

# The Political Challenge of Siting Renewable Energy Facilities

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## ABSTRACT

While there is significant interest in promoting wind energy as a renewable resource in the United States, there are often significant political challenges to siting wind energy facilities because of local opposition to those facilities. Since regulation of wind energy facilities is primarily done at the local government level in the United States, local governments often respond to local concerns and adopt regulations that impede the siting of wind facilities. In response to the challenges of siting wind facilities, a handful of state governments have passed laws that limit the discretion of local governments in the regulation of wind facilities. The State of Wisconsin recently passed a law providing state-wide standards that local governments must follow if they want to regulate wind facilities under 100 MW. It is seen as a model for other states. This paper provides an overview of the institutional framework for wind regulation in the United States including the Wisconsin law and begins to evaluate the influence of those laws on the siting of wind facilities.

**Keywords:** United States Wind Facility Siting, Renewable Energy Policy

## 1 INTRODUCTION

There is considerable interest in promoting wind as a renewable energy resource within the United States. A majority of the states have adopted renewable portfolio standards that require public and private utilities to generate a percentage of electricity from renewable sources. Wind is a key component of many states' renewable energy portfolio standards. Several states and the national government also provide various financial incentives to encourage the development of renewable energy. While there is general interest in promoting wind energy, efforts to build wind energy facilities often encounter significant political opposition from citizens living near the location of the proposed facilities. Proposed wind facilities are often classified as "NIMBYs" (an acronym for Not In My Back Yard) as people living near the proposed facilities are concerned about the perceived impact of the facilities on their property and their lives due to issues such as noise and aesthetics. Governmental regulation of the siting of wind facilities is often left to local governments. Local opponents to wind facilities have used their influence to persuade their local government to adopt very restrictive standards for siting wind facilities. As a result, according to the American Wind Energy Association, a trade group for the wind industry, the greatest challenges to the development of wind energy "are not technical, but rather financial, political, and regulatory[6]." According to the U.S. Department of Energy, about 10 to 25% of proposed wind energy facilities are not built (or are significantly delayed) because of site-specific environmental and community concerns [9].

The State of Wisconsin recently adopted a new state law that seeks to address some of the political challenges of siting wind facilities [7]. The law is touted by wind energy advocates as a "national model" for the development of wind facilities [2]. This paper provides an overview of the

new Wisconsin law. The paper begins with a brief overview of the institutional framework for wind regulation in the United States. Focusing primarily on the issue of noise, the paper explores some of the scientific studies on the noise impacts of wind facilities and the wind industry's guidance for the siting of wind facilities. The paper then examines the new Wisconsin law as it compares to a handful of state laws recently developed in other states that attempt to limit the authority of local governments to restrict the siting of wind facilities.

## **2 INSTITUTIONAL FRAMEWORK FOR WIND SITING DECISIONS IN THE U.S.**

In the United States, the siting of wind facilities is primarily regulated by state law. The federal government does not have authority over the siting of wind generation facilities, except when federal land is involved, or when special laws come into play such as the rules of the Federal Aviation Administration regulating the height of structures around airports. In most states, local governments play an important role in regulating wind facilities. Almost all states (with the exception of Hawaii) delegate the general authority to regulate land uses to local governments. However, many states do assume a role in special land use issues that often encounter political opposition at the local government level such as the siting of power plants and solid waste landfills. Consistent with the general approach of delegating land use authority to local governments, most states provide local governments with the discretion to regulate wind facilities.

A primary concern related to the siting of wind facilities is the noise generated by the facility. While some countries have national noise regulations, there are no national noise regulations in the U.S. The U.S. Environmental Protection Agency has established noise guidelines and encouraged states to adopt guidelines, however, most states do not have noise regulations. Noise in general, is another issue left to local government regulation and many local governments have enacted noise ordinances to manage community noise levels.

There is little uniformity among the fifty states on the issue of regulating wind facilities. A 2011 report prepared by the Environmental Law Institute identifies six different general governance models followed by states for regulating the siting of wind energy facilities [3]. The different models provide for a range of local influence on siting decisions. The first model is local siting with local autonomy. Under this model, local governments are responsible for siting decisions over wind facilities and state law does not limit local siting regulatory power. This model, which is the most deferential to local interests, is the most common approach followed in the U.S. The regulation of wind facilities in the States of Florida, Mississippi, and Pennsylvania are cited as examples of this model [3].

The second model is for local siting with defined scope. Under this model, local governments exercise control over wind facility siting but states have enacted laws that constrain the scope of local control. The State of Wisconsin's new law that applies to the siting of wind facilities below 100 mega watts (MW) is an example of this model [3].

The third model provides for dual authorities with independent decisions. Under this model, wind facility developers must obtain approvals from both the local government and a state agency. This allows a local government to veto the state agency decision by denying a permit. The regulation of wind facilities in the State of Iowa is an example of this model [3].

The fourth model is for dual authority with state pre-emption. Under this model, wind developers must obtain permits from the effected local government and a state agency but the state agency has the authority to override local decisions in certain circumstances. Regulation of wind facilities in the States of Colorado and New Mexico are cited as examples of his model [3].

The fifth model provides for state siting incorporating local requirements. Under this model, a state agency provides a one-stop process that incorporates local policy requirements in a single state permit. Regulation of wind facilities in the States of Oregon and Minnesota are cited as examples of this approach [3].

The final model is for state siting. Under this approach, states have eliminated any role for local governments in wind facility siting. The State of Wisconsin follows this model for siting of wind facilities generating more than 100 MW and the State of Ohio follows this model for the siting of wind facilities generating more than 5 MW [3].

## 2.1 Industry Guidance

The wind energy industry acknowledges the role of government in regulating wind facilities to address the legitimate concerns raised by citizens about the impacts of wind turbines. Considerable attention has focused on the issue of noise. A panel of experts convened by the American Wind Energy Association and the Canadian Wind Energy Association concluded that there is nothing unique about the sound and vibrations emitted by wind turbines and that there is no evidence that sound emitted by turbines effect human health [1].

A widely cited scientific study on the issue recommends that the siting of wind facilities must take sound levels into consideration in order to comply with any applicable noise regulations. Wind facilities must be held to comply with these regulations but there is not a need to be held to additional levels of regulations. Because of the wide variety of sound levels from small wind turbines, blanket setback limits should not be set a priori. However, they should be examined carefully based on the technology proposed. If a wind turbine is proposed within a distance equivalent to three times the blade-tip height of residences or other noise-sensitive receptors, a noise study should be performed and publicized [5].

Nevertheless, guidelines published by the American Wind Energy Association for the siting small wind energy systems (<100 MW), recommend that “[t]he base of the tower shall be set back from all property lines, public right-of-ways, and public utility lines a distance equal to the total extended height [the height above grade to a blade tip at its highest point of travel] [6].” The guidelines acknowledge that turbines can be allowed closer to property lines if the abutting property owner grants written permission and the installation posed no interference with public utility lines or public road or rail right of ways [6]. For sound, the standards provide that “[s]ound produced by the turbine under normal operating conditions, as measured at the property line, shall not exceed the definition of nuisance noise”[6].



Figure 1: State of Wisconsin

## 2.2 Wisconsin Case Study

Like many states, Wisconsin has taken various steps to promote renewable energy. In March 2012, new state-wide rules impacting local government efforts to regulate wind energy facilities took effect. Until the new law became effective, Wisconsin followed the local siting with local autonomy model for facilities generating less than 100 MW. (Wisconsin has long followed the state siting governance model for wind facilities of 100 MW or more. Under this approach, both privately and publically owned utilities operating wind energy facilities of 100 MW or larger are

reviewed and approved by the Public Service Commission (PSC), an agency created by the State of Wisconsin to regulate utility rates.) Prior to the new law, local governments could use their local zoning and police power authority to adopt local ordinances regulating the siting of the facilities. Wisconsin is a state that has a high number of local units of government – over 1900 cities, villages, towns and counties – which in theory, at least, could all have their own ordinances regulating the siting of wind facilities with no uniformity in standards from one community to the next. In reality, some local governments elected not to regulate wind facilities while others elected to regulate wind facilities. While the state had developed a model ordinance to provide guidance to local governments seeking to regulate wind facilities, the approaches followed by the local governments electing to regulate wind facilities varied widely [4]. While larger scale wind projects were being built in the state (those with 100 MW or more that were directly approved by the state PSC), the smaller wind facilities that needed to rely on local approval, were encountering difficulties in getting approved by local governments. A number of communities adopted restrictive ordinances attempting to make it difficult for wind developers to get projects approved or had requirements that increased the costs for wind developers, thereby making projects financially infeasible.

Local opposition to the siting of wind facilities often focused on two perceived impacts – noise and the shadow flicker from the blades. In addition to being a state with a large number of local units of government, Wisconsin is also a state with a fairly dispersed population. It has numerous small and medium size cities scattered across the state. Long known as “America’s Dairyland”, the state’s rural areas are populated with small dairy farms. The average farms size is 195 acres (79 hec. or 9137 m<sup>2</sup>). This compares to a national average of 418 acres (169 hec. or 1586 m<sup>2</sup>). As a result, Wisconsin does not have the wide open spaces enjoyed by some other states. Such a dispersed population increases the chance of a conflict between people and wind facilities.

In 2009, Wisconsin passed Act 40 in an attempt to move Wisconsin into the local siting with defined scope governance model [8]. Act 40 was one of several initiatives to promote the development of renewable energy. Since the perception was that local government regulations were discouraging the development of wind energy, Act 40 attempted to limit local autonomy in the siting of wind energy facilities by directing the PSC to develop a uniform set of rules for the siting of wind energy facilities that local governments would be required to follow if they wanted to regulate wind facilities. By attempting to limit local autonomy, Act 40 acknowledges that policies, such as local zoning, can have a significant impact on whether wind facilities are developed.

Following the guidance of Act 40, the PSC established a working group of affected stakeholders to advise the agency in the development of the rule. The PSC adopted the final wind siting rules, known as “PSC 128,” in December 2010 [7]. The rules were supposed to go into effect in March 2011, however, there was a regime change in state government beginning on January 1, 2011. The legislative body responsible for overseeing administrative rules suspended the implementation of the new rule for one year hoping the Legislature would pass a new law making changes to Act 40. Some groups opposing the new rules were concerned about the loss of local government control. Other groups wanted greater setbacks from property lines in order to minimize the potential impact of wind facilities on adjacent property values. The Legislature, however, failed to act on making changes to the law and the rules finally took effect in March 2012.

### **2.3 A Comparison of State Siting Standards**

Table 1 summarizes the siting standards contained in the new Wisconsin rule. For comparison purposes, Table 1 also summarizes the standards from an illustrative sample of many of the other states that have adopted uniform state-wide laws with standards that restrict local autonomy to regulate wind facility siting. The standards provide a level of certainty for wind facility developers about what to expect if they propose to develop a wind facility in the state.

Table 1 Summary of State Standards for Regulating the Siting of Wind Energy Facilities

State	Facility size	General location limits	Height	Noise	Setback: Property line	Setback: Dwellings	Setback: Roads	Setback: Overhead transmission lines	Setback Waiver
<a href="#">California</a>	<50 kw	>1 acre located outside an urbanized area; Systems prohibited in areas protected by certain special state resource protection programs	Tower may not exceed 80 feet (24m) on 1 – 5 acre parcels and 100 feet (30 m) on parcels >5 acres	60 dBA or applicable local noise regulations measured at property line	≤1.0 times system height (includes blade height)				
<a href="#">Delaware</a>	Systems for single family residential dwelling unit	State limitations on local regulation do not apply in historic districts		5 dBA above existing average noise level of surrounding area no lower than 60 dBA measured at property line	≤1.0 times system height (includes blade height)				
<a href="#">Illinois</a>					≤1.1 times system height (includes blade height)				
<a href="#">New Hampshire</a>	Small	Must allow in at least one zoning district	Generic local height limitations do not apply	55 dBA measured at property line	≤1.5 times system height (includes blade height)				Zoning board of adjustment may provide variance to reduce setback

<a href="#"><u>New Jersey</u></a>	Small (used primarily for onsite consumption)	Must allow in at least one zoning district	Generic height limitations in local ordinances do not apply to system	55 dBA measured at property line	≤1.5 times system height (includes blade height)				Zoning board of adjustment may provide variance to reduce setback
<a href="#"><u>Ohio</u></a>	≥5 MW (Ohio Power Siting Board approval)				≥1.1 times system height (includes blade height)	≥750 feet (229 m) from blade			If adjacent property owners agree
<a href="#"><u>South Dakota</u></a>	Small (≥1 with tower height <75') Large (≥1 with tower height ≥75')				Small: ≥1.1 times tower height Large: the greater of ≥500 feet (152 m) or ≥1.1 times tower height				Written agreement of adjacent owners
<a href="#"><u>Wisconsin</u></a>	<100 MW	May deny if wind facility of at least 1 MW is proposed for area primarily designated in local comprehensive plan for future residential or commercial development		50 dBA (6 a.m. – 10 p.m.); 45 dBA (10 p.m. – 6 a.m.) [Adjacent owners may waive.]	0 for participating properties; 1.1 times the maximum blade tip height for nonparticipating properties	1.1 times the maximum blade height for participating residences; the lesser of 1,250 feet (380 m) or 3.1 times the maximum blade tip height for nonparticipating residences and occupied community buildings	1.1 times the maximum blade tip height	1.1 times the maximum blade tip height (does not include utility service lines to individual houses or outbuildings)	Owner of a nonparticipating residence or occupied community building may waive setbacks to a minimum setback distance of 1.1 times the maximum blade tip height and may waive the property line setback
<a href="#"><u>Wyoming</u></a>		½ mile (805 m) setback from the limits of any city or town			≥1.1 times tower height	≥5.5 times tower height or at least 1000 feet (305 m) (also applies to platted subdivisions)	≥1.1 times tower height		Written agreement of adjacent owners

Table 1 shows the significant differences among the state programs. For example, California's limitation on local government regulations only applies to facilities under 50 kilowatts. Wisconsin's standards apply to facilities under 100 MW.

Despite the aversion in the scientific literature to establishing blanket setback distances, most of the state laws in the sample establish either a minimum or maximum setback distance from property lines. The maximum distances vary from 0 for participating property owners (other properties with wind facilities or properties with a signed waiver) under the Wisconsin law to 1.5 times the height of the system (including the blade tip height) in New Jersey. States that have state approval of wind facilities, such as Ohio, have minimum setbacks. This provides certainty to property owners that the facilities will be setback a specific distance but it also provides the state with the flexibility to require greater setbacks if warranted.

While most states focus on setback's from property lines, Wisconsin's rule also includes standards for setback for residential dwellings and community buildings. For residences that do not have wind facilities nor a signed waiver, the law requires a set back of the lesser of 1,250 feet (381 m) or 3.1 times the height of the facility. Depending on where the dwelling is located, this could require a greater setback than the property line setback required for nonparticipating residences and community buildings.

Most of the states also recognize noise standards as a factor in wind facility siting. For example, California sets a minimum noise level of 60 dBA as measured at the property line. While the California law also requires a maximum setback from adjoining property lines of 1.0 times the facility height, depending on the variable affecting noise, a wind facility may need to be set back a greater distance than 1.0 times the height of the facility.

Finally, while not included in Table 1, Wisconsin's new law also includes limits for shadow flicker from the rotating blades. These standards go beyond the standards used in the other states listed in Table 1. According to Wisconsin's law, a wind facility cannot cause more than 30 hours per year of shadow flicker on nonparticipating residences or occupied community buildings. The guidance developed by the wind industry states that "normal setback distances dictated by property lines or sound requirements mitigates, if not entirely eliminates, this potential nuisance, especially at U.S. latitudes" [6]. If that is not the case, this provision in the Wisconsin law would provide for greater setbacks if necessary to address shadow flicker.

If the potential setbacks provided for in the law are not sufficient, the law provides local governments with the discretion to offer annual compensation to impacted residences located within one-half mile (805 m) of a wind facility. The payments may not exceed \$600 for one turbine, \$800 for two turbines, or \$1000 for three or more turbines.

### **3 CONCLUSION**

Wisconsin's new law presents the most comprehensive set of state standards that local governments must follow if they want to regulate wind facilities. The law attempts to remove political and regulatory barriers to the siting of wind facilities by providing a uniform set of standards that apply state-wide that attempt to balance the competing concerns of neighbours who perceive that they will be impacted by a proposed wind facility with the public interest in promoting wind energy as a cost-effective renewable resource. Other considerations, such as financing wind facilities and the infrastructure for the transmission of electricity, may still pose barriers but are not addressed by the siting law. It will be important to conduct future research that monitors the impact of the law on the development of wind energy in Wisconsin.

While the law should diminish the level of political conflict over wind facility siting, it will not remove all conflict over the issue. In light of the varied approaches followed among the fifty states and the thousands of local governments that regulate wind facilities, it is unclear whether Wisconsin's approach will actually serve as a model for other states. In the 1990s, the national government assumed a more direct role in the siting of mobile telecommunication towers when it limited local government authority to deny the towers under the Telecommunications Act of 1996. The Act helped promote the development of the mobile telecommunication systems in the U.S. but at the local level, the Act has also resulted in many lawsuits as local governments attempt to exercise some control over the siting of the towers. Clearly, this approach did not remove all controversy. In Wisconsin as well, the wind siting law may result in lawsuits as local governments, responding to citizen concerns, attempt to find loopholes in the new law that allows the community to have a greater level of local control. The fragmented structure of government in the U.S. can complicate the achievement of public policy objectives such as promoting renewable energy. Regardless of which level of government that regulates wind facility siting, it is important to understand the standards used, such as set-backs. The impact of these laws on the total potential wind energy generating capacity in the U.S. are worthy of continued investigation.

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