

Wind Energy Economics in the State of New York

On August 20, New York Governor Pataki announced that the state would give \$17 million to four private companies to develop five more “wind farms” in various parts of New York, adding to the 3 existing “wind farms.” The proposed “wind farms” raise questions that will need to be considered by New York’s electric customers, taxpayers, and citizens concerned about impairment of property and scenic values and other environmental concerns. This analysis reviews the following topics:

- The grants for NY “wind farms”
- Huge machines; little electricity
- High costs for electric customers
- Basic “wind farm” economics
- Windfall profits for “wind farms”
- Net losses for state economy
- Overstatement of environmental benefits
- Adverse environmental and related impacts
- Uphill fight for “wind farm” opponents
- Cautions for landowners

“Wind Farm” Grants total \$24 million

The \$17 million in grants for proposed new “wind farms” are in addition to \$7 million provided earlier for existing “wind farms.” The funds apparently came from a so-called “public benefit charge” that is added to consumers’ monthly electric bills and now totals \$150,000,000 annually.

County	Developer or Current owner	Number of Windmills	Capacity (Megawatts)	Amount of Subsidy
<u>Proposed “wind farms”</u>				
Lewis	Atlantic Renewable Energy Corp.	68	102	\$5,000,000
Steuben & Yates	Global Wind Harvest, Inc.	50	75	\$4,500,000
Chautauqua	York WindPower, Inc.	34	51	\$3,100,000
Ostego	Global Wind Harvest, Inc.	27	40.5	\$2,500,000
Erie	Zilkha Renewable Energy	34	51	\$2,000,000
<u>Existing “wind farms”:</u>				
Madison	PG&E-National Energy Group	7	11.55	\$2,000,000
Canastota	CHI Energy	20	30	\$5,000,000
Wyoming	CHI Energy	<u>10</u>	<u>6.6</u>	<u> </u>
New York Total (existing and proposed)		250	367.65	\$24,100,000

Huge Machines; Little Electricity

The windmills making up the “wind farms” are huge (300+ feet tall. The Statue of Liberty is 157 ft. and the US Capitol is 300 feet.), but they produce very little electricity. Specifically:

- If all 8 “wind farms” produced electricity at their full “rated” capacity for 24 hours per day all year long, they would produce 3,220,614,000 kilowatt-hours (kWh) of electricity annually (i.e., 367,650 kW x 8760 hours).
- However, wind turbines produce electricity only when the wind is blowing within a certain speed range. If all eight “wind farms” produced at a 28% capacity factor,¹ the total annual output for all 8 “wind farms” would be 901,771,920 kWh (i.e., 3,220,614,000 x .28).

That may sound like a lot of electricity. However, it’s equivalent to only 58/100 of 1% of the 156,632,000,000 kWh of electricity generated in and imported into New York State during 2000.

Furthermore, the 901,771,920 kWh of potential annual output from the 250 turbines at the 8 “wind farms” (assuming a generous 28% capacity factor) would equal only:

- 44% of the annual output of a modern 360 MW gas-fired combined cycle generating plant operating at a modest 65% capacity factor which would produce 2,049,840,000 kWh annually. Such a plant began operation in Charlton, MA in April 2001. (360,000 kW x 8760 hrs. x .65)
- 15% of the annual output of the new 1,080 MW gas-fired combined cycle plant operating at a modest 65% capacity factor which would produce 6,149,520,000 kWh each year. Such a plant is under construction at Athens, NY, and is scheduled to begin operating in 2003. (1,080,000 kW x 8760 hrs. x .65)

Also, these gas-fired generating units are “dispatchable,” which means that they produce electricity when needed by electric customers, not just when the wind is blowing within the right speed range. Such plants occupy relatively few acres while the 8 “wind farms” would stretch over many acres in 8 or 9 New York counties.

High Costs for Electric Customers

Wind industry advocates readily admit that electricity from windmills costs more than electricity from traditional energy sources: natural gas, oil, coal, hydropower, and nuclear energy. (Otherwise they would not need the extremely generous federal subsidies – discussed below -- that are contributing to windfall profits for “wind farm” developers.) However, wind energy advocates in the US Department of Energy (DOE) and the wind industry seem to avoid admitting the true costs of wind energy. In fact, the true costs for electricity from “wind farms” – which costs end up in electric customers’ monthly bills -- include:

- a. The price paid by the electric utility to the “wind farm” owner for the electricity.
- b. The cost of providing “firming” or “balancing” services for the intermittent electricity from the wind turbines. Wind turbines produce electricity only when wind speed is within certain limits – and then on a variable (sometimes volatile) basis. Other generating units must be kept immediately available to back up the wind turbines so that customers’ electricity requirements are served and to keep the grid system in balance. Often this backup role will be served by combustion turbines, combined-cycle or steam electric units powered by coal, oil or natural gas and running at less than peak efficiency or in “spinning reserve.” This backup service costs money and that cost is a real part of the true cost of wind energy.
- c. The capital and operating cost of transmitting the electricity from the point where it is purchased from the “wind farm” owner to the electric distribution system. Such transmission and associated grid management costs may be higher for electricity from intermittent, volatile sources such as wind than for electricity from stable, dispatchable generating units.
- d. The normal capital and operating costs of a utility’s electric distribution system (e.g., substations, wires, transformers, meter reading, billing and other customer service costs).

If the total costs of electricity from wind were only \$0.02 per kWh (a low estimate) more than electricity from other sources, the added cost imposed on electric customers in New York for the 8 “wind farms” operating at an average 28% capacity factor would be \$18,035,438 per year (i.e., 901,771,920 kWh x \$.02). Such extra costs for electric customers will increase if still more “wind farms” were added in New York.

“Windfalls” for “Wind Farm” developers.

The above costs are NOT the full costs of electricity from “wind energy.” The federal government now provides two extremely generous tax shelters for “wind farm” developers. These subsidies shift costs from wind energy developers to remaining taxpayers.

- a. One extremely generous subsidy available to corporations with income to shelter is 5-year double declining balance accelerated depreciation available for facilities using wind to produce electricity. “Wind farm” owners can recover their capital investment in 5 to 6 years with over half recovered in the first 2 years or less. Specifically, if the capital cost of the 102 megawatt “wind farm” proposed for Lewis County were \$100,000,000, the recovery through depreciation would be as follows (see IRS Publication 946):

<u>Year</u>	<u>% of investment Recovered</u>	<u>Amount Recovered</u>
First	20%	\$20,000,000
Second	32%	\$32,000,000
Third	19.2%	\$ 19,200,000
Fourth	11.52%	\$ 11,520,000
Fifth	11.52%	\$ 11,520,000
Sixth	<u>5.76%</u>	<u>\$ 5,760,000</u>
Total	100%	\$100,000,000

- b. The second generous federal subsidy available to “wind farm” owners is the Production Tax Credit of \$0.018 per kWh of electricity generated during the first 10 years of a wind project’s life. The 102 MW “wind farm” planned for Lewis County would receive a tax credit of \$4,503,341 per year if the turbines produce at an average 28% capacity factor (i.e., 102,000 kW x 8760 hrs. x .28 x \$0.018).

Organizations owning “wind farms” must have substantial taxable income to take advantage of these two federal tax shelters. That is one reason why “wind farm” developers often sell off their projects to larger companies early in the life of their projects, as Atlantic Renewable Energy Corp. did with its Fenner and Madison “wind farm” projects.

In addition, New York State provides at least two major subsidies to “wind farm” developers and/or owners:

- Grants to developers such as the \$24,000,000 described above, financed by the “tax” on monthly electric bills.
- Governor Pataki’s directive to New York State agencies that state buildings, including the State University system, obtain 5% of their electricity from “renewable” energy by 2005 and 10% by 2010. In effect, this directive will force covered organizations to pay the higher cost of electricity from renewable sources. Those higher costs are, of course, paid for by the state’s taxpayers.

In fact, all federal and state subsidies shift costs from “wind farm” developers and owners to taxpayers and electric customers, hiding those costs in tax bills or monthly electric bills.

All the federal and state subsidies for developers and owners are in addition to the revenue received by the “wind farm” owner for the sale of electricity. For example, if the “wind farm”

being planned for Lewis County produces at a 28% capacity factor (i.e., 250,185,600 kWh) and the electricity were sold to an electric utility for \$0.03 per kWh, the “wind farm” owner would receive \$7,505,568 each year for that electricity (i.e., 250,185,600 x \$0.03).

As indicated earlier, if all 8 of the existing and proposed “wind farms” operated at an average capacity factor of 28%, the annual output would be 901,771,920 kWh. Therefore, the “wind farm” owners would receive:

- Federal Production Tax Credits of \$16,231,894 each year.
- Income from the sale of electricity of \$27,053,157 if it is sold at \$0.03 per kWh.

Possible net loss to the State’s economy.

“Wind farms” are often presented as beneficial to states or regions where they are located because of additional jobs in the area and additional income for the landowners who lease land for the windmills, substations, cables, meteorological facilities, support facilities and transmission lines. However:

- a. The number of jobs may be quite small. A developer in Illinois recently indicated that a 50 MW “wind farm” planned there would involve 30 temporary construction jobs for 6-9 months and 6 permanent jobs.
- b. The rental and easement payments received by landowners and wages earned by permanent workers would be dwarfed by the higher cost for the electricity that would be paid by electricity consumers. Specifically:
 - 1) If the electricity from the Lewis County project, for example, cost only \$0.02 per kWh more than electricity from traditional sources, the added burden on electric customers would be \$5,003,712 per year (i.e., 250,185,600 kWh x \$0.02)
 - 2) The 6 permanent jobs might produce \$600,000 per year, or 12% of the added burden on electric customers.
 - 3) Land rental payments for the windmills, if set at \$5,000 per MW of turbine capacity would provide \$510,000 per year to local landowners – which is about 10% of the added burden on electric customers.

Similar calculations could be done for other existing and proposed wind farms with the same result. The net economic impact would almost certainly be an outflow of wealth from New York for the benefit of out-of-state or foreign wind energy developers and owners.

From the vantage point of New York’s electric customers who would bear the higher costs of electricity produced from wind turbines, it would be far better if State officials used the funds from the “public benefit charge” to pay landowners to AVOID hosting the windmills.

Environmental benefits of “wind farms” often overstated by developers

“Wind farm” developers often claim that the electricity generated by the wind turbines will displace on a kWh for kWh basis electricity that would be generated by fossil-fueled generating units and any associated emissions. Such claims are generally exaggerated. For example, they do not take into account that any fossil-fueled generating unit that is kept available to back up the intermittent electricity from the wind farm will be giving off emissions while it is running at less

than peak efficiency or in “spinning reserve” mode. Neither do they take into account the fact that other alternatives for reducing emissions are likely to be far more cost-effective.

Adverse Environmental and Related Impacts

Except when placed in remote areas, proposed “wind farms” are facing growing citizen opposition in Europe, Australia and in nearly every state in the US, including New York, where “wind farms” are being proposed. Opposition is due to a variety of reasons including scenic and property value impairment, noise, bird kills, “flicker” effect of spinning blades after sunrise and before sunset, potential safety hazards from blade and ice throws, interference with telecommunications, and higher costs of electricity.

“Wind farm” opponents are at a disadvantage in New York

Electricity customers and taxpayers concerned about extra costs, neighbors of proposed “wind farms” concerned about impairment of property values, or citizens concerned about scenic impairment of other adverse environmental and safety impacts have a significant disadvantage in New York because they apparently will have to raise their own money for opposition efforts.

The “wind farm” developers, on the other hand, have the generous grants distributed by the New York State government. These funds can pay the developers’ costs for lawyers and other staff to find land to lease for windmills and other facilities, for securing permits from state and local governments, and for “selling” the projects to the public, media and government officials.

The fact that the \$17,000,000 for the latest grants was collected from electric customers underscores the seeming unfairness. Citizens opposing the planned projects might be forgiven for wondering where their government representatives were when these lucrative arrangements for “wind farm” developers were made!

Cautions for landowners approached by “wind farm” developers

Landowners who lease their land for the windmills would receive added income but they may want to be very cautious about the arrangement they make with developers. For example:

- a. What are reasonable annual payments for use of the land needed for windmills and associated facilities (e.g., substations, cables, meteorological stations, support facilities)? Apparently, developers offer \$2,000 or \$2,500 per MW of turbine capacity. However, research suggests that developers in Wisconsin have offered as much as \$5,000 to \$10,000 annually per MW of capacity.
- b. What other payments are reasonable? For example, should owners of land that must be crossed by transmission lines or cables be compensated on an annual basis for such uses or easements? What is an appropriate one time or annual payment for a noise easement?
- c. Should local governments be paid to cover any extra costs for services (roads, etc.)?
- d. Should landowners receive fixed annual payments or payments based on electricity produced?
- e. Should payments for the life of a lease or easement be paid “up front,” placed in escrow, or paid annually?
- f. What arrangements should be made for removal of the windmills and restoration of land when they no longer operate?

The last three questions may be particularly important because:

1. "Wind farm" developers often sell off their projects during the development phase or shortly thereafter. In fact, the Madison and Fenner "wind farms," developed by Atlantic Renewable Energy Corp., were, respectively, sold to PG&E-National Energy Group and CHI Energy, the US subsidiary of ENEL Green Power S.p.A., an Italian company. Landowners and local government officials should recognize that they might end up dealing with a "wind farm" owner that is not the initial developer.
2. The economics, including longer-term costs, of wind energy are far from certain. For example, calculations of the kWh costs of electricity from wind turbines that are cited by DOE, DOE laboratories, and the wind industry are often based on an assumption of a 30-year lifetime for the wind turbines. However, no one has sufficient experience with large wind turbines to know how long they will last or what their maintenance, repair and replacement costs, or the extent of performance loss will be as turbines age. Economics may dictate abandonment of the projects before the end of land rental contracts or current estimates of the useful life of the turbines.
3. "Wind farm" owners may have a strong incentive to sell off or abandon their projects once tax benefits have been captured (5-6 years for accelerated depreciation; 10 years for production tax credits), turbine performance deteriorates, and/or operating and maintenance costs escalate.

Zoning Ordinances

Unfortunately, it appears that very few local governments have adopted ordinances that prescribe proper conditions for siting of "wind farms." Ideally, ordinances addressing the complex environmental and safety issues would be in place before citizens and officials are faced with proposals from wind energy developers. Local governments that have not yet adopted ordinances may want to consider a model "Commercial Wind Energy & Wind Access Model Ordinance" prepared in January 2002 by Catharine Lawton (CMLawton3@aol.com), a member of the Planning Commission of the Town of Barton, WI. Apparently, the ordinance was developed in connection with her work with a Wisconsin Public Service Commission's Subcommittee known as "Guidelines and Model Ordinance Ad Hoc Subcommittee of the Wisconsin Wind Power Siting Collaborative."

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This analysis is provided as a public service by Glenn R. Schleede, Energy Market & Policy Analysis, Inc. PO Box 3875, Reston, VA 20195-1875; Phone: 703 709-2213; Email: EMPAInc@aol.com. Schleede is semi-retired after spending more than 30 years on energy matters in the federal government and private sector. He now spends part of his time on self-financed analysis and writing about:

- a. Government policies, programs and regulations that are detrimental to the interests of consumers or taxpayers, and
- 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 are in Schleede's role as a citizen, consumer and taxpayer and are not on behalf of any client or other interest.

Schleede is a native of western New York and still visits the area.

¹ 28% is the capacity factor for wind turbines assumed in New York's Energy Plan.