

What are the implications of Wisconsin’s “Renewable Energy” Mandates and why do Political Leaders and Media Believe False Claims about Wind Energy?

– Contents –

	<u>Page</u>
Contents	1
Introduction.....	2
Correcting the widespread misunderstanding about wind energy and its potential and cost	2
1. Wind turbines cannot be counted on at the time of peak electricity demand and are not a substitute for building reliable generating capacity	2
2. Wind industry lobbyists often make false claims about the cost of electricity from wind.....	3
a. In fact, a kWh of electricity from a wind turbine is worth less than a kWh from a reliable generating unit	3
b. The “cost” of electricity from wind turbines claimed by wind industry lobbyists does not include its full, true cost	3
c. Other false and misleading claims by wind energy lobbyists and advocates	4
Data on Wisconsin’s electricity supply and demand situation raise questions about the reasonableness and implications of the state’s “renewable energy” mandate and the expectations about the potential for wind energy	5
1. How much electricity from renewables would be required if the 2015 mandate is to be achieved and RENEW Wisconsin’s Mr. Vickerman’s estimate of the share for wind is correct?.....	5
2. Approximately how many wind turbines would be required if all the estimated wind generation were to be produced in Wisconsin?	7
3. What are the environmental implications of the “renewable” mandate for the citizen’s of Wisconsin’s non-metropolitan areas?.....	8
Five probable reasons why false claims about wind energy have been accepted by political leaders and the media.....	8
Concluding observations.....	9
Endnotes.....	10

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What are the implications of Wisconsin's "Renewable Energy" Mandates and why do Political Leaders and Media Believe False Claims about Wind Energy?

A friend from Wisconsin recently asked me two important questions about wind energy:

- What are the implications of Wisconsin's "renewable" energy mandates and what contribution is expected from wind energy?
- Why do Wisconsin political leaders and media believe claims about wind energy made by lobbyists from the wind industry and organizations such as RENEW Wisconsin?

The questions are good ones because Wisconsin's "renewable energy" mandate has far reaching implications and, further, it is now clear that claims made by the wind industry and other wind energy advocates have greatly overstated the environmental, energy and economic benefits of wind energy and greatly understated its true costs and adverse impacts.

In response to the questions, this brief paper:

- Illustrates the widespread misunderstanding about wind energy and its potential and cost.
- Provides data on Wisconsin's electricity supply and demand situation that raises questions about the reasonableness of the "renewable energy" mandate and the expectations for wind energy.
- Identifies possible answers to the question of why political leaders and media believe false and misleading claims made by lobbyists from the wind industry and RENEW Wisconsin.

Correcting the widespread misunderstanding about wind energy and its potential and cost

Wisconsin is but one of several states with growing electricity demand where political leaders apparently do not yet understand the severe limitations of wind energy when seeking to assure reliable electricity for the people of their state. Three critical points illustrate the depth of the misunderstanding:

- 1. Wind turbines cannot be counted on at the time of peak electricity demand and are not a substitute for building reliable generating capacity.** Wind turbines produce electricity only when wind speeds are in a specific range (start producing minimal amounts at about 7 miles per hour, reach rated capacity around 31 mph, and cut out at about 56 mph). Therefore, the output from wind turbines is intermittent, highly volatile (from minute to minute), and unreliable.

Experience in areas with wind generating capacity – including Wisconsin -- demonstrates that wind turbines often produce little or no electricity at the time of peak electricity demand and, therefore, have little "capacity value" when attempting to assure reliable electricity to

meet customer demands.

In areas experiencing growth in peak electricity demand or needing to replace existing generating units, there is no practical alternative to adding reliable (“dispatchable”) generating capacity that can be called upon when needed. Such reliable generating capacity will be needed whether or not wind turbines are added. As a practical matter, electric customers could end up paying twice; i.e., once for the unreliable wind generating capacity and again for reliable generating units.

2. Wind industry lobbyists often make false claims about the cost of electricity from wind. This is illustrated by a quote attributed to the Executive Director of RENEW Wisconsin:¹

“With tax credits, wind energy can compete with natural gas or coal generation plants.”
“If a utility were to build something new, all three are roughly competitive.”

Such comparisons of the cost of electricity from wind with electricity from reliable generating units are invalid for two major reasons:

- a. In fact, a kWh of electricity from a wind turbine is worth less than a kWh from a reliable generating unit.** As indicated above, wind turbines produce electricity only when wind speeds are within a certain speed range, so their output is intermittent, highly volatile, and unreliable. Further, the wind speeds required to produce significant output seldom coincide with peak electricity demands when electricity has its highest real value.

Reliable or “dispatchable” generating units are those that can be called upon whenever needed to produce electricity. Whether we like them or not, nearly all the reliable generating units currently available or expected in the near term in Wisconsin and elsewhere in the US are powered by natural gas, coal, oil, hydropower, or nuclear energy.

Output from reliable generating units clearly has a higher practical value to all who need reliable electricity. Comparisons of the cost of electricity from wind turbines with the cost of electricity from reliable generating units are invalid and lead to false conclusions.

- b. The “cost” of electricity from wind turbines claimed by wind industry lobbyists does not include its full, true cost.** Perhaps the largest cost that is excluded from such claims is the cost of the huge subsidies now being provided to owners of “wind farms,” which cost are ultimately paid by taxpayers.

Those subsidy costs are real and are ultimately passed along to either taxpayers or electric customers. The huge subsidies for “wind farm” owners that are now hidden in tax and electric bills include (i) the wind Production Tax Credit, (ii) federal and state double declining balance accelerated depreciation, (iii) recently passed “bonus” depreciation deduction, (iv) high priced markets created for the benefit of “wind farm”

owners in the form of Renewable Portfolio Standards (RPS), (v) other green energy programs, and (vi) costs of building transmission lines to serve “wind farms.”

(Note: Contrary to popular perceptions and wind industry claims, on a cost per kWh of production, wind energy now appears to be THE most heavily subsidized of all sources of energy for electricity in the US.)

Another real cost of electricity from wind energy that lobbyists try to ignore is the cost of providing backup generating capacity needed to keep electric grids in balance. Because the output from wind turbines is so intermittent, volatile, and unreliable, other units – i.e., reliable dispatchable units -- must be kept running and immediately available. These units generally will be operating at less than their full, efficient capacity.

The simple truth is that electricity from wind energy is much more expensive than electricity from other traditional energy sources when the full, true costs are taken into account.

- c. **Other false and misleading claims by wind energy lobbyists and advocates.** The critically important but often hidden limitations of wind energy described above are not the only examples of false and misleading claims that have been uncovered during the past 3 years. While not practicable to discuss all of them in this paper, ample information and documentation on them can be found on a growing number of web sites in the US and other countries.

The apparent fact that local governments are not permitted (or not required) to take all the costs and benefits of “wind farms” into account when considering proposals from “wind farm” developers should raise questions among all of Wisconsin’s citizens about the reasonableness of existing Wisconsin law.

Additional important factors that are often hidden or ignored by wind energy lobbyists and advocates include:

- Wind turbines are not environmentally benign. Instead, adverse environmental impacts include bird and bat kills, wildlife habitat disruption, noise, shadow flicker, and impairment of scenic and property values.
- Favorable economic benefits are greatly overstated. An overwhelming share of capital costs are spent elsewhere (often foreign), few local jobs are created during construction or operation, and little local economic activity is added.
- Due to federal and state tax breaks and subsidies:
 - Millions of dollars annually are being transferred from the pockets of ordinary taxpayers and electric customers to the pockets of a few large organizations that own “wind farms” – many of which are foreign owned.
 - Billions of capital investment dollars are being spent on energy projects (i.e., “wind farms”) that produce very little electricity – which electricity is intermittent, volatile and unreliable – and is unlikely to be available during the time of peak electricity demand.

- Reliability of electric grids is adversely affected and replacement power costs soar when wind speeds drop and “wind farms” provide less electricity than predicted (as dramatically demonstrated in Texas recently).ⁱⁱ

Data on Wisconsin’s electricity supply and demand situation raise questions about the reasonableness and implications of the state’s “renewable energy” mandate and the expectations about the potential for wind energy.

Two additional quotes from the November 11, 2007, Janesville (WI) Gazette story cited above help frame the challenge facing the people and utilities in Wisconsin when attempting to meet the state’s “renewable” energy mandate:

“A new crop is sprouting in Wisconsin.” “In windy areas of the state, utility and renewable energy companies are planting wind farms that will help meet its mandate of producing 10 percent of its energy from renewable sources by 2015.”

“We expect wind to account for about 90 percent of all renewable electricity required under the law,” he [Vickerman] said.

Wisconsin’s existing “renewable” mandate undoubtedly was based in part on (i) the good intentions of the state’s political leaders, (ii) the interests of the wind industry and other renewable energy advocates, and (iii) the demonstrated lobbying prowess of the Executive Director of RENEW Wisconsin.

However, it has become very clear to many in Wisconsin that achieving the mandate – as well as achieving the amount of electricity from wind turbines that Mr. Vickerman estimates would have significant impacts on many of Wisconsin’s citizens and their environment – particularly on the more rural and scenic areas of the state. It is the people who live in or near smaller cities and towns and in rural areas who are most disadvantaged by “wind farms.”

Therefore, it is quite understandable that these people (i.e., those who live outside the metropolitan areas that account for most of Wisconsin’s growing electricity demand) are questioning both the reasonableness of the existing “renewable” mandate and the implications of Mr. Vickerman’s estimate of the amount of electricity that should be provided by “wind farms.”

Assessing the reasonableness of the mandate and the estimates for wind energy requires looking at hard data on Wisconsin’s electricity supply and demand situation and outlook and addressing several key questions. For example:

1. How much electricity from renewables would be required if the 2015 mandate is to be achieved and Mr. Vickerman’s estimate of the share from wind is correct?

The following table shows recent history and rough projections of the outlook for Wisconsin’s electricity supply and demand situation, based on data from the US Energy Information Administration (EIA) for 2001 and 2006.ⁱⁱⁱ Annual growth rates shown in the 4th column are calculated from the numbers in the 2nd and 3rd columns.

The rough estimates for 2015 shown in the 5th column are simple calculations using the 2001-06 Average annual growth rates shown in the 4th column. All the numbers in the 5th column should be recognized as rough, mechanically calculated estimates, not predictions. The subtotals are probably the most meaningful 2015 numbers since the amount of electricity generated within the state and the amount imported will depend on decisions made by the people of Wisconsin and their political leaders.

Also, since electricity demand is growing in other states surrounding Wisconsin and little new generating capacity is being added, it may not be possible for Wisconsin to continue to depend on other states to supply an increasing amount of electricity or even to maintain the existing levels.

Furthermore, the “projections” in the 5th column of the table may be high since Wisconsin’s political leaders apparently intend to promote or force extraordinary efforts by the people of Wisconsin to hold down the rate of growth in electricity demand. Whether these efforts will be successful remains to be seen.

Recent History & Outlook for Wisconsin’s Electricity Supply & Demand -- in Kilowatt-hours				
	2001	2006	Average Annual % Growth 2001-2006	Rough 2015 estimates assuming growth in each line continues at 2001-06 Avg. Annual rate*
<u>Electricity Supply</u>				
Net Electric Generation in WI**	58,763,000,000	61,640,000,000	0.96%	67,718,000,000
Electricity Imports	12,264,000,000	15,312,000,000	4.54%	22,832,000,000
Subtotal	71,027,000,000	76,952,000,000	1.62%	88,890,000,000
<u>Electricity Demand</u>				
WI Retail Electricity Sales	65,218,000,000	69,821,000,000	1.37%	78,940,000,000
Direct Use***	2,663,000,000	3,587,000,000	6.14%	6,132,000,000
Subtotal	67,881,000,000	73,408,000,000	1.58%	84,515,000,000
Estimated Losses****	3,146,000,000	3,544,000,000	2.41%	4,392,000,000
* Each line is rounded to nearest million kWh. Lines do not add to subtotals because of differing growth rates. ** Includes generation by commercial & industrial establishments, principally for their own use. *** Own use by utility, commercial or industrial producer. **** Line & transformer losses of electricity during transmission & distribution of electricity.				

Based on the above rough projections -- and assuming the 10% “renewable” mandate applies to both utility retail sales and electricity produced by organizations for their own use, electricity from qualifying renewable energy would have to supply 8,889,000,000 kWh in 2015 and in terms of electricity delivered to end users (after line and transformer losses during transmission and distribution) would be about 8,451,500,000 kWh.

If Mr. Vickerman’s estimate for the share of electricity that would come from wind – i.e., 90% -- is correct, that would mean that wind turbines would have to account for:

- 8,000,100,000 kWh in instate generation plus imports, and
- 7,606,350,000 kWh in end use (after losses).

2. Approximately how many wind turbines would be required if all the estimated wind generation were to be produced in Wisconsin?

According to EIA data,^{iv} Wisconsin’s five “wind farms” generated the amounts of electricity during 2006 that is shown in the fourth column in the table below and achieved the capacity factors shown in the fifth column.

Wisconsin “Wind Farm’s” 2006 Turbines, Capacity, Generation & Capacity Factors				
“Wind Farm”	Turbines	Nameplate Capacity	Generation in kWh	Capacity factors
Badger – Montfort, Iowa County	20	30.00 MW	62,442,000	23.8%
Madison – Kewanee County	17	11.22 MW	19,264,000	19.6%
WPS - Lincoln/Kewanee County	14	9.24 MW	15,218,000	18.8%
WEP - Byron/Fond du Lac Counties	2	1.32 MW	2,971,000	25.7%
WPS – Glenmore	<u>2</u>	<u>1.20 MW</u>	<u>1,481,000</u>	14.1%
Totals	55	52.98 MW	101,378,000	

Therefore, based on EIA data, Wisconsin’s 5 “wind farms” shown in EIA data accounted for a total of 101,378,000 kWh which is equal to:

- 16/100 of 1% of the 61,640,000,000 kWh of electricity generated in Wisconsin during 2006 or
- 13/100 of 1% of 76,952,000,000 kWh of in-state generation plus imported electricity.

Further, the total kWh generated by the 5 “wind farms” during 2006 (101,378,000 kWh) equals 1.3% of the 8,000,000,000 kWh that would be expected from wind in 2015 if Wisconsin’s electricity demand continues to grow at 2001-2006 rates and Mr. Vickerman’s 90% of the “renewable” mandate from wind were to be correct.

If two pending and proposed 100 MW “wind farms” (EcoEnergy & WE Energy) are constructed and achieve a 25% capacity factor, they would produce about 438,000,000 kWh per year. That amount of electricity would equal 5.5% of the 8,000,000,000 kWh expected in 2015 by Mr. Vickerman.

Adding the 101,378,000 kWh produced in 2006 by Wisconsin’s 5 “wind farms” and the 438,000,000 kWh that might be expected from 2 additional 100 MW “wind farms” would yield roughly 540,000,000 kWh – or 6.75% of the 8,000,000,000 kWh that Mr. Vickerman may be expecting from wind.

That means that an additional 7,460,000,000 kWh of electricity would have to be produced by “wind farms” in 2015 to achieve Mr. Vickerman’s 90% expectation for production from wind. This would require 2,271 *additional* 1.5 MW turbines achieving a 25% capacity factor (i.e., 3,406,000 kW of additional wind generating capacity x 8760 hours per year x 25% capacity factor = 7,459,140,000 kWh of electric generation).

Of course, the requirement for additional wind turbines would be reduced if Wisconsin is able to achieve the difficult task of cutting the growth in electricity demand in half (i.e., from 1.58% to .79% per year, thus implying a 2015 total of about 79,520,000,000 kWh from in-state electricity production and imports. This would mean that a total of 7,157,000,000 kWh of electricity would have to be produced from wind to achieve Mr. Vickerman's "90% of renewables mandate" estimate. This would require only 2,014 *additional* 1.5 MW turbines achieving a 25% capacity factor.

3. What are the environmental implications of the "renewable" mandate for citizens in Wisconsin's non-metropolitan areas?

Experience across America during the past 40 years or more demonstrates that people living in cities and suburbs do not want electric generating facilities in THEIR backyard (i.e., the "not in my backyard" or NIMBY principle).

Instead, they wish to have someone else bear any adverse impacts associated with supplying the electricity they demand. That is, they wish to require that people *who live outside THEIR daily living space* bear any of the adverse environmental, ecological, scenic and property value effects that are associated with electric generating facilities and transmission lines!

Ironically, people living in metropolitan areas and their elected representatives often accuse people in more rural areas of being "NIMBYs" when those people object to exploitation sought by people in metropolitan areas who wish others to supply their electricity demands.

Five probable reasons why false claims about wind energy have been accepted by political leaders and the media

As indicated in the introduction, this analysis began with a question from a friend about the implications of Wisconsin's "renewable" mandate and why Wisconsin's political leaders and media seem so ready to accept claims by the wind industry that are false or misleading. There appear to be five probable reasons why such claims have been accepted.

1. First, the wind industry and other wind advocates (including, sadly, some government agencies using tax dollars) have had more than a decade to spread their false and misleading claims. They have been extremely successful in misleading the public, media and government officials and, in effect, create a false "popular wisdom" that wind energy is environmentally benign and worth its very high costs.

Only during the past 3 years have facts about the true costs and low value of electricity from wind turbines – as well as the adverse environmental, ecological, scenic and property value impacts -- been uncovered. Only recently have these facts begun to be recognized by some political leaders and to show up in media stories.

2. Second, due to huge federal and state tax breaks and subsidies, the wind industry has enormous financial resources that can be used for (a) lobbying and making campaign

contributions to political leaders, (b) PR campaigns, and (c) hiring lawyers and consultants that overwhelm citizen efforts to defend their interests before local government boards that rule on “wind farm” permits. Also, some federal and state government officials use their positions and citizens’ tax dollars to work on behalf of the wind industry.^v

It is well established that tax breaks and subsidies – not energy or environmental benefits – are the principle reason that “wind farms” are being built. Wind industry officials have admitted publicly that about 2/3rds of the economic value of “wind farms” comes from two of the federal tax breaks (i.e., Production Tax Credits and accelerated depreciation).

Ordinary citizens face a steep uphill battle when attempting to (a) protect their interests when competing against the financial resources and lobbying prowess of the wind industry and “wind farm” developers, and (b) getting facts about wind energy considered by political leaders and brought to public attention via news media.

3. Third, some political leaders and media representatives probably are misled by lobbyists from organizations with cleverly conceived names suggesting that they are promoting the public interest (e.g., protecting the environment) when, in fact, they are “fronts” for (and financed largely by) the wind industry.
4. Fourth, increasingly, local government officials who in good faith establish limitations on “wind farm” developments in order to protect their citizens from the adverse effects of wind farms are being blind-sided by state legislators, governors, and other officials who work to override local government decisions. Unfortunately, it seems that state legislatures often include a few influential members who are exceedingly responsive to special interests. Such legislators are quite willing to help create state “facility siting boards” with authority to impose their decisions without regard to the adverse local impacts. All too often, state level officials have little regard for local impact as long as the undesired facilities are not in their “backyard” and they, personally, are not the victims of the noise, scenic devastation, reduced property value or other adverse environmental or ecological impact.
5. Fifth, in fairness to political leaders and media representatives, it must be recognized that electricity is a complex matter that few of them have time or expertise to understand sufficiently so that they can detect false and misleading claims presented to them or appearing in the media. Like ordinary citizens, political leaders and media representatives are susceptible to being overwhelmed by wind industry lobbyists, publicists, lawyers and consultants.

Concluding Observations

Unfortunately, wind industry lobbyists and other wind energy advocates have been very successful during the past decade in misleading the public, media and government officials. As indicated above, they have greatly overstated the energy, environmental and economic benefits of wind energy and greatly understated the true economic and environmental costs.

Now that the facts about the true costs and benefits of wind energy are becoming better known, citizens, taxpayers and electric customers have a right to demand that their federal, state, and local political leaders reconsider the policies, mandates, tax breaks and subsidies that have been adopted during the past few years which have so unfairly benefited “wind farm” developers and owners and others in the wind industry.

It seems quite clear that the people of Wisconsin have a right to demand that their political leaders reconsider their decisions about wind energy.

Fortunately, some political leaders have begun to recognize the true costs and benefits of wind energy and have begun questioning existing and proposed wind energy policies. Also, facts about wind energy have begun showing up in national and local media, particularly in areas where “wind farms” have been proposed or built. Hopefully, more media representatives and government officials will soon catch up with the facts about wind energy and help overcome the false “popular wisdom” that is now so prevalent.

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End Notes:

ⁱ Janesville (WI) Gazette on November 11, 2007. <http://www.gazettextra.com/news/2007/nov/11/wind-energy-increasing-wisconsin/> (accessed on March 7, 2008).

ⁱⁱ Wall Street Journal, “Finding where the wind blows; Officials beef up forecasting for popular but fickle power source,” March 6, 2008. http://online.wsj.com/article/SB120476274314215009.html?mod=googlenews_wsj

ⁱⁱⁱ US Energy Information Administration, Table 10. Supply and Disposition of Electricity, 1990 through 2006, Wisconsin Electricity Profile, 2006 edition, November 2007.

http://www.eia.doe.gov/cneaf/electricity/st_profiles/sept10wi.xls

^{iv} US EIA, Form EIA-906 and EIA-920 Data Bases. January – December 2006.

http://www.eia.doe.gov/cneaf/electricity/page/eia906_920.html

^v For example, the US Department of Energy’s Office of Energy Efficiency & Renewable Energy (DOE-EERE), DOE’s National Renewable Energy “Laboratory” (NREL), and State “Wind Energy Working Groups” which receive tax dollars via DOE-EERE and NREL and lobby state officials in support of the wind industry.