Heating System
- Blade Control Cabinets
- Hub Control Cabinet
- Nacelle Control Cabinet
- Ice Conditions Monitoring System
- Electrical Integration

Service Package

Installation

- Site Assessment
- Electrical Integration Planning
- On-site Installation
- Safe Deployment

Maintenance & Support

- Preventive Maintenance
- On-site Component Replacement
- SLA-Backed Rapid Response

Monitoring

- 24/7/365 Remote System Diagnostics
- Access to Monitoring Software
- Tuning and Performance Enhancement
- Software and Control Logic Updates

Choose system acquisition model that fits your needs

We offer two convenient ways to equip your wind farm with BorealisWind's Ice Protection System, tailored to your financial and operational preferences. In both models, our expert team handles the delivery, installation, and ongoing maintenance of the IPS - ensuring you get the full benefit with minimal effort on your part.

Option 1
System as a Service

RENT THE SYSTEM WITH SERVICE PACKAGE INCLUDED

- **NO CAPITAL INVESTMENT REQUIRED** - you rent the Ice Protection System, allowing you to improve turbine availability.
- **FULLY MANAGED BY EXPERTS** - we own, operate, and maintain the system, freeing your team from technical oversight.

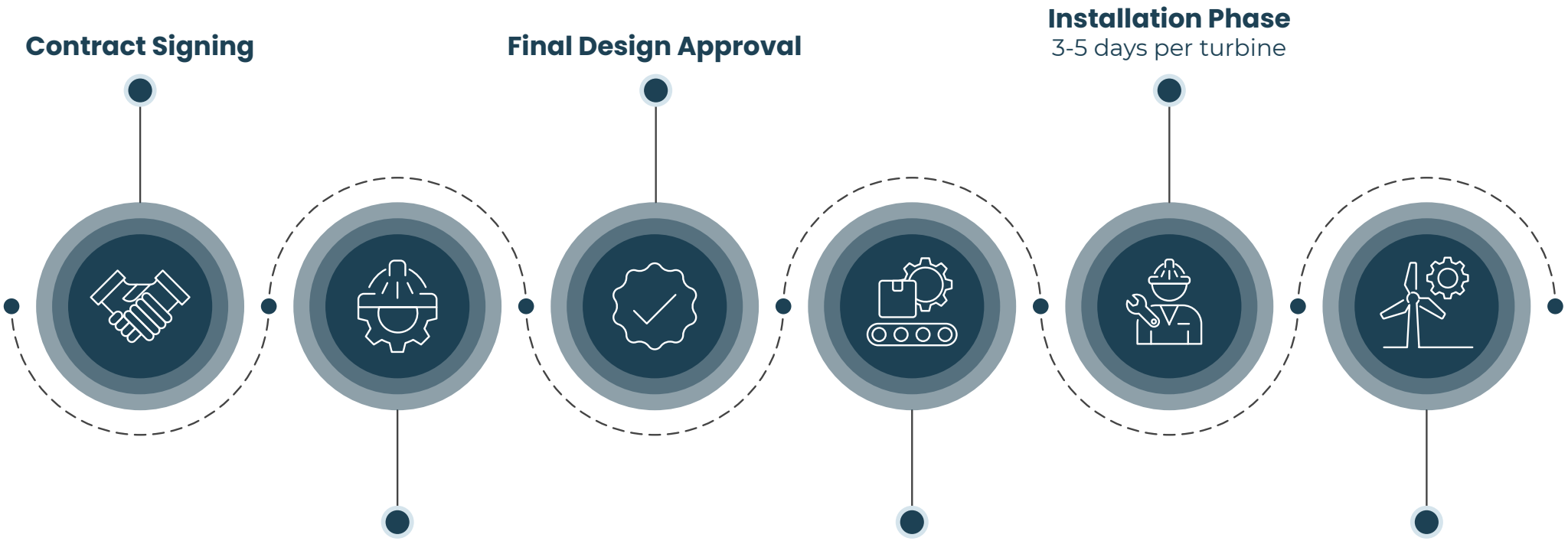
Option 2
System with Service

PURCHASE THE SYSTEM WITH SERVICE PACKAGE INCLUDED

- **OWN THE SYSTEM** - you purchase the Ice Protection System but still benefit from our complete service package.
- **END-TO-END SUPPORT INCLUDED** - from installation to monitoring and preventive maintenance, we keep your system running at peak performance.

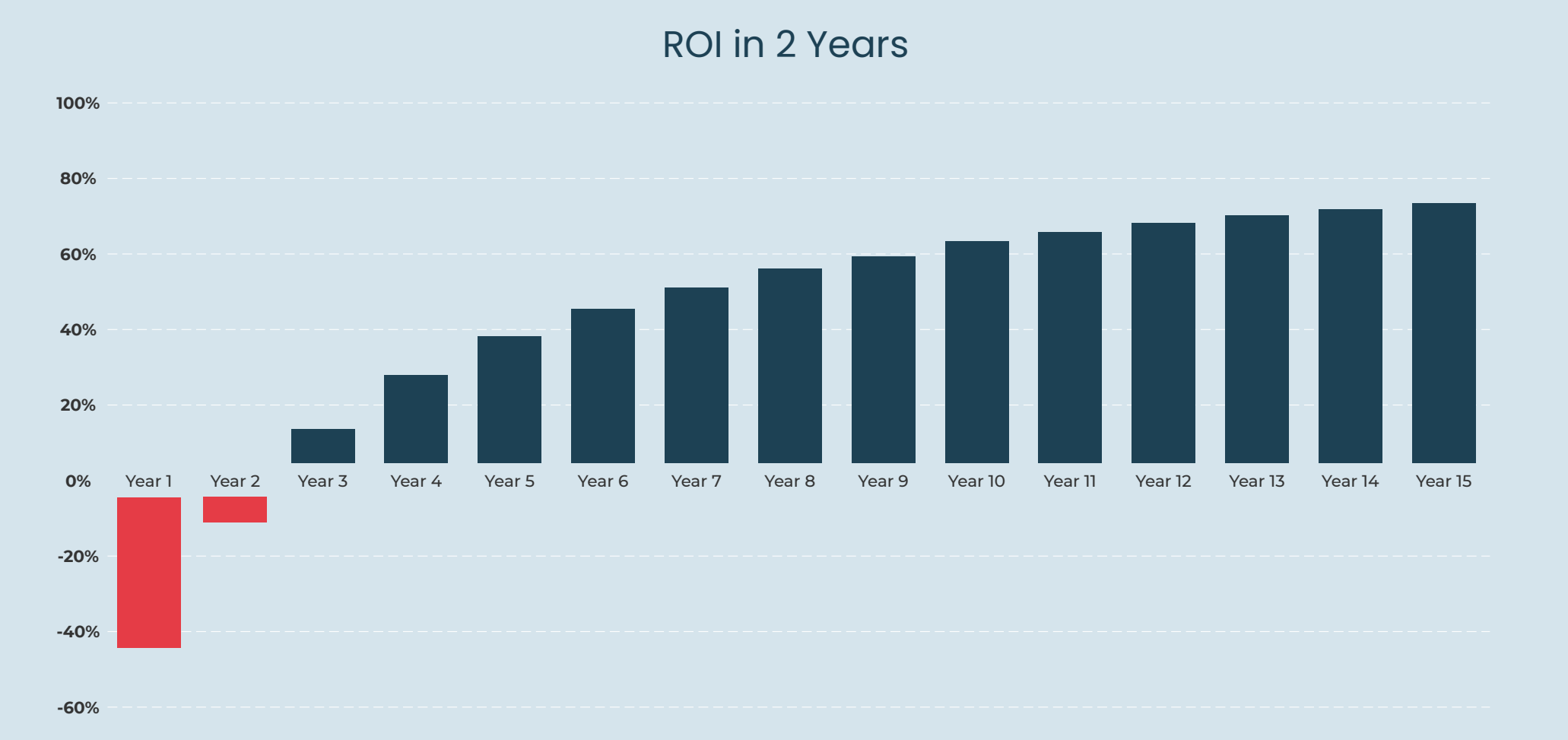
Path to Deployment

Implementing BorealisWind IPS is a streamlined, milestone-driven process designed to minimize disruption and maximize results. From contract signing through design, production, installation, and ongoing maintenance, we handle the details - so your turbines stay on track for a winter-ready upgrade. Here's how we bring the solution to life.



Financial Value & ROI

Investing in the BorealisWind IPS yields strong financial returns by recapturing energy production that would otherwise be lost to ice. Over a typical project lifecycle (~15 years), the cumulative energy gains and reduced downtime from IPS far outweigh the system's costs (both the initial installation and the modest operating costs). Many wind farm operators see a full return on investment within 1-3 winter seasons. After that breakeven point, all additional energy production is pure profit.



Use Case Examples

In cold-climate wind parks BorealisWind's Ice Protection System consistently demonstrates exceptional ROI potential.

These use case examples showcase rapid payback and significant revenue gains that wind farm owners can expect even under harsh winter conditions.

Finland

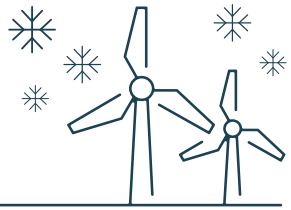
Icing Class: **3**

Capacity Factor: **40%**

Turbine Size: **5.6 MW**

Icing Loss from AEP

10%



Estimated Annual Recovery from IPS (per turbine)

€117,952

Canada

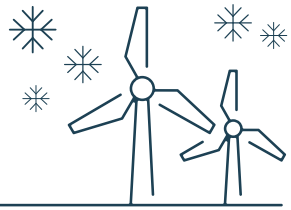
Icing Class: **2**

Capacity Factor: **40%**

Turbine Size: **3 MW**

Icing Loss from AEP

3%



Estimated Annual Recovery from IPS (per turbine)

$52,980

Sweden

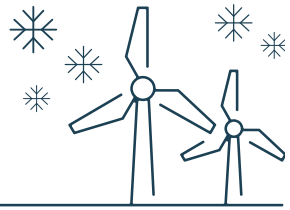
Icing Class: **4**

Capacity Factor: **40%**

Turbine Size: **6.2 MW**

Icing Loss from AEP

10%



Estimated Annual Recovery from IPS (per turbine)

€111,934

FabricAir | BorealisWind Ice Protection System

READY TO MAXIMIZE WINTER ENERGY PRODUCTION AND REVENUE?

Don’t let winter weather dictate your wind farm’s success. It’s time to take control of icing losses and turn them into gains. The BorealisWind IPS has a proven ability to increase winter energy production and revenue.

Request a Free Assessment or Demo

To learn how this solution could work for your specific turbines and climate, get in touch with our team for a free customized icing assessment. Our experts will analyze your site’s icing data and estimate the potential energy uplift and ROI you can expect with IPS installed.

FabricAir

www.borealiswind.com

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RENEWABLES CERTIFICATION DNV TYPE CERTIFICATE TC-DNV-SE-0441-01234