

# A Wind Advocate's Case for Why Industrial Wind Power is the Wrong Choice for Vermont

The solar energy resource in Vermont far exceeds Vermont's relatively tiny wind power potential, and, together with small hydro and other renewable energy sources, can easily and cost effectively provide far more clean energy than is needed with negligible impact. Wind development on ridgelines, however, will severely and permanently damage the character, culture, and ecology of the Green Mountain State. It might also damage the prospects for renewable energy development in general, both technically and politically.

-Ben Luce, Ph.D. June, 2010 Email: [ben.luce@lyndonstate.edu](mailto: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, I feel compelled by recent developments to explain why I believe that industrial wind power on ridge lines is not appropriate for Vermont. Vermonters are told that they should accept big 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 both 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.

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. Why? Because the components cannot be brought in by helicopter: 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 and very wide. 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 culture and ecotourism. For a look at what wind development on ridge lines really means, see for example the photos of sites such as Mars Hill in Maine at [www.energizevermont.org](http://www.energizevermont.org). Photos of the same sites on the websites of developers and other pro-wind groups deftly omit these landscape impacts, creating a false impression of turbines blending in gracefully with the forest, with little or no roads or platforms visible.

Secondly, and perhaps surprising to some, Vermont's wind power resource is actually relatively puny, precisely because it's only available on high ridge lines. Specifically, Vermont has only 6 gigawatts of commercial wind power capacity (the raw total), whereas Iowa, for example, has over 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 resource, on the other hand, means that a great deal of Vermont's high ridge lines, ultimately upwards of half, would be needed to produce enough to support just our state's relatively modest electricity consumption.***

***In comparison to this, 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 farmland, using conservative estimates (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. The small hydro resource in Vermont is also

estimated to be capable of fulfilling most or all of the state's demand. And there are other sources, such as "cow power", small wind, biomass generation, and others that can collectively contribute significantly. ***Blasting and bulldozing ridge lines for wind power in Vermont is therefore analogous to cutting down a forest for a garden when there is already a large field prepared adjacent. It just doesn't make sense on scientific grounds, even from the standpoint of combating climate change.***

The cost of solar power (photovoltaics) 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. It will likely compete directly with retail power by 2015, and possibly sooner, and federal and state incentives today have already rendered solar about break even. Hydro is already cost competitive. 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.

In this vein, it is also worth mentioning that significant wind development in Vermont may well have the effect of tying up the capacity of our rural electric grid and impeding a future build out of other sources: Wind farms produce significantly only part of the time, but transmission capacity must be reserved for them, and rural grids generally have little capacity to spare. Additional generation assets such as natural-gas fired generation must also be maintained to "firm" the wind, and these assets must be paid for. Most of these consequences are hidden from the public, but they are real, and can be considered a hidden cost of committing to wind development. The backlash of highly destructive wind development may also do more harm than good to the political prospects of renewable energy. The opposition to big wind development is actually growing in Vermont today, overall, 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, and am happy to pursue such discussions, but objections of this type fall short on more fundamental grounds: ***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. This is because even the huge wind power resources in the Midwest and offshore are not expected to provide more than a minority fraction of our energy needs in the long run. It follows that the rest absolutely must come from solar and/or other renewables, or we must fall back on nuclear and/or "clean coal".*** As such, solar and the other renewables arguably need our support even more than wind. Given what will be lost in Vermont if significant wind development occurs, these are a much more sensible route, and pursuing them instead would set a much needed example of responsible energy development for the world.

***To conclude, there really is a silver bullet: Regionally appropriate renewable energy development. It's viable. 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, however, and should 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.