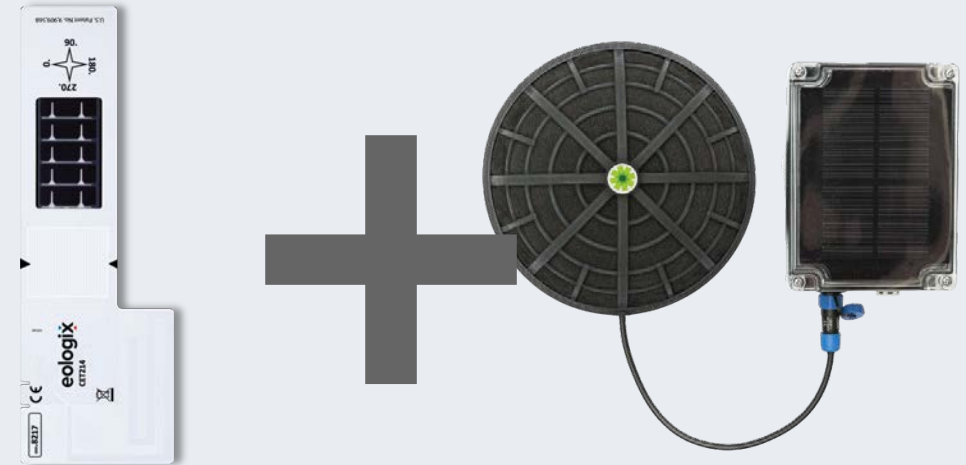




# A field study on acoustic ice detection

Eike Lueken | Winterwind 2024

eologix & Ping Services

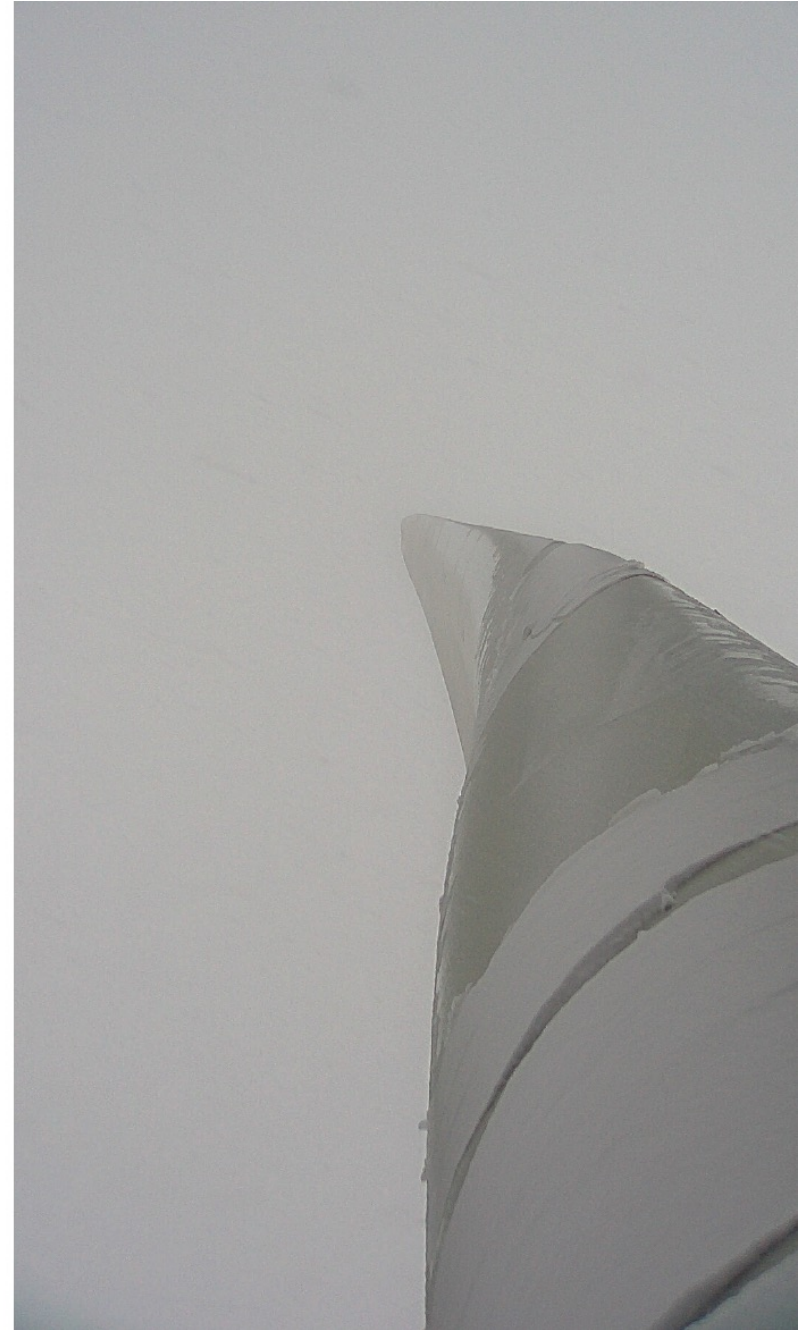




1 mm layer of ice,  
density 600 kg/m<sup>3</sup>

45 m blade with a  
surface area of  
roughly 217 m<sup>2</sup>

→ 130 kg







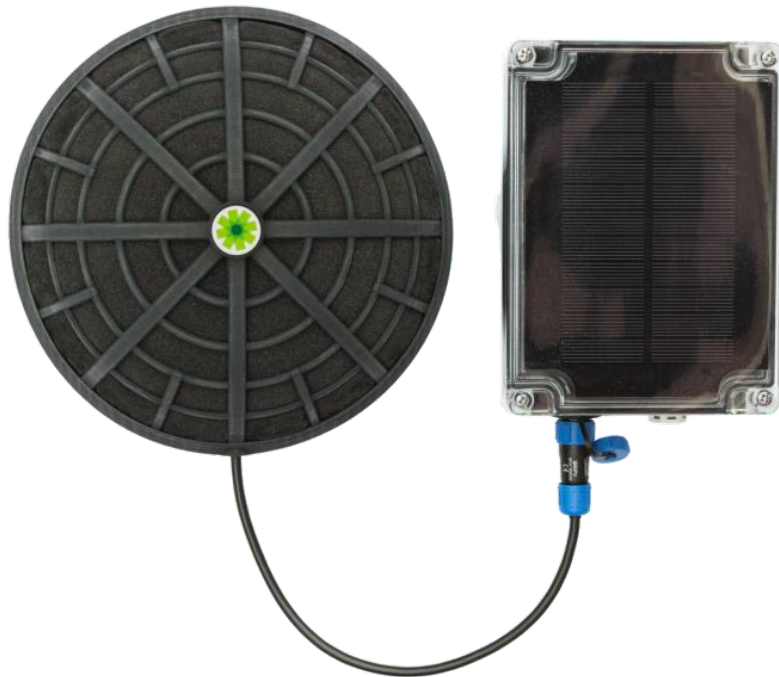
Owner/operators leverage our retrofittable ice detection system, utilizing **acoustic** monitoring for precise early ice detection, thereby enhancing safety and performance.

Eologix – Ping – On-Tower Acoustic Sensor



Intelligent  
Listening  
Sensor

Power &  
Communication  
Module



# ~ 1800 acoustic monitoring systems in the field



Mounts on the outside of the tower with magnets near the ground



Self-sufficiency via solar panel and cold climate battery



Cellular LTE-M communication



# Use Cases (examples)



## Optimize Operation In Ice Conditions

Situation: Ice detection (power curve method, meteorological forecast) works imprecisely.

Problem: The actual icing situation cannot be determined.

Consequence: If not iced, WTG are stopped for no reason. If iced, WTG build-up ice quickly.

- Loss of production
- Ice-load risks

Solution: Record ice build-up more precisely for better operational decisions.

€ 500 - 2 000  
Est. Saving Potential Per Event

## Ensuring Safety From Ice-Throw

Situation: Ice-throw threatens safety of personnel and passerby.

Problem: The icing situation cannot be measured accurately.

Consequence: People at risk of falling ice or preventive WTG shutdown.

- Safety hazard
- Loss of production

Solution: Detect ice build-up more precisely for better operational decisions.

€ 0 - 2 000  
Est. Saving Potential Per Event

# Field Study



## Goal:

- Validating sensor performance
- Understanding environmental factors affecting their operation

## Setting:

- Real-world environment, 1000 hrs of icing
- 2 MW turbine, equipped with 3 different systems
- Hub camera images as a reference



0 – No Ice



1 – Light Icing



2 – Medium Icing



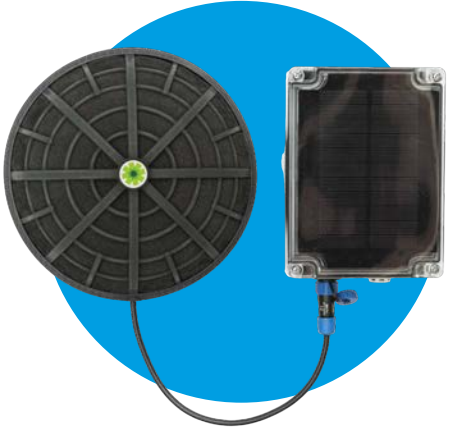
3 – Severe Icing





# Modular & retrofittable

# Simple installation



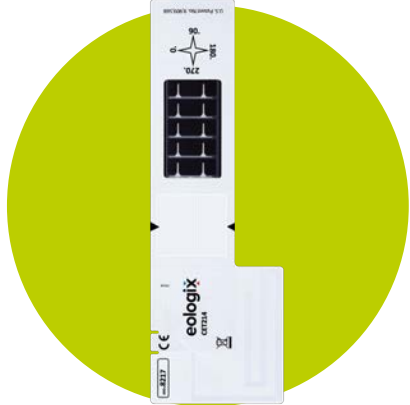
On tower

+

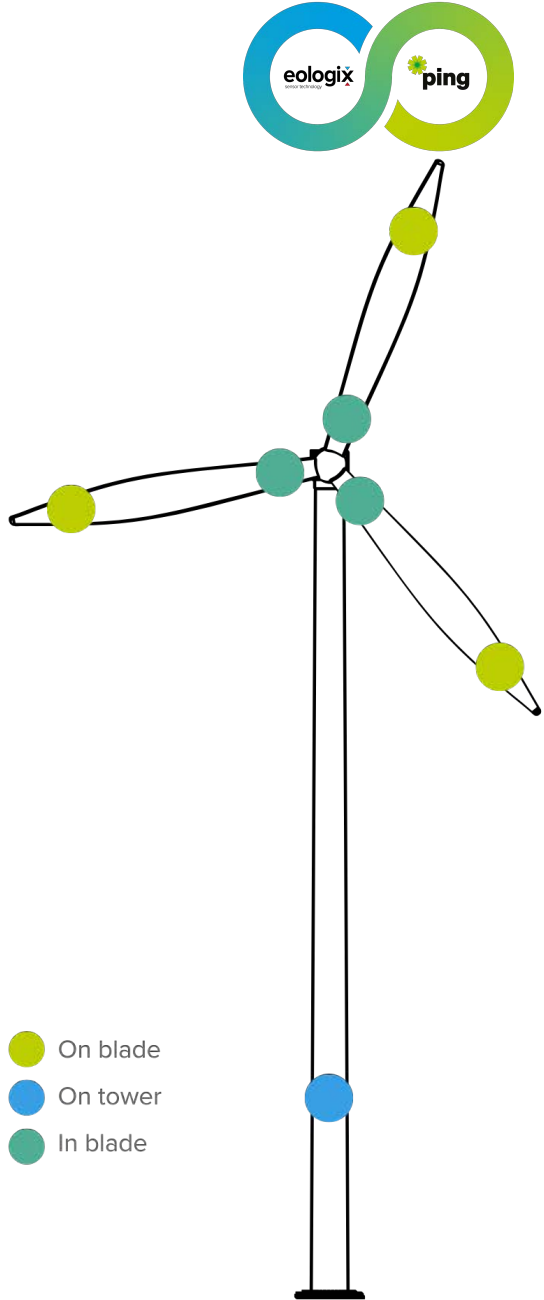


In blade

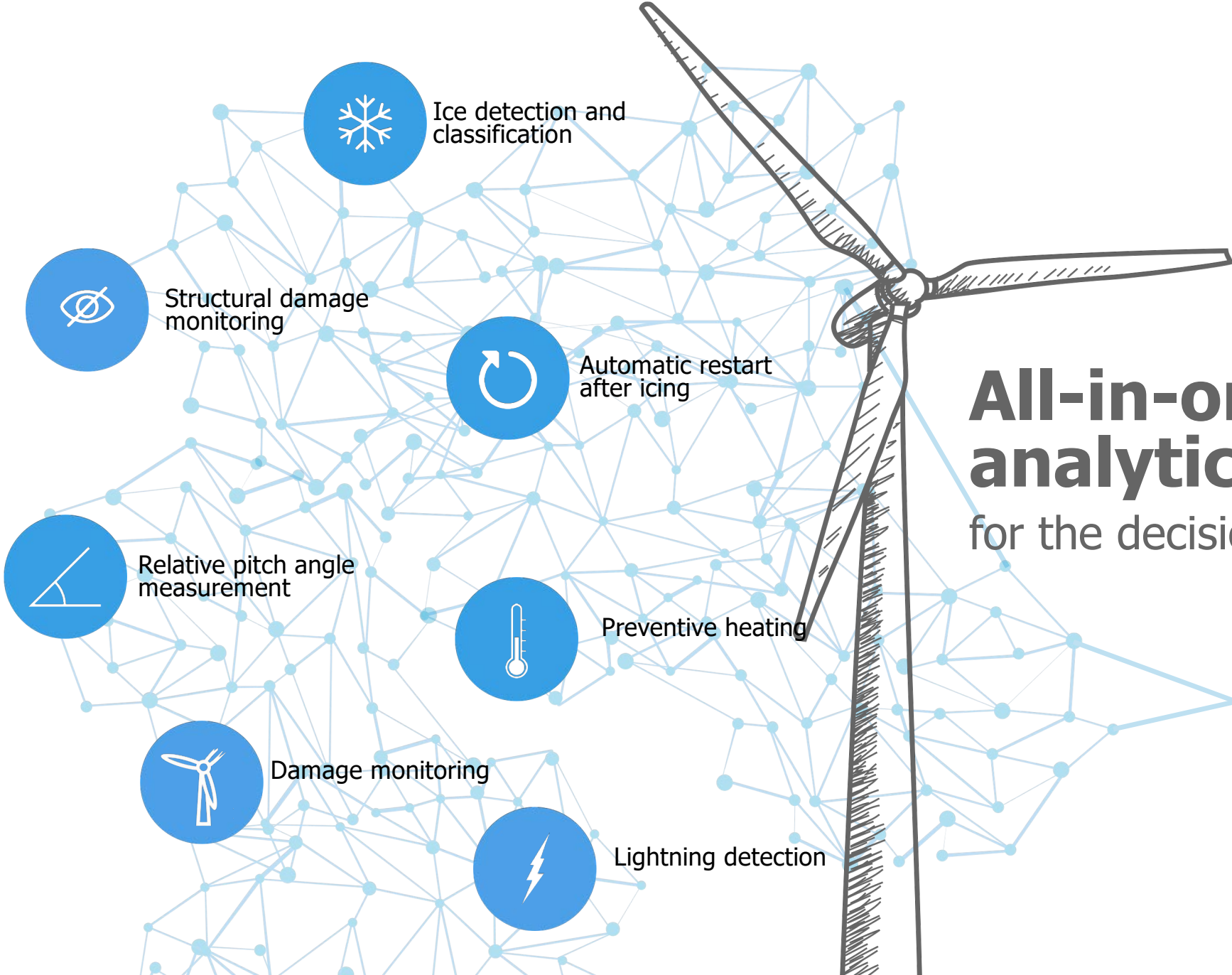
+



On blade

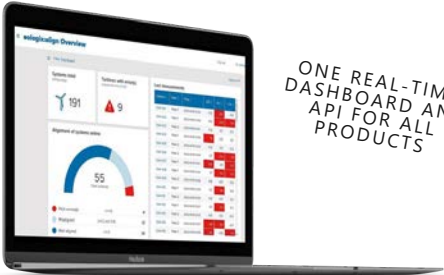


- On blade
- On tower
- In blade



# All-in-one insights & analytics engine

for the decision maker



ONE REAL-TIME DASHBOARD AND API FOR ALL PRODUCTS



# Any questions?

Get in touch with us.  
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