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From **Detection** to **Action**: Improving Wind Turbine Efficiency in Cold Climate

Intro

Icing on wind turbines may cause energy losses up to **20% of the annual production**[1]. To cope with these effects, many turbines are equipped with heating systems. However, the activation of these systems is often **solely based on turbine performance**. This triggering can be **improved with a direct measurement of icing conditions**.

Methods

2 case studies to show why and how ice detection should be done. The Icetek IC-1 Sensor was used in both case studies

- **Good** detection in **bad** weather
- 2 turbines (**Status vs. ice detection**)

Results

- **Avoidable** cycles of icing losses
- 175 mm (7") of ice in 30 hours

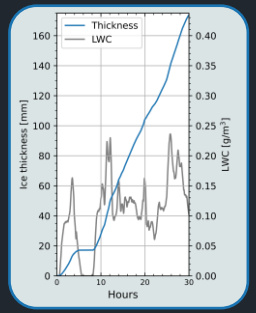
Discussion

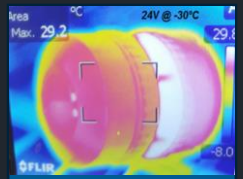
- **Proactive heating** to remove ice before performance decline
- **Robustness is key**

Detection

Power through severe icing event

30-hour event
7 inches of ice

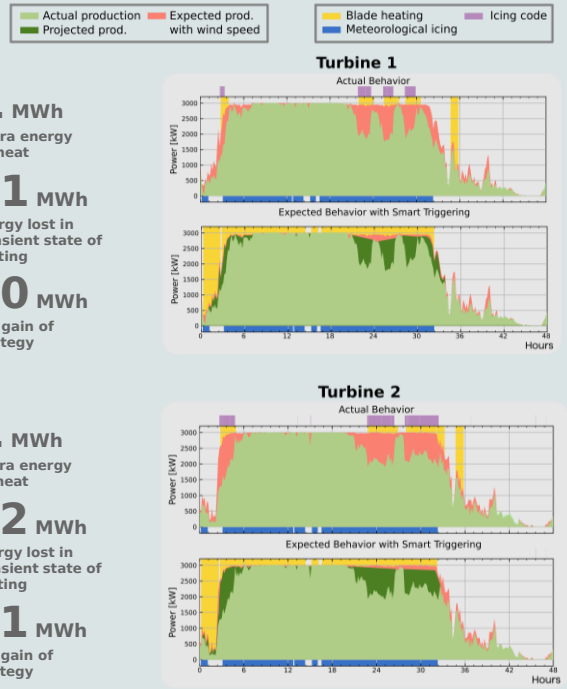




FT Anemometer
- Three-element distributed heater
- Programmable set point
- Power drawn depending on the ambient conditions

How? By remaining **ice-free**

Action



Why? To **heat** more **efficiently**

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Download the full case study here

1 - Cattin, R., 2016. Validation of the IEA Task 19 Ice Site Classification. Winterwind 2016, Åre, Sweden, 8-10 Febuary 2016

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