

Wind Turbine Blades: Modifications to Reduce Aerodynamic Noise
(Technical Report)

Analyzing the Politics of Wind Farm Development
(STS Research Paper)

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Sociotechnical Synthesis

Aerodynamic noise, vibrations of turbine blades caused by air moving across the blade, is among the primary issues facing wind turbine siting and development. In addition to its annoyance, there have been numerous reports from locals residing near wind farms experiencing negative health effects induced by the noise from wind turbines. To address the issue, three blade modifications were designed and tested. Wing tipped blades, noded blades, and blades with trailing edge serrations were each hypothesized to reduce the aerodynamic noise of a blade. Noise is only one factor to consider when evaluating the site for a new wind farm. Wind farm developments produce risks, benefits, and a transition of authority for stakeholders involved. Understanding the distribution of these factors can help determine the politics and environmental justice of a wind farm. Langdon Winner's theories on techno-politics describe ways in which certain technologies can be considered 'inherently political'. He asserts a political technology includes technologies that require or are strongly compatible with certain power relationships between individuals or groups. This framework applies here when looking at wind farm developments as a conduit for centralizing authority by means of purchasing land and building a large system to be managed by a certain group of people. Three cases of wind turbine developments were studied in order to perceive how the wind farms affected the distribution of risks, benefits, and authority between involved stakeholders. The selected cases were from states differing in what level of government held the primary authority in wind turbine siting. The cases were then compared to determine possible correlation between primary level of government holding authority and the outcomes from the case studies. The research attempts to uncover and explain the

differences in risks, benefits, and authority between stakeholders during and following the construction of a wind farm. Both the annoyance and reported health effects from wind turbine noise will be influenced by a quieter turbine blade. The three turbine blade modifications should reduce the implications of these risk components held by the landowners and some community members by lowering the decibel levels of generated aerodynamic noise.

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