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WIND TURBINE NOISE: AN OVERVIEW AND KEY RESEARCH AT VIRGINIA TECH

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Abstract. Power production by renewable wind energy has risen sharply in recent years. During the last 20 years, wind energy has developed very successfully all over the world. This energy source has the highest growth rate of all renewable sources at >20% increase of installations annually. Unlike offshore installations, most of wind turbines are installed onshore and subjected to noise constraints and ever more stringent regulations. Thus, noise is one of the potential key issues hampering further development of wind energy. In fact, many turbines run at reduced power and some projects have been canceled due to noise concerns. Acoustics from wind turbines is a very extensive and complicated field. This presentation provides an overview of the key topics associated with modern horizontal-axis large wind turbines noise. The topics discussed here are the aerodynamics and associated noise generation mechanisms, sound propagation, field and wind tunnel noise measurements, and noise reduction technologies. A particular focus of this presentation is also to highlight research work at Virginia Tech in this area.