EVALUATING THE COSTS AND BENEFITS OF WIND ENERGY

Overstated Benefits and Understated Costs Create False Hopes for Wind Power

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Overstated Benefits and Understated Costs Create False Hopes for Wind Power

Many people accept the well-publicized claim that windmills will be able to supply a significant share of our country's growing requirements for electricity. They also believe that wind energy is environmentally benign and a way to avoid emissions from other sources of energy for electric generation. Political leaders in windy states have even been persuaded that "wind farms" will provide economic benefits, principally through rental payments to landowners.

As proposals to build "wind farms" have proliferated, however, the adverse impacts of wind energy are becoming clear to a growing number of citizens, consumers and taxpayers. They are learning that "wind energy" has adverse environmental, ecological, scenic and property value impacts. They are learning that many of the claimed benefits of wind energy are misleading or false, and that the true costs of wind energy are higher than advertised -- with those higher costs falling on taxpayers and electric customers.

Producing Electricity from Wind

Windmills have been around for centuries and were quite useful in earlier times to provide power to pump water or grind grain. Today, small-scale windmills that produce electricity can be useful in areas without access to electric distribution lines. While expensive, they may be acceptable if their owners need electricity only when the wind blows, or if the windmills are coupled with a battery system that permits storing the electricity until it is needed.

Quite different are the large commercial-scale "windmills" that wind energy advocates favor as a way to produce electricity that would be fed into electricity grids that serve commerce, industry and the general public. These "windmills" consist of large turbine-generators mounted on tall towers (200 feet or higher), powered by long blades (with a radius of 150 feet or more) and overall height that may be in the range of 300 to 465 feet.

Such windmills need to be located in areas with substantial wind. Depending on the model, these wind turbine-generators begin producing a small amount of electricity when wind speeds reach about 9 miles per hour, reach full generating capacity around 33 mph, and then cut out when wind speeds reach 56 mph. (Higher wind speeds can damage the machinery.) The wind turbines produce no electricity when wind speeds are outside the speed range.

The electricity is fed through wires that run down the towers and to a connection point with transmission lines that can carry the electricity to places where it is needed. A collection of these large windmills is often referred to as a "wind farm."

Costs and Benefits of Electricity from Wind

The wind industry – which includes manufacturers of turbines, towers, blades and other equipment, "wind farm" developers and owners – has touted the benefits of wind power. Advocates in the US Department of Energy (DOE) and National Renewable Energy Laboratory (NREL) often voice support for these claims. The industry has enjoyed favorable media coverage and obtained generous federal and state tax breaks and other subsidies.

However, as proposals for additional "wind farms" have proliferated, the claims of the wind industry and other advocates have faced closer scrutiny, as explained below. Proposed facilities are encountering strong opposition from a variety of sources.

Big machines -- little electricity. DOE and the wind industry have suggested that wind could supply 5% of the nation's electricity by 2020.[1] However, a more objective assessment by the U.S. Energy Information Administration indicates that wind will provide only 61/100 of 1% of our electricity by 2020.[2]

Despite their large size, commercial-scale windmills produce very little electricity and only when the wind is blowing within certain speed ranges. At the end of 2002, there were about 15,000 commercial-scale windmills in the US[3] scattered across thousands of acres in 27 states. Ninety percent of the capacity is in 6 states: California, Texas, Iowa, Minnesota, Washington and Oregon. All these windmills combined produce less electricity than one nuclear power plant, one large coal-fired power plant or two modern base load gas-fired power plants.

Because wind turbines produce only when wind is within a certain speed range, their output is intermittent, highly variable, and largely unpredictable. Therefore, the electricity has less value than electricity from generating plants that can produce whenever they are needed.

True Cost of Electricity from Wind. Wind energy advocates claim that the cost of electricity from wind has been reduced sharply but still requires government subsidies. In fact, the true cost of electricity from wind is much higher than admitted by wind energy advocates because they leave out important elements of the true cost, including:

- The cost of providing backup generation to make up for the intermittent and variable output from wind turbines -- so that electricity systems are kept in balance.
- Extra costs of electric transmission and grid management due to intermittence, variability and limited predictability of wind turbine output and inefficient use of transmission capacity.
- Tax breaks and subsidies that shift tax burden and costs from "wind farm" owners to remaining taxpayers and to electric customers.

Environmental impacts. Advocates often claim that wind energy is environmentally benign and that electricity from wind offsets emissions from fossil-fired (coal, oil and natural gas) generating plants. However, the advocates' claims generally are overstated because other generating plants must be kept running at less than full efficiency or in "spinning reserve" to assure that electricity is available when needed by electric customers.[4]

Wind advocates also tend to ignore the adverse environmental, ecological, scenic and property value impacts of large, commercial-scale windmills that are leading to the growing citizen opposition to proposed "wind farms." Examples of adverse effects include:

- *Noise,* such as in Mackinaw, MI, involving one wind turbine, or in Kewaunee, WI, where homes near a "wind farm" were purchased because of noise complaints.
- *Bird kills and interference with bird habitat and migration*: Potential adverse impacts on bird and other wildlife and their habit are important key concerns. The US Fish & Wildlife

Service, for example, is requiring detailed studies in connection with a proposed wind farm in West Virginia.

- *Destruction of rare ecosystems*. For example, citizens are opposing "wind farms" that are proposed for Kansas' Flint Hills, location of the last remaining tall grass prairie in the US.
- *Impact on scenic vistas*: Areas where scenic impairment is a major issue for proposed "wind farms" include the Kittitas Valley in Washington, Allegheny Front in West Virginia, several mountain locations in Vermont, Maine, and Western Massachusetts, and offshore areas near Cape Cod and Nantucket, Massachusetts.
- *Property values*: Concerns about adverse impact on property values are particularly acute when "wind farms" are proposed near populated areas. Examples include but are not limited to existing or proposed "wind farms" in the towns of Lincoln and Addison in Wisconsin; DeKalb, Lee and Bureau Counties in Illinois; Erie, Chautauqua, Steuben and Yates Counties in New York; and counties along the eastern shore of Lake Michigan.

In addition to the above concerns, towns that are developing ordinances to deal with wind turbines are also finding it necessary to deal with issues such as "shadow flicker" from spinning blades, and to protect health and safety from broken windmill blades or ice throws from spinning blades.[5]

Tax breaks and subsidies. Wind industry lobbyists have been very successful in securing tax breaks and other subsidies from federal, state and local governments, all of which shift costs from "wind farm" owners to remaining taxpayers. Federal tax breaks include very rapid, accelerated depreciation (the entire capital cost can be deducted from income over a 5-year period), thus sharply reducing taxable income at both the federal and state level. Also, a "production tax credit" of $0.018 cents is provided for each kilowatt-hour (kWh) of electricity produced during the first 10 years of operation. Some states have sharply reduced or eliminated sales and property taxes for owners of "wind farms," and some provide additional subsidies.

Particularly in the early years of operation, the value of tax breaks and subsidies may far exceed the income that a "wind farm" owner receives from the sale of electricity. Tax breaks and subsidies are now so large that their value to "wind farm" owners – not the alleged environmental benefits – are the primary motivation for building a "wind farm."

Economic impact on states hosting "wind farms." Political leaders in some Midwestern states favor tax breaks and subsidies because of presumed economic benefits to a state. These presumed benefits consist largely of:

- Rental or easement payments to owners of land where windmills and transmission lines are located,
- Jobs during construction (which may last only 6 months or less, with the higher skilled jobs filled by out of state workers), and a few jobs after the project becomes operational,
- In-state purchases of materials and services, and
- Tax revenues or contributions in lieu of taxes.

In fact, however, the net economic impact on a state's economy is often negative, particularly when the higher cost, wind-generated electricity is used by electric customers in the state. The

higher cost of the electricity (i.e., compared to the cost of electricity from traditional sources) paid by these electric customers will often exceed the income associated with the presumed economic benefits.

The big economic winners are the often out-of-state "wind farm" owners. Most of the capital investment in a "wind farm" flows to companies in other states and often in other countries. Most wind turbines, which make up the overwhelming share of the capital investment in a "wind farm," come from foreign owned companies (e.g., Vestas and NEG Micron of Denmark).

The big losers are the electric customers and the local businesses where their money would have been spent if it were not being used to pay electric bills.

Wind resources. Wind advocates often claim that there are enough "wind resources" in sparsely populated states such as North Dakota to satisfy all US electricity requirements. This "Saudi Arabia of Wind" concept is unrealistic. It would be costly to add electric transmission capacity to move the electricity from relatively remote windy areas to places where the electricity is needed. In addition, wind's use of transmission capacity is inherently inefficient (due to its intermittent use) and losses of electricity during transmission increase with distance.

Renewable Portfolio Standards. Because the true cost of electricity from wind is high and because opposition to "wind farms" is growing (except in remote areas), wind advocates are lobbying for mandatory state and/or federal "Renewable Portfolio Standards." Such standards would set a minimum share of electricity that must be provided from wind and other "renewable" energy sources – without regard to the high costs that would be imposed on electric customers.

A few consumers are willing to pay higher prices for electricity that they believe is generated from "renewable" sources such as wind. The revenue from such "green energy" programs is not adequate, however, to cover the higher cost of the electricity and the cost of administering such programs. The remaining cost would be passed on to all electric customers and hidden in their monthly bills. The big winners would be the owners of "wind farms" and other renewable facilities, who would be guaranteed a large demand for their expensive product.

In effect, renewable portfolio standards are another form of subsidy for owners of electric generating facilities powered by wind and other qualifying renewable energy sources. The standards are an insidious subsidy because the higher costs resulting from them are likely to be passed on to many customers without their knowledge.

Protecting Local Interests

People living in areas where "wind farms" are proposed, local government officials, and landowners approached by "wind farm" developers have learned that the developers can be very aggressive.

Protecting citizens and communities. Local governments often do not have zoning ordinances that deal adequately with complex issues raised by large windmills or proposed "wind farms." Local officials may not have the technical, legal, economic and environmental expertise needed to evaluate proposed "wind farms." Therefore, they may not be able to protect adequately the interests of the citizens that they represent. Citizens in some communities facing "wind farm"

proposals have learned that existing rules covering open meetings and records, conflicts of interest, and other fundamental "good government" practices are not adequate to protect the public interest.

Protecting landowners. In addition, landowners often do not have the expertise to defend their interests adequately when confronted by aggressive "wind farm" developers with proposed contracts containing provisions that prove to be onerous. For example, some landowners have been confronted with (and perhaps even signed) contracts that tie up land and prevent alternative use for long and even undefined periods of time, whether or not development occurs. A bill has been introduced in one state (North Dakota) that has the objective of protecting landowners from some of the more egregious practices.

Conclusions

In summary, wind energy provides far fewer benefits and results in much higher costs than its advocates typically claim and which the public, media and government officials have been led to believe. . Generous federal, state and local tax benefits and other subsidies – rather than environmental benefits – appear to be the primary motivation for the proliferation of proposed "wind farms." Owning "wind farms" offers the potential for substantial profits for organizations with significant amounts of income to shelter from federal and state income taxes.

Federal, state and local executives, legislators and regulators have an obligation to pay a lot more attention to the validity of claims made by the wind industry and other wind advocates. They need to understand the true cost of electricity from wind and the adverse impacts of "wind farms" on environmental, ecological, scenic and property values. They also need to take strong action to protect citizens and communities – as well as landowners – from overly aggressive activities of "wind farm" developers and owners.

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a. Government policies, programs and regulations that are detrimental to the interests of citizens, consumers or taxpayers.

b. Government or private programs and projects that are presented to the public, media, Congress and other government officials in a false or misleading way.

The views presented in this analysis are provided in Schleede's role as a citizen, consumer and taxpayer and are not on behalf of any client or other interest.

Endnotes:

[1] http://www.eere.energy.gov/wind/web.html

[2] U.S. Energy Information Administration (EIA), *Annual Energy Outlook 2003*, Tables A8, A17 & regional table 73. EIA is a part of the U.S. DOE but was given statutory independence to help assure its objectivity.

[3] California has about 13,000 windmills, many of which were built during the 1980s in response to generous tax credits. After tax credits were exhausted, many fell into disrepair and/or were abandon.

[4] In addition, wind advocates often use outdated data on emissions from existing generating units and do not take into account the fact that new fossil-fueled generating technologies have fewer emissions that older units.

[5] For example, Eveline Township in MI.