Increasing availability

Ice Prevention System engineered to perform in icing conditions

In cold climates, wind turbine icing can cause production losses, reduce turbine lifetime and result in ice throw—a safety hazard. VTT has put 20 years of cold climate wind energy experience into practice and engineered a unique technology: the VTT Ice Prevention System. The System increases turbine availability and allows for safe wind power production, even in the harshest winter conditions. The VTT Ice Prevention System for wind turbines has proven to be the most effective and reliable solution in the world for ensuring continuity in cold climate wind power generation.

Offshore wind energy generation comes with its own set of cold climate challenges. To date, sea ice load has impeded the launch of offshore wind production in cold climates due to concerns surrounding structural performance. VTT has developed a reliable analysis toolkit for the optimisation of wind turbine structural performance in icing conditions. Conceptual studies, undertaken with the right tools for analysis, are the basis for cost-effective and reliable design of offshore wind turbine foundations and sub-structures.

The VTT Offering:

Cold climate solutions for wind turbines
• Ice prevention systems
• Cold climate instrumentation and measurement
• Loads and performance in icing conditions (onshore & offshore)

Grid and energy system integration studies
• Grid, smart grid and system integration
• Short term production forecast modelling
• Market insight and road mapping

Simulation-based design and experimental facilities
• Wind assessment and wind farm optimisation
• Turbine design and performance field and research facilities
• Assessment of the effect of wind power plants on radar

Future innovative solutions
• Preventive condition monitoring and service life assessment
• Using shape memory alloys for active blade profile control
Case study: **Ice Prevention System**

A wind farm investor approaches VTT for assistance in avoiding loss of revenue in their existing or planned wind farm, or a turbine manufacturer approaches VTT for assistance with the development and implementation of an Ice Prevention System for wind turbine blades. VTT starts by performing a feasibility study together with the client. After feasibility has been proven, the next step involves a pilot implementation of the system including a follow-up project for certification and optimisation, and licensing of the technology.

**Track Record:**
- First commercial installation in 1996
- Scalable from 220kW to 3MW
- Developed for 5 turbine models from 3 turbine manufacturers
- Installed on 10 wind farms in Finland and Sweden
- Operational in >50 turbines, totalling >100 MW

**Additional information**

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