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Wind Energy Opposition in Vermont: Perspectives on the State's Energy Future

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Abstract:

Due to the high levels of concern and awareness of environmental issues, rural character, and sparse population, Vermont would at first glance appear to possess the ideal recipe to become a national leader in renewable energy development. Renewable initiatives have focused primarily on wind energy, as over a dozen wind farms have been proposed in the last few years across the state. However, in spite of the widely held belief in Vermont's wind energy future, its proponents have run into vehement opposition at every proposed site, often successfully impeding the planned developments.

This report develops a wide-level framework of the motivations of and complaints presented by wind opposition groups around the state, followed by an analysis of opposition strategies commonly employed. These are contrasted with the tactics used by wind developers and their supporters to remediate or overcome this opposition. Next, this essay will offer a view of the state and local institutional settings in which these battles take place, and finally conclude with a brief analysis of various alternatives to utility-scale wind, offering suggestions for wind's role in the future of energy in Vermont.

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1. Introduction

In recent years, concern for the threat of global climate change has led to a heightened awareness of the effects humans have on the physical world we inhabit. Of primary concern is the global climate change that has been witnessed in recent years and is projected to radically worsen in the years to come. The chief cause of this change is the anthropogenic emission of heat-trapping greenhouse gases, first and foremost among them carbon dioxide, emitted through the burning of fossil fuels such as coal, oil, and natural gas. Since the intersection of the OPEC oil embargo and the blossoming of the US environmental movement in the 1970s, Americans have been pursuing to varying degrees the idea of replacing fossil-fuel-fired electricity generation facilities with lower-emissions, domestic, inexhaustible renewable energy sources. Over the years, wind energy has emerged as a leading technology and many wish to see wind play a central role in the nation's future renewable energy portfolio. Vermont, with its progressive politics, strong environmental ethics, windy mountain ridgelines, and lack of in-state electricity generation, would at first glance appear to be an excellent location for wind energy development.

Since its inception, wind energy around the world has run into persistent local opposition, and Vermont is no exception. While each individual opponent carries his own unique set of opinions, biases, and motivations, and each individual wind proposal evokes its own unique set of responses, patterns can be drawn that will help to explain the vehement opposition that has taken many Vermonters by surprise in the last several years. Polls[1] indicate that a commanding majority (70%) of Vermonters support wind energy in theory, as one might expect from what is considered one of the most progressive and environmentally-oriented states in the country.

[1] McGilvery, Kevin. "Poll: Where Vt Voters Stand on Energy Issues.", *WCAX*

However, the experience for wind developers on the ground has been one of persistent frustration at the hands of a determined, passionate opposition and, after a recent glut of proposed wind farms, wind in the state has run into a major roadblock, and it appears that developers have all but given up on Vermont as too much trouble. The starkest lesson I took from a summer internship at a small Vermont-based wind energy developer was the strength of wind energy opposition, and I set out to explain what at first struck me as a surprising and illogical movement. Nevertheless, through my research I came to understand the nuances of the various arguments and no longer see the issue as so black-and-white. In this paper I hope to first offer a comprehensive study of the motivations of and strategies employed by wind energy opponents around the state, followed by a summary of the measures taken by the wind energy developers and their supporters, an analysis of the different arguments the two sides present, and finally recommendations for the state's energy future.

2. Background

a. Wind Energy

People have harvested the wind to do mechanical work for many centuries, with original wells functioning to draw groundwater up for human use. Since the 1970s, wind energy has been pursued as an alternative to fossil-fuel-based electricity production, with wind emerging as one of the foremost renewable energy technologies. As of 9/30/2012, the United States had a total installed wind generation capacity of 51,630 MW, exceeded only by China[2]. Between September, 2011 and August, 2012, wind power provided 3.3% of America's energy production. Recent years especially have seen a boom in U.S. wind energy development, accounting for 35%

[2] "Wind Powering America: U.S. Installed Wind Capacity."

of the country's new electrical generation capacity between 2007 and 2012[3]. Although wind detractors claim that wind energy is overly reliant on subsidies, it does have the benefits of being inexhaustible, domestic, not subject to changing fuel prices, and it does not release air pollution or emit greenhouse gases. Many renewable energy advocates see wind energy as one of the most promising solutions to the current environmental problems of global climate change and air pollution, at the same time that it can contribute to solving the political and social issue of energy dependence.

b. Vermont's Energy History

Since its early days as an autonomous republic, Vermont has maintained a fierce independent streak, and has battled time and time again to preserve its rural character and cultivate the natural environment to which it is so strongly tied. One legal maneuver of particular importance to the current debate over wind energy is the 1970 passage of State Act 250, which laid down a series of zoning and regulatory guidelines intended to halt the alarming pace of development and the influx of out-of-state immigrants that many viewed as a threat to Vermont's quiet charm and its people's way of life. As such, the state has remained quite rural (with the second lowest population in the country), and maintains its image – both in the conceptions of most Vermonters and in the wider public view – as a relatively pristine, wild area that the hustle and bustle of modern life has largely passed by. Vermont's citizens take a great deal of pride in this image and, as the recent controversy over wind energy has demonstrated, many are willing to fight tooth-and-nail to preserve it.

[3] (http://www.awea.org/learnabout/utility/index.cfm)

Vermonters have long been opposed to the construction of large, landscape-altering electrical generation facilities, with only one major power plant located within state lines. However, this power plant, the 620 MW Vermont Yankee nuclear reactor, has itself faced a great deal of opposition since its construction in the early 1970s up until the present day. Recent controversies have focused on a series of radiation leaks and management scandals, including several instances of lying in public statements and even in sworn testimony to government officials. While this controversy is far from over, it has played an important role in making Vermonters re-examine the energy they consume and has provided a push toward developing renewable alternatives[4]. Leading the charge for Vermont Yankee's decommissioning in the Vermont legislature was democrat Peter Shumlin, at the time Senate President Pro Tempore. He and many other Yankee opponents proposed wind energy as the primary means for replacing the generation capacity lost, in combination with ramping up imports from the excess capacity available from the Hydro-Quebec hydroelectric dam and the New England grid. A recent deal between Green Mountain Power, Vermont's largest utility, and New Hampshire's Seabrook Station nuclear plant has remedied the projected near-term shortfalls in energy production. Nevertheless, the impact of the Vermont Yankee controversy on the drive to develop wind energy remains potent.

c. Vermont's Current Energy Matrix

Peter Shumlin was later elected governor of Vermont, and since taking the reins from his Republican predecessor in 2011, he has continued to be a strong advocate of developing Vermont's wind resource. Shumlin has pushed a series of in-state financial and legislative incentives to bolster wind energy production. The most important of these is Vermont's

[4] Bromage, Andy. "In Yankee's Wake, Legislators Look to Fast-Track Renewable Power Projects", *Seven Days*

Sustainably Priced Energy Enterprise Development (SPEED) program brought forth by the state legislature in 2005. While the SPEED program only applies to smaller renewable energy facilities, with a cap at 2.2 MW, the federal incentives are much more lucrative for larger renewable energy producers. First and foremost among these is the federal government's Production Tax Credit, which offers producers a tax credit of $0.02 per kWh generated, described by one renewable energy executive as "'a once-in-a-lifetime opportunity.'"[5] Overall, federal renewable energy subsidies have almost tripled between 2007 and 2010, jumping from $5.1 billion to $14.7 billion. (http://www.eia.gov/analysis/requests/subsidy/) While proponents see these measures as crucial to enabling the nation to take responsibility for its contributions to global climate change and to take agency over its energy future, critics deride the current regulatory atmosphere as overly favorable to wind developers and lacking the thought necessary to make informed, reasoned decisions. Whatever one's opinion, the current regulatory and political atmosphere is an important factor in the success of wind energy development in Vermont, and must be taken into account both by both wind's supporters and its opponents.

Before digging into the battle over the future of Vermont's energy, one must first understand the current makeup of the state's energy matrix. Vermont is home to the sixth-highest electricity prices and third-lowest per-capita consumption in the nation. One item of note is the relatively small contribution that electricity production makes to Vermont's greenhouse gas emissions, as transportation around the sparsely populated rural state and home heating during the bitterly cold winters both play much larger roles than electricity generation. As wind opponents love to emphasize, only 4.1% of Vermont's total energy consumption comes from the electricity sector, much lower than the national average (Figure 1.)[6] This disparity between

[5] Lipton, Eric, and Clifford Krauss. "A Gold Rush of Subsidies in Clean Energy Search." *The New York Times*
[6] "Vermont GHG Emissions Inventory Update 1990-2008.", *VT Agency of Natural Resources*

Vermont and the rest of the nation is due to low per-capita electrical usage and the small proportion of electricity generation coming from fossil fuels (Fig. 2)[7] – though it should be noted that the state is heavily dependent on electricity imports.

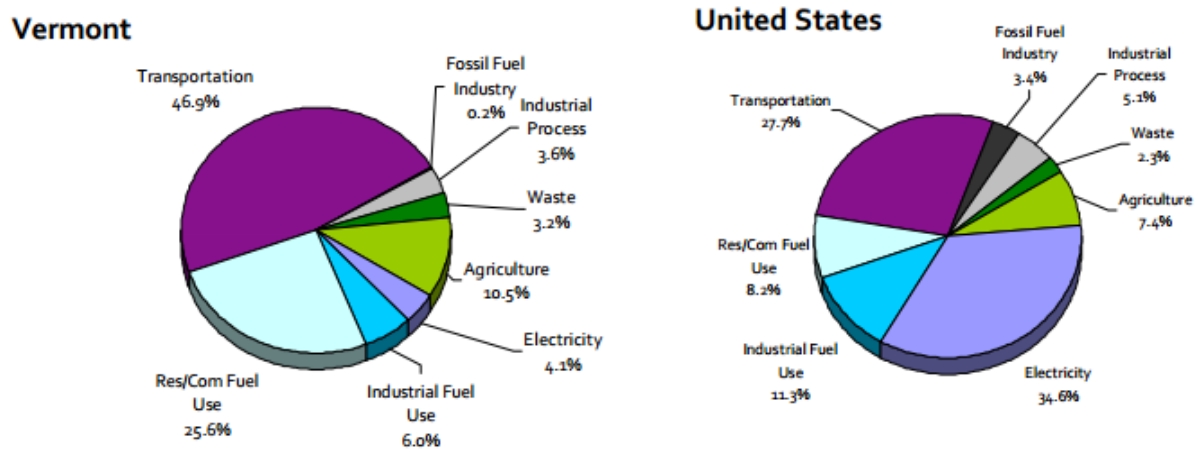

Fig. 1 Percent Energy Use by Sector, VT vs. USA. Note VT's high contribution from Transportation and Residential/Commercial Fuel Use (Heating) and low (4.1%) contribution from Electricity Generation

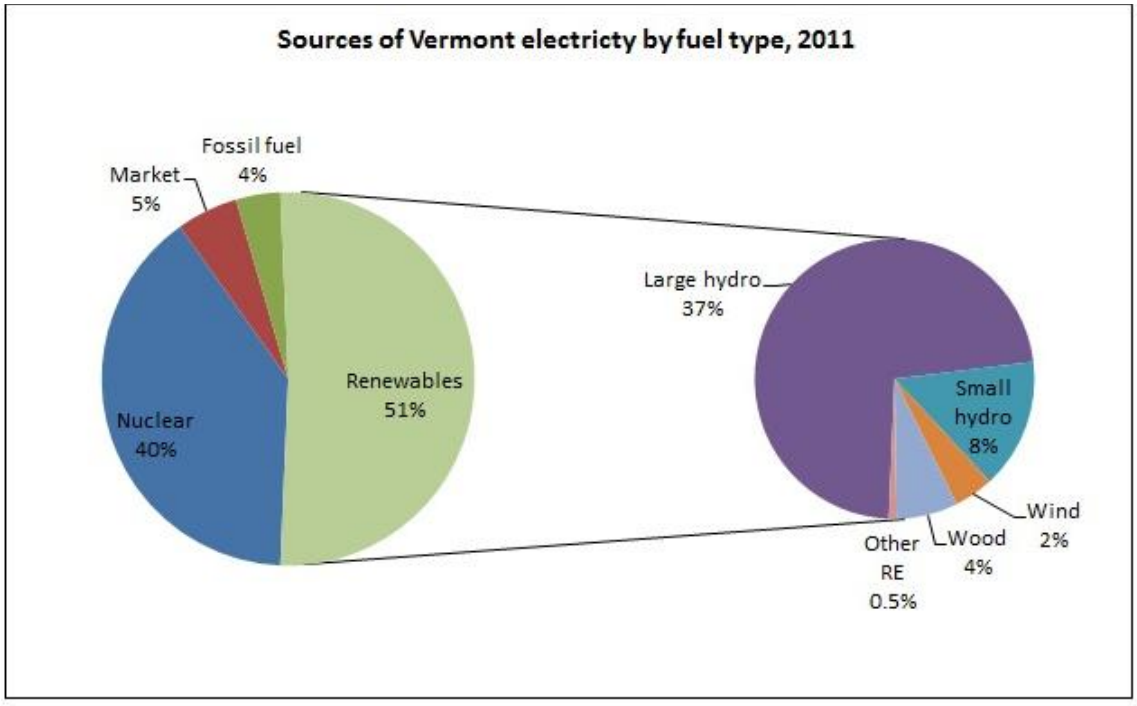

Fig. 2 – Note the high contributions of nuclear and large hydro Source: http://governor.vermont.gov/govdash/energy

[7] "Energy." *The Official Website of the Governor of Vermont*

It is important to understand the distribution system into which Vermont is connected. Consumers must purchase their electricity from one of several utilities that each has control of certain regions within the state. These utilities in turn buy their power from the greater New England electrical grid, operated by ISO New England (ISO NE), who aggregates all the power produced at the various grid-connected power plants around New England and at those that feed into the grid from the surrounding area, most notably the Hydro-Quebec dams north of the Canadian border. The additional element of the wider grid does add some level of uncertainty into the equation when one calculates the relative costs and benefits of wind energy (or any other electricity generation for that matter) because it is difficult to trace the flow of the exact electrons all the way from production to consumption. While there are other issues affecting energy accounting to be discussed in further depth later, we can assume for the sake of argument that one unit of renewable energy produced in Vermont is equivalent to one unit of renewable energy consumed in Vermont. Construction was completed on Vermont's first commercial wind project, composed of eleven 550 kW wind turbines, in Searsburg in July, 1997.[8] Since then, only one other project has begun operations: the Sheffield Wind Farm, made up of sixteen 2.5 MW turbines on two hills in the small Northeast Kingdom town of Sheffield.

d. Political Structure

In Vermont, the political and regulatory authority for wind energy development is held primarily at the state government level. Responsibility for wind project permitting falls onto the state's Public Service Board (PSB), "a three member, quasi-judicial board that supervises the

[8] "Searsburg Wind Power Facility." *Northeast Wind*.

rates, quality of service, and overall financial management of Vermont's public utilities."[9] Quasi-judicial indicates that it can hold hearings and issue legally-binding rulings as if it were a court. Section 248 of Title 30 states that, in order for a wind developer to receive permission to begin construction, the project proposal must come under review before the board and receive a Certificate of Public Good (CPG). The state's Agency of Natural Resources (ANR) and Department of Public Service (DPS – not directly affiliated with the PSB) are party to every Section 248 hearing and can play important roles in the success or failure of a wind project. To receive a Certificate of Public Good, the developer must show the board that "the proposed project promotes the general good of the state."[10] The board makes its determination of whether to issue a Certificate of Public Good based on the following ten qualities:

- Orderly Development of the Region
- Need for Present and Future Demand for Service
- System Stability and Reliability
- Economic Benefit to State
- Aesthetics, Historic Sites, Air and Water Purity, Natural Environment, and Public Health and Safety
- Consistency with Integrated Resource Plan
- Compliance with State Electric Energy Plan
- Outstanding Resource Waters
- [specific set of regulations for waste-to-energy generation: irrelevant to wind]
- Existing or Planned Transmission Facilities

Furthermore, there exists an additional set of qualifications put forth by the Agency of Natural Resources specifically relating to wind energy projects that developers must prove they can meet during the Section 248 hearings in order to receive a Certificate of Public Good. It bears noting that both the PSB's and ANR's requirements address many of the complaints put forward by wind opponents around the state; however whether opponents find the agencies' findings are satisfactory is another matter. Shumlin has recently announced the creation of the

[9] "About the Public Service Board." *Vermont Public Service Board*.
[10] "Draft Guide to Filing a Petition Under Section 248." Vermont Public Service Board, March 29, 2012.

Governor's Energy Generation Siting Policy Commission,[11] which has been charged with revamping the state's permitting process. Regardless of whatever changes that the commission brings into effect, the current process is configured to weigh the pros (generally felt on a larger scale) against the cons (generally more local) of wind energy projects, and many opponents feel that they deserve a larger say.

e. Proposals

There are currently over a dozen utility- (aka industrial-) scale wind energy projects either planned, in construction, or already producing power in Vermont (Fig. 3)[12] They range in size from a few megawatts (MW) all the way to nearly 100 MW and are being developed by a variety of interests, all the way from individual local entrepreneurs and small Vermont wind development firms to massive multinational energy conglomerates. These projects are located on the ridgelines of the mountains that define the vast majority of the state's topography and are home to the highest and most consistent wind resources (Fig. 4).[13] The projects tend to be located in very rural areas in towns of fewer than a thousand residents, and often very few economic means. Whether the coincidence of wind proposal siting and poverty is due to outside variables, such as the presence of mountainous, difficult-to-farm terrain, or can be attributed to intentional targeting of poorer communities by wind developers remains up for debate. The "Northeast Kingdom", a particularly rural, poorer, and traditionally agricultural area in Vermont's northeast corner has been home to a disproportionate share of wind energy proposals, and has been the state's most vocal region in opposing wind energy. Turbine size has increased considerably in recent years, with the models featured in the last few years' proposals more than double the

[11] Stein, Andrew. "Shumlin Administration Forms Commission to Assess Siting Process for Industrial Wind and Other Energy Generation Projects." *VTDigger*

[12] Panebaker, Alan. "A Dozen Industrial Wind Farms Under Way in Vermont Despite Intense Local Opposition." *VTDigger*

[13] "Vermont Annual Average Wind Speed at 80 m." National Renewable Energy Laboratory

height of those featured in the Searsburg project. The size and location of the various proposals are important determinants of the character of opposition that emerges and the final fate of the wind projects.

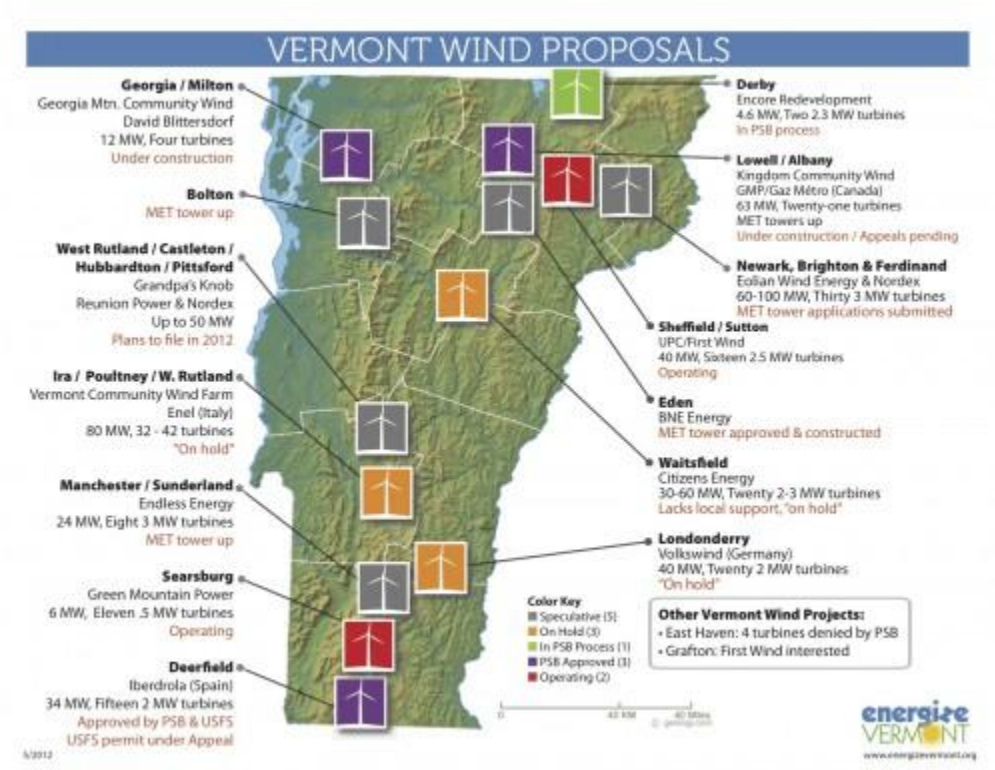

Fig. 3 – Summary of VT wind proposals
Courtesy of Energize Vermont

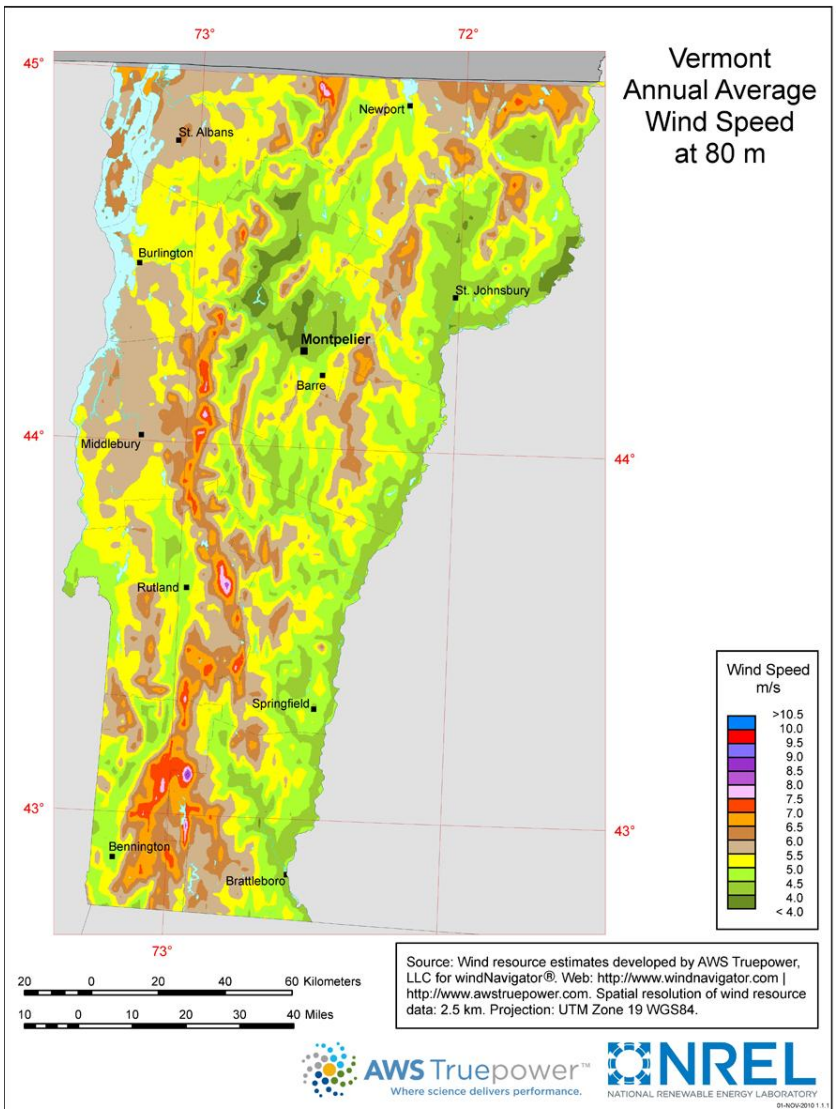

Fig. 4 Vermont Wind Resource Map (Height: 80m.) Note that the highest wind resources are located along the state's central spine and northeast corner.
Source: NREL

3. Opposition

a. Arguments

Numerous studies of wind energy opposition around the world have found that opposition movements are primarily motivated by aesthetic issues, as wind energy produces "the most blatant landscape changes of any renewable energy source;"[14] this appears to ring especially true

[14] Pasqualetti, Martin. "Social Barriers to Renewable Energy Landscapes." *The Geographical Review*

in Vermont. In spite of all the (debated) large-scale benefits of wind energy, the simple fact remains: Vermonters love their mountains. A brief inspection of the names chosen by the various local opposition groups can offer considerable insight into the primary motivations of wind opponents. Glebe Mountain Group (Londonderry), Lowell Mountain Group (Lowell), and Brighton Ridge Protectors (Newark), to name a few, all reflect the central focus of the opposition discourse (and the local scale within which most critics base their opposition.) Some of the most compelling arguments put forward have followed the age-old adage that a picture is worth a thousand words, as witnessed in the photos of mountaintop destruction distributed in local flyers and around opposition groups' websites. While many do in fact find wind turbines to be aesthetically pleasing, wind supporters cannot argue that most projects will carry a significant impact on the mountains in which they are placed. The effects of these aesthetic impacts on the people of Vermont varies from each person to the next, and these differences account for a considerable portion of the strife between the pro- and anti-wind camps across the state.

Wind opponents argue that the aesthetic changes to Vermont's mountaintops caused by wind energy development will have irreversible impacts on the rural, wild character of the state. Vermont's cultural identity is inextricably linked with its landscape, both in the eyes of those whose families have called Vermont home for generations and for the large numbers of relatively recent immigrants who moved to the state to escape the hustle and bustle of modern-day "civilization" and "development" in more metropolitan areas. While notions of identity and its tie to landscape are particularly nebulous and varied between individuals, evidence of the cultural connection between the people of Vermont and the Green Mountains that form the state's geographical backbone abound. To name a few: license plates bear Vermont's official nickname "The Green Mountain State", forested mountains are featured prominently in the

background of the state flag, and the name Vermont itself comes from the French *Vert Monts*, meaning none other than "Green Mountains." Across the state, one is likely to see bumper stickers reading "Ridges are NOT Renewable" plastered to passing cars. Jim Matteau, a former regional planner from Windham, VT recently named to the Governor's Commission, explains Vermonters' connection to the land as an important contributor to the strength of opposition to wind energy, claiming, "Vermont's landscape is intimate compared to some landscapes. Because of that, the things we do are more intimately felt and that causes people to react a lot more."[15] Opponents argue that by constructing turbine foundations, access roads, and transmission lines, we are not only destroying the mountains themselves, but also on a wider, less tangible scale, our unique identity as a state and a people.

Another interesting element of the aesthetic/landscape argument is the widely-held perception that mountains are communal,[16] in spite of legal ownership of many mountains by private interests. While there is certainly legal veracity to the claim of communal ownership of a good portion of the state's mountains, as the Green Mountain National Forest covers some 400,000 acres within Vermont, the majority of the mountains upon which wind farms could be placed are privately owned and therefore much easier to develop. The nature of wind is such that the most promising resources tend to be on mountain ridges where turbines are most visible to the highest number of people. While it should be reiterated that dislike of the aesthetics of wind farms is far from universal, the fact remains that changes to the landscape (for better or worse) from wind energy are especially prominent due to the high elevation at which they take place.

In addition to concerns over visual alteration of the landscape and its effect on culture, many Vermont wind opponents argue that mountaintop wind energy carries too heavy of an

[15] Page, Candace "Governor's Panel to Tackle Renewable Energy Debate." *Burlington Free Press*,
[16] Termyn, Christian. "Opposing a Wind Energy Landscape: Perspectives on One Vermont Community's Unsolicited Introduction to the Politics and Planning of Wind Farms." Undergraduate, Yale

environmental cost. The Agency of Natural Resources has at times spoken out in opposition of wind proposals (Grandpa's Knob) and/or issued temporary stop work orders (Lowell) due to their impacts on wildlife and water quality. Some common arguments against wind based on its purported effects on wildlife are as follows:[17][18]

- Wind projects tend to be sited far away from population centers and, as such, they often are placed in the middle of large blocks of unfragmented habitat
- Mountaintop ridges are relatively rare habitats and are of particular importance for biodiversity and migration
- Wind turbines have long been plagued with accusations of bird and bat fatalities.
- Many opponents argue that wind developments (i.e. turbines, foundations, roads, and transmission lines) have detrimental impacts on populations of certain animals – primarily the area's so-called "charismatic megafauna", such as bears, wolves, and moose.

The environmentalist opponents' case against wind energy is not limited to solely its alleged biological effects, but also hinges largely on the wind farms' expected impact on local hydrology. Blasting, filling, and clear-cutting during road and turbine construction can have serious consequences on the headwater streams originating atop the mountain ridges. It is argued that these changes will lead to degradation of downstream aquatic habitats, local water supply for wildlife and, because many rural Vermonters draw water directly from wells located on their property, those living below wind farms might experience changes in water quality and quantity for drinking and agriculture.[16] Also concerns have emerged at various locations about the effects on the mountain wetlands found in the relatively flat ridge-top locations where turbines tend to be sited**.** Some worry too that the filling of mountaintop soils that collect water during heavy rains and the removal of the trees that hold the dirt in place may increase the frequency and severity of floods in the valleys below the wind turbines. This is especially in relevant in

[17] "Vermont's Precious Ridges with Susan Morse and Annette Smith." *Wind Wise Radio*
[18] Smith, Annette, and Richard Watts. "Renewable Energy Development Challenges in Vermont: A Close Look at Wind Energy From the Community Perspective." UVM

Vermont in the wake of 2011's Hurricane Irene, which caused hundreds of millions of dollars in flood damage, and with future projections of the increasing severity of global climate change (ironically, in large part due to the fossil fuel consumption that wind energy seeks to reduce.) Environmental issues form a crucial part of the case against wind energy and are a key motivation behind many opponents' decisions to side against wind developments.

Another central area of concern for many wind opponents is the potential impact on human health. This is an especially contentious area of debate, with both sides publishing highly conflicting accounts – even more so than in every other issue. I cannot speak to the veracity of either side's claim, and will only aim to summarize their arguments (with the pro-wind account coming in a later section.)

The largest health issue is the noise produced by the spinning blades. Many neighbors claim that nacelle noise can be heard from much longer distances than developers have stated in the projections that they provided in PSB applications. Some theorize that this alleged discrepancy is due to the topography of the areas in which turbines are sited, as the noise might be amplified in the downhill valleys where residences tend to be located.[19] Others accuse that it is due to outright dishonesty from the developers. In one of the case studies included in this report, a neighbor collected a petition with dozens of signatures of nearby residents who complained of loud turbine noises disturbing them at night.[20] It is argued that the turbine noise, along with sub-auditory low-frequency vibrations, is responsible for a variety of symptoms including sleep disturbance, headache, ringing or buzzing in the ears, dizziness, vertigo, nausea, visual blurring, rapid heart rate, irritability, problems with concentration and memory, and

[19] Howe, Avril, and David Howe. "Northfield Ridge Is Not the Appropriate Site." *The Valley Reporter*.
[20] Smith, Robin. "Lowell Wind: Neighbors Complain of 'Unbearable' Noise Over Weekend." *The Caledonian Record*.

depression.[21] A widely distributed and highly controversial study by Nina Pierpont, a licensed pediatrician with an impressive career and academic resume, explains the connection among this series of health issues and groups them under the umbrella term of "wind turbine syndrome." In spite of the study's many criticisms, including accusations that it did not follow proper peer-review procedures, it is referenced in most opposition groups' websites and lends authority (deservedly or otherwise) in many people's eyes to the complaints of turbines' human health effects. Similarly, there remains no consensus with regard to the broader argument that wind turbines cause negative health effects to humans living within a certain proximity, but it has served as a potent argument nonetheless.

There are also concerns with the effects of the phenomenon known as shadow flicker, which refers to the irregular and variable (i.e. flickering) shadow cast by wind turbines during the times of day and times of year that the spinning blades are located between the sun and nearby residences. Wind opponents claim that shadow flicker can cause health disturbances to wind farm neighbors, such as headaches,[22] and can trigger symptoms for those who are vulnerable to seizures and epilepsy.[23]

Beyond concern for the health of individual humans, many opponents are arguing against wind energy for its effects on community health, as debates over wind facility development can have extremely divisive effects on local populations. Within communities, Vermonters for a Clean Environment's Annette Smith claims that "the neighborhood, friendships and families have been fractured."[18] Furthermore, they can aggravate pre-existing regional and class tensions, as evidenced by those who accuse wind proponents of living higher-consumption lifestyles that

[21] (www.wind-power-problems.org.)
[22] Gray, Louise. "Shadow Flicker: Rotating Blades Can Cause Headaches." *Telegraph.co.uk*
[23] Pagano, Margareta. "Are Wind Farms a Health Risk? US Scientist Identifies 'Wind Turbine Syndrome'." *The Independent*

create the demand for electricity and then exporting the negative local consequences to poorer areas that are less capable of stopping wind turbines from popping up in their backyards. Many Vermonters, especially those living in more rural and conservative areas, tend to harbor a level of resentment against what they view as predatory corporations and intrusive government. Accordingly, many opponents are driven by these motivations and are able to increase popular opposition by use of anti-corporate and anti-government arguments.

A particular source of anti-government resentment among many wind opponents is the current legislative/political process for approving wind farm proposals. There are accusations that the system is "rigged"[24] and loaded with industry supporters. Many believe that the process is not sufficiently rigorous for wind developers and that most proposals are a done deal from the start. Wind opponents have found that the Public Service Board review process favors wind developers who can afford expensive attorneys and consultants, while marginalizing everyday Vermonters.[2526] Steve Wright, an organizer in the Lowell Mountain opposition, describes the process as "not accessible from a public standpoint… people-unfriendly and lawyer-friendly," and estimates that to mount a successful challenge through the existing state political mechanisms, towns would need a minimum of $150,000.[25] Critics deride the review process as inaccessible, overly technical, and prohibitively expensive for many important parties whose voices cannot be heard without legal counsel and paid scientific/expert testimony.

The last, and most troubling, criticism leveled at the current political process surrounding renewable energy in Vermont is the issue of Renewable Energy Credits (RECs.) Because an individual electron that enters the grid cannot be tracked from its source, there is no way to physically track electricity produced from renewable sources. As such, an accounting tool called

[24] (Steve Wright, Personal Interview, 11/9/12)
[25] (Annette Smith, Personal Interview, 11/28/12)
[26] Chris Braithwaite, *Stand Against the Wind*

the renewable energy credit (REC) has emerged as the accepted political solution. The idea behind RECs is that producers of energy from renewable sources receive a credit for each megawatt-hour of renewable energy generated, which can then be sold to producers of dirty fossil fuels for a fixed price, in exchange for essentially trading production profiles (i.e. wind is now counted as dirty and coal is now counted as clean.)

This system has many merits, providing an additional financial incentive to produce clean energy and allowing society to make more cost-efficient reductions in carbon and pollution emissions. A fossil fuel plant may find it is cheaper to buy RECs to offset their emissions and achieve the same environmental benefit than to invest in, for example, pricey filtration systems. Allowing those who would find it very expensive to reduce their greenhouse gas and pollutant emissions to effectively purchase reductions from those who can do it most cost-efficiently means cheaper electricity for ratepayers and more economic production, and therefore tax revenue, for society as a whole. In order for a utility to meet its state's renewable energy standards, such as Vermont's 20% of electricity production from renewable sources by 2017, it must either purchase the corresponding RECs from providers or earn them itself (as in the case of Green Mountain Power, which owns both the transmission infrastructure and much of the production as well, including several wind farms.) Utilities can buy RECs from any producer they want, even those located out of state. However, this system is based on the assumption of cross-state accountability in which, for example, a REC sold by a Connecticut solar generation plant to a New Jersey gas-fired plant, is counted in New Jersey but cannot be counted in Connecticut – in essence, the REC must be "retired" from the market and cannot be sold again. However, Vermont's SPEED program does not have the same type of Renewable Portfolio Standard (RPS) employed by 39 states, including all of Vermont's neighbors in the region,

instead maintaining only renewable energy "targets" that allow RECs to be counted both toward the in-state target and the RPS of the state in which the purchaser of Vermont-produced RECs is located.

Steve Wright, former commissioner of the Vermont Department of Fish & Wildlife and vocal opponent of the Kingdom Community Wind project on Lowell Mountain, attempted to put the problem in more relatable terms through an analogy, which I then slightly modified to the following: an elementary school teacher gives the class monthly spelling tests with each student who earns an A receiving a gold star. At the end of the year, each student with a gold star gets to trade it in for candy. But at the same time, their classmates can pay them for the gold stars if they think they would like the candy more and it is worth the price to buy the gold star. This seems fine, but to extend the analogy to the case of Vermont's current system of REC counting, the students who sold the gold stars could then turn around and get candy because they can point to their old tests and say, look: I got an A, so I earned the reward. This means both that more students are earning candy – i.e. utilities are making more (taxpayer) money than they have earned under how the program is intended to function – and that the teacher is now counting the class as having done better on the spelling tests than it actually has, and therefore in less need of improvement and further instruction.[24]

This means that neighboring states can count RECs bought from Vermont renewable energy facilities toward their RPS, directly reducing the amount of renewable energy that is actually produced in these states. At the same time, Vermont counts these very same credits toward its state SPEED target, meaning that less additional renewable energy is added to meet these targets than should rightfully be added under an ideal system without double-counting loopholes. Wind opponents claim that this is due to the large influence of corporate electrical

interests in the state government; regardless of the causes, it is a very serious issue that receives relatively little attention, but is viewed by many opponents as a major reason to question the environmental benefits of wind energy in Vermont.

The last area in which wind opponents have focused their arguments is the economic merits of wind energy. Critics, especially those in favor of smaller government and reduced taxation, deride wind as an economically inferior energy source that is overly on subsidies. Especially when the energy produced does not go directly to providing reduced electricity rates for consumers in the area (due to the ISO-NE grid system), many opponents take issue with their tax dollars supporting a more expensive energy source. Another source of complaint is the geographic disconnect between where the economic benefits are felt (i.e. where the developers and utilities are based, primarily outside the local area) and the areas in which the turbines are located, where the heaviest negative effects are incurred. Others question the cost effectiveness of wind energy as a source of greenhouse gas reduction. Dr. Ron Holland, a surgeon in the area surrounding the Lowell Mountain project with training in cost effectiveness analysis in the public health sector, published an independent study he did, which came to the conclusion that wind energy in Vermont is on average twelve times more expensive per unit of greenhouse gas emission than efficiency measures that could be taken in the state.[27]

In addition to the larger-picture economic issues presented above, there are other economic questions that have been raised regarding the local area surrounding wind facilities. Opponents warn that wind farms will have ruinous effects on local property values and will drive people away from the area.[18] Furthermore, because so much of Vermont's economy is based on tourism revenue, which is due in large part to the idyllic, pristine rural image that Vermont has cultivated (http://vermontpartners.org/pdf/VT%20Brand%20Research_FINAL.pdf), there is a

[27] (Ron Holland, *The Cost Effectiveness of Utility-scale Wind Turbines on Vermont Ridgelines*).

widespread fear that wind developments will discourage tourists and hurt revenues. Finally, it bears noting that many of the neighbors of wind projects who are the most vocal opponents and the most directly affected have themselves been approached by wind developers and have turned them down – just like many turned down housing developers before them – claiming that they cannot put a price on the landscape they hold so dear.[28] Steve Wright, in a September, 2011 New York Times opinion piece, describes the alteration of Vermont mountaintops as "a profound failure to understand the value of our landscape to our souls and our economic future in Vermont."[29] Because Vermont's ridgelines are so tied to its culture, and because its culture is in turn so tied to its economy, opponents are often motivated by the fear that wind development will have negative effects on the local economy.

Whether or not any of these individual arguments succeeds in swaying public opinion on wind energy development, some opponents believe that with so many questions being raised by so many people, we should take a more measured approach – especially as many even question the necessity of wind energy in Vermont in the first place. Opponents such as Luke Snelling, Communications Director of Energize Vermont, wonder why we are pushing forward with wind projects in spite of such vehement arguments against them, when there is both a surplus in the ISO-NE grid and when Hydro-Quebec has between 7 and 10 TWh extra low/no-emission electrical capacity available.[30] Even beyond the existence of this surplus, wind critics point out that electricity production only accounts for 4% of Vermont's energy consumption**.** Especially if Dr. Holland's cost effectiveness analysis is accurate, opponents argue that it is not in the state's best interest to compromise its precious mountains when greater good could be accomplished

[28] (Peter Cosgrove, Personal Interview, 11/2/12)
[29] Wright, Steve "The Not-So-Green Mountains." *The New York Times*
[30] Chung, Andrew. "As Quebec Bathes in Electricity, Money Goes down the Drain." *The Toronto Star*

more efficiently and less destructively with changes in other sectors such as home heating and transportation.

In summary, Vermont wind energy opponents' arguments can be broadly qualified under the follow categories: aesthetic/landscape/character preservation, environmental, human health, social, economic, legislative/political, and necessity. While the specific contentions employed vary somewhat from one site to the next, and every individual places a different importance on each of the arguments listed, opponents' cases against wind energy development are consistently centered around this core group of anti-wind arguments.

b. Organization

To understand how wind energy opposition groups function, it is first crucial to understand how they are organized and the nature of interactions between the different levels. Because wind projects' negative externalities are felt most acutely at a local scale, it logically follows that the majority of opponents operate solely within a narrow geographical framework, concerned primarily with the effects on their surrounding area. Additionally, there exist state-level groups which act in conjunction with the local groups, lending a number of assets, including experience, assistance in navigating often-complex political structures, manpower, and funding. State-level groups can be distinct in that many do not claim wind energy opposition as their main operational goals, and instead view it as one of several causes with which they are involved – for example, in Vermont, the head of one of the two main state-level opposition groups claimed that "wind isn't even [her] biggest headache."[18] There is generally a high level of coordination between state and local groups once the larger state group has decided to take up a

local group's cause. State groups also provide a great deal of information to the local opponents on the (alleged) effects of wind energy development on its vicinity.

The last level of wind opposition that must be factored into the equation is the national anti-wind movement, whose groups' websites, similar to those of many state groups, can act as a valuable resource for diffusing the information that forms the backbone of most popular anti-wind arguments. The role of the national groups, at least in the relatively narrow context of Vermont's wind energy battles, has remained fairly minimal, with no direct involvement other than republishing accounts of the local struggles to a national audience. While exposure to a national audience can bring some level of wider awareness, this generally has little tangible effect on the outcome of the individual struggles, as wind energy opposition is by nature quite localized. I will focus primarily on the local and state groups, since they play much more active and central roles in the actual outcome of the various opposition campaigns, with analysis of national groups primarily formed in reference to their interactions with the local opponents.

Local

Local opposition groups form the backbone of any serious effort to obstruct a wind project's development. They tend to be reactive, forming as an agglomeration of neighbors who share concern over perceived threats to their natural surroundings and their way of life. They tend to form naturally from the ground up, generally as public meetings are assembled in response to the developer's announcement that an area is under consideration for a wind project.[31] In these early meetings, usually conducted in the traditional style of small New England town hall meetings, often with representatives of the wind developer in attendance to

[31] It is important to note that wind developers are not required to publicly announce their intentions to install turbines until well into the development process. Many critics have argued that this confers an unfair advantage to pro-wind interests over their opponents in the fight to determine a site's suitability for wind development, and ultimately if the wind development will contribute to the overall public good.

offer their arguments for the project, people are given their first glimpse of the conflicting cases made for and against wind, and those with vocal anti-wind opinions tend to gravitate to one another. These meetings are a crucial avenue in the early spread of information, both pro- and anti-wind; the other primary information vector in wind opposition movements' formative days is the internet. Conflicting accounts of wind's benefits and costs abound, and it is in these early moments that the national wind opposition groups play their most important role. While local opposition groups often include one or more members with extensive knowledge of the issues commonly in contention in wind energy debates, many local opponents begin the process as uninformed laymen.

These national groups' websites – easily found by google searching "wind energy problems" – act as a reference hub for those who wish to quickly inform themselves on the main arguments against wind energy. The websites tend to contain a brief summary of the arguments and extensive link sections that connect would-be opponents with numerous supposedly authoritative studies demonstrating wind's negative impacts, and with affiliated state and local groups from around the nation and sometimes the world. Although these websites lack any sort of scientific review process, they play an important part in hardening anti-wind convictions and forming the anti-wind arguments brought forward by many opponents, especially those without the formal educational training necessary to discriminate among conflicting claims. These early days of local wind energy opposition movements are the setting in which national, largely internet-based, opposition groups play their most important role, acting as a critical avenue for inserting the non-site-specific arguments against wind energy into the local discourse and helping to solidify the ideologies of the local opposition leaders.

Once the most vocal and active opponents get together, their first task is to spread their message around the local populace in order to sway public opinion against the wind farm proposal. This is accomplished through several means, all of them characteristic of traditional popular grassroots movements. The Vermont towns in which these wind farms have been proposed are small enough that a dedicated core of even just a handful of people can effectively spread a message and get folks talking and debating. Information easily travels through word of mouth, and local opposition groups have also successfully disseminated their ideas through more organized tactics, such as door-to-door campaigning, writing and distributing newsletters around local stores and libraries, penning letters to the editor in local newspapers, and holding informational barbecues and town-hall-style meetings. It is difficult to pinpoint the relative strength of each method, as they are generally used in conjunction with one another, but Vermont wind energy opponents have found that the grassroots model of building community awareness can be quite effective.

Although the level of public support for wind proposals has varied quite a bit from one town to the next, opposition groups tend to be similarly composed of a small nucleus of several dedicated members who are vocal enough to speak up in front of the town and committed enough to donate their time, energy, and money to promoting the cause.

Also it bears mentioning that local opposition movements are not always confined to one town. Wind turbines, especially those placed on visually prominent ridgelines, can have effects on the towns neighboring the ones in which they are sited. Additionally, some proposals have projected wind developments stretching across town boundaries along miles of ridgeline, and local opposition groups have similarly formed across town lines. There have been examples of distinct groups from individual towns displaying high levels of communication and coordination

– e.g. in Lowell, where the neighboring towns of Craftsbury and Albany filed joint petitions to act as intervenors in the PSB Section 248 process and a subsequent joint appeal before the Vermont Supreme Court in order to present a unified message and split the financial burden. In even other instances, regional (i.e. multi-town) groups have formed and worked in conjunction with individual town groups. Overall, local wind opposition groups have displayed a very cooperative attitude toward each other in spite of the rather haphazard organization of a wide range of people, as they have been given a common enemy against which they can unite.

State

Similarly, there has been a high degree of collaboration between state and local opposition groups. There are two particularly important state-level anti-wind groups in Vermont: Energize Vermont and Vermonters for a Clean Environment. The two groups have different histories, mission statements and areas of expertise, but share many common characteristics beyond their opposition to large-scale wind development. They both formed as local grassroots movements to oppose a specific power plant proposal (in VCE's case natural gas) and subsequently expanded their missions to include a wider range of activities. Beyond broadening the scope of their activities, they also expanded geographically, taking on issues at a statewide level, both in the sense of governmental and legal advocacy in Montpelier, but also working in conjunction with local groups to assist their community-specific opposition efforts around the state. They are both non-profit organizations staffed by a small number of workers, with several hundred members around the state. Vermonters for a Clean Environment and Energize Vermont have played crucial roles in coordinating and bolstering the local efforts to oppose wind energy.

Vermonters for a Clean Environment (VCE) was founded in 1999 as a small grassroots campaign to block the construction of a natural-gas-fired power plant and gas pipeline in several

towns in the state's southwest corner. They have since broadened their mission to "help raise the voices of Vermonters to demand that corporate neighbors be held to the same standards as anyone else in the community," taking on a number of issues across the state, including "Land Use and Act 250 Permits, Groundwater and Drinking Water Protection, Mining Waste, Rail Development, Energy, Agriculture, and more."[32] They have a few hundred members, but are staffed only by founder and Executive Director Annette Smith, one full-time, and one part-time assistant. In recent years, the majority of their time has been spent on alternative energy issues, particularly wind, and Annette Smith has become a central figure in the statewide movement against large-scale wind energy.

In addition to her work in assisting the local wind opposition groups, she has worked on a larger statewide scale to raise public awareness of what opponents view as the excessive negative externalities of mountaintop wind energy in Vermont. In 2012, she ran for the Progressive Party's gubernatorial candidacy before narrowly losing out and subsequently declaring a write-in candidacy. Although there was little hope of her unseating Shumlin, the campaign was conducted in large part in order to raise wider awareness of what she believes is an out-of-touch government that is more accountable to larger corporate interests and exclusionary to everyday Vermonters – both in the specific context of wind energy development and across a wider spectrum of political and environmental issues. She has given speeches, made television appearances, and organized events such as August 25, 2012's Mountaintop Justice Festival. While many see Smith as a polarizing character, she insists that she is working not, as her critics say, to act as a roadblock to the development of Vermont's wind resources, but instead to help voiceless Vermont citizens to make their voices heard.[25] Vermonters for a Clean Environment is

[32] http://vermontersforacleanenvironment.blogspot.com

one of the handful of largest environmental groups in the state, and the only one that has taken a vocal position against utility-scale wind energy.

Energize Vermont (EV), with a more narrow focus on small-scale renewable energy development, has emerged as the other primary statewide group in opposition of large-scale wind in Vermont. Energize Vermont was established in 2009 as a continuation and expansion of the regional group that represented the several towns affected by the proposed Vermont Community Wind project (which I have chosen as a case study and will return to later for more detailed exploration.) Interestingly, Energize Vermont's creation was in part inspired by Annette Smith and VCE, who worked in conjunction with the original regional group and implored them that "[they] can't just oppose; [they]'ve got to be part of the solution."[25] In conjunction with the efforts against large-scale wind energy, Energize Vermont is a leading advocate for community-level distributed generation, primarily solar, which they see as less disruptive and more appropriate for Vermont's character, environment, and energy needs. Energize Vermont's stated mission is "to educate and advocate for establishing renewable energy solutions that are in harmony with the irreplaceable character of Vermont, and that contribute to the well-being of all her people."[33]

The two groups, while often working in the same fight and maintaining periodic contact as the need arises, tend to direct their efforts in distinct arenas. Vermonters for a Clean Environment is more focused on the political facets of the fight against wind energy, and in proposing and implementing alternative models of social and political involvement that will allow Vermonters to more easily and effectively advocate for themselves – especially in the environmental arena. Energize Vermont, on the other hand, is more focused on the "nitty gritty" of bringing what they see as the ideal energy production scenario into being, and in providing

[33] (http://energizevermont.org/about/)

practical guides for citizens to take action against what they view as inappropriate energy developments. Both Vermonters for a Clean Environment and Energize Vermont employ many of the same strategies in opposing wind energy developments and are in large part working toward the same goal, but there remain important differences in how the two groups fit into the Vermont wind energy picture.

While VCE and EV do independent activity at a wider state level outside the frame of individual wind proposals, it is important to understand their relationships with the regional and municipal opposition groups in the more isolated local contexts. Both groups can help bring to the table a wider (and often more affluent) statewide membership to help fund many of the expensive modes of impeding wind development, such as appealing a PSB ruling. Additionally, with their hundreds of members and a measure of established political and social clout, the statewide groups can help raise awareness around Vermont for the isolated communities. Perhaps most importantly, the larger political groups bring a high level of experience and proficiency at navigating the often-complicated and technical legislative territory. In lending an authoritative, practiced, and assured voice to the complaints brought forth by many local citizens, Annette Smith in particular has emerged in many wind opponents' minds as a champion of the little guys who feel threatened by more powerful outside interests. Smith especially has been actively involved and made personal appearances at several different towns in which wind energy proposals have been sited. In fact, her first experience helping wind opponents in a local setting was at an informational meeting in Tinmouth (located next to Ira) speaking out against the developers of the proposed Vermont Community Wind project, assisting the very people who would go on to form Energize Vermont. She claims this as emblematic of the type of community

cohesion that VCE hopes to foster among the citizens who call for her assistance in bringing together the opposition, often neighbors who have never spoken to each other.

Energize Vermont has taken a slightly different approach in aiding local opposition groups in subsequent conflicts. Energize Vermont's website, nowadays many people's first serious view of the organization, contains a section titled "Taking Action." Under its first subsection header "What You Can Do", Vermonters are presented a summary of arguments against wind and for distributed solar, along with a list of several relative easy, non-technical, and accessible means through which they can begin contributing to the fight against utility-scale wind energy. These include a list of local newspapers and a guide for writing letters to the editor, along with, perhaps most importantly, a blueprint for modifying Town Plans – a tactic that will be discussed in further detail later. In addition to the aforementioned strategies, Vermonters for a Clean Environment and Energize Vermont play an important role at the town level in framing the discourse against wind developments by getting involved early, giving the vocal local opponents a list of successful anti-wind arguments, and creating a focus on the negative externalities of wind energy, which acts to counterbalance the emphasis developers' community outreach programs place on the positive benefits.

National

Beyond the local and state groups, there exist a few national anti-wind-energy groups who play a smaller role in Vermont wind energy opposition. Their main purpose, at least in relation to the local opposition groups that spring up at the various wind proposal sites around Vermont, seems to be to spread information. This information, much of it highly disputed, tends to revolve around wind turbines' alleged human health impacts on nearby residents, with some

focus given to the environmental consequences commonly associated with wind projects and infrastructure. It is not clear, at least to me, what these national groups' motivations are, who compiles these websites, and to what degree they check their information for accuracy, but they can be important in early attitude formation for the so-called "undecideds" or, it can be argued, for those with negative gut reactions to nearby wind proposals seeking justification. Because they play an otherwise minor role in Vermont wind energy opposition, I have limited my analysis of the national players and will remain focused on the local and state groups.

c. Strategies

Once the core of vocal opponents neighboring the proposed wind projects has coalesced into an organized nucleus of opposition, they must first spread their message around the community. As mentioned before, this is generally accomplished by word of mouth, door-to-door campaigning, flyers and newsletters, town meetings and informational forums, and writing letters to the editor. Vermonters for a Clean Environment and Energize Vermont, in gaining a measure of fame around the state for their work opposing wind, have spread awareness sufficiently that local wind opponents are now turning to them earlier in the development process. This is crucial in that a new blueprint has emerged in the fight against utility-scale wind developments: altering the Town Plan before the Public Service Board has issued a Certificate of Public Good.

Town Plans in Vermont do not act as binding legal documents, instead functioning more as a theoretical document stating the character that the town wishes to cultivate and the development path upon which it hopes to embark. However, in its consideration of whether a specific project serves the overall public good, the Public Service Board takes into account the development wishes of the municipalities involved, and a Town Plan that expressly discourages

large-scale wind generation serves as a very compelling argument against granting a Certificate of Public Good. Town Plans come up for review, with the Town Planning commissions holding public hearings to receive residents' input, every five years and whenever else the public demands revision. Energize Vermont's "Guide to Town Plan Advocacy" includes a background on Town Plans, suggestions for how to successfully modify Town Plans to exclude wind and encourage small-scale solar, and examples of Town Plans around the state that have already been altered to exclude wind developments. While it should be reiterated that a Town Plan excluding wind energy development does not compel the Public Service Board to reject permits for wind turbines or, in some cases, for meteorological towers to measure the wind resource, recent statements from the Department of Public Service, including public comments by Commissioner Elizabeth Miller and a letter from a DPS attorney to the PSB, have come out in support of Town Plans' authority in impeding wind development. So far, the PSB has never ruled in favor of permitting for wind energy facilities in sites whose Town Plans contain specific language against it; whether this will hold up forever remains to be seen, but currently appears likely.

While Town Plan modification appears to be the most promising strategy for those who oppose wind energy development, there are a number of other strategies that can be employed within Vermont's current legal framework. If it is too late, or otherwise not feasible, to modify the Town Plan before the PSB holds Section 248 hearings, interested parties can apply for intervenor status in the hearings in order to make their voice heard. There is widespread criticism among wind energy opponents who have taken this route, claiming that the process is overly expensive and technical, and ultimately fails to sufficiently take intervenors' opinions into account, but it is one method that wind opponents have utilized in several cases, and has at least some potential for future use.

Additionally, if the PSB has ruled in favor of granting a CPG, it is possible for opponents to bring suit and challenge the ruling in front of the Vermont Supreme Court. While many of the factors that contribute to a PSB determination are inherently subjective and difficult to quantify, there is some potential that the Supreme Court will make a notably different interpretation of what constitutes the public good, especially if there has been a glaring flaw in a particular part of the application, such as an environmental permit that opponents view as under-representing the true impacts. Similar to the strategy of applying as intervenors to the Section 248 hearings, the one lawsuit challenging a PSB ruling found little success for the wind opponents who brought it forth. Barring a major overhaul of the permitting process – which is not wholly improbable – it appears that the most successful method of impeding a wind development is by preemptive modification of the Town Plan, with more reactive steps that take place later in the permitting process exhibiting much lower effectiveness.

4. Wind Proponents

a. Strategies

If wind energy opposition has proven surprisingly spirited in Vermont, it certainly does not mean that the state's wind advocates have not been busy waging their own vigorous campaign in favor of development. The pro-wind-energy camp is by nature composed of a larger group of private interests than the grassroots movements opposing it, but wind energy enjoys a high level of public support in Vermont, and several public groups and individuals have made significant contributions as well. Pro-wind arguments generally are dispersed at a local scale in the areas in which projects are sited by the individual project developers, who generally run a

fairly comprehensive public opinion campaign upon announcing the proposal. These campaigns can involve many of the same tactics employed by the opposition, such as conducting open informational forums in local meeting houses, mailing flyers espousing the benefits of wind energy, and creating attractive websites for the projects. The traditional axiom among wind advocates is that education is the antidote to opposition and if resisters are made to understand the larger-picture benefits of wind energy, they will in large part see the error in their judgment and come around to wind.[34] Additionally, one strategy of particular interest is that employed by Green Mountain Power in Lowell – one of the sites chosen as a case study – in which they contracted a local family with strong pro-wind beliefs to spread the message around the community for them (in return for a financial stipend, causing some critics to cry foul.) This strategy surely contributed to the vote in which town residents opted in favor of the wind proposal on the local mountain by a 3-to-1 ratio, in spite of highly vocal opposition. There is a large degree of overlap between the methods employed by wind proponents and opponents in the battle for public opinion, as both sides race to frame the public discourse on their own terms and cast their side in a positive light among the local communities.

However, contracting locals with standing in the community has not proven universally successful for wind developers, as will be shown in the Ira case, in which the wind company's local public relations man was previously the well-regarded mayor of the nearby city of Rutland (to which many Ira residents commute for work, education, and shopping) and was largely resented and disliked by Ira residents by the time the proposal was shelved. Many pro-wind arguments carry less weight among small-town Vermonters because they come from large corporate interests whose motives are perceived as contrary to those of the so-called little guys.

[34] (Swofford & Slattery, 2009, *Energy Policy*)

Both the academic literature on wind energy implementation[35] and personal interviews with Vermonters involved in the fight for wind[30] indicate the importance of developers establishing trust early among the affected communities. A persistent issue among wind proposals around the state is the role of the negative perceptions of the developer integrity in discrediting the pro-wind arguments they bring forth.

At a state level, there are also a number of wind proponents outside of the project developers, including industry trade associations, individual citizens, and a major environmental advocacy group. The wind industry is represented at the national level by the American Wind Energy Association (AWEA) and at the state level as part of the wider Vermont renewable energy industry by Renewable Energy Vermont (REV.) These groups' role in the spread of pro-wind arguments is similar to their anti-wind counterparts. AWEA, describing itself as "a lobbying force for wind development and voice for wind manufacturers in the United States," provides a first glance at the wider issues at play in wind energy development and boasts over five thousand visitors per day. Its website, awea.org – quite significantly, the first result when one Google searches "wind energy" – effectively acts as a counterbalance to national wind opposition websites such as wind-watch.org, wind-power-problems.org, and aweo.org. While AWEA serves many other functions within the wind industry, its main role in the battle for Vermont's wind energy future is to offer laymen an authoritative source of information that casts wind energy in a positive light.

REV, while focused on the unique combination of circumstances defining wind energy in Vermont, represents a wider sweep of renewable technologies, including bioenergy, energy efficiency, small-scale hydro, solar, and wind. This creates a peculiar dynamic in which the most influential state advocacy groups on both sides are actually in agreement over large parts of their

[35] (Aitken, 2010, *Energy Policy*)

respective mission statements and work in heavily overlapping fields such as bioenergy and community-scale solar, while at the same time they are bitterly opposed on questions of wind energy. This is true as well of the Vermont Public Interest Research Group (VPIRG), the only major non-profit public advocacy group that has come out vocally in favor of wind energy development – VPIRG is also simultaneously working to develop Energize Vermont's vision of distributed solar generation, and running campaigns to raise public voices in environment and healthcare issues, similar to Vermonters for a Clean Environment. Where the major players in the national scene may hold a more opaque set of motivations, in Vermont the divisive role wind energy has played, and the divergent stances taken by otherwise-similar groups have only served to convolute the battle in state.

Vermont's pro-wind advocates have made a number of arguments for pursuing the development of the state's wind resources, primarily based on the environmental and economic benefits of wind power. There are also considerations given to the aesthetic and human health issues, with wind developers essentially dismissing the validity of the opponent's arguments through references to studies and experts of their own that, typical of the informational battle over wind energy, directly contradict the other side's claims. It is interesting to note the distinction between the relative emphases placed on the different arguments depending on the nature of the audience. The larger-picture environmental issues are stressed more at a wider state level, while in the areas surrounding proposed wind farms, developers tend to highlight more the economic benefits to communities and shy away from environmental questions, as the balance is tipped more heavily against wind for the locals who bear the heaviest environmental burden. Proponents who are not directly affiliated with the wind developers, such as VPIRG, focus more on the environmental motivations for increasing Vermont's wind power generation.

One other common strategy that has been used by wind developers in recent years is to organize bus trips for residents who live near proposed facilities to be transported to nearby wind facilities that are already in operation in order to gain a first-hand view of the effects. There is a common belief among wind advocates that fear of the unknown is a larger contributor to many citizens' opposition of wind farms than actual tangible concern over the issues. By touring active wind farms, they hope to alleviate this uncertainty by allowing people to gauge for themselves whether they find the turbines as aesthetically disruptive as opponents claim they are, or if their reactions are more in line with those who see wind turbines as a visually appealing symbol of progress and environmental stewardship – a sizable group, according to many wind proponents.

b. Arguments

The driving force behind wind energy's development in recent years has been concern over the negative environmental externalities of fossil-fuel-based energy production. Wind proponents argue that, although there is no perfect source of electrical energy, in the big picture, wind energy's benefits to humanity in the potential for reducing greenhouse gas and pollutant emissions outweigh the individual projects' localized environmental impacts. AWEA claims that one megawatt-hour (MWh) of electricity produced by wind energy reduces an average of 1,200 pounds of CO_2 emissions, and that wind must therefore act as a vehicle to reduce greenhouse gas emissions and curb global climate change. Wind proponents argue that it is everyone's responsibility to make the relatively small sacrifices necessary to bring about positive change.

There is a common perception, both in Vermont and worldwide, that many wind opponents work for so-called "Not In My Backyard" (NIMBY) motivations[36,36,37] and wind

[36] (Devine-Wright, 2004, *Wind Energy*)

advocates question, if not here, then in whose backyards are we going to locate the negative effects of the high-consumption lifestyle with which we seem so unwilling to part. An editor of one of Vermont's most highly regarded political blogs in a post entitled "Lowell Mountain: if not there, then where?" implores Vermont's opponents, whom he classifies first and foremost as NIMBYs, to "compare the effects of a wind farm to other kinds of energy production: deep-water drilling, widespread hydrofracking, mountaintop removal in coal country, the hazards of supertanker transport, the Alberta tar sands." In that framework, wind energy, with fewer local environmental impacts than mountaintop coal mining, and no emissions from generation, emerges as a viable method of upholding our "responsibility to produce at least as much energy as we consume" in order to avoid "preserving our environment on the backs of others." This sentiment is echoed by developers, such as Dave Hallquist, CEO of utility Vermont Electricity Cooperative (VELCO), who claims on Lowell's Kingdom Community Wind project's website that "members want low emissions, low carbon footprint, and local generation… although we also acknowledge members' concerns for aesthetics."[38] This essentially sums up the environmentally based argument that, although there are indeed some negative impacts, they pale in comparison to benefits of clean, renewable energy in lessening the damage of fossil fuel extraction, and the greenhouse gas and pollutant emissions that come from fossil fuel combustion.

Vermont House Natural Resources and Energy Committee Chairman Tony Klein derides what he sees as the "hypocrisy" of Vermont wind opponents' short-sighted arguments that fail to consider the bigger picture of energy usage and production. He asserts that "these opponents of renewable projects, they are consciously or unconsciously saying it is OK to use natural gas, it is

[37] (Wolsink, 2007, *Renewable & Sustainable Energy Reviews*)
[38] http://www.kingdomcommunitywind.com/

OK to use coal, it is OK to use nukes."[15] Similarly, Governor Peter Shumlin characterized Vermont wind opponents in a 2012 gubernatorial debate as members of "CAVE – the Committee Against Virtually Everything."[39] These are of course sound bytes provided to the media by politicians, but they do effectively summarize many wind supporters' views of the state's opponents.

At a more local level, wind proponents tend to focus their efforts to cultivate public goodwill more on the economic benefits of the specific projects. They argue that by developing Vermont's in-state energy resources we are keeping more money in the state, creating clean local industry and jobs, economic benefits from wind farms' taxes and Payment In Lieu of Taxes (PILOT) agreements. One recurring criticism of recent wind proposals around Vermont has been that they are of a larger scale that is incompatible with the small towns, often with fewer than one thousand residents, in which they are sited. However, this disconnect of scale means that wind developers are able to provide economic benefit packages that can make truly monumental differences in the town's fiscal outlook. Although wind developments, like energy generation facilities, are prohibited by state law from feeding their tax revenues into the local education fund (a point that is criticized from both sides of the aisle), they make considerable payments to the state education fund. Furthermore, wind farms' non-educational payment packages have been known to exceed the host town's entire annual municipal budget, allowing large reductions in property taxes, increases in services provided, and formation of a sizable rainy day fund.

Wind farms construction is projected to become more expensive as the prices climb for the bulk materials necessary for construction, such as concrete and steel, but will likely become relatively more competitive as the prices of fossil fuels also increase, at a higher projected rate. They point to studies that claim wind energy nationwide is becoming more economically

[39] Hirschfield, Peter. "Candidates Take Opposite Tacks on Energy." *The Rutland Herald*

competitive with fossil-fuel-based electricity generation and estimated to reach parity with fossil fuels and nuclear by the year 2016.[40] Furthermore, advocates emphasize that the inexhaustible wind resource will "help to assure price stability for generations of Vermonters,"[40] as operations costs are negligible compared to energy production methods that require the continual purchase of fuel. Economic arguments, including long-term price stability, increased in-state tax revenue, and especially the local community financial benefit packages, make a compelling case for wind energy and help proponents shift the balance of pros and cons toward continued wind development.

Wind advocates' arguments with regards to human health are generally reactive, and consist mostly of refuting opponents' negative claims. The one major human health argument that has been made by wind power advocates is the lack of airborne pollutants from wind energy generation, especially in relation to coal- and, to a lesser degree, natural-gas-fired generation. This argument unfortunately does not have a strong immediate effect on most Vermonters, since the geographic disconnect between Vermonters and their out-of-state energy sources has allowed Vermont to keep remarkably clean, fresh air as is.

Wind developers additionally provide a number of responses to the common accusations of excessive and damaging wind turbine noise. These include a number of expert studies and medical professionals who testify to the lack of substantiated evidence in favor of opponents' health-related claims, many arguing that, while turbine noise is certainly not nonexistent, it is not overly loud at the legally-established setback parameters that wind developers must follow in order to receive permitting to begin construction. Furthermore, one crucial argument is that wind turbine noise is not unique – many opponents claim that the largest health problem with wind turbine noise is the variable nature of it, as it constantly changes in pitch and frequency

[40]"Onshore Wind Energy to Reach Parity with Fossil-fuel Electricity by 2016." *Bloomberg New Energy Finance*

according to shifts in the wind – but these are refuted by wind advocates who argue that none of the noises produced is any different from noises that are heard all the time in everyday life, such as a car engine, a whooshing fan, etc.[38]

One other opposition argument that is commonly raised, and most easily refuted by wind proponents, is that the so-called shadow flicker can cause serious problems to neighbors' health. Wind developers, often with a great deal of frustration, point out that the position of the sun in the sky, while not constant throughout the day or the year, has been accurately predicted by humans for literally hundreds of years, and projections of when wind turbine shadow will pass over neighboring residences are easily constructed in every wind farm proposal and that turbines are legally required (and easily programmed) to temporarily pause spinning during these times. While issues of wind turbines' effects on human health have proven quite controversial and are marred by high levels of conflicting information, developers have argued that they are practically negligible and should not factor nearly as heavily into the decision-making process as opponents claim.

Wind proponents' arguments focus mostly on wind energy's positive environmental impacts, mostly in the context of curbing global climate change, but also with regards to airborne pollutants and the destructive methods used for fossil fuel extraction, such as mountaintop removal for coal, hydrofracking for natural gas, and deepwater drilling and tar sands for oil. Additionally, proponents push the economic benefits of developing in-state energy generation capacity, especially for the local communities in which the wind farms are constructed. Finally, the pro-wind camp provides a very different picture of the health effects of wind turbines than wind opponents, leaving it highly unclear where the truth lies – however, if proponents' studies are to be believed, then it appears that there is little to fear from wind. Although it is universally

acknowledged that wind energy generation is not perfect, proponents argue that the environmental and economic benefits outweigh the opponents' arguments against wind.

5. Case Studies

The following three case studies were chosen as representative of the interplay of a wide range of the aforementioned factors that contribute to the success of a wind farm proposal and the strength and effectiveness of popular opposition. First, Ira was chosen because it was the site of the first large-scale wind facility proposed in the state of Vermont, because the opposition movement ultimately triumphed in preventing the wind proposal, and because it was the birthplace of many defining characteristics of Vermont's current wind energy scenario. Next, I chose Lowell because it is as current as issues can get, with most major events transpiring earlier this year and last year, with operations scheduled to come online in December, 2012, less than a month from the time of this writing. Lowell grew into the most contentious argument over wind energy in the state, with over a dozen protesters arrested, and high level of media coverage that brought the issue of wind energy into center stage in Vermont politics. Finally, I conclude with a brief summary of the case of Newark, in which a large wind farm proposal has recently been announced, and the ever-more-united opposition has emerged early and vociferously, building on many of the lessons learned from previous confrontations, with the results as yet unknown.

i. Ira

While Vermont's first utility-scale wind installation began operations in Searsburg in 1997, the first of the recent large-scale proposals took place in 2009 in the tiny town of Ira. Ira, with 432 residents, is broken into two residential areas, with the majority of residents settled in

Ira Flats, the bowl of a picturesque mountain valley. When one resident stumbled across the website of the proposed Vermont Community Wind project, the town was thrust into center stage of the state's fight for utility-scale wind development. Vermont Community Wind, LLC is a subsidiary of the major Spanish energy conglomerate Iberdrola, SA, composed of wind engineer Pers White-Hansen and community outreach specialist Jeffrey Wennberg, formerly the well-liked mayor of the nearby city of Rutland, a commuter destination for many Ira residents. VCW had been planning with private contractors for a period of months, even years (which, it should be noted, is perfectly legal) before this discovery to construct a wind facility composed of up to 60 turbines for a total nameplate capacity of up to 80 MW.

These potential turbines sites were scattered around Ira and, typical of many developments on windy ridgelines that extend across political borders, in several neighboring towns as well. Up to 45 turbines, each between 400- and 500-feet-tall depending on which models would best utilize the wind resource at each given site, would be placed on the ridgelines surrounding the Ira Flats, both to the east and west, leading many residents to fear that they would feel "boxed in" by the wind turbines that would come to dominate the mountain ridges which formerly provided the town a comfortable feeling of enclosure.[16] The turbines would be placed on land that was owned by Yankee Forest, LLC, an out-of-town forestry corporation that has persistently turned away inquiries of just who its higher-level owners are; the widespread belief is that it is a shell company for Yale's endowment. Regardless of the owner's exact identity, it bears noting that the only landowner in Ira willing to sign away land for wind turbine installation is one with no residences in Ira itself, who would feel no direct negative effects from the turbines.

Ira residents responded to the suggested changes by organizing several public informational gatherings for people to come and discuss the newly discovered proposal, share what information they knew (or just picked up off the internet, as the case may be), and get a better feel for what sorts of changes the town would undergo if the wind installation were to go forward. These meetings tended to take a negative tone toward the proposal and the developers, who had already kicked public relations off on a bad note with accusations of illegally hanging bat-detection devices on neighbors' private land from several residents whose properties border the project boundaries. At these meetings, the crucial nucleus of local opponents began to coalesce into a more organized form, in which the most vocal of those who spoke out against VCW got together, determined several opposition strategies, divided work based on each person's individual talents, free time, and level of dedication, and generally "made as much noise as possible."[30] At the same time a petition against the proposed wind development was being drafted and distributed door-to-door around the town, Peter Cosgrove, a retired graphic designer, started composing and mailing print and electronic copies of *Ira wINdFO*, "a newsletter published on occasion reporting on issues of the proposed wind towers in our town as well as other information about wind turbines, legislation, renewable energy, news articles, etc."[41]

A regional group, representing residents from the various towns that would be affected – Ira, Tinmouth, Poultney, and West Rutland – was also forming simultaneously, using many similar tactics. This regional group worked in conjunction with the Ira town group to dig into the issues, drum up local opposition, and determine what methods lay at opponents' disposal for impeding the development of the proposed wind farm. Interestingly, it was at a VCW-led meeting of residents of the four towns that Annette Smith from Vermonters for a Clean

[41] (Peter Cosgrove, Ira wINdFO vol. 1 no. 1)

Environment made her first vocal stand against wind energy development, insisting that "there has to be a way we can do this better."[25] The Ira and regional groups, working in step with one another, both contributed heavily to the strength and effectiveness of the opposition to the Vermont Community Wind proposal.

Cosgrove believes that no one factor doomed the VCW proposal by itself, but rather a combination of negative circumstances that proved too much for the project to go through. Aside from the widespread popular resentment of the project proposal, the developers themselves were poorly regarded among Ira residents and viewed by many as representing a dishonest, profit-driven corporation with little interest in the townspeople's well-being. This perception led Ira residents to pursue a variety of strategies in opposing the Vermont Community Wind project. The most important political tactic employed was to change the language of the Ira Town Plan to explicitly discourage large wind turbines in the high-elevation Highland Conservation District. Ira's Town Plan was up for revision in 2009 under the normal five-year cycle, and opponents rallied high turnout at all three public meetings held that summer by the Town Planning Commission and, due in large part to overwhelming public backlash against the Vermont Community Wind proposal, the language was changed in order to send a clear message against wind energy development to the Public Service Board and VCW's developers.

The new Town Plan took a markedly different stance toward wind energy than the previous 2003 edition as evidenced by the following transformation. When the VCW developers began assembling their proposal, Ira's Town Plan noted Ira's ridges' abundant wind resource and tentatively asserted that "this resource, and the possibility of its use for providing for Ira's energy needs should be considered and researched further." (2003, p.29) Furthermore, it explicitly stated under the heading "Objective" that Ira should look to "encourage the use of renewable sources of

energy such as wind, solar, and wood." (2003, p. 31) However, the new Town Plan, under pressure from vocal opposition among town residents, sang a very different tune. It was revised to include the new goal of "preserv[ing] and continu[ing] the rural character of the physical and social resources in Town." (2009, p. 13) The most clear message of opposition to wind development came later in the new Town Plan, with the following passage:

"Construction of large wind towers and related infrastructure such as roads, power lines and staging areas in the Highland Conservation District (shown on the Future Land Use map that is part of this Plan) would wholly undermine the specific goals and polices established for the Highland Conservation District, and should be strictly avoided

Commercial or industrial-scale wind energy development also involves high potential for negative visual impacts and noise, which would directly conflict with provisions of the Ira Town Plan related to scenic resources.

The character of the Town of Ira and surrounding communities is defined by the rural mountain setting, and the pattern of undeveloped highlands. Commercial or industrial-scale wind development in the Highland Conservation District would threaten the orderly development of the region because the effects upon the values sought to be protected in the Highland Conservation District in Ira, and those in adjacent communities necessarily affected by such development, would be profound." (2009, p. 24)

While it should again be emphasized that this new Town Plan, while quite unequivocal in its message, did not hold the legal authority to prohibit wind development within Ira, and that its real function was more to discourage the Public Service Board from granting the project a Certificate of Public Good. Compounding the problem for the VCW developers was a new slew of environmental concerns raised by state environmental agencies, such as the Fish and Wildlife Department claiming that the project would unduly exacerbate habitat fragmentation by disrupting the continuity of the high mountain ridges and the Agency of Natural Resources naming some of the land on which proposed turbines would be sited "rare and irreplaceable natural habitat."[42] Ultimately, the Public Service Board ruled against permitting the construction of meteorological towers to measure the wind resource for wind farm planning, a critical setback to project development.

[42] Smith, Molly. "Ira Wind Project on Hold." *WCAX*

In addition to explicitly political procedures, opponents began investigating just who exactly was the shadowy corporate landholder who had so far refused to reveal its parent company ownership. It was determined to reasonable certainty that Yankee Forest LLC was a subsidiary of Yale's Endowment, and Ira resident Peter Cosgrove decided that the residents of Ira who were against the proposed wind development needed to make their opinions heard in New Haven and stir up some controversy. To do so, he personally composed and mailed a letter to every professor in Yale's School of Forestry and Environmental Studies, and later traveled with his wife down to Connecticut to give a presentation to Yale's Advisory Committee on Ethical Investing. While it is impossible to say with certainty which factors played the largest role in impeding the development of the VCW facility, especially due to the simultaneous way in which most of the tactics were employed, it is likely not coincidental that the proposal was shelved within a week of the Cosgroves' argument before the Yale committee.

The case of Ira and the proposed Vermont Community Wind project is notable for several reasons. VCW was the first large utility-scale project proposed in the state, and it showed a very early manifestation of the battle over wind energy in which both sides were relatively inexperienced and there was little to no background of trial and error upon which to draw lessons. Many felt that the developers acted underhandedly and their proposal's lack of success reflected this belief, showing later wind proponents the critical importance of obtaining widespread community support and cultivating trust among locals. It was also the first instance in which modifying the Town Plan emerged as a viable method for an opposition movement, with sufficiently universal public support, to formally assert popular opposition to a wind farm proposal. This has now become one of the first steps in the Vermont wind opponents' blueprint, and can be employed not solely on the five-year revision cycles, like in the instance of Ira's

Town Plan, but also whenever there is enough popular demand, as later witnessed in other towns where wind turbines have been proposed. Furthermore, the battle over Vermont Community Wind inspired the birth of the statewide wind opposition network as well, with Annette Smith and Vermonters for a Clean Environment taking their first involvement in wind issues, as well as the regional group's ultimate transformation, upon the VCW proposal's withdrawal, into Energize Vermont, the other major statewide group that has taken a vocal stance against wind. Additionally, Ira was the first time in Vermont's wind history in which the issue of habitat fragmentation was raised, and while this may be of secondary importance to the outcomes already mentioned, it has since become an oft-repeated argument among those who opposed wind on the basis of environmental concerns.

ii. Lowell

No study of wind opposition in Vermont would be complete without an analysis of the Kingdom Community Wind project located on Lowell Mountain in the small Northeast Kingdom town of Lowell. It has been a lightning rod of controversy and, according to one reporter who has focused on Vermont's battle over wind energy, it has come to be something of a rallying cry among wind opponents statewide.

Lowell is one of the poorest communities in the state, with fewer than a thousand people and little industry to speak of since the Belvidere Mountain asbestos mine went out of business in 1993. Green Mountain Power (GMP), the state's largest utility company (owned by the Quebecois gas corporation Gaz Metro) in 2010 announced plans to construct a 63 MW facility composed of twenty-one 459-foot turbines located on the beloved Lowell Mountain, located in prominent view from downtown Lowell and neighboring Albany, located just on the other side

of the mountain. GMP ran an effective public relations campaign from the start, heralding the project proposal with mailings around the community and open informational meetings, allowing them to frame what to most people were entirely new issues in a favorable light for wind development. Furthermore, they contracted two local wind proponents, Gert and Andy Tetreault, to act as their representatives in Lowell and mount a two-person community outreach campaign to espouse to their neighbors the benefits of wind energy. This outreach effort "included living room gatherings, door-to-door conversations, open houses, tours to existing wind project, fact sheets, and a willingness to be available to answer questions and concerns."[43]

Green Mountain Power supplemented the environmental arguments with a highly tempting economic benefits package that would guarantee Lowell a baseline sum of $535,000 per year, (set to increase by $25,000 every five years) a total well exceeding Lowell's yearly municipal budget. For citizens of a town with so little economic means, the prospect of a lucrative source of long-term income and property tax relief was extremely attractive. While some critics deride these payments as little more than a bribe, it can just as easily be argued that GMP, having acknowledged that wind energy is not perfect and does carry negative externalities, is simply offering what it sees as fair compensation to those who bear these externalities. Regardless of one's personal opinion, the people of Lowell were apparently sufficiently impressed, as a vote taken by the town's Select Board at a meeting which over 75% of Lowell residents attended showed nearly 3-to-1 support of proceeding with the project.

Although Green Mountain Power's public relations strategies were generally quite successful, there have been widespread protests both within Lowell and in the surrounding towns who feared that they too would be affected. Opponents drew a great deal of public attention to

[43] (Martha Staskus, Personal Communication, 11/13/12)

the specific case of Lowell Mountain and found a wider audience for their messages. Just about every argument that can be made against ridgetop wind energy was used in Lowell, with opponents decrying the disruption of local hydrology, as nine headwater streams would need to be filled in during the construction of service roads and turbine foundations, the further destruction and fragmentation of sensitive mountaintop habitat, and the potential to interrupt bird migration corridors and habitats for bears and moose. Beyond the environmental complaints, the issue of human health was hotly debated, especially with some of the most vocal opposition to the project coming from neighbors Don and Shirley Nelson, whose farm borders several turbine sites on the Albany side of Lowell Mountain. They claimed violations of property boundaries and that the turbines were not set back sufficiently (despite the Public Service Board ruling in the developer's favor) and that several procedures were not carried out properly during construction, such as blasting that sprayed flyrock onto their side of the property lines.[26] The Nelsons even distributed a letter complaining of "unbearable" noise from the turbines that woke them up in the middle of the night and was likened to "a cross between a helicopter and high winds blowing through the trees" and "a constant roar like a speeding truck passing next to us that never went away."[20] It was undersigned by nineteen neighbors who live within 3.5 miles of the wind farm and sent to the Department of Public Service, the state governmental body intended to act as a public advocate in situations like this. To what degree this letter influenced the recent announcements from DPS Commissioner Elizabeth Miller in favor of a more measured, restrained approach to wind energy development is unclear, but the purported human health impacts of the Kingdom Community Wind project have played a crucial role in shaping public opinion, both within the local communities surrounding the project and at a wider state level.

The opposition in Lowell used a particularly wide variety of strategies, in part reflecting the large number of distinct interests standing together in opposition of the project. At first, similar to Ira and many other wind energy sites around the state, the Lowell opponents started by drumming up attendance among like-minded individuals at informational meetings and organizing meetings of their own. From there, opponents began to spread their message through media, led by two particularly vocal opponents from affected neighboring towns: Craftsbury's Steve Wright (former head of the Vermont Fish and Wildlife Department) and Albany's Mike Nelson. In late 2010, Wright and Nelson began publishing *The Windy Tymes*, a regional newsletter intended to keep concerned citizens up to date on the issues surrounding the wind proposal. This was supplemented by various letters to the editor, with one of Steve Wright's short pieces even being published in the New York Times.

In order to allow people to gain a first-hand look at the effects of the project on Lowell Mountain, opponents began organizing so-called "mountain open houses" on the third Sunday of every month, in which those with the time and interest would hike up the mountain, meet at a campsite constructed by several students from nearby Sterling College on the Nelsons' property, and hear opposition leaders' interpretations of what was unfolding in front of them. As construction pushed onward in spite of the opposition (though with the support of the majority of Lowell residents), opponents started to turn more toward civil disobedience to impede the project's advance. Anne Morse, a professor of outdoor education at Sterling College with a long personal history of involvement in civil disobedience began offering open classes to those who hoped to make their objections more effective. Several protests were held to varying outcomes.

The first one, in October 2011, was a relatively mild affair with high turnout (100+ in attendance) but little more than just signs and chants. The next protest, in which opponents

blocked Route 100 for nearly four hours in order to keep the trucks from being able to deliver the first wind turbine parts to the mountain, ultimately resulted in two arrests. Several other protests were staged on top of Lowell Mountain itself, with three different events ending in demonstrators being arrested, bringing the arrest total to sixteen, all of them peaceful, mostly for trespassing on GMP land. In addition to the demonstrations taking place on Lowell Mountain and in the surrounding area, there were three different protests staged in Montpelier on the State House lawn. While these demonstrations and civil disobedience did succeed in increasing widespread awareness of the objections to the Kingdom Community Wind project and put Lowell on people's tongues around the state, in the end they did not succeed in stopping the project from marching forward.

As well as the aforementioned social tactics, the opposition to the Lowell Mountain project also employed a number of political tactics in their fight to stop its development. The towns of Albany and Craftsbury, both of whose viewsheds would be significantly altered by the wind turbines on Lowell Mountain, applied as intervenors in the Public Service Board's Section 248 hearings. These efforts, due to the need to hire lawyers and expert witnesses, quickly ran up an expensive bill for the towns, which had to draw funding strictly from private sources. This was further compounded, upon the PSB granting the Certificate of Public Good, by the towns' attempt to challenge the decision before the Vermont Supreme Court.

Although they combined their appeals into one case in order to present a unified front and save money, the towns of Craftsbury and Albany still had to come up with over $150,000 between the two of them for lawyers and witnesses,[24] a considerable sum for a poor, sparsely populated rural town. The towns of Albany and Craftsbury, along with the grassroots Lowell Mountain Group, also filed an appeal to the Agency of Natural Resources at one point during

construction alleging that GMP and its contractors had violated the terms of their Clean Water Act permit by failing to build sufficient stormwater runoff controls. This was confirmed and the ANR issued a temporary stop work order, but this was quickly remedied and work proceeded as planned. The last attempt at blocking the wind farm through political methods came when opponents reported to the PSB that illegal logging had taken place on land being held aside for conservation to mitigate the project's environmental impacts.[44] They claimed that this required another hearing to be conducted before project construction could continue, which would almost certainly push GMP past the December 31, 2012 deadline for project completion necessary to receive the federal tax credits upon which Kingdom Community Wind's economic viability hinged.

Lowell is an important case study for Vermont wind opposition because, in spite of the opposition's strength and resourcefulness, the project continued moving forward and is currently mere weeks away from officially commencing operation. Lowell has demonstrated the importance of having local supporters in addition to opponents, as developers, who tend to be larger private interests located outside of the immediate area in which the wind farms' negative externalities are felt, are usually viewed more distrustfully than individual neighbors who one has been running into at the grocery store and the post office for decades. Furthermore, Kingdom Community Wind's success can be largely attributed to the strength of its economic benefits package; Green Mountain Power clearly succeeded in tipping the scales toward approval of the project in enough people's eyes, with the primary emphasis in the local area coming not from the environmental benefits of wind energy as a whole, but on the financial benefits of the wind farm itself. On a larger scale, the bitterness and media savvy of the opposition movement to this project in particular pushed wind energy into the center of the public and media discourse around

[44] Smith, Robin "Lowell Wind: Supreme Court Strikes Down Appeals." *The Caledonian Record*

the state and may have profound impacts on the future of wind in Vermont, especially in the wake of DPS Commissioner Miller's recent statement on slowing the pace of wind development.

iii. Newark

Vermont's most recent proposal for a large utility-scale wind facility is N.H.-based Eolian Renewable's Seneca Mountain Wind project, with up to thirty turbines potentially located in the towns of Newark, Brighton, and Ferdinand (also in the Northeast Kingdom region near Lowell.)[45] This proposal met immediate local opposition since the developers filed applications for permitting to construct meteorological towers to measure the wind resource in April, 2012. Newark has become in some senses the newest proving ground for the tactics that wind opponents around the state have honed over the last three years of fierce battles during the glut of construction intended to take advantage of the federal production tax credit before its expiration.

Newark residents voted just this past September to alter their Town Plan, following in the footsteps of Peter Cosgrove and his fellow Ira wind opponents, along with several other towns since. The new edition, approved by a 169-59 vote, unequivocally states that "industrial-scale power generation and transmission facilities are inappropriate in the town…" including but not limited to "…industrial-scale wind turbines and their associated transmission facilities."[46] While this edit was put into place several months after the application for the meteorological tower permits was filed, the DPS Commissioner Miller wrote a letter to the PSB claiming that the new language is timely and should therefore be taken into consideration when deciding whether to issue permits – this comes just on the heels of a similar DPS recommendation, in which the freshly revised Town Plan in Windham, a small southeastern Vermont town that has also

[45] Page, Candace "State Defends Newark in Wind Energy Case." *Burlington Free Press*
[46] "Newark, Vermont Town Plan," September 17, 2012

recently had a wind facility proposed within its boundaries, was described as a "clear mandate" that should be strongly considered in PSB proceedings.[49]

To further complicate matters, the Hong-Kong-based firm that owns Hawk Rock, upon which the turbines would be sited, has filed a case in Vermont Superior Court to overturn the Town Plan amendments. On top of that, the town of Newark has requested that the PSB reject the proposal because the developer allegedly failed three times to inform neighboring landowners of plans to build a wind energy facility. Beyond demonstrating the effect of explicitly anti-wind Town Plan alterations, Newark will be an interesting indicator of the importance of organizing opposition early and calling in the larger state groups from the beginning, before wind developers can have time to effectively get their message out. From the other side of the aisle, if Eolian stays unable to drum up popular support in a situation quite similar to that of Lowell (though importantly, after the controversy of Lowell itself), then they, and other future wind developers looking for how to get the public on their side, might benefit from taking a closer look at their public relations strategies and seeing what Green Mountain Power did right that they did not. A good starting point would be the local supporters on the ground, who played a crucial role in drumming up the 3-to-1 ratio of support for wind farms seen in Lowell, a ratio that was roughly flipped in the corresponding vote in Newark.

6. Discussion

The following is a brief summary, broken down into several broader categories, of the pro- and con-wind energy arguments commonly presented, broken down into several broader categories (note the frequent contradictions.) It is also important to understand that most people base their opinions not solely on one issue, but rather a constellation of factors taken from a wide range of issues, each with varying importance according to the individual in question.

Environmental

Pro:

- Reduces greenhouse gas emissions
- Reduces air and water pollution
- Reduces negative effects of resource extraction (e.g. coal mining, tar sands, fracking)
- Takes responsibility for Vermont energy consumption instead of shifting effects to others
- All proposals must go through rigorous environmental permitting process

Con:

- Habitat fragmentation, affecting migration and species diversity
- Disturbs rare high-elevation ecosystems
- Affects water supply
- Increases risk of floods and erosion
- Requires clear cutting forested mountaintops
- Bird and bat mortalities
- Environmental permitting process insufficient
- Renewable Energy Credit double-counting means that fossil fuels are not cancelled out

Social

Pro:

- Polls show majority of Vermonters support wind energy
- Can be source of pride for communities
- More money in community brings social benefits, such as services and better education

Con:

- Divides communities
- Justice: costs local, benefits far away, poorest towns often targeted
- Intrusion by corporations and government at the little guys' expense
- Sours public opinion toward renewable energy, compromising better future projects

Aesthetic/Cultural

Pro:

- Many people like (or at least don't dislike) sight of turbines
- Sign of progress
- Approval increases over time (U-shaped curve)
- Less visually disturbing than mountaintop removal coal mining in southern Appalachians
- We can't hide ugly externalities of our high-consumption lifestyle

Con:

- Intrusion of technology/civilization/development
- Destroys rural, wild character
- Industrializes small towns
- Mountains especially treasured part of Vermont scenery
- Flashing red lights on some towers
- Ridges prominent part of many people's view

Human Health

Pro:

- Doesn't affect human health much
- No unique sounds
- Health effects considered in permit process

Con:

- Noise and low-frequency vibrations: Wind Turbine Syndrome
- Shadow flicker
- People evacuating homes near turbines

<u>Economic</u>

Pro:

- Taxes and PILOT
- More local business during construction
- Less energy money leaving the state
- Prices stable (and mostly up-front)
    - Not dependent on fossil fuel prices
- Wind inexhaustible
- Property values unaffected

Con:

- Property values affected
- Tourism affected
- Cost of new transmission
- Not viable without subsidies
- 12x more expensive per unit of GHG savings than some efficiency measures
- Electricity more expensive

The drive to develop wind energy is primarily fueled by the widespread desire to curb the environmental impacts of our current fossil-fuel-based energy production matrix, yet one of the major sources of opposition to wind is the concern for its environmental impacts. Studies of wind opposition in the national context[36] have classified the struggle over wind energy as a "green vs. green debate", a peculiar situation in which environmentalists in both camps are pitted against each other, leaving the public to decide the relative merits of the two sides' arguments. On one hand, the pro-wind environmentalists focus on the larger concerns of global climate change, regional air pollution, and the far-away localized concerns of the negative effects of fossil fuel extraction, while the anti-wind environmentalists are more concerned with the effects of a

specific wind development on the local hydrology and wildlife/ecosystem health. While there are valid cases to be made for both sides, a large source of the disconnect between the two factions is attributed to the different scales in which they base their arguments, with the environmental arguments especially indicative of the literature's[36,39,47]; assertion that, generally speaking, "the positive acceptance of wind power is largely based on public attitudes regarding the benefits of *wind energy,* while the negative opposition of wind power is largely based on public attitudes regarding the negative aspects of *wind turbines."*[36] In the case of ridgeline wind, this can be more accurately expanded to the negative attitudes of wind turbines and the associated infrastructure, such as roads, foundations, and transmission lines. One study of European wind opposition asserts that "the choice between sustainable energy and ecological values is not really a dilemma for [opponents]. They simply assess the applicability and acceptability of wind turbines in terms of visual intrusion and the consequences for the given location."[48] While this is not universally true in Vermont, as many opponents of utility-scale wind are very environmentally conscious, it does accurately characterize the high emphasis anti-wind arguments make on the negative local impacts relative to the broader-scale environmental benefits.

It is universally acknowledged that there is no perfect energy source, thus a well-informed assessment of the worth of a wind development requires a careful weighing of the associated pros and cons. In no area is this more difficult and convoluted than with respect to the environment, in which there is no clear right answer. The environmental benefits of wind developments are less immediately detectable and more theoretical, as they are felt across a much broader group of people, involve maintaining the status quo and preventing negatives, and

[47] (Krohn & Damborg, 1999, *Renewable Energy, Energy Efficiency, Policy and the Environment*)
[48] (Wolsink, 2000, *Renewable Energy*)

remedy the future problem of global climate change (a problem for which there is not universal concern.) Conversely, the environmental costs are immediate, visually intrusive, and involve the negative alteration of a previously positive local environment. It therefore stands to reason that the equation will be significantly different for those who must suffer the alteration of their nearby mountains for an equal share of the widely enjoyed environmental benefits of reduced climate change and air pollution than for those who only see pictures and feel a twinge of sympathy for their cross-state neighbors without suffering any immediate negative consequences themselves. It can be argued that the economic benefits of wind energy, such as tax and PILOT revenues, to the local areas in which the negative environmental effects are felt act as a form of compensation for the sacrifices that a small group of individuals must make for the greater good. However, many Vermont wind opponents question if a cash value can be attached to the ecosystems that are worsened by the construction of wind turbines and, beyond that, whether the large-scale benefits of wind energy, which many see as a drop in the bucket in the massive fight to reduce global climate change, justify the much more radical small-scale environmental negatives.

Vermont wind opponents who base their arguments on environmental concerns almost universally acknowledge the need to combat global climate change, but question whether wind is the most appropriate method of doing so – essentially whether wind is the "right fit" for the state of Vermont. Many argue that the same reductions in greenhouse gas emissions can be achieved with less environmental damage through alternative means that do not require the fragmentation of rare high-altitude ecosystems and the alteration of local hydrology. Furthermore, there are some who question just how much Vermont wind energy will really reduce greenhouse gas emissions, as the intermittency of the wind speed requires rapidly dispatchable backup power

sources to be constantly available to make up for any gaps in supply caused by lulls in wind speed. These backups are generally natural-gas-fired turbines that require the units to be maintained at a certain temperature at which the gas will combust to spin the turbines that produce the electricity, meaning that they are never fully turned off and continue to use energy even with wind turbines in motion. While this still amounts to some reduction in fossil fuel usage, opponents argue that it is not as sizable as wind proponents would have us believe, and when one takes the new factors into account, the balance of pros and cons becomes less favorable to wind development. The employment of environmental justifications on both sides of the issue reflects a frequently-seen contradiction within the environmental movement as a whole, in which those who share similar goals and similar concern for the environment weigh in on different sides of complex problems, such as Vermont wind energy, due to different priorities placed on the respective upsides and downsides of each case.

The state-level environmental groups face an especially difficult situation in their contributions for or against wind energy, as they must simultaneously balance the local concerns for the small-scale environmental damage, the statewide concerns for determining Vermont's energy future and enhancing its unique character, while also working to remedy the large-scale concerns of air pollution and global climate change. This might explain why only two of the most prominent state environmental groups have voiced their opinions on Vermont wind, even more interesting because one has come out in favor of wind and the other in opposition, despite sharing similar missions and working in similar manners. It will be enlightening to see if the other major groups in the state, including Vermont resident Bill McKibben's 350, lend their voices to one side or the other in the months and years to come, as these groups could play a

crucial role in breaking the gridlock and moving Vermont forward with renewable energy – wind or otherwise.

Socially, several important points of analysis emerge. First, Vermont is running into the common issue seen in wind energy proposals around the world of the conflict between widespread public support in theory[49] and vehement local opposition in practice.[36] Many wind proponents and observers explain this gap as a classic case of NIMBYism, in which people want wind energy and its associated environmental benefits, but are unwilling to make the necessary sacrifices that are required to actually implement wind energy. This may in large part be accurate, which I do not say as a critique of the residents of Lowell, Ira, Newark, etc. so much as a statement of fundamental human nature. People certainly don't oppose wind turbines on nearby mountains because they don't think they should pay the price for their lifestyles or out of some desire to place the burden on some other sucker, but rather that they would prefer not to be that other sucker themselves, and furthermore would prefer not to even think about the unpleasant issue of their contributions to climate change in the first place.

However, the reasons behind this gap are more nuanced than solely a NIMBYist refusal to take responsibility for their actions. Vermont wind developments have also been plagued with questions of environmental justice, as local opponents, often in some of the poorest areas of the state (especially the Northeast Kingdom), see wind developers as predatory corporate intruders who take advantage of the locals to make a quick buck during wind's "gold rush" of subsidies and incentives, and saddle them with the environmental and human health costs of the wind projects. To what degree this is based on tangible actions taken by wind developers versus the reflexive small-town fear of outsiders and corporations is unclear, and it certainly does not help wind proponents that developers, by nature of the economies of scale involved in wind farm

[49] (Luskin, Robert. *Report on the Deliberative Poll® on "Vermont's Energy Future*)

construction, tend to be larger corporations the larger the development itself is. On the other hand, wind opponents tend to be more individual interests united by a shared aversion to a wind development that would affect a wide range of people, which can lend them credibility in the eyes of many citizens, especially in a state as fiercely independent as Vermont.

Nevertheless, wind proponents argue that the opposition is not in fact representative of the popular voice, and that by nature those who are most likely to speak up are those who have the strongest negative opinions, as it is "much harder to get someone to come out to a town meeting at 8:30 at night to say yes and much easier to get someone to come out when they're afraid…when they feel like their lives are going to be affected in a negative way."[50] On the other hand, Martha Staskus, a board member of Renewable Energy Vermont, argues that for citizens "if supportive, it's expected it will get approved/move forward so busy people don't engage."[46] Another factor to take into consideration is that the demographics that are most likely to oppose wind in particular are older, more tradition-minded people who are more likely to have the free time necessary to show up at a public hearing on a weeknight than a young professional with children.

Additionally, proponents argue that opponents receive an undue amount of media attention, as fear and controversy are much more compelling (and therefore more beneficial to sales and distribution) to news outlets than reports of issues that have gone according to plan. To demonstrate this point, Staskus asks, "Did you see the head line that the Sheffield Project post-construction ANR stormwater assessment findings were very very positive? Probably not." As such, what wind supporters classify as a "small, well financed, very dedicated, loud minority" ends up having a disproportionately loud say in the public discourse.[46] Whether this is true appears to vary from site to site, as practically every wind proposal has run into a forceful

[50] (Gabrielle Stebbins, personal communication, 11/9/12)

opposition movement, but the actual extent of public opposition seems to differ considerably; for example, Lowell residents voted 3 to 1 in favor of the wind development, while the Vermont Community Wind proposal in Ira faced much lower public support.

One factor that might help explain this tremendous difference in levels of local public support is the effect on one's own opinion of what one perceives to be others' opinions. In the Lowell project, the developer, Green Mountain Power, mounted an effective campaign to get their message out early and convincingly, with the help of their local advocates, Gert and Andy Tetreault. This allowed them to shape the discourse early on in favor of wind energy and to drum up a high level of support from the get-go that helped propagate acceptance of their narrative of local economic development and Lowell citizens' contribution to the global effort to fight climate change. To the contrary, in other locations such as Ira, the opposite occurred, where the developers made several public relations errors that caused many citizens to view them with hostility from the beginning, and perhaps more importantly, the developers failed to introduce the idea of wind development on their own terms, allowing the opposition first crack at shaping the public discourse in anti-wind tones. For such complex, far-reaching, and difficult issues with such a wide range of topics coming into play, it stands to reason that people will feel overwhelmed (as I certainly did at the beginning of my research) and will tend to form opinions based on incomplete analysis. One's opinion on a local wind energy proposal, like any other opinion, is in large part informed by the opinions of friends and neighbors who one trusts and whose insight is valued; it is therefore important for each side to get its message out as early and effectively as possible so that their work in forming opinions can snowball beyond just those who are convinced at those first public meetings.

Krohn & Damborg and Wolsink (2007) argue that support for wind energy developments tends to follow a U-shaped pattern over time, as the public generally supports renewable, clean, local energy in theory at first. During the next stage – the dip in the U – doubts enter as those surrounding the project begin to consider the negative externalities associated with the positives upon which one tends to focus before being faced with a wind project in his vicinity. In the third stage, approval finally returns to a higher level after construction is completed and operations begins, as people adjust to the change in scenery and their doubts and fears are replaced by the actual realities of the wind project. That said, there are some limitations to the applicability of this trend to Vermont, the first of which being that there simply have not been enough wind developments in the state for a long enough period of time for definitive conclusions to be made about the specific Vermont context, with its unique characteristics, such as wind developments only being sited on mountaintops, and with feared environmental effects, such as increased risk of floods, at this point still only theoretical with no real-life testing.

As far as the aesthetic concerns, wind energy has run into two very serious (and highly related) impediments: Vermonters are very strongly tied to their mountains and very distant from their electricity production. Because of 1970's Act 250, along with a series of individual opposition efforts throughout the years (including the one that led to the formation of Vermonters for a Clean Environment), Vermonters have been largely successful in keeping power generation facilities from intruding into their precious viewsheds, and there is no more visually intrusive source of electrical energy than a string of wind turbines along a prominent mountain ridge. While wind proponents point to this disconnect as a reason that wind energy is right for Vermont, arguing (in my opinion correctly) that we can no longer export the negative externalities of our energy generation to our neighbors, and that if we are to continue consuming

energy like we do, then we must take responsibility for it and bear the costs. However, many Vermonters are asking why they must sacrifice the beloved mountains that give the state its cultural identity and the people so much joy when there are less intrusive alternatives, such as distributed solar, that would only be located on rooftops (where the land is already essentially a sunk cost) and on lower-elevation, more tucked-away areas, such as the corner of an agricultural lot, for example. That many wind opponents – including but not limited to those from the Ira regional group who grew into Energize Vermont – have turned to embracing and advocating distributed solar in their local areas serves to reinforce the common assertion among the academic literature that wind energy opposition is based more on "landscape protection values" than on simple NIMBY motivations[36,51]

Even if solar does not prove to be a viable alternative to utility-scale wind energy, opponents argue that the current glut of supply on the New England grid and, in the Hydro-Quebec hydropower portfolio, means that wind energy is not necessary at this moment. Because it only takes a few months from start to finish to construct a wind farm, opponents believe that it would make more sense for Vermonters to preserve our mountains until the need for wind energy becomes more pressing, at which point we would proceed, with due caution of course. While in my opinion, this view is a simplification of what is necessary to bring a wind project to fruition, as it completely discounts the siting, permitting, wind resource assessment, and landowner approval segments of wind power development, I do see some validity to the overall argument. Wind energy in Vermont now serves functions beyond simply meeting the demand for electricity in Vermont, as it can act, if successful, as an example of the viability of wind energy, a burgeoning technology for which many people have doubts, and make Vermont a national leader in the field of renewable energy.

[51] (Toke et al., 2006, *Renewable & Sustainable Energy Reviews*)

Economically, it is not entirely clear whether wind energy is beneficial to Vermont. It is heavily dependent on subsidies, and electricity generated from wind is more expensive than the grid average – at least for now**.** However, fossil fuels, nuclear and other renewable technologies also receive extensive subsidies, so wind is certainly not unique in that regard. Furthermore, it is argued that for younger industries, especially ones such as wind that exhibit savings from economies of scale, subsidies are necessary in the beginning to get the industry on its feet, so that it can later become independently economically competitive, with nuclear serving as a prime example of this phenomenon. There are definitely valid arguments to be made toward Vermont wind's benefits in keeping the state's energy dollars in state, and toward a long-term outlook that takes into account wind's inexhaustibility and independence of fossil fuel prices, which are bound to go up eventually (even if newer – more environmentally destructive – technologies such as tar sands oil extraction and hydraulic fracturing keep prices low in the short term.) In terms of energy independence and long-term economic benefits, wind energy does seem to be a good choice for Vermont.

On a more local scale, wind energy can also have large economic benefits for the towns in which it is located. Although tax payments from wind developments are legally prohibited from going toward local school funds, they can have extremely significant positive impacts on local municipal budgets, with payments often exceeding towns' annual municipal expenditures by over $100,000, allowing property tax relief for local homeowners and an increase in services. However, there are two counterarguments to this claim that are worth noting. The first is that these payments are a contributor to the increased rates that electricity ratepayers experience from wind power, so they are coming at the detriment (albeit a small cost distributed among many people) of the rest of the state's residents. To me, this does not seem a significant problem, as

Vermonters have indicated in a 2008 opinion poll[53] that they are willing to pay on average $20 more per month for electricity that is generated from renewable sources, and this distribution of economic costs and benefits almost exactly mirrors the distribution of environmental benefits and costs associated with wind developments. Nevertheless, the problem with this first assertion is that there have been accusations of unfair distribution of economic benefits among those who are affected by the wind developments, with some residents of neighboring towns complaining that the environmental, aesthetic, and human health costs are not felt solely by residents of the town in which the turbines are located. Lowell is a perfect example of this dilemma, with residents of the five neighboring towns who receive a share of Kingdom Community Wind's $150,000 "Good Neighbor Fund", claiming that that these payments were not nearly enough to remunerate the costs they bear. This seems to vary from one case to another, so it is difficult to form wide-reaching conclusions, other than simply recommending that wind developers be more sensitive to the wider impacts to the region, though a balance must be struck with consideration given to the ratepayers who would have to fund these benefits.

The second economic argument against wind is turbines' effects on property values in the surrounding area, about which there is also a great deal of conflicting information. One Clarkson University study on the subject in three counties in upstate New York that have hosted wind development in recent years showed that wind turbines did indeed have a significant negative impact on the surrounding property values.[52] However, a nationwide analysis study conducted in 2009 by the U.S. Department of Energy found that "neither the view of the wind facilities nor the distance of the home to those facilities is found to have any consistent, measurable, and

[52] Heintzelman, Martin, and Carrie Tuttle. *Values in the Wind: A Hedonic Analysis of Wind Power Facilities*

statistically significant effect on home sales prices,"[53] and no reasons have been provided to account for this disparity. It is likely that some of the price difference, if there is in fact any, can be attributed to fear and uncertainty over the health impacts of living near wind turbines, and this will hopefully be resolved in the coming years. Wind developments' effects on nearby property values is clearly an important economic issue that must be definitively resolved in order to present local residents with an accurate picture of the economic impacts they face.

Perhaps the most difficult area to draw a definitive conclusion is that of wind's purported human health impacts, since there is so much conflicting information available depending on the source. Both sides present directly conflicting information, each with doctors, studies, and neighbors testifying to their arguments. Opponents claim that the wind industry is paying experts to spread false information and cover up the health impacts, with a common comparison being the doctors who testified that cigarettes did not have negative effects on smokers' health. On the other hand, wind supporters point to studies downplaying the impacts and claim that the central studies upon which the opposition arguments are based, primarily Nina Pierpont's paper that coined the term Wind Turbine Syndrome, lack scientific credibility and used faulty research methods. Further complicating the issue is the actual variation on the ground, as effects can differ from person to person, turbine to turbine, one hour to the next depending on how hard the wind is blowing, and even from one room to the next in neighboring houses.[54]

Even beyond these concerns, there are questions as to whether studies done on smaller turbines are applicable to newer, larger turbines that are being erected in Vermont today, and whether Vermont's topography and the nature of its wind resource, which requires turbines be

[53] Hoen, Ben. *The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis*. Berkeley National Laboratory
[54] (Ben Luce, Personal Interview, 11/28/12)

located on top of mountain ridges, means that effects are amplified in the valleys downhill. The Canadian government is planning a study on wind turbines' effects on human health in the coming years that will hopefully provide a more definitive and reliable source for people who otherwise cannot know without actually living next to a turbine. Some wind developers hope to demonstrate that the health effects are negligible by bringing people in areas with proposed wind developments to turbines that have already been erected (such as Vermont Community Wind busing Ira residents to Lempster, NH.) However, it is impossible to form an accurate opinion based on several hours' exposure from a limited number of locations, when the effects could be totally different with higher wind or at a different position relative to the turbines. The disconnect between the information provided by the two sides is a major problem that must be remedied before productive discussions of the future of wind energy can take place.

One major source of the information disconnect between wind energy's supporters and opponents is the self-reinforcing nature of propaganda, as people unconsciously tend to seek out information that will give voice to and justify their preconceived notions. When one finds himself in a new and unfamiliar situation, such as discovering that there has been a large wind farm proposed on a nearby ridgeline, there is an immediate, uninformed, subconscious "gut" reaction that I believe largely determines on which side one ultimately falls in the debate on wind energy. According to French sociologist Jacques Ellul in his seminal 1965 publication *Propaganda: the Formation of Men's Attitudes*, when faced with the stress of an overwhelming quantity of information, "man, eager for self-justification, throws himself in the direction of a propaganda that justifies him and thus eliminates one of the sources of his anxiety."[55] (I include this quote not to accuse either side of providing "propaganda" in the common sense of deceit and lies, but to acknowledge that the information presented by both wind proponents and opponents

[55] Ellul, *Propaganda*, 1965

inevitably includes some level of spin meant to push previously uninformed citizens in one direction or the other.) As Ellul notes, this drive for self-justification leads to an ever-widening split between the information presented to, and accepted as truth by, one side and the other.

A perfect example of this phenomenon is found on none other than Google, a highly important method of gathering information for many uninformed citizens of today. A Google search of 'wind energy' produces as the first result www.awea.org, the American Wind Energy Association's website, which is of course full of information that paints wind energy in as favorable of a light as possible. On the other hand, if one searches 'wind energy problems', as one who might be initially fearful of the changes that a proposed wind farm would be tempted to do, the second result is www.aweo.org, one of the central national wind opposition groups which, while only one letter away, presents a wholly conflicting view of wind power from AWEA. In order to stimulate productive debate over wind energy and bridge the social divisions that have formed over the topic of wind energy, it is critical to first establish a nonbiased, authoritative source of information that can be trusted by supporters, opponents, and those who are still undecided alike.

Another area for improvement that has been gaining attention recently is the legislative/political process, which both wind opponents and proponents have targeted as an area that must be reformed in order to break the current gridlock and make progress in determining wind's role in Vermont's energy future. However, just what sort of reforms Vermont needs is hotly contested by wind proponents and opponents. On one hand, wind supporters, particularly developers, say that Vermont's approval process, is too cumbersome and slow, and has acted as an impediment that has driven wind developers away from the state. Like many wind advocates, Gabrielle Stebbins would like to see the process streamlined, noting that "Vermont is one of the

few states that has a permitting process with no end-date, resulting in projects that have taken years for approval, projects that generate clean energy and green jobs."[56] They point to Vermont's current target of 20% of electricity generation coming from renewable sources by 2017 as evidence of the need for more wind energy and fewer legislative obstacles.

On the other hand, wind opponents claim that, to the contrary, the process is not rigorous enough, and that further controls need to be put in place to make the approval process more of a genuine evaluation of the small- and large-scale merits of each wind project and less of a "rubber stamp" affair that they believe it is now.[57] Governor Shumlin's recently announced Energy Generation Siting Policy Commission will aim to address these concerns from both sides and to strike a balance between the competing desires that will hopefully allow energy projects, wind and otherwise, to be more efficiently implemented in a manner that is more sensitive to the aforementioned environmental, health, and social issues. There is some doubt among wind opponents, such as VCE's Annette Smith, as to whether this new commission will bring about the radical overhaul of the current process that many opponents have called for, but of course the commission must take into account both sides of the argument when considering modifications to the existing system, and it is likely that people on both sides of the aisle will be less than fully satisfied with whatever compromise solution the commission ends up recommending.

To me the most pressing question regarding the environmental benefits of wind energy in Vermont actually has nothing to do with the wind turbines themselves, but rather with the politics surrounding renewable energy. The issue of double-counting Renewable Energy Credits for Vermont-generated renewable energy in other states' Renewable Portfolio Standards delegitimizes renewable energy both in Vermont and in the region, and means that the

[56] Page, Candace. "Governor: Time for Fresh Look at How Vermont Sites Energy Projects." *Burlington Free Press*
[57] "VCE's Comments and Observations on Vermont's PSB, ANR, and Act 250 Permitting Processes."

environmental benefits of wind energy in Vermont is effectively cancelled out by dirty fossil fuel plants that are counted as renewable energy in other states' accounting under the assumption that the state in which the credit seller is located will count the seller's clean energy as the buyer's dirty energy (hence the trade in cap and trade.) This to me is the most glaring flaw in the current renewable energy system, but one that has gained little public attention because it is fairly complicated and difficult to understand. Before Vermont can make real strides toward implementing renewable energy, it must implement a more reasonable and effective policy that places a higher premium on real environmental change and less on benefiting the utilities that develop wind energy.

More so than the current siting process, critics call for alterations of Vermont's system of renewable energy credit allocation. The current system is unreasonably favorable for utilities – with some accusations of undue corporate influence in Montpelier – and leaves Vermont shouldering the economic and environmental bill as they purchase supposedly clean renewable energy that, when one takes into account the regional picture, does not actually provide the larger-scale environmental benefits that justify higher-priced electricity and damage to the local environments. Regardless of how this flawed system was put in place, it is imperative that Vermont close the REC double-counting loophole as soon as possible, hopefully within the following legislative session. When one digs into this relatively complex and little-known issue, it becomes evident that Vermont adopt a more effective process, especially with myriad examples around the country and even nearby in the Northeast. The Public Service Board has recommended that Vermont switch to an RPS mandate similar to its neighbors'.[58] Ideally, as awareness begins to spread within the next few years, Vermont will enact a Renewable Portfolio

[58] Jones, Kevin. "Fixing Flawed Energy Program." *Rutland Herald*

Standard, or at least fix the loophole in the current SPEED program, and take a necessary step toward real progress in the state's fight to reduce its contribution to climate change.

Furthermore, the alteration of this current procedure presents a unique opportunity to heal the divisions that the debate over wind power in Vermont has created in the past few years. Kevin Jones, director of the Smart Grid Program at the Institute for Energy and the Environment at Vermont Law School, describes REC-double counting as "an important policy on which those on both sides of this debate should find common ground,"[59] and it is only through a collective effort from actors with a diverse range of political, social and economic backgrounds around the state that enough pressure can be applied on legislators to bring about this change. Closing the current SPEED program's REC loophole is a critical step in improving Vermont's legislation to allow renewable energy to make a meaningful difference for the environment.

As well as the problem of double-counting, critics have derided Vermont's SPEED program for the fact that RECs from small-scale net-metered facilities (e.g. houses or businesses with rooftop solar panels) do not currently count toward state standards. This represents an impediment to the development of a distributed infrastructure of smaller facilities around the state and a failure of Vermont's government to fully embrace the potential for a larger number of small contributions. Most importantly, this means that a lower share of financial incentives is given to distributed electricity producers, since they do not directly contribute to meeting the central policy goals established for renewable energy. This may actually end up resulting in slightly more renewable energy produced in the short term – assuming that Vermont fixes the REC double-counting loophole – since those who would be installing net-metered installations either way will do it with or without the added incentive of the state recognition of RECs, in addition to the required quantity produced by the larger-scale producers (from which the

[59] Jones, Kevin "Renewable Energy Policy Is an Expensive Illusion." *Burlington Free Press*

contribution of net-metered systems is not subtracted.) However, this lack of recognition of net-metered RECs in the long run only serves to discourage a promising technology that could be a very important contributor to Vermont's clean energy future and help reward the citizens who are taking a big step toward doing their share.

Again, the Shumlin administration and the Vermont legislation have received criticism for placing the interests of the utilities, who lose out if consumers begin to generate their own electricity, over those of Vermont's citizens and environment. While I can only speculate as to the veracity of these claims, it is worth noting that Green Mountain Power, the state's largest utility, was one of the largest corporate donors to Shumlin's 2010 campaign, and that its CEO, Mary Powell, organized Shumlin's inaugural ball. Whether this is indicative of corporate interests penetrating the state political process or simply Ms. Powell's considerable skill as an organizer and mover of people is well beyond the scope of this analysis. However, I will say that if Governor Shumlin wants to quiet the critics who, in a series of recent protests on the state house lawn, have accused him of placing the interests of Green Mountain Power over Vermont's economy and environment, he can advocate a modification of Vermont's SPEED program that provides stronger incentives for small-scale, net-metered electric generation. This will also help achieve Vermont's ambitious renewable energy goals of 20% by 2017 and 90% by 2050.

Just as large-scale wind developments should play an important role in meeting Vermont's needs for renewable electricity even in the face of public criticism and attractive smaller-scale alternatives, so too do the utilities play an important role in Vermont's renewable energy future. Green Mountain Power has been working in a wide range of renewable technologies, not just wind, and the utilities can act as important partners for the community-scale projects, perhaps through an arrangement in which the utility, in return for partial or full

ownership, provides some level of financing, knowledge, labor, and expertise to bring a smaller-scale project to life.

Green Mountain Power is considered by many of Vermont's more vehement opponents as something of a corporate boogeyman for its involvement in the Lowell Wind Project, recent merger with Vermont's other largest utility, and alleged influence on state politics. However, GMP has also been working in conjunction with towns and businesses around the state to construct smaller-scale renewable energy facilities across a wide range of technologies, including not just wind, but also solar and cow power. GMP's financing power, expertise, and financial incentives to expand renewable electricity production, along with its responsibility to update Vermont's grid to include 'smart grid' technologies such as net metering capacity make it a critical actor in the struggle to expand the state's renewable energy generation capacity and infrastructure.

Vermonters need to take responsibility for their energy consumption in a conscientious manner that incorporates the use of locally-produced renewable energy. Much of the surprising strength of the opposition to wind energy in Vermont can be attributed to its citizens having grown accustomed to the luxury of the negative externalities of the energy they consume being located out of state, with wind energy recognized as a particularly visually intrusive method of energy production.

While I, along with many other Vermonters, have come to doubt the widespread applicability of large-scale wind installations to Vermont's specific electrical and cultural necessities, I believe that wind energy in Vermont has its merits. Even though I see many utility-scale mountaintop wind projects as a relatively poor fit in Vermont, there is still large potential benefit from the incorporation of smaller, community-scale wind that can meet the electricity needs of those who would be most affected by it, and who would ideally have the largest say in determining siting and whether the environmental benefits

outweigh the local costs. Additionally, many Vermonters encourage the development of large-scale wind energy in what they see as more appropriate locations, such as many Midwestern states with wind resources over 100 times as high as Vermont and whose flat topography and sparse population translate to lower human impacts.

Furthermore, wind energy in the Midwestern and Western states can help buoy the local farming industries, since wind turbines can easily be placed on large corn fields and ranching pastures with minimal reductions in agricultural productivity and large potential to save farms that are on the brink from economic collapse (similar to solar generation on Vermont dairy farms.) The Midwest already has much higher rates of wind development than Vermont and other eastern states, but there remains quite a bit of potential for expansion, and many Vermonters argue that wind energy is much more appropriate for the land and the people there than in Vermont.

In the Eastern United States, the majority of wind resources are located offshore, and there is some optimism that, if offshore wind technology can become financially viable in the United States, this would become a preferable alternative to Vermont ridgetop wind. Of course, wind proposals have met plenty of resistance both in the Midwest and the East Coast, the most notable example of the latter being the highly controversial Cape Wind project off the shore of Massachusetts and Rhode Island. My and other Vermonters' assertions that wind energy would be better sited in these alternate locations do certainly take on some irresponsibly NIMBYist overtones – even if they are underpinned by solid factual reasoning. It is therefore important that Vermonters 'walk the walk' so to speak, and demonstrate a serious commitment to developing whatever renewable energies are decided to be more appropriate, namely solar, cow power, geothermal heating, and smaller-scale wind, before simply dismissing utility-scale wind as better sited elsewhere.

In a state whose wind opponents are characterized by unusually high levels of concern for environmental issues, especially global climate change, a number of alternatives to utility-scale wind energy have emerged. As Annette Smith told the Vermont Community Wind opponents

who would go on to form Energize Vermont, "you can't just oppose; you've got to be part of the solution."[25] Energize Vermont, among many other private and public stakeholders, advocates distributed solar generation as the state's main source of renewable electricity generation. This solar potential would be installed on the rooftops of net-metered buildings around the state, and on larger community-scale pole-mounted solar installations placed in open areas such as cleared agricultural land. Although Vermont's solar resource, with lulls during the short days of the overcast winter months, is hardly ideal, proponents have noted that it is actually more concentrated per unit of surface area than Germany, the world leader in installed photovoltaic generation capacity.[60]

Solar in Vermont carries the advantages that it can be installed on low-elevation sites that do not require clearcutting, blasting, filling, road construction, and extensive transmission lines of Vermont wind, which only has sufficient resources on mountaintops far away from human population centers. This means that solar generators, in addition to being logistically easier to construct, by some estimates produce energy at roughly the same price in Vermont as wind. Furthermore, and perhaps more relevant to the discussion of Vermont's energy future, the prices of solar have been decreasing recently (Fig. 5) and are projected to continue to do so, due to increases in technology, dropping prices of silicon (the main element required in fabricating photovoltaic panels), and the serious market penetration made by Chinese manufacturers in recent years.[58,61,62] On the other hand, wind energy, at least in Vermont, will likely become more expensive in the coming years due to the rising prices in steel, concrete, and copper, and the exhaustion of the "low-hanging fruit" locations that will force wind developers to seek locations on more difficult construction sites farther from interconnections into the transmission grid. [58]

[60] Kirschbaum, Erik. "Germany Sets New Solar Power Record, Institute Says." *Reuters*
[61] (Professor David Tanenbaum, Personal Communication, 11/27/12)
[62] (Greg Pahl, Personal Interview, 12/4/12)

This price increase will likely compromise large-scale mountaintop wind's economic benefits and lead to a reduction in the amount of wind energy produced in Vermont in coming years, even aside from the presence of in-state opposition movements.

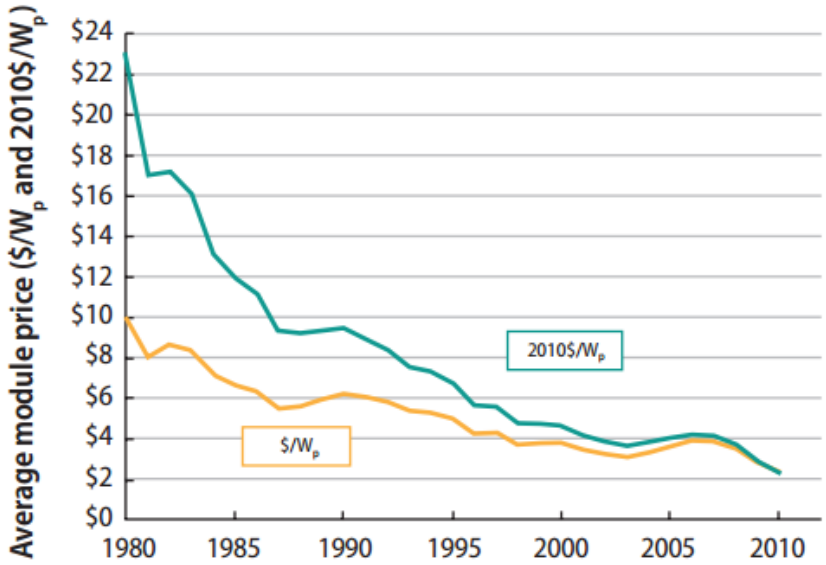

Fig. 5 Average global solar prices 1984-2010, all technologies. Since 2010, solar prices have continued to drop further and are projected to keep dropping.

Additionally, Vermont's solar resource is much more extensive than its potential for wind energy. It would require allocating much more land to generate the same quantity of electricity as is needed for large wind turbines, but solar could be placed on much less environmentally- and culturally-sensitive sites. Furthermore, according to an estimate by Ben Luce, a physics professor at Vermont's Lyndon State College who was formerly a part of New Mexico's wind industry and has since become one of Vermont's most vocal advocates of distributed solar instead of utility-scale wind, "A PV collection area of less than 1% of the cleared farmland in VT would produce the equivalent of VT's entire electricity demand." If this estimate of solar energy's space requirements are accurate (or even remotely close to accurate) and solar prices continue their recent downward trends, then solar photovoltaic appears to be the most promising means for Vermonters to take responsibility for producing clean in-state electricity.

While solar requires more space to produce the same energy as wind, it can be placed closer to demand, with fewer visual and health impacts on neighbors, and I believe it is the best fit for Vermont's unique culture. At the same time that solar can be placed in less environmentally sensitive areas and avoids the destruction of the state's precious mountaintops, solar also has a huge potential to support and preserve Vermont's struggling dairy industry, a critical part of Vermont's economy and cultural identity. The potential for local-scale solar, located on cleared agricultural land, in combination with a particularly Vermont method of small-scale methane (i.e. natural gas) collection and electricity generation known as "cow power" appears especially promising. With cows providing a constant source of methane, there is the potential for dairy farms to double as self-sufficient net-metered renewable energy producers. This carries the additional benefit of reducing the amount of methane – a greenhouse gas 25 times as potent as carbon dioxide – that is put into the air from Vermont's farms. The potential for renewable energy to aid the ailing farm industry and preserve a hallmark of Vermont culture and a source of livelihood for thousands of Vermonters while helping to preserve the environment should not be understressed. As much as Vermonters love their mountains, the farms are just as dear, and if it is possible save one instead of destroying the other and still achieve the state's environmental goals, it only serves as an additional motivation for Vermont to take a more measured approach to implementing renewable energy.

Another suggestion for improving Vermont's renewable energy development is incorporating higher levels of community ownership. Higher community involvement in planning, siting, and financing renewable energy projects has been shown to increase public acceptance in places like Denmark and Germany, whose community involvement models are large contributors to their statuses as renewable energy pioneers,[55] and whose climates are more

comparable to Vermont's than many American states. Valid arguments can be made that it is more difficult to actually implement renewable energy development when dealing with a high number of possibly apathetic individuals than one for-profit entity with clear financial motives. However the success of recent projects, such as Middlebury's newly operational solar plant – Vermont's first three-way collaboration between a municipality, a renewable energy cooperative, and a local insurance cooperative – contrasts with the accusations that controversial, locally damaging wind projects are souring Vermonters toward renewable energy as a whole.

The community ownership model can just as easily be applied to small-scale wind developments if there is an acceptable site with sufficient wind resource. Many investors in community-owned projects finance their construction for more environmentally based motivations, understanding that they should expect lower rates of economic return,[66] and therefore open the possibility of implementing a more extensive renewable energy infrastructure than would be possible for companies with higher cutoffs of what constitutes minimum acceptable financial returns. This will carry obvious benefits both to the environment and to Vermont's local community health.

As wind opponents like to emphasize, only 4% of Vermont's greenhouse gas emissions come from electricity production, with the heating and transportation sectors making much larger contributions – understandable given the state's long, bitterly cold winters and the sparse human settlement. Accordingly, efficiency and conservation have become central themes, both in the context of home heating and automobile fuel efficiency. There is tremendous potential to improve Vermont's energy efficiency, and save consumers and taxpayers a great deal of money in the process, as increased fuel efficiency means that not only are they not putting greenhouse

gases in the air, but they also save the money that would have gone toward purchasing the fuel whose combustion would emit them in the first place.

Many of Vermont's ridgelines are already in some way altered. Ski areas provide a critical portion of the state's economy and dozens of other mountains are in other ways altered. To name a few examples: the mountain across the road from my house has a small hydroelectric dam at the high-elevation lake, roughly a mile of above-ground penstock, a highly visible water tower, an access road, and fairly extensive transmission lines. Another treasured and heavily traveled mountain a dozen or so miles away has clear evidence at the peak of the foundations of an old hotel with an access road for horse-drawn carriages. Mount Mansfield, the tallest mountain in the state and one of my personal favorite hikes, has several radio and cell towers and a road to the second highest peak and is within clear view of two of the state's most famous ski mountains. I consider myself an avid hiker and I do not believe that these signs of human impact have severely limited my and other people's enjoyment of the mountains' views and recreational value. Wind turbines are larger and more visually intrusive to be sure, but I believe that there are places that can be sacrificed without too much social and cultural detriment.

If legislators can shore up the SPEED program's double-counting issue and stop allowing coal plants in Massachusetts and Connecticut to count toward their RPSs, then I believe that the benefits of some wind energy to the environment are worth the local costs. In order to ensure correct weighing of Vermont wind's costs and benefits, further studies must be conducted to definitively resolve the question of wind turbines' alleged health impacts on neighboring residents. I do not advocate unreasonably wide-scale adoption of wind energy, since I believe that Vermont's mountaintops do hold an incredibly strong intangible value for the state and its people.

I believe that Vermont should primarily pursue lower-impact options, such as efficiency and distributed generation, which could potentially include wind (I would support a small turbine on Chipman Hill in the center of my hometown if the health and noise impacts on neighbors weren't too severe; furthermore, Vermont is home to one of the foremost community-scale (100 kW) wind turbine producers.) Assuming that solar prices continue their downward trend and they reach parity with wind, and ideally, with the NE-ISO grid market rate, I believe that solar should be pursued as the highest priority for distributed generation.

With the threatened expiration of the federal Production Tax Credit at the end of 2012 (it remains unclear whether it will be renewed in the wake of Obama's recent victory; Romney explicitly stated that he would have let it expire had he won)[63] the wind industry has entered a period of serious contraction following the so-called "gold rush" of the past few years. At the same time, the controversy surrounding Vermont's recent boom of wind energy development and relatively difficult permitting process have caused many developers to effectively give up on the state as too much trouble with too little reward.[64] David Blittersdorf, founder of two successful Vermont-based renewable energy companies, admits that "Next year is a disaster for the wind industry"[65] It is worth noting that Blittersdorf, while one of wind's most vocal proponents in the state and individual part-owner of a 4-turbine 12 MW wind farm that will come online later this month, has also bet heavily on solar, as his company AllEarth Renewables just completed North America's largest distributed solar tracker farm (2.2 MW) outside Burlington.

Further darkening the situation for wind developers is the increasing effectiveness of opposition movements who have honed in on the strategy of organizing early and altering the

[63] Silverstein, Ken. "Romney Would Not Leave Wind Energy to Dangle." *Forbes*
[64] (Kathryn Flagg, Personal Interview, 11/16/12)
[65] Hallenbeck, Terri. "Turbines Rising on Georgia Mountain." *Burlington Free Press*

Town Plan, and the signs of changing tides in Montpelier, especially in light of DPS Commissioner Elizabeth Miller's recent support of Windham and Newark's new Town Plans. The resolution of Newark's court case against the developers who claim that the recent changes were invalid will likely have a significant political impact, as it will largely determine the effectiveness of the opposition's new strategy. However, there are several other factors to consider. First, the Governor's Commission on Energy Generation Siting Policy's recommendations may lead to major changes in the current political structure, which will inevitably necessitate a shift in strategies for both proponents and opponents. However, as Louise McCarren, an appointee to the Governor's Commission, notes, even if she and her colleagues can successfully improve the Section 248 procedure, "You can have the best crafted process in the world, but if the politics of the issue overwhelm it … well, it gets overwhelmed,"[41] If the people of Vermont are soured to the idea of wind energy, it will be very difficult for it to take hold in the state regardless of the political process.

While polls show the majority of Vermonters approve of further development of wind energy,[1] there appears to be a downward shift in the focus of political power in the fight over wind energy from a more statewide scale to the local areas in which turbines are sited, as local opponents are starting to gain some hold in the state regulatory process through the Town Plan method. While I expect the majority of power to remain at the state level, the strength and spread of public outcry has put the state government in a public relations pinch, as Governor Shumlin has started to shift more in favor of supporting local opponents' wishes if they are formalized into a concrete (albeit non-binding) Town Plan that has been adopted by the vote of a popular local majority. This represents an important step in the trend of increasing weight being attached to the concerns of local residents living around the proposed wind turbines relative to the

environmental concerns of the state at large in the assessment of whether a project contributes to the public good – the ultimate determinant of whether a wind project receives the Certificate of Public Good from the state Public Service Board. This downward shift will likely continue to obstruct the implementation of large-scale wind energy in Vermont.

A proposed solution that I believe is particularly promising is the adoption of a new state Renewable Portfolio Standard that fixes the aforementioned double-counting and net-metering REC flaws, and shifts the control of the decision not only over siting, but also over which renewable production method(s) to employ down to the county level. The state would provide incentives for efficiency measures, but counties would have greater agency in deciding how to meet their renewable production standards, which I see no reason to change from the current 20% by 2017 and 90% by 2050. This would at the same time help remedy issues of environmental justice and lessen resentment between the poorer areas of the state, such as the Northeast Kingdom, who consume less electricity and are often stuck with the local costs of wind turbines, and the richer, more developed areas, such as Burlington, where much of the electricity goes. Because each county would have to produce the given percentage of its own demand, there would be much less need to build capacity in poorer areas than in the cities. Of course, there are local economic benefits from renewable energy installations, so there are clear incentives for areas whose residents feel that the economic pros outweigh whatever cons may be associated with the generation technology they decide upon.

This may mean that economically-distressed farming areas end up taking on a disproportionate load of the solar installations, which I foresee drawing similar complaints of compromising another backbone of Vermont's cultural identity and source of tourism revenue. However, if my predictions about solar energy's potential benefits to the farming community are

correct, and it does prove possible to find visually out-of-the-way locations for photovoltaic panels that cannot fit on roofs, then the inevitable solar opponents will have much less of a case for impeding renewable energy development than wind opponents (especially since solar panels aren't 400-feet-tall and are less likely to ruin neighbors' views than wind turbines.) Furthermore, Green Mountain Power is planning to make Rutland – Vermont's second-largest city – the state's first entirely solar-powered city which, along with the unveiling of AllEarth Renewables' 2.2 MW facility outside Burlington, indicates that there is much less necessity to outsource solar production to less dense, poorer areas as there is for wind.

Alternately, it is argued that distributed renewable generation, primarily solar, that includes more Vermont citizens as stakeholders will foster a much higher acceptance of renewable energy and help bridge some of the gaps that were widened in the debate over utility-scale wind energy. Renewable energy should act as and be viewed as a local endeavor that Vermonters can get involved in to make a positive difference to the environment, preserve the state's character, strengthen communities, and minimize costs to neighboring residents.

Furthermore, Vermont has a strong culture of resisting corporate influence (seen in the continued success of local shops and restaurants, and the low penetration of national chains), and large-scale wind energy, due to its economy of scale, is by nature more oriented to private interests than distributed generation systems. That said, Green Mountain Power is responsible for a number of projects in areas beyond wind, including the alternatives previously listed, such as solar and cow power, and many of Vermont's larger wind farms are developed by small local enterprises. Regardless, the trend (or at least the perception of many Vermonters) is that larger wind farms tend to be more the realm of corporate interests and community-scale generation more human-oriented. Many wind opponents who also support renewable energy fear that the

controversy surrounding Vermont wind development will actually be counterproductive in that it will sour public opinion toward renewable energy as a whole.

7. Conclusion:

Large-scale wind energy in Vermont is not without its merits and should in some cases be supported, but the strength and frequency of local opposition, as well as the serious potential for controversial big wind projects to sour public opinion toward renewable energy indicate that it is not as benign as it may appear from a distance. On a personal level, I can say that, although my immense love of the mountains around my home and the countless hours of time I have spent in them over the years make it difficult for me to unreservedly embrace the idea of putting several miles of roads and windmills along a ridgeline, I see the value of utility-scale wind developments in doing the broader-scale environment a large service in a relatively concentrated area.

Vermont must continue to develop its renewable generation capacity; in the coming years it is likely that larger-scale wind will fall out of favor as the wind industry contracts, and the focus will shift more toward solar, cow power, efficiency, and distributed generation, including small-scale wind. If, after more conclusive studies of wind's human health effects come forward and Vermont's current renewable energy accounting structure is fixed, Vermonters decide that the environmental benefits of large-scale wind developments are worth the localized costs, then the state can once again embrace large-scale wind, but in a more measured and reasoned manner than has been seen in the wind boom of the last several years.

Ironically, as the wind industry has grown in the last few decades, it has been transformed in many people's perception from the "green" alternative to the big, bad, polluting fossil fuel corporations to the big bad corporate machine itself. Strangely enough, now it is wind, the alternative proposed by many energy-project-opponents from years past, that is receiving the

ire of the local opposition movements. While this is not isolated to just Vermont, as wind energy has run into similar problems in implementation around the country and around the world, wind opposition has proven especially fierce in Vermont because the state has such a strong legislative and cultural history of environmental stewardship and resisting corporate influence. While some part of the wind opposition movement may be explained by NIMBYist motivations, there are also many opponents of large-scale wind in Vermont who have been receptive to implementing renewable energy alternatives, such as distributed generation and efficiency, that they see as more in line with Vermont's physical and cultural resources. If the intense debate over wind has divided the state politically, it has also served to bring energy into the public focus. It is now critical that renewable advocates and concerned citizens push the continued debate over Vermont's energy future to take place in a productive, honest manner that uses a variety of technologies to meet the need for in-state renewable energy in a way that inspires in Vermonters a sense of pride instead of resentment.

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