



REpower status concerning the operation of wind turbines in cold climates

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REpower Systems

Winterwind 2013, Östersund



REpower Cold Climates

Operational experience



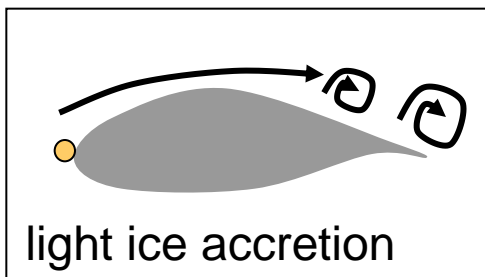
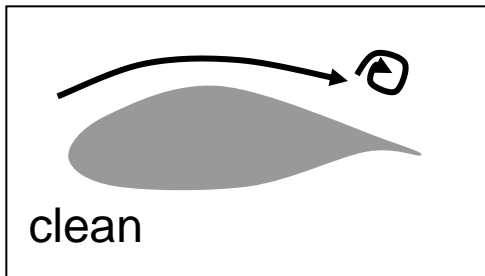
>550 cold climate version turbines will be installed until 2015

- Severe icing conditions / Long winter periods
- CCV turbine adapted to cold climate (operation to -30°C)
- Equipped with various icing solutions
- Validation in cooperation e.g. with local research institutes



Efficient turbine operation in case of icing events

Technical approach to light icing




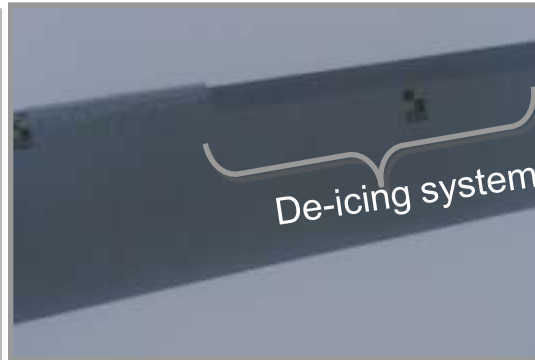
Active De-Icing

Extensive field testing



De-Icing prototype installations

- 1x MM92 in Quebec since 10/2011
- 1x MM92 in Quebec since 09/2012 - cooperation with 
- 3.2M 114 CCV in Sweden planned for end of 2013



- Ice has been removed from heated area
- De-icing time: < 5 min / blade

Optimization of process parameters

Heating Tests in the field



Extreme icing

- Sensor availability needs to be ensured
- Ice will fall from other parts of the WTG and can cause damages

Active De-Icing

Comprehensive laboratory testing

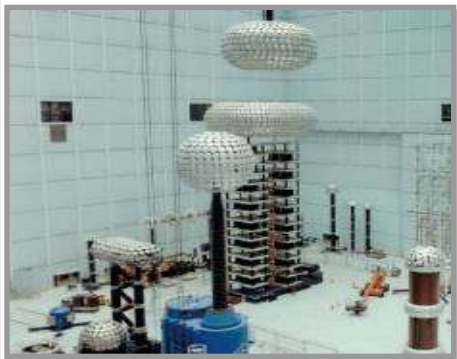


Fatigue Test



- Blade with installed de-icing system is subjected to loads similar to over 300 years of operation
- Static in 4 directions (including direction of lowest design safety margin)
- Dynamic flap wise and edgewise (according to IEC61400-23)

Test passed



Lightning test



- Full scale rotor blade lightning test **acc. to IEC 61400-24 class 1** with installed de-icing-system

State of the art lightning protection for blades need to be specifically adapted for a De-Icing system

Test to be repeated after design change



THANK YOU!

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