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Winterwind
INTERNATIONAL WIND ENERGY CONFERENCE
March 18-20, 2024

Robotic ice-phobic coating application

Presenter:
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Senior Business
Development Executive
Aerones

We provide services in **Europe, North America, South America, and Australia**

220+ employees
40+ teams on field
4 continents
27 countries
100+ customers

Inspections done in extreme temperatures

Robotic blade care systems

We inspect

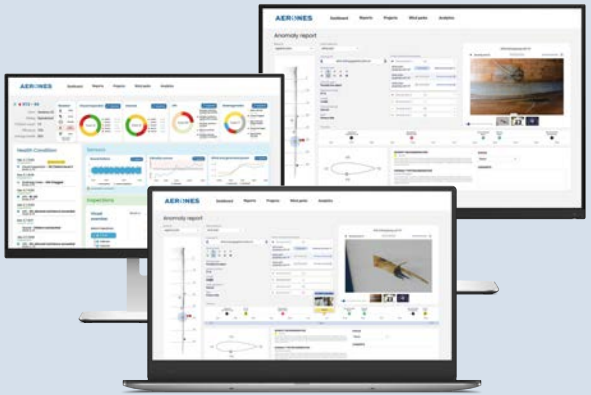
We clean

We repair

We analyze

Aerones customer platform

Advanced wind asset analysis and management platform developed and provided by Aerones



Our experience

9 patents

27 countries

100+ companies

10 000+ turbines serviced

30 000+ blades serviced

Approved by TOP manufacturers

GE, Vestas, Nordex, acciona Windpower, Siemens Gamesa Renewable Energy, DEC 东方电气 Dongfang Electric, Leitwind, Enercon Energie für die Welt, Suzlon, Repower, Senvion wind energy solutions

Completed projects for large industry players

aes, Alliant Energy, AXIS, Avangrid A member of the Iberdrola Group, Allete clean energy, Algonquin, BayWa r.e., BluEarth Renewables, Boralex, Cubico, Constellation, Capital Power, Deriva Energy, Dragon, Deutsche Windtechnik, edp Renewables, Engie, EDF renewables, Enbridge, enel Green Power, evergy, ERG, Fu-Gen, finerge, Gothaer, Invenergy Renewables, Iberdrola, Liberty, LM Wind Power a GE Renewable Energy business, MidAmerican Energy Company, Naturgy, NextEra Energy Resources, oak creek energy, OnwardEnergy, Pattern, Peñoles, REPROJEKT GmbH Sachverständigenbüro für Windkraft, res, RWE, saetayield, TotalEnergies, tpi, Vattenfall, Verbund, wpd windmanager

Challenges of generating wind power in cold climate

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Icing on blades

Challenging maintenance

Limited energy production

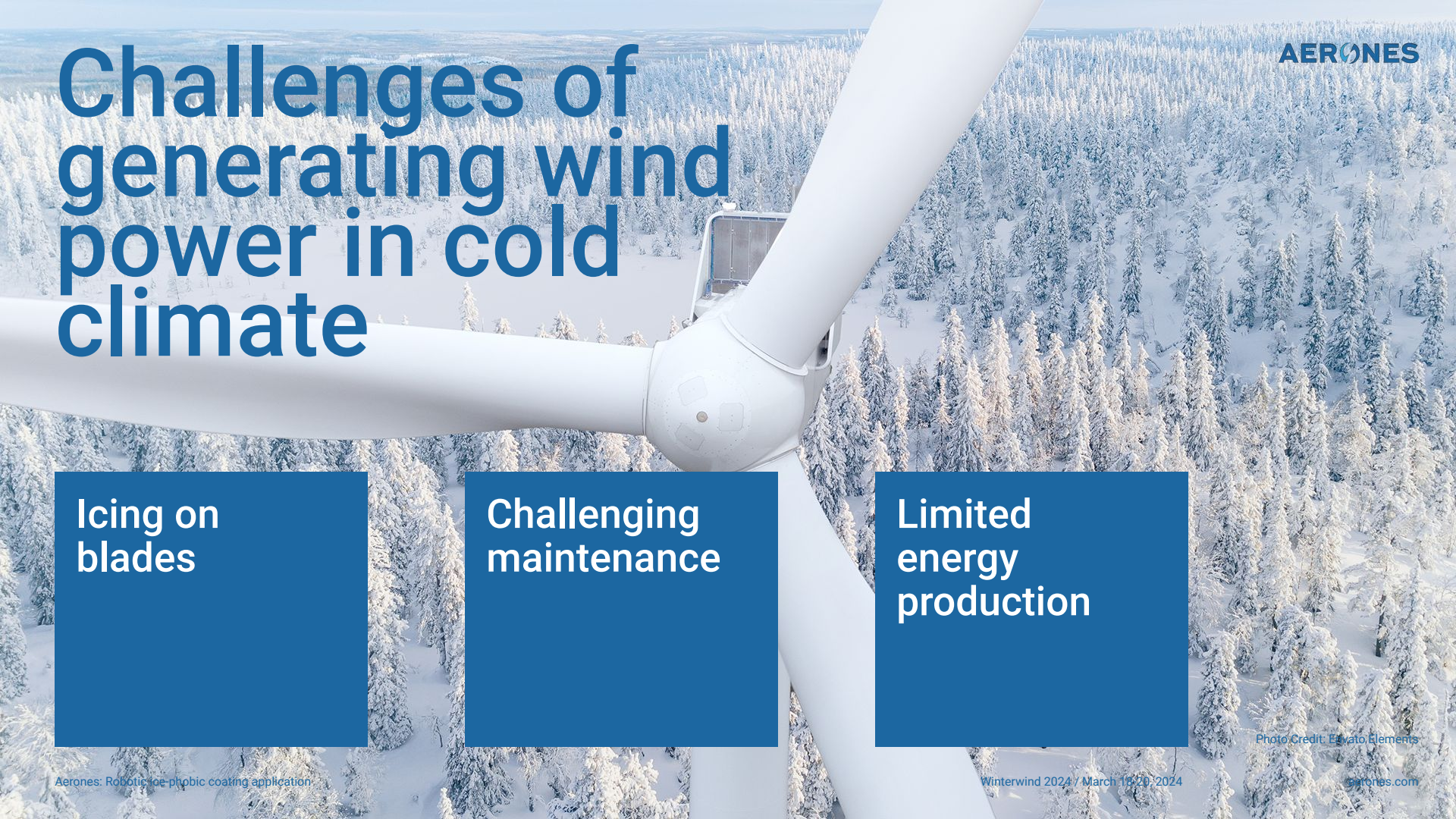
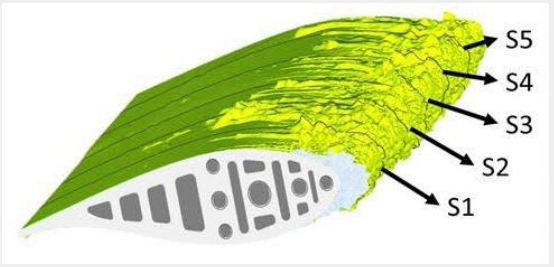
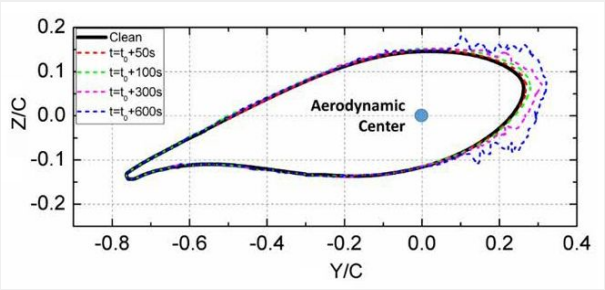
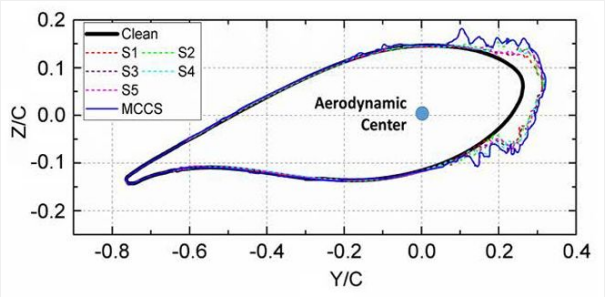


Photo Credit: Envato Elements

Ice build up habits on leading edge





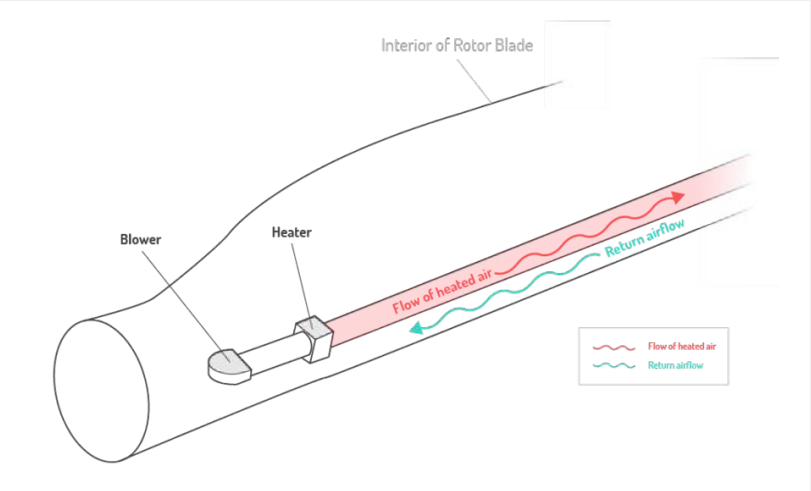


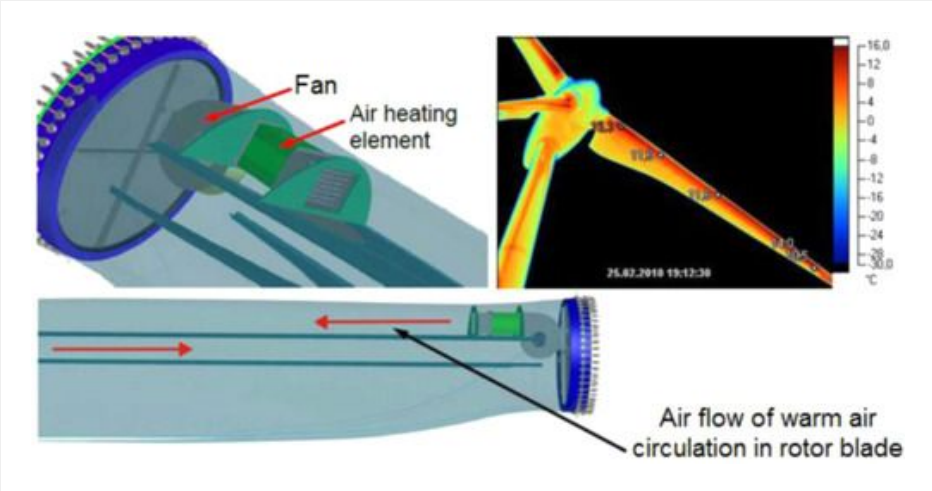
Existing solutions

Because heating often results in **uneven temperatures on the blade surface,** and therefore incomplete deicing of the surface, the **blade may become imbalanced.**

Heating these massive areas, **adds to the cost of the turbine and is energy-consuming.**

PROBLEM:
Water from melting ice may simply run back and refreeze elsewhere.





De-icing is inefficient and expensive

Solution: icephobic coatings applied preventively

Video:

Robotic ice-phobic coating application

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Link to video:
https://youtu.be/_TioRGHhnas?si=o2D5rRi2pzTzEDFP


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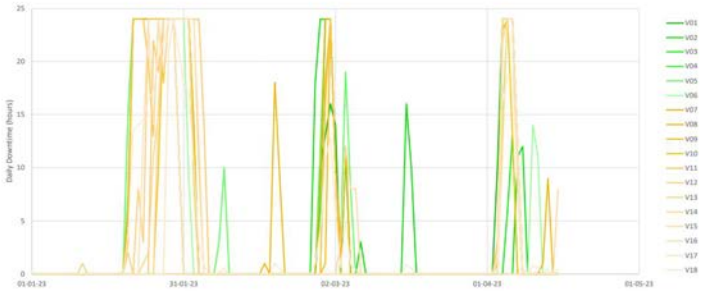
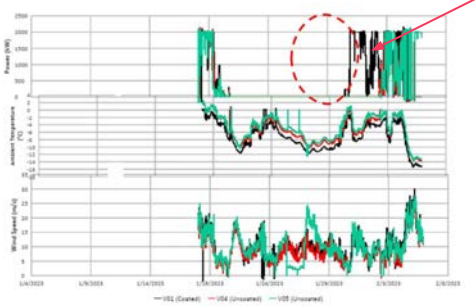
Avoid water adhesion
and protect the leading
edge from ice building up

We don’t just apply the coating – we measure

Daily downtime – all WTGs

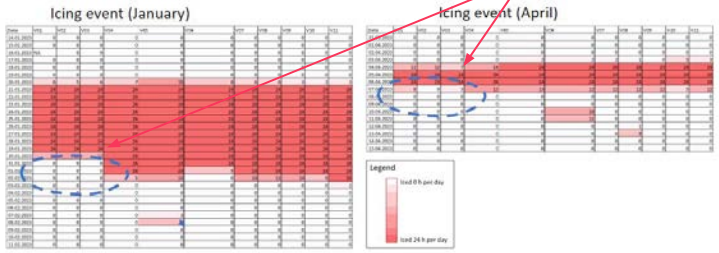


Coated vs. Uncoated



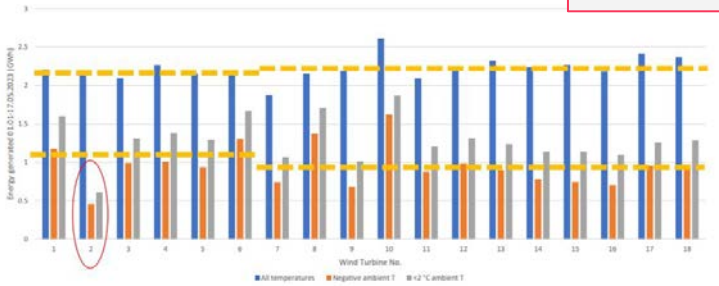
Coated wind turbine generator restarts operation quicker than the surrounding uncoated turbines

Icing events



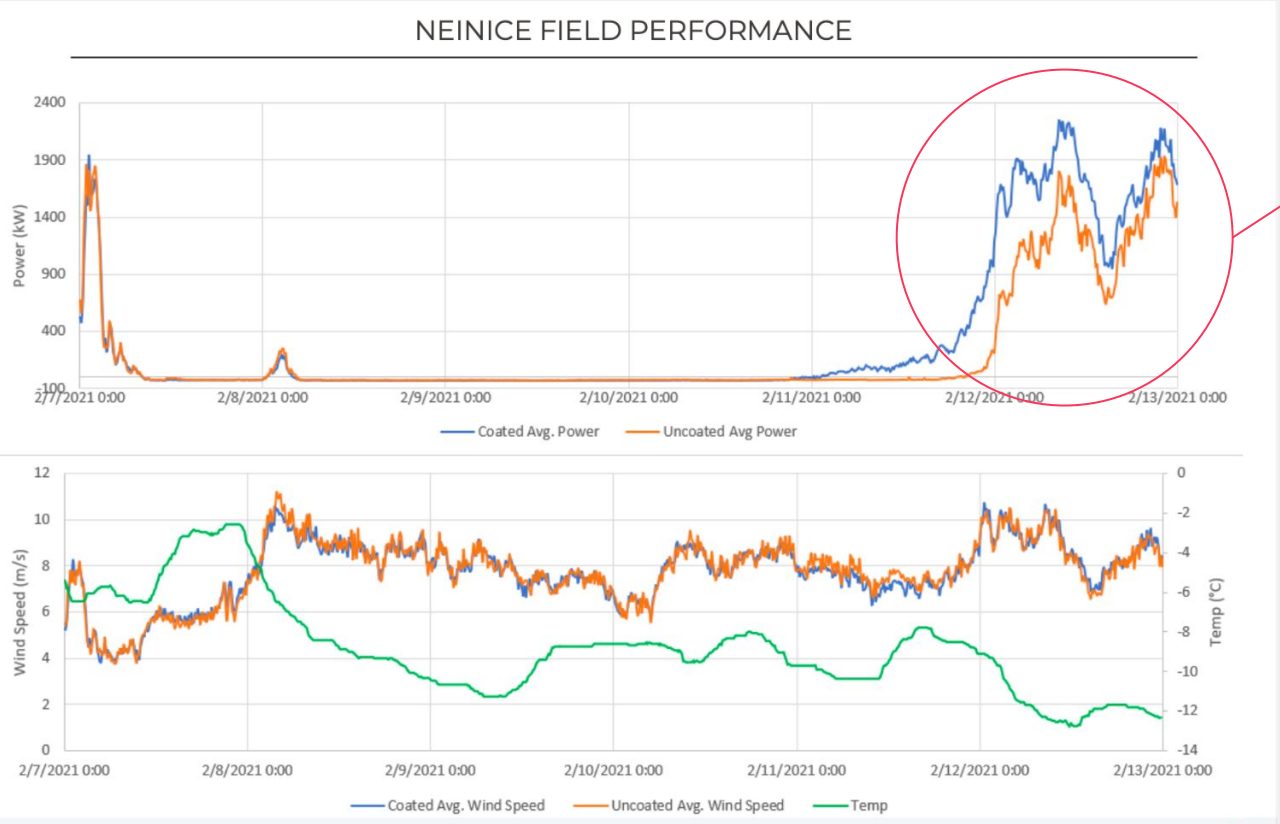
Coated wind turbine generators (V01-V03) restart operation quicker than the surrounding uncoated turbines

Energy generated by WTGs



Conclusion - first 6 WTGs generated 2% more energy during sub-0 temperatures

… and prove the effectiveness



Coated turbine performs better than uncoated one

Video:

Coated vs. Non-coated blades

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Link to video:
https://youtu.be/itxvp0XPd_4?si=W1PQ-WkS_LfEkyk3


Coated vs.
Non-coated
blades
by Aeronex

Thank You!
Q&A

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