

Eiserkennung als Baustein einer ganzheitlichen Rotorblattüberwachung

Potsdam, 11.11.2021

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Introduction to Polytech

PolyTech at a glance

Founding year

1994



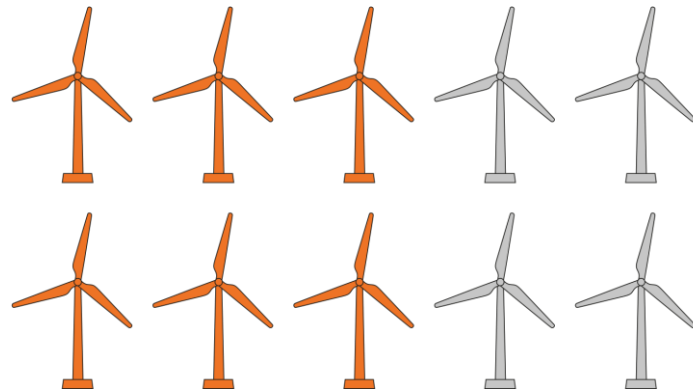
Employees

>850



including +50 dedicated to innovation
and +30 PhDs within wind, lightning & fiber optics

50% of all new blades
worldwide
have a PolyTech lightning protection
system (85% of carbon blades)



Parts installed in ~60% of all
blades manufactured

Blades with PolyTech's LEP
solution installed worldwide

~30,000



United Nations
Sustainable Development Goals



Certified

Global Reach

from presence in China, Denmark,
Germany, Mexico, and USA



In-house DANAK
accredited
test centers

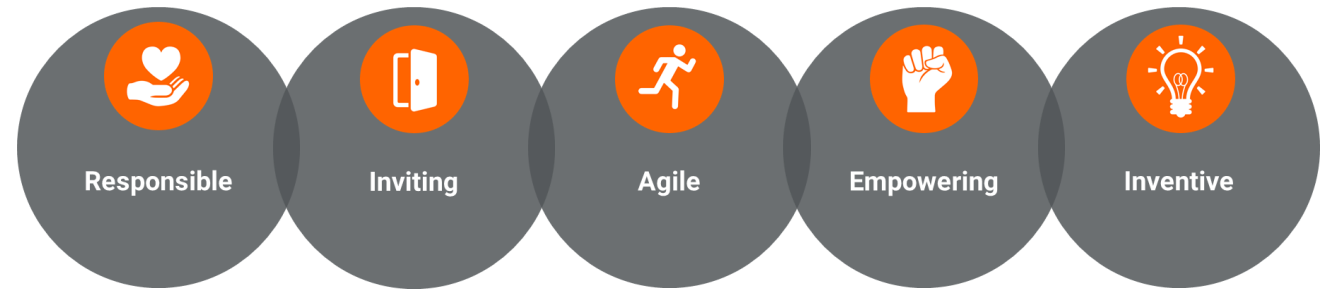
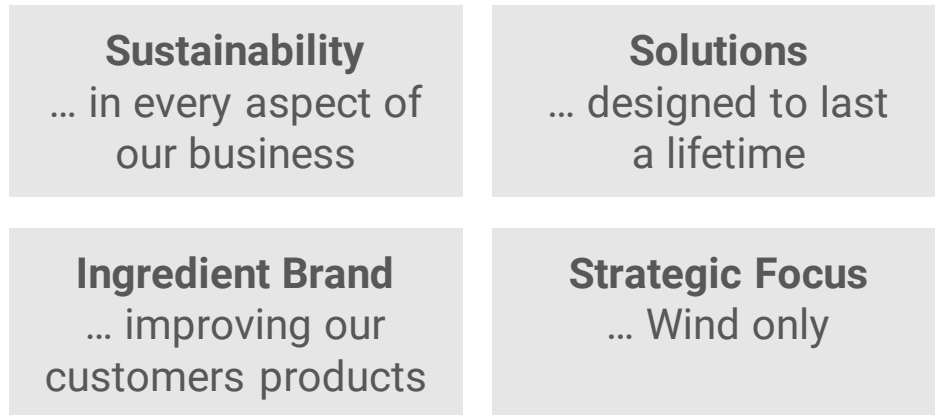
~30,000

Fiber optic sensors installed worldwide
generating data on ice monitoring, CMS
and blade load monitoring

Our brand: Wind for life™



OUR FOUNDATION



OUR VALUES

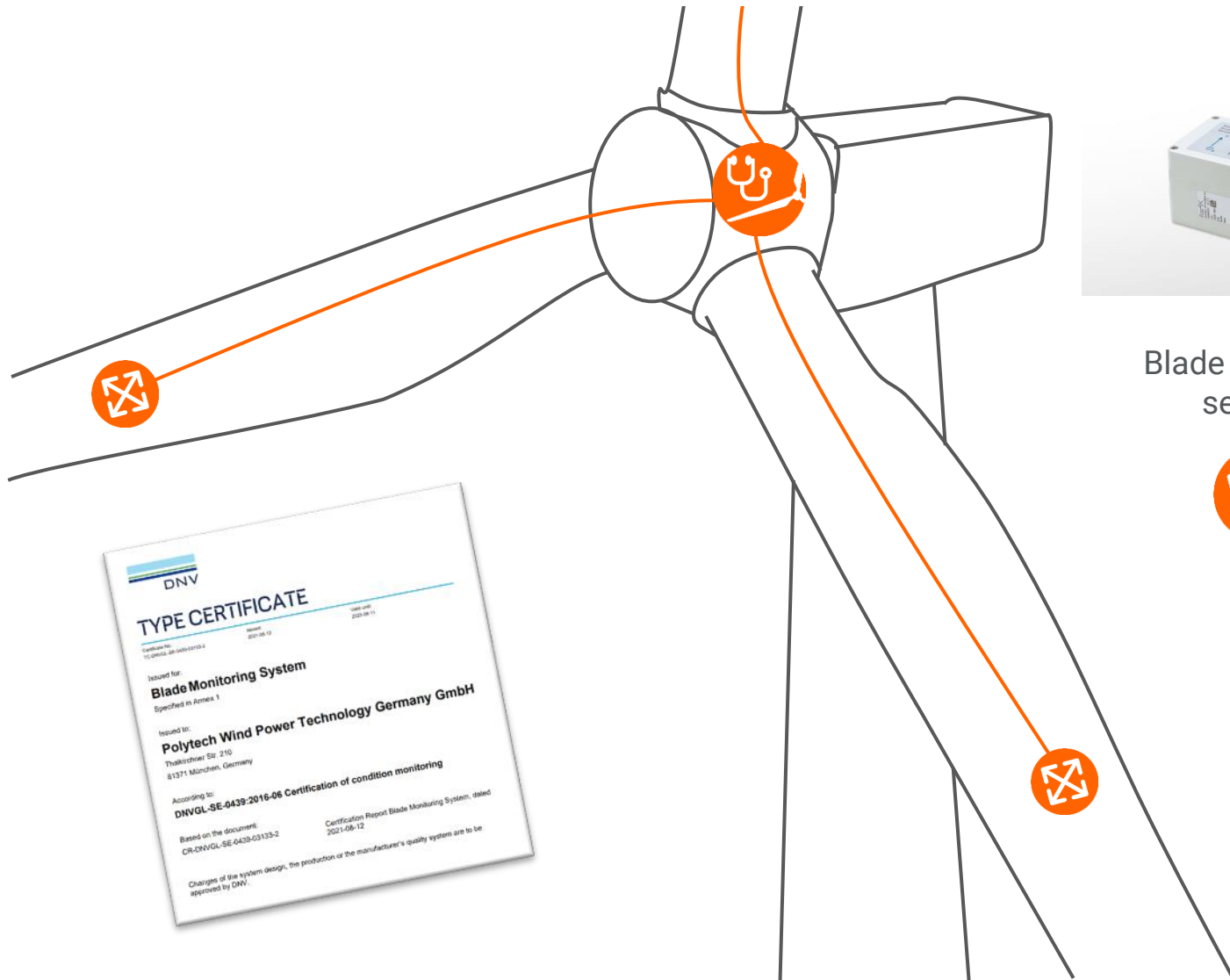
Vision: We want to make wind the preferred source of energy through innovation and collaboration.

Mission: We bring sustainable solutions to life that improve the durability and performance of wind turbines.

Polytech Ice Detection System



Hardware Setup



Blade vibration sensor



Blade monitoring hub



Hub control cabinet





Fiber-optic Blade Strain and Vibration Sensors



Blade strain sensor
Strain amplification
Temperature compensation



Blade vibration sensor
Intrinsic lightning protection
Measurement deep inside rotor blade

Fit and forget

Fast application

Step-on protection

High MTBF
(> 1,000 years)



Benefits of Polytech Rotor Ice Control

Benefits for restricted sites



Mitigation
of ice throw risk



Automatic
stop and restart

Benefits for unrestricted sites



Reduced
operation mode



Control
of De-icing system

Benefits of the measurement principle



No premature nacelle-based
ice detection



Ice detection direct
on the blade

Benefits of Polytech in general



Intrinsic
lightning protection



Standard telecommunication
components

Field study

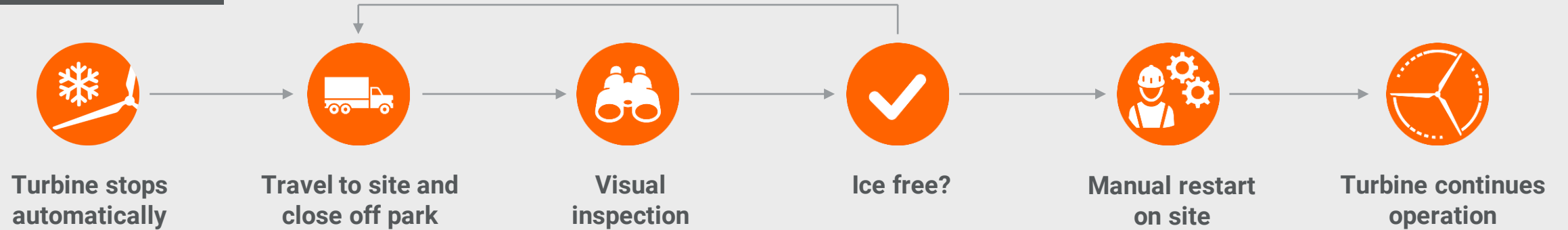
Polytech Ice Detection System



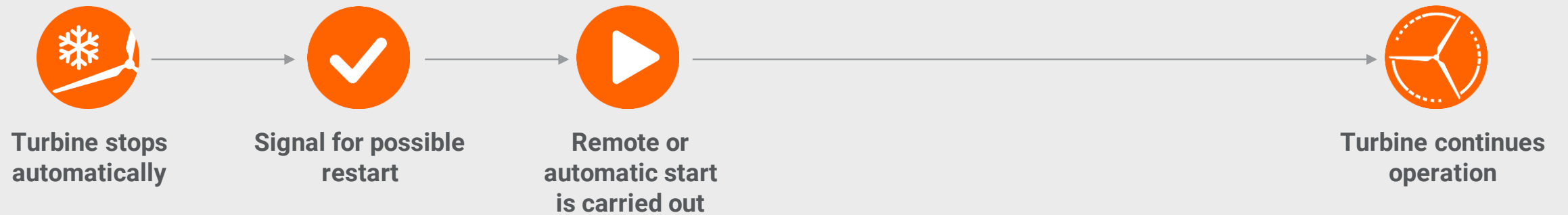


Optimization of operation under ice

Current approach



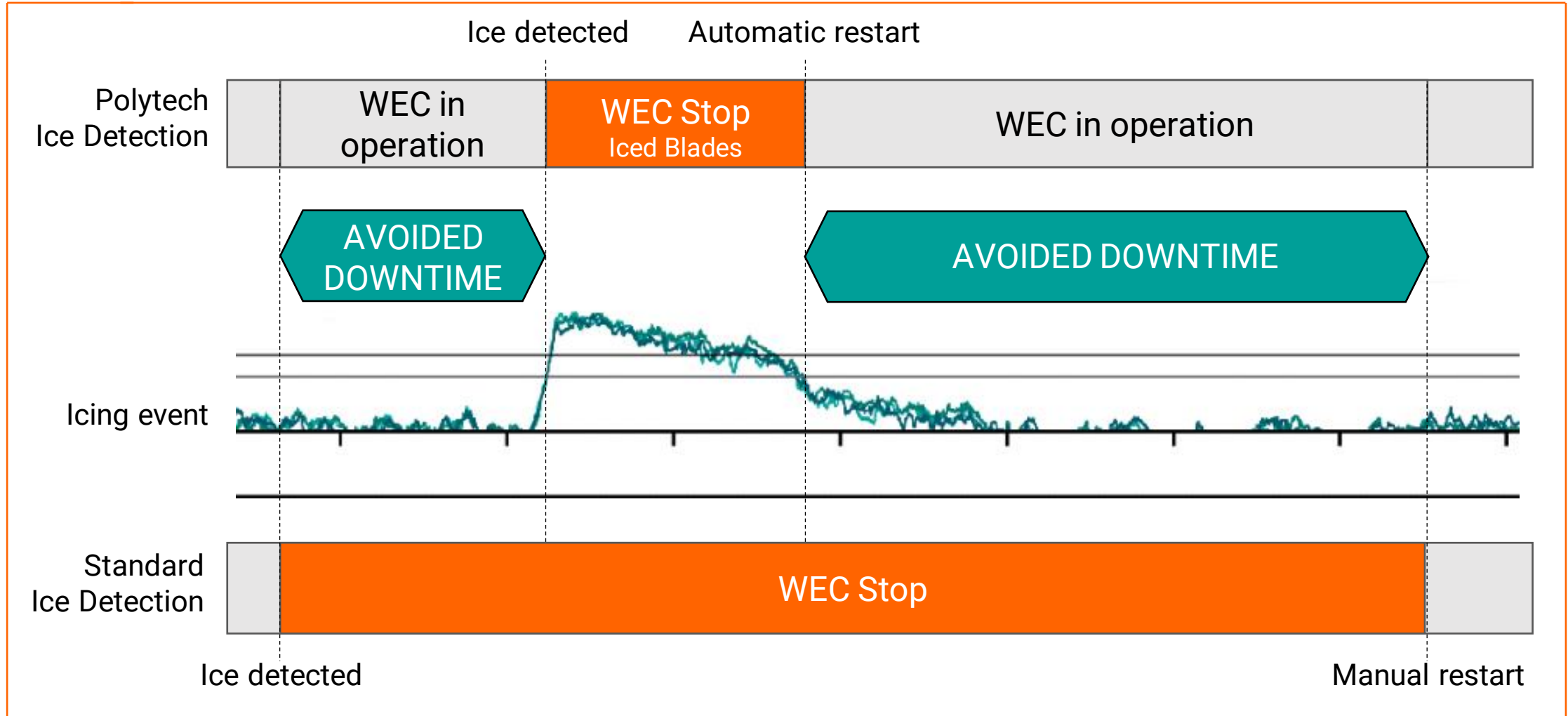
Polytech optimized approach





Automatic Restart

MAXIMIZE YIELD AND MINIMIZE SERVICE COST





Field study on the performance of Polytech ice detection



Global

fleet of ice detection systems



125

selected systems from fleet



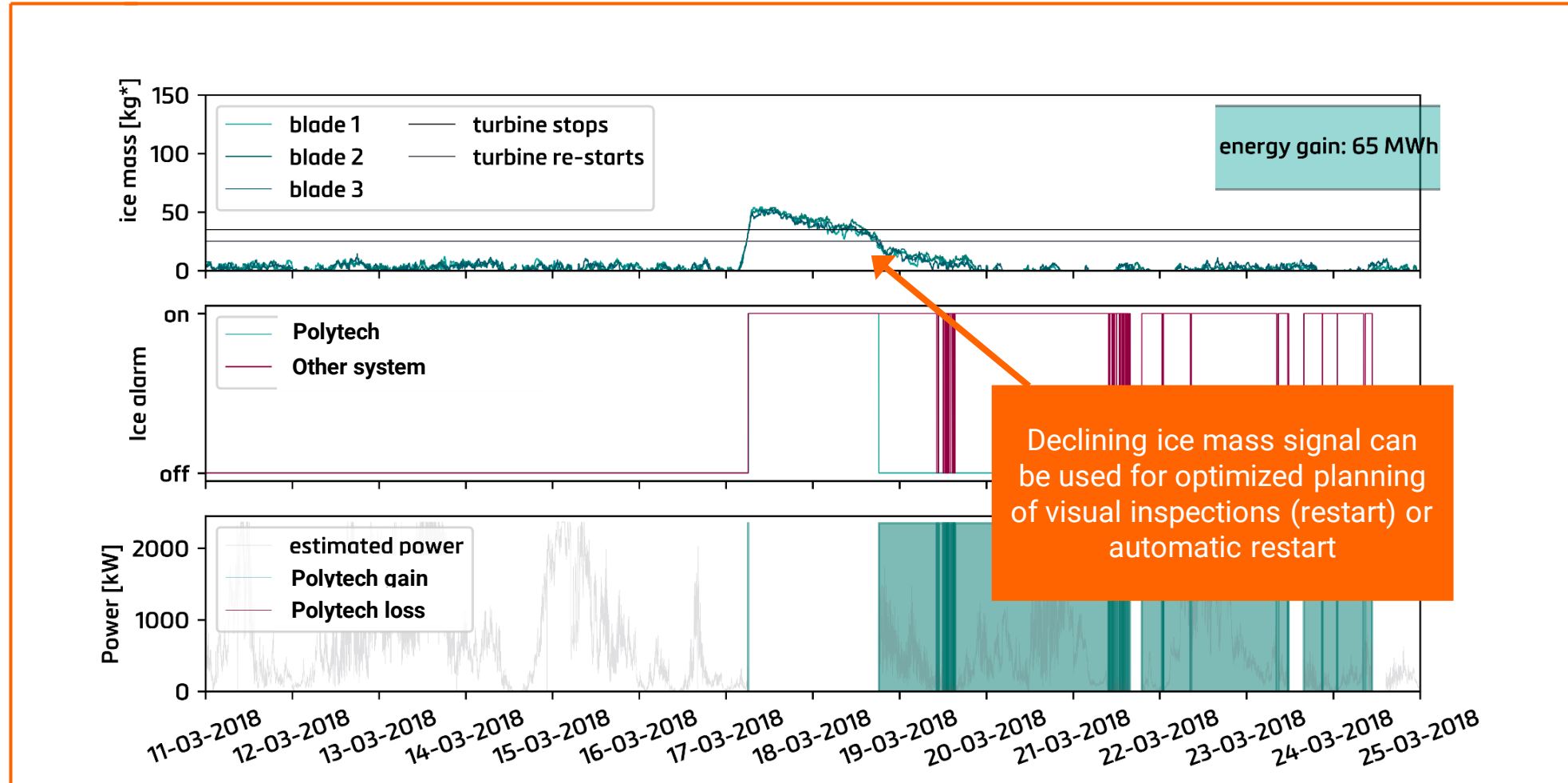
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winter seasons of data



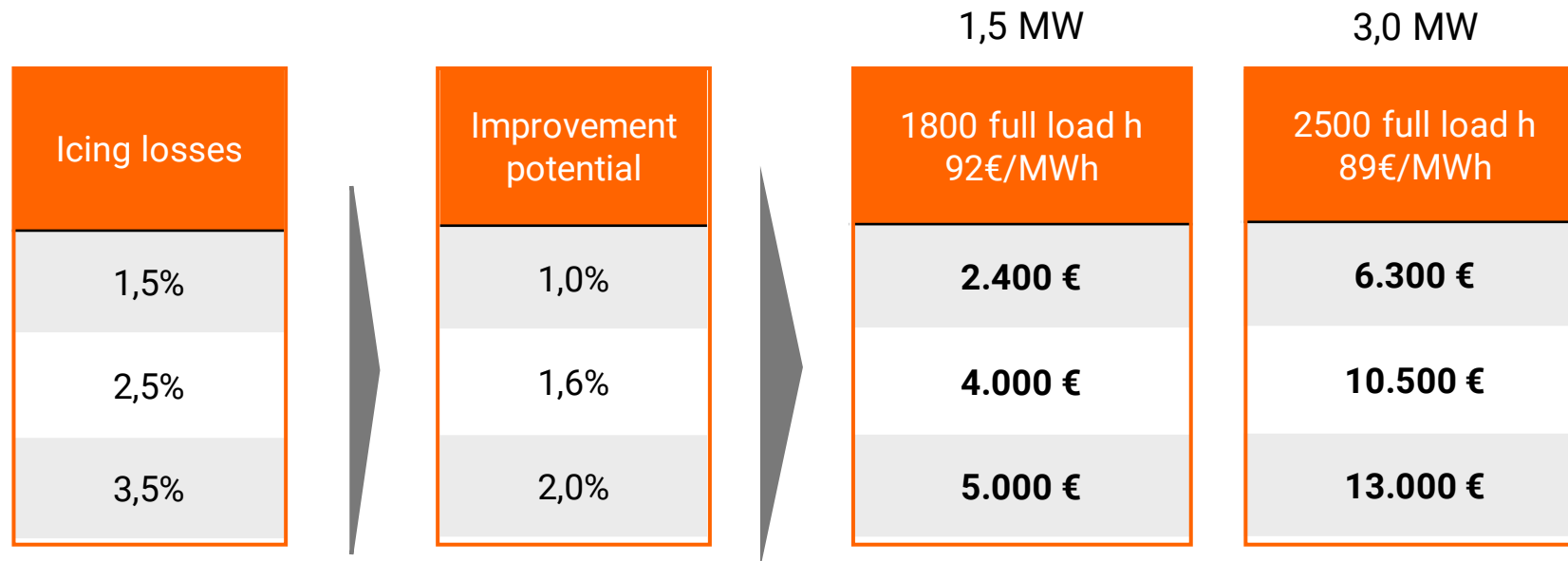
Automatic Restart

MAXIMIZE YIELD AND MINIMIZE SERVICE COST





Improve AEP by between 1% and 2% with ice detection



The relative gain results from the average of 125 systems in the field.

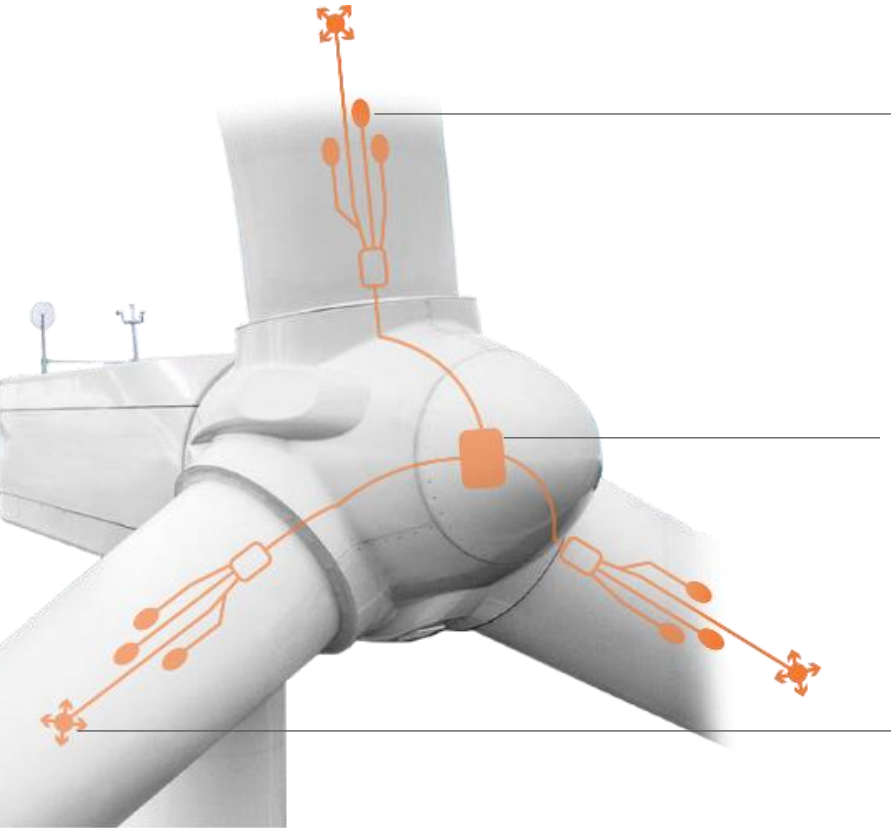
Learn about accurate ice detection and all detail of the field study in our white paper



[Download white paper
on ice detection
\(polytech.com\)](http://polytech.com)



Blade Monitoring & Optimization



Blade Strain Sensor



Blade Monitoring Hub



Blade vibration sensor



Polytech Insight™

BLADE MONITORING SYSTEM

Key Applications



Load Monitoring

– use real time signals to mitigate loads of the turbine and achieve design or operation benefits



Ice Monitoring

– avoid unnecessary downtime due to ice for improved annual energy production and safe operation



Blade Condition Monitoring

– keep track of life-time consumption of the asset, and detect damages on the structure early

Key Value Propositions



Accurate measurements over 25-year lifetime



Powerful hub unit with built-in application layer & connectivity

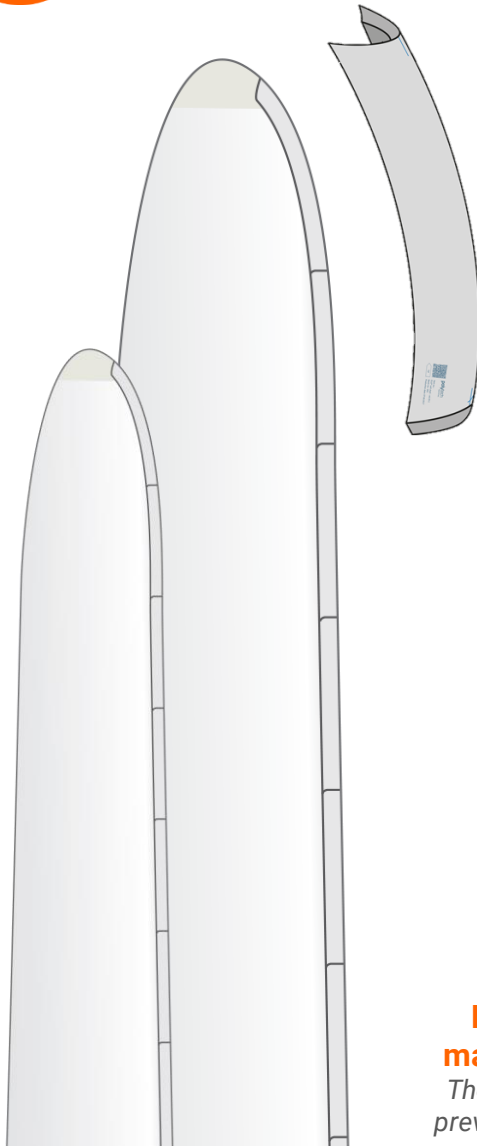


Lean installation process with robust components – no cycle time impact





Leading edge protection and lightning monitoring



Properties

Proven lifetime durability
Testing and calculations according to DNV-GL show that ELLE™ will last the lifetime of a turbine

Flexible application
ELLE™ is used for factory as well as retrofit installation and has a shelf life of 18 months

Tailored fit
ELLE™ is custom-made to fit each individual blade perfectly and allows tracing via QR codes

Plug & play
Solution with pre-cut sections and minimum use of equipment



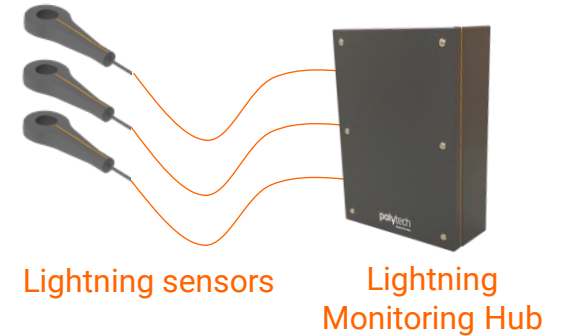
Reduce operational maintenance expenses
The durability of ELLE shells prevents repairs to the leading edge



Avoid AEP loss
Leading edge erosion disturbs the laminar flow and thus reduces the energy that can be converted from the wind



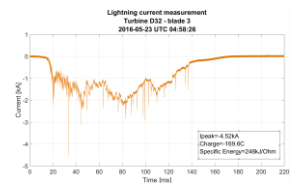
Lightning Monitoring
Measures **how** the blade was hit



Lightning Detection
Detects **where** the lightning hit



Lightning Detection Sensing



Lightning Monitoring Data

Questions?

