

3M™ WIND VORTEX GENERATOR

FACT SHEET

ENHANCING EFFICIENCY AT EVERY TURN



THE CHALLENGE

Due to shape and operation limitations, the blades of large pitch-regulated wind turbines often have suboptimal aerodynamic properties at the root. This frequently leads to undesired airflow separation – known as aerodynamic stall – and can have a significant impact on wind turbine efficiency. Blade surface roughness and leading edge erosion can amplify the issue.

The ideal structural twist and chord length of the blades required to avoid this effect is hard to achieve. The design compromises made by blade OEMs generally offers an opportunity to improve the aerodynamic performance of the blade.



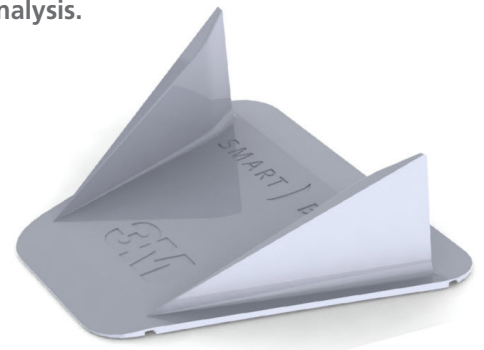
THE SOLUTION

EDF Renewable Services has joined forces with 3M and Smart Blade to develop a maximum performing, highly reliable and quick-to-install aerodynamic enhancement system called 3M™ Wind Vortex Generators. 3M Wind Vortex Generators are tailored to each specific blade type and improve the blade performance by energizing the flow around the surface. This reduces flow separation and increases the performance of the entire turbine in terms of power, loads and service life.



3M™ WIND VORTEX GENERATOR

Several 3M™ Wind Vortex Generators are attached to the root section of a wind turbine blade in locations determined by a proprietary analysis.



SUPERIOR CUSTOMER VALUE

Through 3M Bonding Technology and Materials Expertise

As reliability is the key to achieving a long term, profitable investment, the material selection and evaluation is based on 3M's extensive knowledge about polymers, bonding technologies and weathering. 3M™ Wind Vortex Generators are made of a durable thermoplastic with dimensional stability and strength which has a proven track record of superior weathering resistance. Furthermore, 3M Wind Vortex Generators are equipped with factory-installed 3M Acrylic Foam Tape die-cuts that provide long-term holding power while treating the blade surface with care.



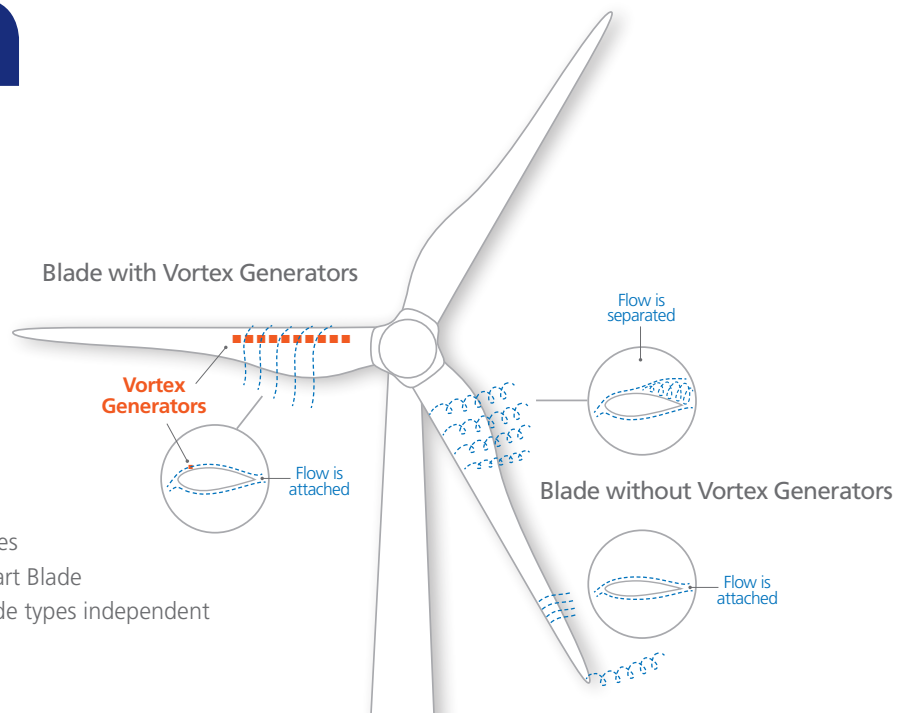
YOUR BENEFITS

Address aerodynamic issues at the blade root caused by suboptimal blade design

- Increased AEP, typically of 1.5 to 3%, has been confirmed in several case studies
- Stabilized aerodynamics balance load effects of unsteady wind conditions
- Lower noise levels due to reduced stall

Profit from an economically viable upgrade opportunity that gives you peace of mind

- Designed for highest reliability and fast roll-out
- Relies on joint competency of EDF Renewable Services (O&M expertise), 3M (material knowledge), and Smart Blade (aerodynamic expertise). Adaptable to different blade types independent of turbine OEM
- Proven in hundreds of existing installations
- Payback time of 1 to 2 years including installation, materials and downtime



Increased AEP,
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Authorized 3M Wind Energy Products Installer



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