

Vestas

Sound Power Optimisation

Combining siting methods, sound mitigation strategy, and technical solutions to maximise energy production at specific sound power levels

Sound Mitigation Strategy:

Sound Optimised Mode and application variables can be applied individually or in combination to meet site specific conditions and requirements. Application variables include, time of day, week day, date range, wind speed, and wind direction.

Example

- Sound Optimised Mode: 98 Db(A)
 - Time: From 20:00 to 06:00, Workdays only, from 3 April to 31 October
 - Wind speed: From 10.5 to 17.6 m/s
 - Wind direction: From 28 to 136 degrees
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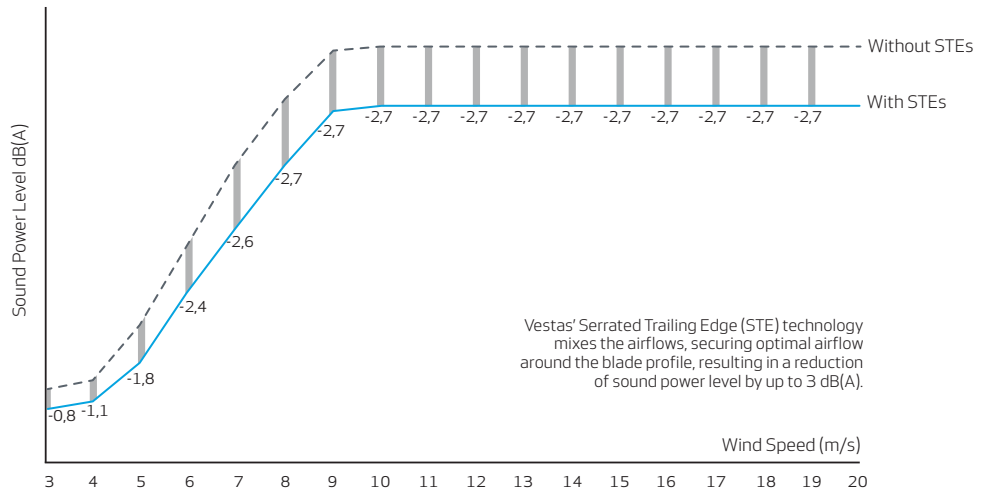
Siting Methods

Vestas' industry-leading siting methods is the first step in sound power optimisation. In order to optimise layouts according to sound power levels and requirements, Vestas Wind and Site engineers consistently deploy Vestas' DNV-certified siting process and advanced tools, including Computational Fluid Dynamics (CFD) modelling.

Operational strategies for sound power levels

Vestas' wind turbines benefit from the availability of multiple Sound Optimised Modes configured to meet known requirements in relevant markets. These modes can be combined with application variables to create a tailored sound mitigation strategy to meet unique site specific conditions. Sound power emission is controlled by optimising the operational parameters of the turbine. Optimal performance is achieved by only deviating from maximum energy production when needed, due to a specific time, wind speed or direction.

Impact of Serrated Trailing Edge technology



Vestas' Serrated Trailing Edge (STE) technology mixes the airflows, securing optimal airflow around the blade profile, resulting in a reduction of sound power level by up to 3 dB(A).

Example based on V136-3,45 MW* with 3.6 MW Power Optimised Mode. Actual performance depends on site specific conditions. Serrated Trailing Edge technology is a standard option for all Vestas 4 MW platform turbines.

Advanced technology lowering base sound power levels

The dominant source of sound emission by wind turbines is aerodynamic, caused by the encounter between high velocity airflow and the wind turbine, particularly, blades. Vestas reduce aerodynamic sound emission, by use of OptiTip®, aerodynamically optimised blades and proven Serrated Trailing Edge technology.

Vestas OptiTip®

With OptiTip®, Vestas' pitch-regulation system, the pitch angle of the blades is continuously adjusted in accordance with changing wind conditions, ensuring the optimal angle of the blades while maintaining required sound power levels.

Aerodynamic blade design

Vestas manages to combine high performance and low sound power through innovative blade design. Extensive modelling and simulation are conducted to obtain critical knowledge of the sound profile of new products. By dedicating significant resources into the development of advanced aerofoil and planform designs, the blade is aerodynamically optimised for low sound power levels.

Serrated Trailing Edge Technology

The outer part of the blade's trailing edge is the main driver for aerodynamic noise, created by turbulent air flows along the blade. The serrations help to mix the airflows, thereby reducing turbulence and ultimately aerodynamic noise. Since 2015, Vestas has sold more than 2,000 turbines with Serrated Trailing Edge technology, allowing an overall sound power reduction by 1-3 dB(A) without affecting the power generation. All Vestas turbines within the 2 and 4 MW platforms are available with proven Serrated Trailing Edge technology, specifically designed for the Vestas blade profile.

For more information

Please contact your local Vestas office for market specific availability and further information.

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