The Top Ten False and Misleading Claims the Windpower Industry makes for Projects in the Eastern United States

#1. Industrial wind developers are interested only in providing a public service.

All the false and misleading claims which this industry makes for itself work to disguise the fact that it is only a nominal producer of electricity in the eastern US. Its primary purpose is to provide extraordinary tax and income sheltering opportunities for a few wealthy investors at the expense of average taxpayers and rate payers. On a per kilowatt hour basis, wind is the most heavily subsidized source of industrialized power in the nation.

In response to persistent lobbying from the wind industry and its allies, 20 states have passed renewable portfolio standards requiring each state to purchase a percentage of its electricity from renewable power sources. This obligates utility companies doing business in the state to purchase electricity from the wind industry without any meaningful competition.

At the same time, also in response to a long term and very sophisticated political lobbying effort, Congress has re-authorized substantial subsidies to wind development, including an accelerated capital depreciation schedule and extraordinary investment and production tax credits. With laws ensuring a captive market and with tantalizing incentives for profit, investment in wind seems nearly risk free. The only remaining factor assuring success is access to land—and lots of it.

This is a major obstacle to the industry. A typical windplant is gigantic, consisting of dozens of 400 foot turbines arranged along many miles of access roads and communication/transmission line infrastructure. But the potential for profit is so great that wind investors are working hard to bulldoze opposition in order to secure the land they so desperately need.

Meanwhile, Congress has made wind initiatives so lucrative that it seems to have discouraged responsible citizenship. Consider what's at stake financially:

- Federal production tax credits remain front and center for wind developers and their investors, giving the industry tax credits worth 1.9 cents for each kilowatt hour it produces. As cited in Claim #4, a modest 40 MW windplant should produce about one hundred million KW hours annually (each 1.65 MW turbine would yield about four million KW hours a year), generating nearly $20 million in tax credits over the ten year period allowed by the production tax legislation. Since this windplant would power about 9000 homes a year, the total subsidy, underwritten by taxpayers, would be about $2,200 for each household powered! But this is just the beginning of the story. At a recent Maryland Public Service Commission heading, a spokesman for Clipper Windpower, a company proposing to erect a 100MW wind facility in Western Maryland, told the hearing examiner that his company expected $150,000,000 from production tax credits leveraged over a ten year period.
- Moreover, federal tax benefits pay as much as two-thirds of the capital cost of each $1.5 million wind turbine, with many states creating incentives to cover on average an additional ten percent of these costs.

- Windplant owners can use these tax credits to reduce their corporate tax obligations by tens of millions each year, as the Marriott Corporation did a few years ago with a similar clean energy scheme, within a year reducing its corporate tax obligations from 36 to 6 percent—at a savings of nearly $100 million, with average ratepayers and taxpayers picking up the slack to the federal treasury (See "The Great Energy Scam: How a Plan to Cut Oil Imports Turned Into a Corporate Giveaway," Time Magazine, October 13, 2003. Read an excerpt here).

State renewable portfolio standards laws make it probable that wind companies will likely charge utilities double the price paid for coal. For example, a 140MW wind facility as a consequence will likely reap 15-25 million dollars annually for the product it generates, and almost all of that energy product will be wasted in the electricity grid's spinning reserves. In addition to its lucrative production tax credits, the wind industry is a lusty cash cow.

It is for these kinds of rewards that wind developers have placed private gain over the public interest. In the process, they have transformed the wind business into yet another extraction industry, relying upon false claims and the gullibility of those seeking easy solutions to complex problems. According to the Department of Energy's Energy Information Administration, if the renewable production tax credit is extended from 2005 to 2015, there will be 42,000 1.5 MW or larger wind turbines installed in the United States by 2025, covering 3,750 square miles. These would generate 206 billion kilowatt hours of electricity per year, meeting about 3.7 percent of the United States' electricity demand in 2025. Although this projection is optimistic because it assumes a capacity factor of 37 percent, the sheer numbers of turbines invite social and environmental havoc without regulations for responsible siting.

#2. Windplants are harmless to wildlife.

Untrue. The wind industry has touted the safety of its newer technology, maintaining that "monopole towers" and slower moving blades, which rotate no faster than 20 rpms, will not harm wildlife. However, huge 350-465 feet tall continuously lit wind turbines—with propeller blades so long that, at 20 rpms, they are moving at nearly 200 miles per hour at their tips—and placed atop prominent ridges where large numbers of wildlife migrate—will kill raptors, songbirds, and bats. Despite industry insistence this won't happen, it already has. The annual body count at Altamont Pass, California has averaged nearly 5,000 birds for 20 years, prompting several current lawsuits. The wind industry response has been: "We need more time to study the problem" while the turbines continue to run full bore. Indeed, when confronted with actual bodies on the ground, the industry argument morphs into a ten wrongs make a right scenario: "Cats and communication towers kill millions of bird and bats annually, and we don't expect to kill that many." When challenged about the appropriateness of this defense, the industry shifts gears once more: "The strategic need for clean energy justifies the tactical loss of some wildlife."

When pressed hard, wind developers do admit their technology does kill. But the low bird and bat mortality ultimately acknowledged is extremely misleading if not outright disingenuous, for their "experts" often use an apples to orangutans comparison, giving statistics (only two or three birds killed per turbine) derived from western turbines averaging about 150 feet tall and located in fields not known for significant avian migration—then stating these should be comparable to 400 foot turbines located on high forested ridges in areas well known as a major avian flyway. This kind of comparison is no basis for credible prediction, which is the purpose of scientific analysis.

Recent radar studies at proposed industrial windplant locations atop the mountains of Vermont and West Virginia demonstrate that hundreds of thousands of birds and bats fly low enough to collide with huge turbines, placing them at risk—especially birds in times of fog and low clouds. The taller the turbines, the larger the threat. In 2003, a developer-sponsored mortality study conducted over a several week period at a West Virginia windplant revealed that over 2,000 birds and bats had been killed during fall migration in that span. Independent experts have doubled that mortality figure to more than 4,000, concluding that the developer's accounting methodology was insufficient.

While bird mortality has long been a concern, recent studies show that bat mortality may be an even greater problem, for reasons which are not entirely clear. But wind industry proponents press forward. To insure they receive all their tax credits, they continue to insist on post construction studies, a la Altamont Pass, vowing to work on resolving the "problem" in the future. Nonetheless, because of the documented experiences at Altamont and the recent discoveries made by radar analysis on ridgetop migratory routes, the industry has now begun to admit that windplant mortality could be very high. But not high enough to deter the building of windplants in risky areas, since, while the wildlife mortality at these sites may be significant, it is, according to the industry "not likely to threaten any species with extinction... ." Faced with the news that its wind turbines were killing thousands of bats at two windplants on Appalachian mountains ridgelines, Florida Power and Light, the owners of these windplants, reacted quickly. It barred scientists from pursuing follow-up work, pulled its $75,000 contribution from the research cooperative studying bat mortality and ended the doctoral work of a graduate student who had produced two years of data showing unusually high rates of bat death at the Pennsylvania and West Virginia sites. Although Florida Power and Light has pulled the plug on further research into avian and bat mortality on any of its properties, the company plans to construct hundreds more huge turbines in the mountainous areas.

Good public policy requires those who make claims about the safety of their product to substantiate those claims *before* introducing it into the environment, deferring to what Rachel Carson called the precautionary principle. Industry funded research should be highly suspect. Experts who work for the industry should submit their research and resulting conclusions for independent, peer-reviewed analysis. Good science insists upon conclusions which account for all the evidence, not selective pieces which fit the convenience of a developer's point of view. *Post* construction studies are extremely risky and problematic—and more than a little self-serving. As is the case at Altamont Pass, who is going to shut down a $100 million capital facility once it is running, even if studies verify it kills significant wildlife?

#3. Windplants will reduce the mining/burning of fossil fuels and lessen dependence on foreign oil.

Foreign Oil

Wind only generates electricity. Electricity generation is only part of our energy production. Sixty percent of the nation's energy use does not involve the making of electricity. Coal and gas-fired power plants do pollute the air with toxic hydro-carbons. But the sheer volume of automobile exhaust combined with home heating demand are major contributors to the problem It is folly to suggest that thousands of wind turbines blanketing the mountains of the the eastern US would do anything of significance to mitigate these other energy forces evidently contributing to the warming of the planet. Allegheny Power, the major electricity provider in the region including Western Maryland, reports that oil accounted for 1% of the resources used to generate its power in 2004. Nationwide, this figure is less than 3%. Even if industrial wind generated ten

percent of the nation's electricity, it would not staunch the fossil fuel emissions thought to be involved in accelerating global warming, given our nation's increasing energy consumption and given that wind can only intermittently (about 30 percent of the time) address the electricity portion of the energy production problem—the minor portion.

Given that wind only produces electricity, given that we use so little oil for electricity production, and even if large numbers of wind turbines displaced the one percent of our electricity now powered by oil, the region would still be heavily dependent on coal and gas, power sources often described as "dirty"—and we would still be mightily dependent on foreign oil, contrary to what the wind industry claims.

Fossil Fuels

Wind technology in the uplands of the eastern United States stands little chance of displacing fossil fuel extraction efforts or reducing its consumption, given our increasing rate of electricity demand. Wind machinery has problems accessing and controlling its source of power. Because of the intermittent nature of wind velocity, sometimes it is not strong enough to generate power and other times it is too strong to be commercially tapped. The industry has attempted to increase its effectiveness by making taller machines and targeting them on high ridges with excellent wind potential. Nonetheless, because of its intermittency, wind technology will require back-up from other, often "dirty" power sources for the time it does not operate or works at sub-optimal levels.

A wind turbine is designed to generate optimal electrical power relative to its size, shape, ability to withstand stresses, rotor sweep and efficiency, and location, among other conditions. The wind needs to blow eight to fourteen miles an hour before a turbine will produce electricity, and a turbine is programmed to shut down when the wind velocity exceeds 50 or 55 miles per hour to prevent harm to its gears. If the wind were to blow at a sufficiently consistent velocity all the time and the turbine never broke down, the turbine would be operating at 100 percent of its capacity potential over a year's time—its Rated Capacity. However, because the wind is intermittent and volatile, and the turbines at various times require maintenance, they actually will produce electricity only some of the time. Using a combination of considerations, such as meteorological testing, weather history, the history of turbine effectiveness, among others, energy experts assign a Capacity Factor for each turbine model, which predicts the amount of electricity a turbine will actually produce in a year. No existing windplants located in the Pennsylvania, New Jersey, Maryland (PJM) region have achieved a capacity factor of more than 30 percent. This means that 70 percent of the time they are not producing electricity. Consequently, a windplant rated at 47 MWs, for example, will generate electricity in the neighborhood of 12-15 MWs (25-30% of its rated capacity).

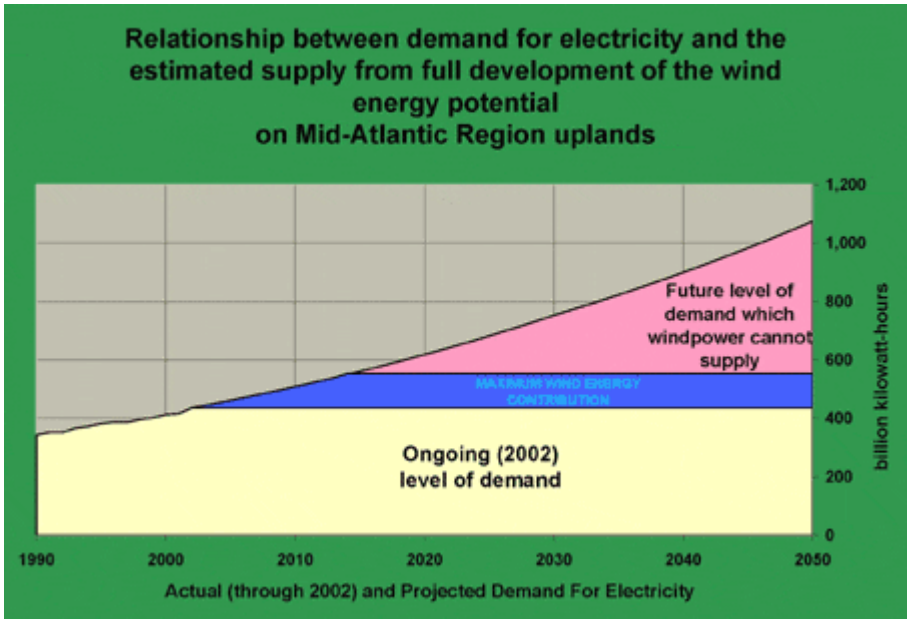
Other power sources, such as coal or nuclear, also don't work all of the time and must be supplemented by power sources that are working. The electricity grid has a complex monitoring system for predicting and maintaining its supply. Electricity must balance the rate of production with the rate of consumption at all times. A fundamental problem with supplying electricity is that electricity cannot be stored at industrial levels. Once generated, electricity must be delivered and consumed immediately. However, power sources like coal and nuclear are rarely volatile when producing their yield and produce electricity at about 75-80 percent of their rated capacities. The volatile, extremely unpredictable nature of wind resource makes its technology different from other power sources not only in degree but in kind.

The intermittent nature of wind energy might not pose a problem to the region's electricity grid at present levels. However, increasing the percentage of wind energy to higher levels would require significant and expensive technological modifications to the grid and to the various transmission systems out to the end user. It would also present major challenges for the grid's management.

This may not be a substantial concern until wind energy becomes a major contributor to the electricity grid, adding, say, two or three percent to the total electricity supply. A "Wind Report 2004" by E-On/Netz, one of Germany's largest electric grid operators, confirms this analysis, adding many other "price" caveats: given the intermittent and volatile nature of the wind, both the mechanics of grid operation and transmission technology would have to be retooled—at substantial cost—to back up wind generation. In fact, if wind energy increased to provide, say, just a small percentage of the power for the PJM grid, primarily fossil-fueled generating plants would have to fire up to levels of 80 percent to function as a "shadow" back up service. This report also confirms that wind utilization rates rarely achieve 30 percent, that is, they don't work more than 70 percent of the time.

Even with a generous 30 percent capacity factor, more than 2000 giant 2.5 MW turbines are needed to equal the annual production of one 1600 MW coal plant. Even if we placed huge wind machines at all the good wind sites possible in the uplands east of the Mississippi River (a region with only 5% of the wind energy potential of the continental US), this would still not reduce the mining or burning of coal, given that our demand for electricity will likely nearly double in 30 years. In fact, wind technology works least when the need is greatest—summer peak demand, when the wind is typically not very active. For example, at the newly constructed Mountaineer wind facility in West Virginia, the capacity factor during summer months averages less than 15 percent—half of the average annual capacity factor. This is also true for the mountains of western New York state, based upon anemometer projections for that region.

Consider the following graph showing the relationship between demand for electricity and the potential of windpower to meet it in the uplands of the Mid-Atlantic region.



This region comprises all or most of six states and Washington, DC. It's ridges have less than one percent of the nation's wind energy potential. Moving from left to right, the upward curve on the graph represents the demand for electricity which is expected to increase in the region at a conservative projection rate of two percent each year into the foreseeable future. Present supply comes from the PJM Interconnection, the world's largest grid operator, which taps a variety of power sources—primarily fossil fuels, with negligible contributions from wind.

However, *if* (and this is a most improbable if) the wind industry could immediately exploit all the wind potential available in the region's uplands, saturating it with 30,000 huge turbines functioning at a capacity factor of 30 percent (see the table below), then it could produce enough electricity to supply about one-fourth of the present level of demand. In the graph, this hypothetical supply from wind is represented in blue atop the ongoing level of demand. But note, in about 15 years, our increased rate of demand will absorb any yield produced by windpower, necessitating additional energy sources to supply it. Unless wind turbines fill up the Chesapeake Bay and are constructed off the ocean's shore, the projected additional future power sources will not come from wind, for the industry will be tapped out on land. As the graph rather dramatically shows, wind energy development of the region's uplands—at its realistic maximum—will not result in a net reduction of greenhouse gases or cut the present rate of the burning of coal and other fossil fuels. The very best case scenario for windpower in the Mid-Atlantic region is that future wind energy development will only slightly lessen the rapidly increasing rate in the growth of demand for electricity from "dirty" power sources.

The claim wind companies make about potential wind energy production may seem impressive. However, a million hamsters churning treadmills will also produce electricity. But what's the point? In this larger scheme, industrial windpower's comparatively minuscule power production would immediately be engulfed by increasing demand. The PJM grid coordinates the delivery of more than 163,000 MW of electricity annually to the region. A 45 MW wind facility might annually contribute 14 MW of unreliably intermittent energy to the grid—.0000858 percent of the grid's current supply. The boast that this kind of power plant would be an important first step in the direction of a comprehensively effective windpower system is therefore unsupportable.

Potential Amount of Electricity That Could Be Generated Annually From Renewable Sources Within States Of The Mid-Atlantic Region

STATE	RENEWABLE ENERGY SOURCES[1]				TOTAL OF RENEWABLE ENERGY SOURCES (million kwh)	% TOTAL FROM WIND	NUMBER OF INDUSTRIAL WIND TURBINES TO GENERATE WIND POTENTIAL[3]
	Geothermal Potential (million kwh)	Landfill Gas Potential (million kwh)	Clean Biomass Potential (million kwh)	Wind Potential[2] (on-shore) (million kwh)			
DC	0	0	0	0	**0**	0	**0**
Delaware	0	123	561	4,806	**5,490**	88%	**1,219**
Maryland	0	515	2,333	5,640	**8,489**	66%	**1,431**
New Jersey	0	1,374	482	15,327	**17,182**	89%	**3,888**
Pennsylvania	0	1,748	9,969	67,894	**79,611**	85%	**17,223**
Virginia	0	1,098	11,669	13,366	**26,132**	51%	**3,391**
West Virginia	0	0	5,323	9,764	**15,087**	65%	**2,477**
TOTAL	**0**	**4,858**	**30,337**	**116,797**	**151,991**	**77%**	**29,629**

1. Source information is from a national report entitled - **Generating Solutions: How States Are Putting Renewable Energy Into Action** - A Report of the US PIRG Education Fund and the State Public Interest Research Groups. February 2002. ["This report examines 21 states and their potential for electricity generation

from renewable resources using state-of-the-art technology." Estimates of amount of electricity possible for energy sources were based on studies by government (mainly National Renewable Energy Laboratory), industry and the Union of Concerned Scientists (UCS).] Amount of electricity is shown as Million kilowatt-hours.

2. Union of Concerned Scientists estimate based on a state breakout of data developed for Doherty, Julie P., "U.S. Wind Energy Potential: the Effect of the Proximity of Wind Resources to Transmission Lines," Monthly Energy Review, Energy Information Administration, February 1995. Includes class 3 and higher windy land area within 20 miles of existing transmission lines, excluding all urban and environmentally sensitive areas, 50% of forest land, 30% or agricultural land, and 10% of range land.

3. Number of modern industrial wind turbines is calculated by dividing each state's Wind Potential by the average amount of electricity annually generated by a 1.5-MW turbine. An "average" 1.5-MW turbine produces only about 30% of its rated capacity each year (i.e., Capacity Factor = .30), so its annual output would be about 4 million kilowatt-hours (1,500 kw *.30 * 8760 hrs/yr).

Unfortunately, the demand for electricity will be so great over the next thirty years that additional coal plants are likely to be built. Florida Power and Light, the nation's third largest electric utility company, now owns over one-half of the wind energy facilities in the US. Moreover, AES Corporation, which operates a coal-burning power plant at Cumberland, Maryland, has recently joined with US WindForce (which has several approved and planned projects in West Virginia and Maryland), lending its financial backing to wind energy development in the region. US WindForce is the most ambitious developer of wind energy in the Alleghenies.

Such "equity investments" between wind and coal will likely grow in number, as the former industry reaps the cachet of association with a major electricity producer while the latter gathers in the use of wind's generous tax avoidance shelters and its reputation as a green energy source. The irony of these partnerships should not be lost on the public.

Unless we have a major change of political direction, fossil fuel combustion, and the toxins it emits into the air, will increase in the future, contributing to such dire statistics as the rate of asthma's doubling every five years. The wind industry will not itself alter this circumstance. Only when the public insists upon implementing appropriate standards and newer equipment to increase efficiency, as well as conservation measures that reduce per capita consumption demand, will air quality improve. Indeed, because of some of these measures residual to the last Administration, which mandated newer, more efficient coal-burning technology, air quality in the region has actually improved in recent years.

Altogether, the wind industry in the uplands of the eastern US is not an answer to the concerns about global warming, energy independence, air pollution, or public health.

#4. Windplants are highly efficient and provide power for significant numbers of homes.

The press often prints this inflated fiction as truth. Wind technology is very problematic from an energy production standpoint.

A wind turbine is designed to generate optimal electrical power relative to its size, shape, ability to withstand stresses, rotor sweep and efficiency, and location, among other conditions. The wind needs to blow eight to fourteen miles an hour before a turbine will produce electricity, and a turbine is programmed to shut down when the wind velocity exceeds 50 or 55 miles per hour to prevent harm to its gears. If the wind were to blow at a sufficiently consistent velocity all the time and the turbine never broke down, the turbine would be operating at 100 percent of its capacity potential over a year's time—its Rated Capacity. However, because

the wind is intermittent and volatile, and the turbines at various times require maintenance, they actually will produce electricity only some of the time. Using a combination of considerations, such as meteorological testing, weather history, the history of turbine effectiveness, among others, energy experts assign a Capacity Factor for each turbine model, which predicts the amount of electricity a turbine will actually produce in a year.

No existing windplants located in the PJM (Pennsylvania, New Jersey, Maryland) region have achieved a capacity factor of more than 30 percent. This means that 70 percent of the time, they are not producing electricity. Consequently, a windplant rated at 40 MWs, for example, will generate electricity in the neighborhood of 11-12 MWs (25-30 % of its rated capacity).

Consider the following example.

Recently, a wind developer claimed his proposed 40 megawatt windplant would generate enough electricity to power 33,000 homes. A megawatt (MW) is one million watts or one thousand kilowatts (KW). According to the Department of Energy, the average home consumes 12,000 KW hours of electricity annually.* Using this estimate, one can rather easily obtain a reasonable annual projection for the number of homes this windplant might actually power. The following example assumes a 24 turbine windplant with 400-foot tall turbines, each rated with a potential of 1.65MW and with a generous capacity factor of 30 percent:

> 1.65 MW x 30% capacity factor = .50 MW (or 500 KW)
> 500 KW x 24 hours x 365 days = 4, 380,000 KW hours per year per turbine
> 4,380,000 KW x 24 turbines = 105,120,000 KW hours annual plant output
> 105,120,000 KW / 12,000 KW hours average household use per year* = 8760 homes powered annually.

Consequently, a 40 MW windplant would power less than 9,000 homes annually.

Even this overstates the case significantly, however. Because electricity from wind is inherently intermittent and volatile, it would really "serve" those homes where the occupants were willing to have electricity only when the wind was blowing in the right speed range—or for them to invest in an expensive battery storage system. Seen in this light, windpower would service no homes in any conventional sense of that term's use. A 40 MW windplant may produce about 14 million watts annually for the grid, but this is not the same as saying it will service any particular sector. And it is a figure which should be seen in context.

The Mid-Atlantic region requires the PJM grid to supply many millions of households with about 163,000 MWs annually, with residential usage increasing two percent each year—far more than the tiny fraction of a percent a wind facility would contribute to the supply. A windplant with a rated capacity of 40 MWs, which actually will produce electricity at only 30 percent of its rated capacity via the capacity factor, delivering about 14 MWs of energy (but not capacity) annually to the grid, with the potential to power about 9,000 households if it weren't so unreliable, would be so statistically negligible as to be meaningless in terms of cleaner air and improved health—.0000858 of one percent of the PJMs annual production.

*The wind industry often uses a decade-old low end projection of 9,000 showing only direct household use. The conservative 12,000 projection assumes that the average household requires a reasonable baseline of public, community-related infrastructure electricity to operate in society—hospitals, schools, courthouses, traffic lights, etc—in order to function.

#5. Locals who oppose the wind industry are NIMBYS.

One of the most persistent hypocrisies from corporate wind and its supporters is the accusation that locals who resist the industry are selfishly holding back progress. However, many politicians who vote to enable industrial wind do so fully aware that windplants will be built in someone else's back yard, realizing they would not survive the political backlash if one were constructed in their district. Wind investors—and the politicians who enable them—live hundreds of miles away from the results of their handiwork. While there are many areas of good wind potential available, the industry focuses on rural, often economically depressed areas which don't have much money or political influence. In Maryland, for example, the Chesapeake Bay has the best overall wind potential in the state. Yet the wind industry, aware of the probable political repercussions, avoids this region, preferring instead to target Appalachia and the mountains in the far western region of the state. It is the old story of colonialism, with distant capital exploiting the people and resources of the hinterlands to give the illusion of progress.

Nedpower, one of the most aggressive wind companies in the country, seeks to construct a huge 200 wind turbine facility along a 14 mile strip of the Alleghany Front east of Mount Storm Lake in West Virginia. Frank Maisano, a Washington, DC lobbyist and media spokesman for Nedpower, said that any allegation that a wind-powered project will be an "eyesore" is generally a claim without merit." However, when asked by a reporter, he declined to say if he would want such a project built within two miles of his home. "I'm not living next to one, so I'm not going to answer hypothetical questions for you just for the sake of answering them," he said. (Charlotte, WV Gazette, November 30, 2005.)

As has been shown, there are legitimate, unselfish reasons for locals to be concerned about how massive windplants will affect their lives.

6. Windplants will generate significant local revenue and increase property values.

Promised "windfall" revenue is tantalizing. Rural areas often rely heavily upon tourism attracted to the region's scenic natural beauty. The lure of additional revenue without any apparent cost often blinds authorities to the problems created by development which will diminish the natural beauty at the heart of the economy.

Taxes

Most rural communities have no ordinances for taxing a windplant in ways commensurate with the capital value of a proposed windplant. Wind developer's promises about what their plants will pay in taxes are basically promotional propaganda to curry favor with local politicians, and should be closely scrutinize for legal accountability, since these claims are usually not secured by any legal document. Characteristically, nowhere is it made clear what the assessed value of each turbine will be for tax purposes. Developers often claim a 30 year turbine life, which seems meaningless in light of the federal double declining capital depreciation schedule allowed for the industry.

For the first two windplants operating in Somerset County, PA, the average per turbine tax payment in 2003 was only $528, a combined property tax payment of $7,388 (fide Somerset County Commissioner Pamela

Tokar-Ickes) on machines that cost nearly $50 million to install. Moreover, another Florida Power and Light windplant in Thomas, West Virginia (Mountaineer Wind) has purportedly paid $93,000 over several years after a capital outlay of over $70 million—and this after much delay and a lot of negative press (Judy Rodd, Citizens for Responsible Windpower). These companies had originally promised to contribute many hundreds of thousands of dollars in local taxes. Usually wind facilities will not be taxed as public utilities. Indeed, it is not clear what taxes they would be obliged to pay. With knowledgeable tax accountants, a developer will undoubtedly look to protect his investors, not a local economy hundreds of miles away from its corporate offices.

No penalties seem to apply if local jurisdictions do not receive promised tax revenues. Consequently, there are no real incentives to tell the truth. Wind developers know that spin wins.

Since this project will lease private land, the county will receive little additional property tax. Wind leases are typically written to favor the developer, restricting the owner's use of the land for up to 35 years and devaluing it significantly (a major problem for those in need of emergency funds). Turbine leases also may allow abandoning all equipment to the property owner, providing little or no indemnification for any decommissioning, removal, or restoration costs. And they often include noise and other "nuisance" easements, holding the developer harmless from legal responsibility if his machines create such nuisances.

Wind Leases

Income generated from turbine lease agreements varies widely. Wind developers insist that their leases with private property owners remain secret, but they will often claim that lease income will range from $4,000-$6,000 annually per turbine, although it is not clear how this estimate is derived. An examination of several wind leases obtained from disgruntled lessors, however, reveals provision for an initial, one-time payment (from $500 to $1,000) to reserve a turbine lease, with pledges of minimum annual rental income of about $1500 per turbine against a small percentage of the power the turbines actually produce, generating at maximum about $2500 per turbine. Wind lessors should interrogate any lease proposal from a wind developer before signing anything. The supposedly "solid" promises of lease revenue are typically unsecured—and the developer can unilaterally withdraw from the lease with only a 60 day notice. The lessor will not have this luxury.

Wind leases are typically written to favor the developer, often restricting the owner's use of the land for up to 35 years. Aside from saddling lessors with an onerous obligation, the contract also may place property owners who live near the proposed wind turbines at risk. A contract typically specifies that the wind developer can make noise without hindrance on the leased property, which noise will likely spill over to adjacent properties. The contract also may stipulate that the wind developer has the right to the free flow of the wind, effectively controlling not only what can and what cannot be built on the property but also where any building can take place. It usually gives the developer veto power over hunting on the land. The grant of easement may permit the wind developer rights to use any and all the property at the developer's discretion, including provisions for unlimited ingress and egress at any time, for transmission lines, for building any structures, wires, fences, buildings at any place the developer deems necessary, for allowing access at any time to any of its employees—and "an easement for any sound waivers or noise emitted from the wind turbine generators or other equipment."

Further, these agreements may stipulate that the owner "*shall join with* [italics added] the developer in requesting all infrastructure modifications and ...any and all zoning changes or other land use permits and/or approvals necessary to the developer...". In the words of one contract lawyer who has reviewed these documents, they may well constitute an "unconscionable contract," so lop-sided in favor of the developer that it is unconstitutional.

Windplant leases diminish property values throughout the viewshed, while creating major disturbances which reduce the quality of life for nearby residents. One of the most validated real estate precepts is the idea that significant natural views have premium value, and intrusions which restrict that view erode value. Realtors doing business near windplants in the western United States and in Europe understand that property will sell for between ten and thirty percent less than previous market value, depending upon how close it is to the windplant. The few "studies" which appear to support the claim that windplants don't devalue property are extremely flawed in fact and methodology, often surveying people and evaluating property miles away from a wind site. According to Paul Gipe, author and proponent of responsible wind development, an axiom for the wind industry is that its technology is far more popular with people who live a remote distance from wind facilities—and much more unpopular with those who live nearby. This attitude manifests itself when calculating values to properties near windplants.

Local Revenues

Wind developers nearly always overstate the general local economic benefits from a wind facility by counting the full price of goods and services, rather than value added. Generally, a large part of the price paid to a local supplier has to be paid by that supplier to another agent, in this case likely to be a party outside the local area. This price is part of the local supplier's cost of acquiring the goods (for example, the purchase of fuel, wiring, cement) the local supplier is reselling to the windplant. The only portion of the price paid by the windplant that should be tallied is the difference between the local supplier's cost and the price he charges—that is, the value added portion—which in any case would be extremely small in a rural county as most goods will be purchased elsewhere for a wind facility.

Property Values

Although looming windplants are a relatively recent phenomenon in the eastern United States, there is increasing evidence that the closer one resides to them, the lower one's property value falls. For quiet rural properties, the premiums paid for the serenity of natural views can no longer be justified if the area is surrounded by huge wind turbines. The rural areas targeted by wind developers are often filled with family farms framed by misty mountains. Those who feel that a single wind structure is beautiful should visit a wind facility like the one above Meyersdale, PA to see how the 2,750 foot mountain there seems to disappear with 375 ft. wind machines on top (one can see these 15 miles away on a clear day). Note, too, the four acres of clear-cut around each turbine.

One of the most validated real estate precepts is the idea that significant natural views have premium value, and intrusions which restrict that view erode value. Realtors doing business near windplants in the western United States and in Europe understand that property will sell for between ten and thirty percent less than

previous market value, depending upon how close it is to the windplant. The few "studies" which appear to support the claim that windplants don't devalue property are extremely flawed in fact and methodology, often surveying people and evaluating property miles away from a wind site, then "averaging" these results with properties adjacent to windplants.

The wind industry has recently put forward The Renewable Energy Policy Project(REPP) (May, 2003), written by personnel associated with the national Renewable Energy Lab, to bolster its claim that not only will wind facilities not diminish nearby property value—they will actually enhance them. However, this study contains serious methodological flaws:

- The study covers just ten projects, only one of which comes close to the size and scope of many newly proposed projects—and this site (Madison County, NY—the Fenner Site), with 20 1.5 MW turbines situated on farm fields—not atop prominent ridgelines—interestingly showed significant decreases in property values.
- The time frame of the study was so short that even the study's authors were compelled to state the data was insufficient to offer compelling conclusions.
- The study did not verify whether individual properties had a direct view of the windplants, making the use of the term "viewshed" something of a misnomer in this context, since the viewshed properties were actually all properties within a five mile radius of the turbines regardless of whether they had a direct line of sight. To mitigate this problem, the researchers conducted phone interviews with tax assessors and other local authorities to get estimates on the number of properties in the defined viewshed that might have had views of the turbines. However, under scrutiny, many of these estimates proved inaccurate.
- The analysis used in this study did not incorporate distance from a wind facility as a variable or weighting factor, so that a viewshed property sale five miles away from a windplant counted the same as one a quarter mile away. It is at least plausible that if windplants do have an effect on property values, it would be strongest close to the turbines and decline with distance. Simple geometry suggests that the majority of properties in the area of a five mile circle are likely to be fairly distant from the wind development: 64% of the area of this circle is three miles or more from the center—and only 4% lies within the first mile. Though properties are not necessarily distributed evenly about the landscape, and property values conceivably can be affected by other things in the vicinity, the REPP study confuses substantially the proportion of properties that either have only a distant view of wind turbines or no view at all.
- The study relied on average rates of sale prices before and after the windplant construction and between viewshed properties and properties in a comparison group. Therefore, if one calculates that sale prices among viewshed properties increased $50/month faster than sale prices in the comparison group, then it makes a difference whether the statistical uncertainty in the point estimate is plus or minus $25/month or $500/month. The former leads to a conclusion that the wind development unlikely had a negative effect on property values while the latter intimates that the data are inconclusive—there could be a large negative impact, a large positive impact or no impact at all. These "smoothed" average sale prices against a very small time variable creates a regression analysis that is, for prediction purposes, almost beside the point, suggestive of nothing.

The REPP "study," although its basic methodological approach holds considerable promise, is severely flawed. To say, as wind developers do, that the study demonstrates a proposed windplant will have no effect on property values, that it may in fact enhance them, is disingenuous. George Sterzinger, the executive director of the REPP, admitted as much in response to critics who stressed the study contained no proof that

windplants were the reason for changes in property values. "We have no idea," he said, noting that the REPP did not have time or money to answer that question. (Cape Cod Times, June 20, 2003). Sterzinger further agreed that the study's findings have to be applied carefully to different situations.

There are very few windplants in the world, let alone in the eastern United States, with turbines over 400 feet tall placed on such a prominent ridgeline. Consequently, there is no comparable facility "yardstick" by which appraisers can measure the impact for predictive appraisal purposes. And without knowing about the various nuisances this kind of windplant will produce, the problems for credible prediction increase even more.

Let's examine a few other areas where wind facilities and property values have actually been correlated.

In 2001-2002, the Moratorium Committee of Kewaunee County, Lincoln Township, Wisconsin compared property sales prices to assessed values before and after the construction of two wind energy facilities, each having relatively small .65 MW turbines. An assessor reported that property sales (vs. 2001 assessed values) declined by 26% within one mile and by 18% more than one mile of the wind project. The Moratorium Committee also sent anonymous survey forms to 310 property owners, of whom 223 responded. These responses were then grouped based upon proximity to the windplants.

The survey results found that 74% of respondents would not build or buy within 1/4 mile, 61% within 1/2 mile and 59% within 2 miles of the windplants. In fact, a large percentage stated that they would not buy a home within 5 miles of the turbines. The windplant's offer to purchase neighboring homes for demolition—to create an "additional buffer for the windmills"—came immediately following the release of a noise study showing the Lincoln wind turbines increased the ambient noise level significantly, depending on wind conditions, etc.

A 1996 Danish report, *Social Assessment of Wind Power—Visual Effect and Noise from Windmills—Quantifying and Valuation*, contained a survey of 342 people living close to windplants. The accompanying survey found 13% of people in the area considered wind facilities a nuisance and would be willing to pay 982 DKK per year to have them leave. A survey of house sale prices showed a 16,200 DKK lower price near a single wind turbine and a 94,000 DKK lower price near windplants versus similar houses located in other areas.

In October, 2003, the Beacon Hill Institute, as part of a study of the proposed Cape Wind project in which hundreds of 430 foot turbines were to be located five miles off shore from Cape Cod in Nantucket Sound, contacted 45 real estate professionals operating in towns around the Sound, asking them about the anticipated effects of the wind power project on property values. Forty-nine percent of these realtors expected property values within the region to fall if the Cape Wind power plant was erected, while most of the rest said they didn't know. [Jonathan Haughton, Douglas Giuffre, and John Barrett, Blowing in the Wind: Offshore Wind and the Cape Cod Economy, Beacon Hill Institute at Suffolk University, October 2003, pp. 16-17]

The BHI study also surveyed 501 home owners in the six towns that would be most affected by the Cape Wind project . Sixty-eight percent of these said that the turbines would worsen the view over Nantucket Sound 'slightly' or 'a lot'.[BHI study, page 14] On average, they believed that Cape Wind would reduce property values by 4.0%. Those with waterfront property believed that it would lose 10.9% of its value. The study concluded that, based on the loss of property value expected by home owners, the total loss in

property values resulting from the construction of Cape Wind would be $1.35 billion, a sum substantially larger than the approximately $800 million cost of the project itself.[BHI study, page 4]

As the study noted, any reduction in property values would, in turn, lead to a fall in property tax collections in the affected towns; the drop in these tax collections would be $8 million annually. If the tax rates were raised to maintain revenue, this would shift some of the property tax burden off waterfront residents (whose property values would fall the most) and on to the (less affluent) island residents.[BHI study, pages 4, 5]

In the home owner survey, in response to the statement: "It is important to protect an uninterrupted view of Nantucket Sound," 76% strongly agreed, 18% somewhat agreed, 3% were neutral, 2% somewhat disagreed, and 1% strongly disagreed.[BHI study, page 28] It's worth noting that of the home owners surveyed, 94% did not have homes with a view of the Sound; [BHI study, page 32] 76% were not members of a conservation or environmental organization.[BHI study, page 34]. Their main reasons for living in the area were the 'beauty of the region,' 'the beaches,' and 'the ocean views.'[BHI study, page 31].

In 2002, two properties outside Berlin, PA near Somerset Wind, LLC were sold to the wind developer for considerably less than fair market value. According to witnesses and deed records, Somerset Wind (incorporated in Delaware with offices in Texas—an Enron spawn), in order to discourage lawsuits brought by owners who felt that Somerset's wind turbines were disturbing the quiet enjoyment of their property, bought these properties for fair market value—one in May, 2002 for $101,049, reselling it in August to a lessor who had initially leased land to the wind company for $20,000—20 percent of the previous sale price! In May, 2002, Somerset Wind purchased the other property for $104,447, selling it in August for $65,000—62 percent of the purchase price!

The prices Somerset Wind paid for these properties were comparable to prices paid for similar properties in the area and in line with the price previous buyers had paid. Although the properties were assessed for tax purposes at around $20,000 (as of 1997), they initially had sold for fair market value at $80,000 and $74,000 respectively—in 1998 and 1997. The quotes of the prices listed in the documentary are those listed in the deeds, which are public records. And the reason the developer bought the properties in the first place was to forestall a lawsuit brought on because of the very real nuisances that the windplant created.

The new owners, moreover, signed a "memorandum of non-disturbance easement agreement," which absolves the wind company from liability for what the owners might regard as wind turbine-caused nuisances such as "noise, lights, air movement, odor, dust, vibration, traffic, obstruction of view, [and] light or air currents."

Let's be clear about the difference between the assessed value for tax purposes of these properties and the fair market value involved in the purchase. It is virtually a universal verity that tax assessments for property lag well behind the current market value. The price Somerset Wind paid for both properties was well within the average range of comparable market prices. Clearly, Somerset Wind was willing to pay this price to head off a nuisance suit. And the price it sold the properties for should be instructive as to the company's assessment of their worth, given such proximity to the windplant and the exculpatory non-disturbance easement agreements in the new deed.

Russell Bounds, one of Garrett County's (Maryland) leading realtors in large property transactions, has already lost sales in the area of proposed windplants. He has stated that huge industrial windplants "would be devastating not only to the real estate values in the Pleasant Valley viewshed, especially to neighboring

properties, but would also negatively affect the entire county economy, since so much of that economy is tied up with tourism drawn by the county's natural views." Mr. Bounds has recently testified at a Maryland Public Service Commission wind hearing that, over the last several years, he has had at least 25 people who expressed interest in buying land in the area targeted by wind developers. However, when he advised them about the plans for the wind facilities, not one of those people expressed any further interest.

In the face of these transactions, it is ridiculous to believe the spurious claims the wind industry makes about how their facilities will enhance neighboring properties.

7. The wind industry will create many local jobs.

This is a cruel untruth, especially in economically depressed areas. Very few permanent jobs will likely be created—perhaps a couple of low wage maintenance employees. According to a report by the National Renewable Energy Lab on windplant jobs, the national average is one maintenance employee for every 12-15 turbines. A 20 turbine windplant in Meyersdale, Pennsylvania now employs only two maintenance employees. Forty miles south, the Mountaineer wind facility in West Virginia, with over 45 turbines, employs three to four workers. For two windplants proposed for Western Maryland (Clipper Windpower and Synergics Wind Energy, both LLCs), the developers have pledged to pay each of their maintenance employees little more than $18,000 annually, less than a living wage for a family of four in this country. The collective capital value of their facilities, however, is projected to be in the neighborhood of $140 million....

During windplant construction, a few security guards and some local earth moving crews will be hired for a few months, while the bulk of construction is typically completed by primarily foreign labor, since the turbines are often manufactured in Europe with warranties serviced by the manufacturer. A recent study by the Iowa Department of Natural Resources on the "Top of Iowa" windplant showed that, of the 200 total construction jobs, only 20 were local—and all disappeared within six months.

8. Wind technology is noiseless and creates few disturbances.

Tall wind turbines in concert with each other, especially those sited on prominent ridgetops, create profound noise reverberations extending out for more than a mile, sounding like "a boot tumbling in a dryer" or the revving of jet engines on a runway. It is very difficult to predict noise levels in the mountains compared to flat land. Noise levels will be amplified in some areas and diminished in others depending on the shape of the terrain, the wind direction, the changes in wind velocity, and so on. The impact on people also depends on whether wind turbines operate in synchronization and whether the noise "beats" or throbs. This also depends on wind direction and velocity. Who will get bombed? Who knows? That is likely very hard to predict. The travel of sound waves and their behavior is similar to the way water waves travel. Most of us have seen how water behaves when waves enter into a gap or a split or channel of rocks in the ocean. The waves travel inward and pile up-and-up as they become restricted by the channel. The more the channel narrows, the greater the piling of the wave. Sound behaves in the same way. The more it piles up, the louder it gets.

A letter from Meyersdale. PA resident Bob Laravee, who lives 3,000 feet from the windplant, documents how he measured the noise over a 48 hour period. The results "showed an average reading of about 75 decibels during that period." "According to the EPA, noise levels above 45dB(A) disturb sleep and most people cannot sleep above noise levels of 70 dB(A)." Turbine noise is so irritating and disconcerting that it often

causes people to seek medical attention, as Rodger Hutzell in Meyersdale had to do. Wind leases typically contain "noise easements" to protect the company from liability.

Noise from European windplants is a notorious and well-documented nuisance there. The wind industry is very aware of this problem but often tries to "hide" it by taking visitors during the day directly under the turbines where there is typically little noise or by conducting tours from May-September when wind speeds are typically lower.

A leading acoustical researcher of the noise problem, G.P. van den Berg of the University of Groningen in the Netherlands, believes loud aerodynamic sounds are generated when the moving propeller blade passes the turbine tower mast, creating sound pressure fluctuations. Such fluctuations may not be great from an individual turbine, but when several turbines operate "nearly synchronously, the pulses... may occur in phase," significantly magnifying the sound. Van den Berg also notes a "distinct audible difference between the night and daytime wind turbine sound at some distance [more than one mile] from the turbine"—a finding consistent with the experiences of Meyersdale residents. (Both quotes were taken from G.P. van den Berg, Effects of the Wind Profile at Night on Wind Turbine Sound: Journal of Sound and Vibration (November 2004) 277:955-970.)

The problem is so acute and well-documented that the First International Conference on Wind Turbine Noise was held in Berlin, Germany on October 17 and 18, 2005. Organized by INCE/Europe in collaboration with the European Acoustics Association, the conference addressed "Wind Turbine Noise: Perspectives for Control"

Regulatory agencies and county zoning ordinances should insist upon acoustical field research to assess this noise phenomenon, requiring independent measurements and interviewing nearby residents. They should pay particular attention to noise measurement averages. Averages would not mean much if they were applied, say, to residents living next door to an outdoor pavilion during a rock concert. And it will not mean much to the residents of a rural community, either—who are used to the enjoyment of a quiet landscape.

An exemplary noise testing protocol for windplants was recently approved as part of the Shawano County, WI wind ordinance. Other polities should strongly consider adopting this standard to protect citizens from windplant noise. This county had been targeted for industrial wind development and the citizens there, aware of problems with wind technology, vowed to protect the public by establishing regulations and testing protocols that the wind industry and enabling agencies now must follow.

Other nuisances industrial windplants may cause are:

- **Shadow Flicker and Strobe Lighting.**
  When turning with the sun behind them, turbine blades cast moving shadows across the landscape and into houses in ways that may affect surrounding properties at a considerable distance; these are commonly described as a strobe effect within houses that can be difficult to block out. "Some people lose their balance or become nauseated from seeing the movement. As with car or sea sickness, this is because the three organs of position perception (the inner ear, eyes, and stretch receptors in muscles and joints) are not agreeing with each other: the eyes say there is movement, while the ears and stretch receptors do not. People with a personal or family history of migraine, or migraine-associated phenomena such as car sickness or vertigo, are more susceptible to these

effects. The strobe effect can also provoke seizures in people with epilepsy." (Nina Pierpoint, PhD, MD in a personal conversation. Dr. Pierpoint was formerly a clinical professor of pediatrics at Columbia, University and is now in private practice in Malone, New York).

- **Lightning and power surges.**
  Wind turbines themselves may cause irregularities in the power supply as wind speed changes. Within the power grid, supply and demand must always be balanced; there is no storage of electricity on this scale. When the wind dies, there is less power (brown-out) until a plant using a more reliable resource powers up to increase production. When the wind gusts, there may be power surges. Residents living near the installation in Meyersdale, which came on-line in December 2003, have had to replace stove elements and small appliances due to power surges which started at that time. Residents of Lincoln Township, Wisconsin, near a wind installation noticed an increase in power surges associated with lightning strikes in their area after the turbines went on-line in June 1999. [Two computers protected by surge protectors and a TV set, all in different houses, were simultaneously "fried" one evening when lightning struck a nearby wind turbine tower.]
- Shoddy site construction practices can also cause serious erosion problems, especially if built along steep slopes. There is much documentation about how turbine blades throw bolder-sized ice that has accumulated on the blade surface during winter. There are documented—and very dangerous—fires caused by malfunctioning turbine equipment.

#9. Wind technology consists of "wind mills" on "wind farms."

As if 400 foot tall differentially moving turbines were bucolic Dutch windmills, and their arrangement—eight to a mile on tall ridgetops, each with a four acre clear-cut when sited in the forest, and spread out in rows over many miles of upland habitat—was akin to a family farm.

The reality is that the technology consists of mammoth industrial factories often targeted for areas which pride themselves on their natural beauty. This inherent incompatibility makes for a hard sell. Consequently, the wind industry has commandeered the terms "windmill" and "wind farm" to make its outsized machinery more attractive to rural areas. But when a windplant is built, the rift between promise and reality becomes stark. Contemporary industrial wind turbines are taller than most urban skyscrapers, rivaling the size of the Statue of Liberty. Pittsburgh has but one building near 400 feet, while Cleveland has none.

Wind developers sometimes misrepresent their turbines' size in the press to make the machines appear even more hospitable. Press releases describing "wind farms" occasionally state the turbines' size in meters, causing some readers to think that a 125 meter turbine is really only 125 feet—and not over 400 feet. More often, they will only refer to the height of the turbine tower, not mentioning the size of the enormous propeller blades. However, a turbine tower which is 265 feet tall with a propeller blade that is 135 foot long is 400 feet tall. Even when they concede the actual size, they maintain wind facilities won't be intrusive because the turbines will be hidden in the trees, as if trees over 400 feet tall exist on forested ridges.

Watch for this classic bait-and-switch technique. Wind developers will often initially propose a facility consisting of a number of "smaller" turbines, typically 1.5 MW-340-400 foot machines. When the public begins to realize the threat to its basic qualities of life, and rushes to oppose the project, the wind developer will appear to offer appeasement—in the form of lesser numbers of turbines but 10-15 percent larger (430-

465 foot—2.5 MW) with a much greater rotor sweep (the propeller blade will be more than 310 feet long). The developer will claim this is possible because of "newer technology." It is more likely, however, that this is a cynical ploy to make the industry seem more congenial to the communities it seeks to exploit, always "ready to compromise." In fact, however, this is a tactical move that will actually increase industry profits while playing havoc with the community.

10. Those who are concerned about windpower are not true environmentalists.

The facts demonstrate otherwise. Notable environmentalists such as Robert Kennedy, Jr. and Chandler S. Robbins have studied the issue and urge that wind technology be carefully evaluated before implementation decisions are made. Many are mindful that the claims for windpower mirror those made one hundred years ago for hydroelectric dams, another clean, renewable power source now known to be environmentally devastating. One should note especially that John Muir founded the Sierra Club in part to protest the destruction of the Hetch-Hetchy valley viewshed by a hydroelectric dam.

An environmental group, The Center for Biological Diversity, is presently suing twelve windplant companies to stop the slaughter of eagles, hawks, and owls at Altamont Pass in California. Moreover, because of the many thousands of bats and birds killed at a recently constructed windplant atop an Appalachian ridge, Congressmen Alan Mollohan and Nick Rahall of West Virginia are calling for a windplant moratorium in their state, while the governor of New Jersey has mandated a moratorium on windpower along the Jersey shore to prevent unintentional harm to wildlife and the viewshed. Other environmentalists urge construction of smaller scaled, locally distributed wind projects which pose significantly less risk to wildlife, habitat, viewsheds and property values. This should not excuse, however, wind prospectors who seek to place a few 400 foot tall wind turbines on their property merely to obtain tax credits. Such prospecting is at best unneighborly and insights civil discord. Many environmentalists also point out the similarities between factory farms and contemporary industrial windplants, and note how the size and scale of each corrupts the economy, diminishes the ecosystem, and blights the landscape.

What all these environmentalists have in common is a concern that deployment of massive, irresponsibly sited windplants poses unacceptable risks to much they hold dear, with correspondingly little benefits.