

TRANSPORTATION OF WIND ENERGY INDUSTRY COMPONENTS



Jason J. Bittner
Deputy Director
CFIRE, University of Wisconsin-Madison
bittner@engr.wisc.edu

Dan K. Kleinmaier
Research Assistant
CFIRE, University of Wisconsin-Madison
dkkleinm@wisc.edu

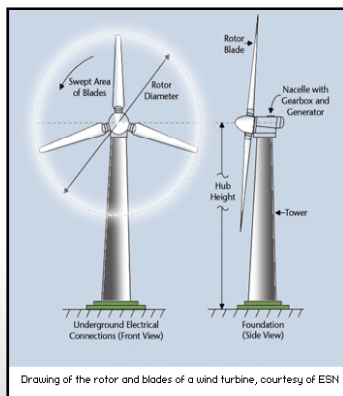
Josh B. Levine
Research Assistant
CFIRE, University of Wisconsin-Madison
jblevine2@wisc.edu

Introduction

The wind energy industry is growing in the United States. However, transportation of the wind turbine components from the point of production to the wind farm site incurs multiple challenges and obstacles. Along with the turbine components, the transportation of supplemental construction materials such as sand and gravel also have a significant impact. By the time a large wind farm project is completed, it is likely costly infrastructure damage has occurred (primarily on road surfaces), especially at the local level. Given the current economic climate, it is necessary to address these obstacles with practical solutions to construct wind farm projects with increased efficiency.

Objectives

- To identify the primary challenges and obstacles associated with the transportation of wind turbine components and the construction of wind farms.
- To identify the most effective and efficient solutions to address these challenges and obstacles.



Size of Components:
Tower 60-120 meters (197-394 ft),
Blades 30-60 meters (98-197 ft)



Innovative truck design Source: TI Group, KAMAG



Nacelle on numerous axles Source: TI Group, KAMAG

Summary

Local roads suffer significant damage during the construction of large wind farms due to the repeated travel of heavy loads on relatively few axles. In order to recoup the costs necessary to restore the roads to their pre-construction condition, local municipalities should create agreements with the developer specifying the developer's financial responsibility. Better communication and strategic planning between the county and developer can also help mitigate the damage (ex., reinforcing roads prior to construction).

In terms of the logistical problems due to the immense size of wind turbine components, several strategies are available. These include an increased use of rail, strategic location of production plants, innovative truck designs, enhanced uniformity for permits across states, and moving shipments through townships at night.



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Conclusions

Wind energy is still in its developing stages in the United States, and it is far from perfected. From the infrastructure perspective, innovative design of wind components and tractor-trailers are reducing the stress on pavement and bridges. In terms of logistics, strategic coordination including increased use of rail is decreasing the number of miles traveled and the damage inflicted on the road. For planners and engineers, increased communication, strategic planning, improved technology, and clearer expectations for developers using pre-construction agreements (see sample ordinance below) will allow them to better manage infrastructure maintenance.

Minnesota Model Wind Ordinance Section

Avoidance and Mitigation of Damages to Public Infrastructure-

Roads- Applicants shall:

Identify all county, city or township roads to be used for the purpose of transporting WECS, substation parts, cement, and/or equipment for construction, operation or maintenance of the WECS and obtain applicable weight and size permits from the impacted road authority(ies) prior to construction.

Conduct a pre-construction survey, in coordination with the impacted local road authority(ies) to determine existing road conditions. The survey shall include photographs and a written agreement to document the condition of the public facility.

Be responsible for restoring or paying damages as agreed to by the applicable road authority(ies) sufficient to restore the road(s) and bridges to pre construction conditions.

Drainage System- The Applicant shall be responsible for the immediate repair of damage to public drainage systems **Detailed agreements based on similar ordinances have been used in Freeborn, Jackson, and Nobles County in Minnesota with success.**