

A Wind Advocate's Case for Why Industrial Wind Power is the Wrong Choice for Vermont and other Environmentally Sensitive Areas

The solar energy resource in Vermont far exceeds Vermont's relatively tiny wind power potential, and, together with other appropriate renewable energy sources will soon be able to provide unlimited and cost effective clean energy with negligible impact. Wind development on ridgelines, however, will severely and permanently damage the ecology, character, economy, and culture of the Green Mountain State, and do so without providing significant amounts of energy to the US grid due to severe resource limitations. It will also likely damage the prospects for renewable energy development in general, both technically and politically. A better paradigm of wind development is now gradually emerging.

-Ben Luce, Ph.D. October, 2011 Email: ben.luce@lyndonstate.edu (Available for in-depth presentations on this subject)

As the former director of a pro-wind advocacy group in New Mexico, and as a technical expert on renewable energy who continues to advocate for wind power generally, I feel compelled to explain why I believe that industrial wind power on ridge lines is not appropriate for Vermont or other environmentally sensitive areas. Vermonters are told that they should accept wind development on their mountains for a number of reasons: to address climate change, to increase energy independence, to demonstrate their commitment to clean energy, that there is "no silver bullet", etc. Opponents to wind development are derogatively characterized as shortsighted "NIMBYs". But all of these justifications fail to take into account basic facts about the severe impacts of wind development to mountain landscapes, and also the real potential of alternatives to wind development in Vermont. The NIMBYs are actually on solid scientific ground, at least where wind power on ridges is concerned. Wind power has its place, surely, but should be prohibited in environmentally sensitive areas in general. Although this might strike uncritical supporters of wind as heresy, a growing body of environmental scientists and energy experts now openly embraces this idea¹.

First, it is undeniable that wind development on narrow ridge lines, unlike on flat agricultural lands or far offshore, is highly destructive, both ecologically and culturally. Wind development on ridges requires the blasting and bulldozing of miles of industrial scale roads, which must access each and every turbine site. This is because the components cannot be brought in by helicopter, or installed without great disturbance. Turbines typically weigh in excess of 150 tons (in total), and their cement foundations, which are typically more than 30 feet across, can weigh over 1000 tons. The blades are also typically longer than 100 feet, and the towers have large diameters (wider than most trucks), requiring that the roads be quite straight, wide, and very sturdy. Clearings in excess of 150 ft in diameter are also needed for assembly purposes. Flashing lights are also required day and night on wind projects. These impacts will be enormously and permanently destructive to the beauty and ecology of Vermont's mountains, features which are the unique and irreplaceable product of hundreds of millions of years of geological and natural history, and are also the foundation of Vermont's pro-environmental culture and ecotourism. For a look at what wind development on ridge lines really means, one can find honest photos of wind generation sites in Vermont and Maine at sites like www.energizevermont.org. Photos of the same wind sites on the websites of wind promoters deftly omit these landscape impacts, creating a false impression of turbines blending in gracefully with the forest, with little or no roads or platforms.

Secondly, and perhaps surprising to some, Vermont's wind power resource is actually very small, precisely because it's only available on high ridge lines. According to Department of Energy estimates, Vermont has a maximum commercially viable potential of just 2.9 gigawatts of wind power capacity, whereas Iowa, for example, has nearly 600. Or closer to home, the Gulf of Maine has an estimated 149. The comparison is stunning. Iowa already has more wind power installed than will ever likely occur in Vermont, and is arguably an ecologically and culturally acceptable place for massive wind generation. ***Vermont's small wind resources means that hundreds of miles of Vermont's high ridges would be needed to produce an amount just approaching the state's very small electricity consumption (Vermont utilizes just 0.15% of US electricity generation). This level of impact for so little in return, which some wind industry representatives are nonetheless openly advocating for now, will utterly devastate Vermont's pristine watersheds, severely fragment critical habitat, endanger birds and bats and other species, and ruin the state's aesthetic character and ecotourism based economy.***

¹ See for example "Win-Win for Wind and Wildlife: A Vision to Facilitate Sustainable Development", www.plosone.org

In comparison to this, straightforward estimates of solar production capacity based on real world data in Vermont show that producing enough power to support Vermont's consumption from solar energy would require a solar collection area of less than 1% of Vermont's existing cleared lands. (Vermont is sunnier than many people think – it has a better solar resource than Germany, a world leader in solar installation). Most of this could be accomplished on rooftops, or on parking structures, or in discretely placed “solar orchards” at municipal sites and fields that are largely out of view. And there are other sources, such as “cow power”, small wind, biomass generation, small hydro, and others that can collectively contribute significantly. Blasting and bulldozing ridge lines for wind power in Vermont is analogous to cutting down a forest for a garden when there is already a perfectly suitable area available. It doesn't make sense on scientific grounds, even for combating climate change.

The cost trends for wind power also do not look promising. It's not actually cheap, even with subsidies factored in. Due to its dependence on massive amounts of cement, steel, copper, and other bulk materials, and the cost of wind has actually risen in recent years. If the full cost of the transmission upgrades that will be needed for significant wind power development in the Northeast are added in – roughly \$10 billion - onshore wind in the East doesn't even look competitive with solar power today.

On the other hand, the cost of solar power is now also a little under two times our current retail electricity rates, a huge decrease from the cost even a decade ago, and is continuing to decrease as the technology improves and as economies of scale are achieved. Projections clearly suggest it will compete directly with retail power by 2015, and possibly sooner, and federal and state incentives today have already rendered solar about break even. Solar, small hydro, and other small-scale sources are also fully distributed, which decreases the need for transmission lines, and most are better correlated with load than wind power on both daily and seasonal time scales, meaning that it will ultimately be easier to store and/or back up. They are also much more democratic: People and communities can own their own solar generation, for example, whereas wind farms are generally the province of large corporations, due to the huge capital investments required to build them.

Ultimately, a backlash against highly destructive wind development may also do more harm than good to the political prospects of renewable energy. Opposition to wind development is growing rapidly in Vermont today, and I believe it will reach enormous size and intensity as Vermonters begin to see the actual impacts. This in turn will discredit both the renewable energy business community and the advocacy groups that promote wind.

These arguments aside, there is a tendency these days to debate endlessly on detailed grounds whether or not solar or other alternatives can substitute for wind. I do believe they can, but such debates are actually moot: ***If it is true that we cannot rely on solar or other alternatives as substitutes for inappropriate wind development, then the whole premise of renewable energy is in doubt for the Eastern United States. This is because Department of Energy estimates show that commercially viable onshore wind resources in the East constitute just a tiny fraction of what Midwest and offshore wind resources offer, and, in particular, are at very best capable of offsetting only about 4% of the East's electricity demand. It follows that the rest absolutely must come from solar, or offshore wind, or other renewables. Or we must fall back on nuclear and/or “clean coal” (a disaster).***

Onshore wind development in this region will therefore not be paving a way for a renewable energy transition in this region, despite the hopes to the contrary, and the diversion of money away from sources that have real potential, such as solar, will actually only inhibit such a transition. Given what will be lost in Vermont if significant wind development occurs, solar and other alternatives are a much more sensible route, and pursuing them instead would provide a needed example of responsible energy development for the rest of the East, and truly help us address problems such as climate change.

To conclude, there really is a silver bullet: Regionally appropriate renewable energy development. There is plenty of resources available, and there is no rational reason not to channel development this way. But this will not occur unless the public insists on it. The multinational corporations backing wind power today care little for the irreplaceable character of Vermont, and many in the environmental advocacy community today are indiscriminately supporting wind development and have not taken the potential of alternatives fully into account. Vermont is known for its independence and iconoclastic stances on issues, though, and can blaze a new path of responsible and sustainable renewable energy development, before it's too late.

About the author: Ben Luce is a professor of physics and sustainability studies at Lyndon State College, where he researches and teaches sustainable energy and physics. He is a founder and former director of the Coalition for Clean Affordable Energy, a pro-clean energy (and pro-wind) alliance of nonprofit organizations, a former president of the New Mexico Solar Energy Association, and a former renewable energy program manager at Los Alamos National Laboratory. Among other things, Luce advocated successfully for the adoption of a renewable energy standard and a production tax credit for wind power in New Mexico, leading to the installation of several hundred megawatts of wind generation on the Eastern Plains of New Mexico.