

High Elevation Wind Energy



**Good Energy Policy?
Bad for the Environment?
Neither/Both?**

You Decide!

*An Environmental Policy Debate for Students
By the Agency of Natural Resources
Deb Markowitz, Secretary*

Introduction

Environmental policy debates are rarely simple. There are often important ecological considerations and social values at stake; and while it is important to have good science to help us make good decisions, science alone is not always determinative.

This publication is designed to help Vermont students develop critical thinking skills and understand how environmental regulators balance science, law and policy by considering the complex issues surrounding one of the “hot” environmental issues of our time – ridgeline wind energy development.

The packet includes background information on wind energy, global climate change and how climate change is affecting Vermont. It also includes information about Vermont’s energy and climate policy as articulated in Vermont’s new Comprehensive Energy Plan, the potential environmental impacts of ridgeline wind projects and who decides whether and where a wind project will be sited in Vermont. Links are also included in the text to more information so students can dig deeper into the topics and review for themselves the sources of information in the packet.

A series of questions for the class to consider are also provided, in order to get students to think critically about this complex and challenging environmental policy debate, and the appendix includes opinion editorials from both opponents and proponents of large scale wind development in Vermont.

It is my hope that this exercise will spark student’s interest in learning more about the science, public policy and law affecting our most pressing environmental challenges. As the Secretary of the Agency of Natural Resources, one thing I know for sure is that unless we engage all Vermonters in solving our environmental problems, including our young people, we will not succeed in our mission to protect, sustain and enhance Vermont’s natural resources for this and future generations.

“I believe there is no greater challenge and opportunity for Vermont and our world than the challenge to change the way we use and produce energy.”
- Governor Peter Shumlin



Deb Markowitz, Secretary
Agency of Natural Resources

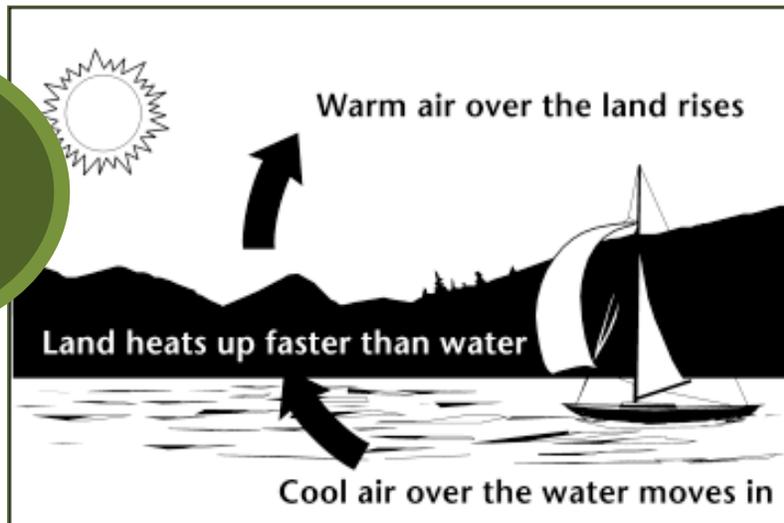
Disclaimer: This publication is intended for educational purposes only. It provides general information about the subjects within and does not express the Agency of Natural Resource’s position or opinion in any matter that is currently, or will in the future, be before the PSB or that is subject to permitting by the Agency.

What's blowing in the wind? Energy in Motion!

*Wind is air
on the move!*

The earth's surface is composed of many different types of land and bodies of water. Each of the varied surfaces absorbs the heat from the sun at different rates, thus heating the air above the surface to different temperatures. The warm air rises and the cooler, more dense air moves in to take its place, creating wind.

**Uneven
Heating of
Water and / or
Land Causes
Wind**



Source: National Energy Education Development Project

Air moves when thermal energy (energy from heat) becomes kinetic energy (energy from motion). Wind energy has been harnessed by humans for a very long time. The earliest known use of wind power was to help move boats across water. People have been using sailboats since as early 3100 BC.

The first windmills were also developed over a thousand years ago. The earliest documented windmills were used for water-pumping and grain-grinding in Persia approximately 500-900 A.D and in China around 1219 A.D. In the late 18th Century, people in Europe and the United States began to experiment with connecting wind turbines to electric generators. The first megawatt-size (1.25 megawatts) wind turbine in the world was installed and linked to the electric grid in Castleton, Vermont in 1941, where it functioned as the world's largest until 1979 when Holland began its serial production of windmills.



Although the technology has changed quite a bit, we still use windmills or wind turbines to harness the wind's energy, but today, the largest windmills can generate about seven times more energy (7 megawatts) than the one that was installed in Castleton in 1941. (The average Vermont home consumes 576 kilowatts month. 1000 kilowatts = 1 megawatt.)



Turbine on Grandpa's Knob in Castleton

* Here is how to understand megawatts: 1 megawatt = 40,000 25 watt compact florescent light bulbs. 1 megawatt = 1340 horsepower (a 2011 Prius has about 134 horsepower, a 2011 Ford Mustang has 412 horsepower and a 2012 Dodge Caravan Minivan about 282 horsepower.

Wind power is an intermittent source of power – meaning that electricity is only generated when the turbines are spinning. This means that there needs to be a back-up source of energy available to fill the gaps.

Why consider wind power?

Wind is a **renewable energy** source. Renewable energy comes from energy sources that restore themselves over short periods of time and do not run out. These include the sun (solar), wind, moving water (hydro-electric), organic plant and waste material (biomass), and the earth's heat (geothermal). No matter how much we use the wind, we will not deplete this energy source.

As long as the sun shines, wind will blow and provide a source of energy that can be used by people.

Fossil fuels are an example of a **non-renewable** energy source, one that is finite and will eventually be used up. Today, we use many fossil fuels (oil, coal, and natural gas) to power our vehicles, to run our industries, and to electrify our homes, schools, and office buildings. Since fossil fuels are non-renewable, we will eventually run out of these energy sources, and well before this time, as they become rare, they will also become unaffordable.

Check it out for yourself!

Learn more about renewable energy from the National Renewable energy Laboratory website:
http://www.nrel.gov/learning/student_resources.html

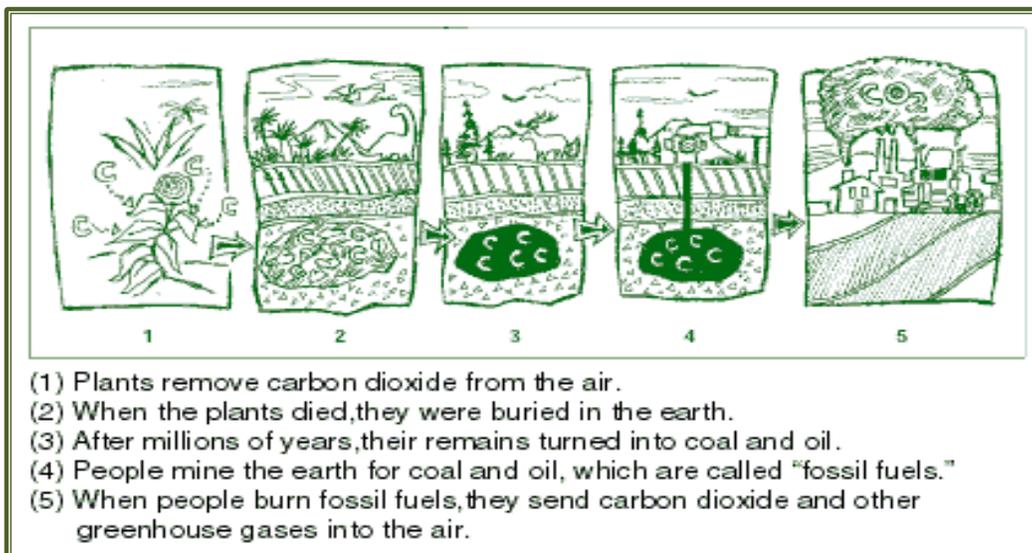
An important thing to know about fossil fuels is that when we burn them to power our cars, homes, offices and industries, 'heat trapping' gases called **greenhouse gases**, and other pollutants are released into the atmosphere. An increase in greenhouse gases is warming our planet, resulting in big climatic changes.

Have you taken the earth's temperature lately? It's getting warmer!

The earth has many natural cycles and systems that function like an enormous thermostat that keeps the earth at a temperature that can sustain life as we know it.

Greenhouse gases naturally occur in earth's atmosphere and play a critical role in maintaining the earth's temperature. Without greenhouse gases in the earth's atmosphere the planet would be very cold.

The greenhouse gas we hear the most about is **carbon dioxide**. Carbon dioxide is sent into the atmosphere through both natural processes (ex. plants decomposing) and human activities (ex. heating a house by burning wood, gas or oil.) Carbon dioxide is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the carbon cycle and when it dissolves into the ocean.



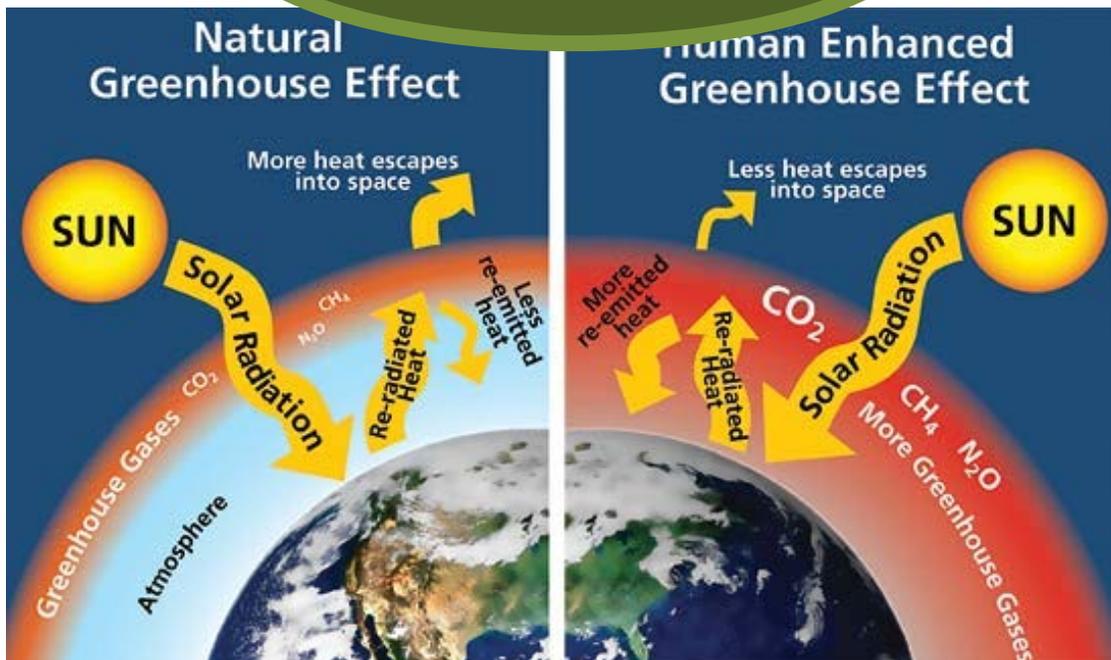
US EPA Climate Change Kid Site

Once, all greenhouse gases were created by natural processes. However, since we learned how to build machines that run on coal, oil and gas, and have learned to burn fossil fuels to produce heat and electricity, human activities have added greenhouse gases to the atmosphere (that were previously stored away in the earth through natural processes) at a very high rate since the beginning of the industrial age.

Greenhouse gases are very important because they help to keep the earth warm enough for plants, people and other animals to live. However, too high a concentration of greenhouse gases in the atmosphere can set Earth's thermoregulation system off balance and warm the earth. Even a small increase in the global temperature is likely to have enormous impacts on Earth's climate.

For the majority of human history, up until about 200 years ago, the earth's atmosphere contained 275 parts per million of carbon dioxide and today, that number has risen to about 392 parts per million, and it is still rising. Many scientists agree that the safe upper limit of carbon dioxide in the earth's atmosphere to sustain life as we know it is 350 parts per million. In order to curb climate change we need to work to reduce the amount of CO₂ in the earth's atmosphere from 392 to 350 parts per million or lower!

The earth-warming properties of greenhouse gases can be explained by the greenhouse effect.



Check it out for yourself!
See the National Oceanic and Atmospheric Administration Climate Change Q&A: www.ncdc.noaa.gov/oa/climate/globalwarming.html. For CO₂ updates: <http://co2now.org/Current-CO2/CO2-Now/noaa-mauna-loa-co2-data.html>.

Weather vs. Climate

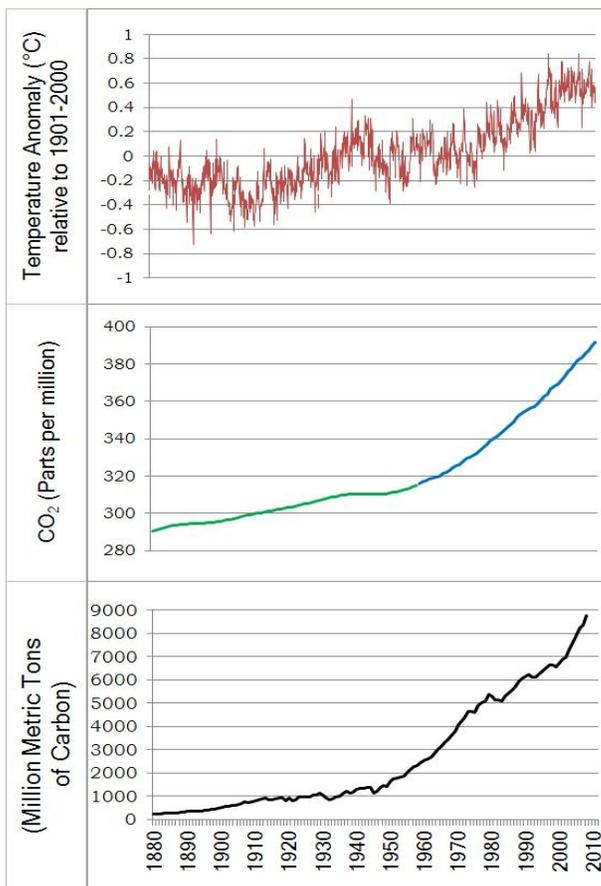
Although the earth's climate is warming, the weather is sometimes colder or snowier than ever. This can be confusing.

Weather refers to the conditions at one particular time and place, and can change from hour to hour, day to day, and season to season.

Climate, on the other hand, refers to the long-term average pattern of weather in a place. For example, we might say the climate of Vermont is cold and snowy in the winter, although the weather on a particular day could be quite different than that.

We rely on long-term data to tell us whether there have been changes in climate, and such data indicate that Earth's climate has been warming at a rapid rate since the start of intensive use of coal and oil in the late 1800s.

These charts show how the Earth's temperature increases correlate with increases in CO₂ and tons of carbon in our atmosphere



JAN-DEC GLOBAL MEAN TEMPERATURE over Land & Ocean

Source: NCDC / NESDIS / NOAA

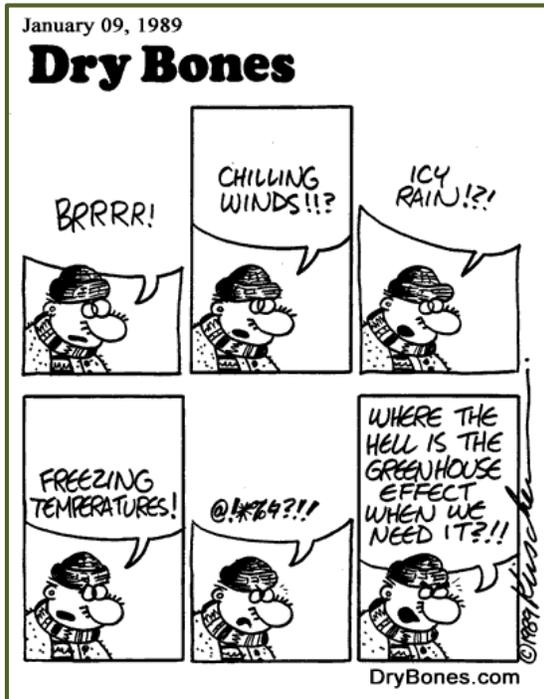
ATMOSPHERIC CO₂ CONCENTRATIONS

Source: Law Dome data (1880-1958)
Oak Ridge National Laboratory

Mauna Loa data (1959-2011)
(NOAA - Earth System
Research Laboratory)

TOTAL GLOBAL CARBON EMISSIONS From Fossil Fuel Combustion

Source: Carbon Dioxide Information
Analysis Center (CDIAC)



Check it out for yourself!
 The National Center for Atmospheric Research, National Science Foundation has produced a climate change simulation.
www.vets.ucar.edu/vg/IPCC_CC_SM3/index.shtml

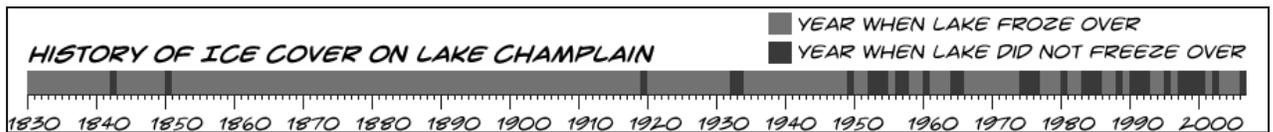
Climate Change in Vermont. Our seasons are changing!

Winter: The number of days with snow on the ground is declining. In fact, all across the northeast over the last 30 years, the average number of days with snow cover has **decreased** an average of **16 days**. Snow is melting earlier in the season and we have more slush.



A decrease in natural snow poses challenges for the winter outdoor recreation industry. Downhill skiing alone contributes over a billion dollars to Vermont's economy each year! Warmer winters also affect our plant life. For example, the open summit of Mount Mansfield has many rare alpine plants that are specifically adapted to very cold winters, such as black crowberry and mountain sandwort.

Lake Champlain takes longer to freeze over in the winter, and some years it never completely freezes over! This affects ice fishing and ice skating and also changes Lake Champlain's very complex ecology; affecting plants and animals, like the fish Vermonters like to catch and eat!



Source: Climate Action Plan, Burlington VT, Winter

Spring: Spring is coming earlier these days. This means that many of our flowers are blooming earlier as Vermont's climate gets warmer. One study has shown that lilacs are blooming about 4 days earlier in the northeast than they did 50 years ago! This impacts birds, bees and our other pollinators who rely on predictable blooming periods of flowers.

A warmer climate also changes our sugaring season. Sugar Maple trees need a mix of warm days and cold nights for their sap to flow. As our nights stay warmer, Vermont's maple syrup production will slow down. Already, the number of days that Vermonters can tap their maple trees is on average several days shorter than it was 40 years ago!



Rusty Blackbird Photo by Cory.

Because of climate change bird ranges (where they live for part or all of the year) are changing. Some bird ranges are beginning to shift out of Vermont to the north, like the Rusty Blackbird. Other species, like the Red-bellied Woodpecker, are becoming more common in Vermont as their range shifts north.

Summer: Our summers are getting hotter! The mean temperature in the northeast has risen about 2 degrees over the past 50 years and there has been a marked increase in the number of very hot days (over 90 degrees Fahrenheit) which can pose threats to human health and can negatively affect our air quality.

As we saw with the record flooding in the spring of 2011, followed by the floods of Tropical Storm Irene in August of 2011, Vermont is experiencing more rain, including more frequent extreme weather events that cause floods.

Fall: We are experiencing our hard frosts later in the season and certain insect and other pests that kept away from Vermont due to cold temperatures are now surviving here such as deer ticks (that carry Lyme Disease) and hemlock wooly adelgid (that kills hemlock trees). As our weather changes we have to be prepared to deal with new pests that challenge the way people live and effect how Vermont ecosystems function.

Our forests are not only being challenged by new pests and nuisance plant species, but over time, as Vermont's climate changes, tree species will change their range and the composition of Vermont's forests will change.



Check it out for yourself!

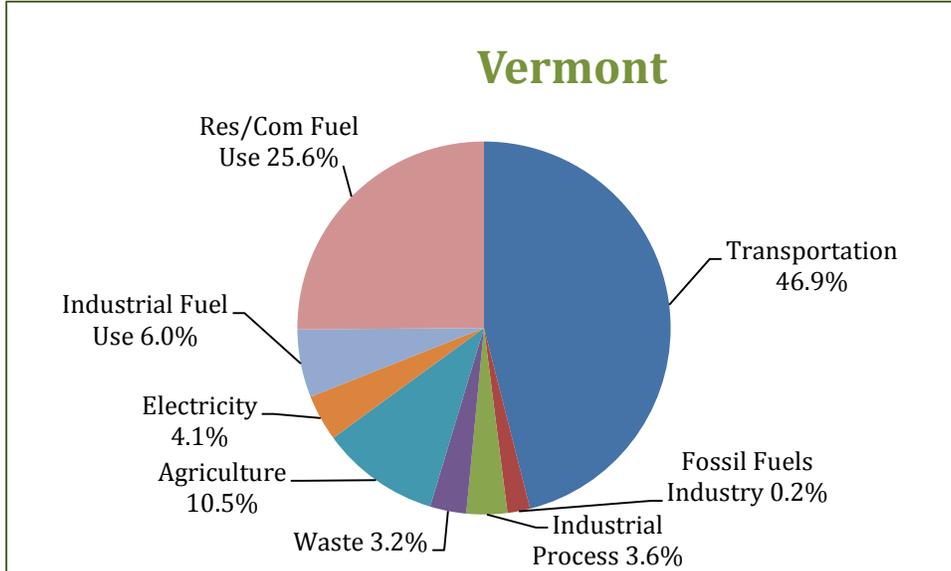
For more information about climate change in Vermont see "VERMONT, Confronting Climate Change in the Northeast" by the Union of Concerned Scientists.

www.climatechoices.org/assets/documents/climatechoices/vermont_necia.pdf

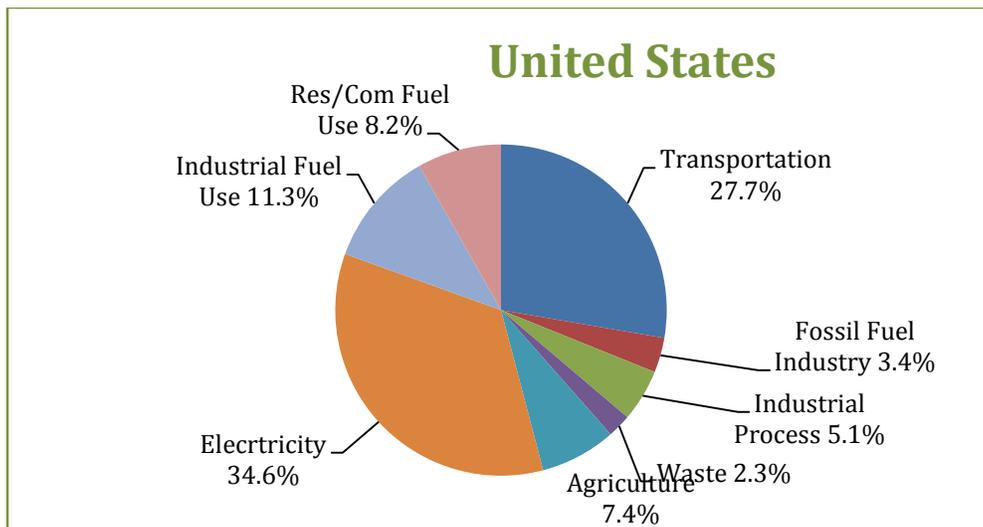
Also take a look at the work Dr. Alan Betts of Atmospheric Research has done looking at climate impacts in Vermont: <http://alanbetts.com/understanding-climate-change/question/what-is-happening-to-vermont/>

What can Vermont do about Climate Change? Vermont State Energy and Climate Policy:

In Vermont we generate greenhouse gases when we drive, use electricity, throw garbage in landfills, when we farm, when we manufacture things and when we heat our homes. The following chart shows Vermont's greenhouse gas emissions by sector. Look below to see how different Vermont is from the rest of the country.



In Vermont our largest contribution to GHG is from transportation, with residential and commercial fuel (used principally for heat) coming in a distant second.



As you can see, in most states electric generation is the biggest contributor to GHG. This is because most states have power plants that burn coal, oil or natural gas. In contrast, Vermont's energy comes primarily from Hydro-electricity and nuclear energy. Electricity is represented by a small sliver in our pie chart.

Vermont's Energy Plan: In 2011 the State of Vermont adopted a new energy plan for the state. The plan was developed with input from thousands of Vermonters and it was presented to the Vermont legislature in 2012.

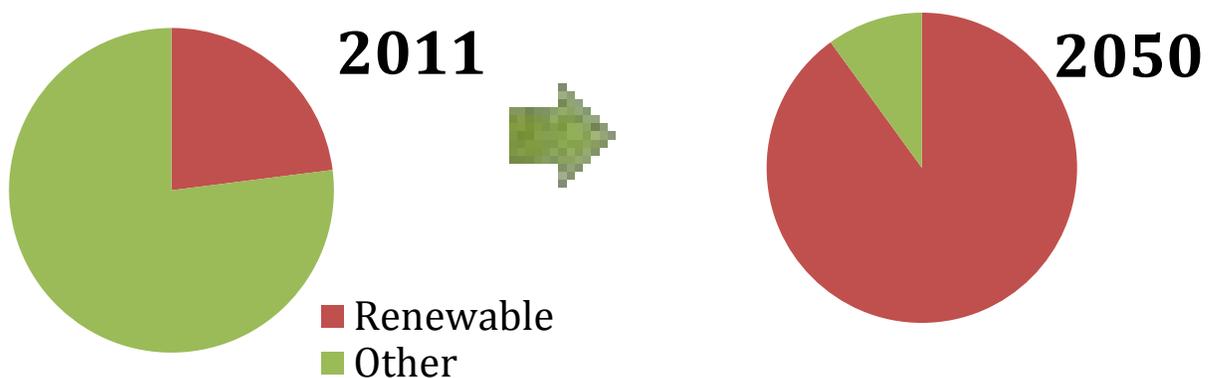
Vermont's Energy Plan describes the state's energy policy and it sets a vision for Vermont's energy future.

“Some may ask, ‘what can the small state of Vermont do to help our global climate challenge?’ The answer is that we can do our part and lead others by example. A ton of greenhouse gases saved here is still a ton saved—and if we spur our economy with the energy investments we make, we will show how environmental choices can lead to economic prosperity.

By making these choices, we will help not only our environment but also the Vermont brand—which underpins our tourism and agricultural industries and attracts businesses to our state. We must balance what we love about Vermont—its fields, forests, and mountains—with responsibly sited energy projects.”

- Excerpt from Vermont's Comprehensive Energy Plan

Vermont's Energy Plan sets the goal for Vermont of getting 90% of our total energy from renewable sources by 2050.



Meeting this goal will require Vermont to dramatically reduce our reliance on fossil fuels (oil, gas, coal). It will require Vermonters to reduce our energy use by becoming more efficient in how we use energy. For example, energy efficiency measures (what we can do to use less energy) includes things like insulating our

buildings to keep in the heat, using more fuel efficient cars or carpooling and unplugging electronics when we are not using them.

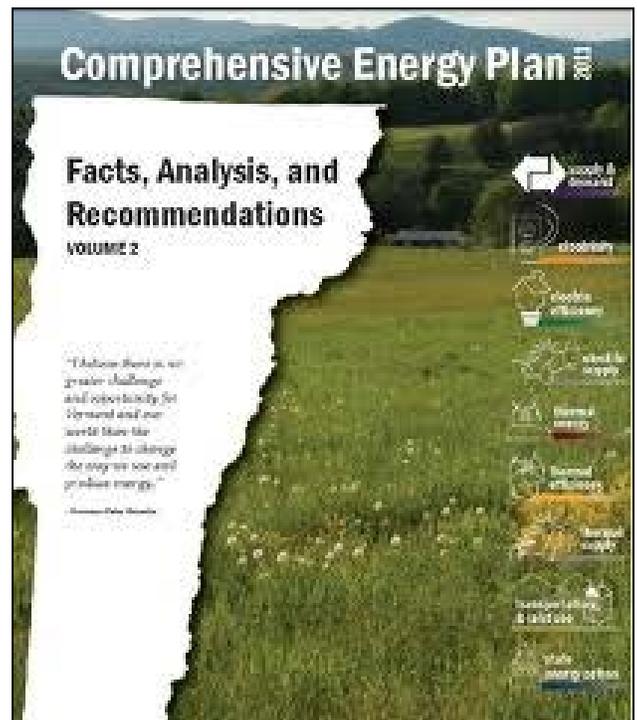
In order to meet Vermont's energy goal Vermonters will have to begin using renewable sources for electricity, heating and transportation. This is why Vermont's Energy Plan calls for the development of local renewable technologies such as wind, solar, biomass and hydro-electric generation.

We can generate renewable energy in one of two ways – we can develop large, centralized facilities, like a large wind farm, or develop many smaller scale energy projects, like solar panels in a person's backyard. This latter form of renewable energy production is called "distributed generation." Distributed generation is currently more expensive than other sources of electricity. That being said, as fossil fuels become more expensive smaller, decentralized renewable energy projects will become more cost-competitive.

Check it out for yourself!

Read a two page summary of Vermont's Energy plan:
http://www.vtenergyplan.vermont.gov/sites/cep/files/CEP%20Overview%20Page_Final.pdf

Or take a look at the entire plan with lots of great information in the Appendices:
<http://www.vtenergyplan.vermont.gov/>



The energy plan has sections devoted to the different renewable energy resources and recommendations. It makes 7 recommendations related to wind energy. **Read them for yourself on the next page!**

Wind Energy Recommendations from Vermont's Comprehensive Energy Plan.

“As we weigh the benefits and drawbacks of wind generation, we conclude that wind power should continue to be an important renewable resource for Vermont's diverse electricity portfolio going forward. To improve wind project permitting and siting and to address some of the concerns that have been raised regarding these projects, we recommend the following:

- (1) Vermont utilities should continue to monitor opportunities to purchase cost-effective in-state and out-of-state wind generation to add to their sources of energy supply.
- (2) Vermont should continue to facilitate development of in-state wind projects in order to achieve the state's renewable energy goals, with particular focus on community and small-scale projects. For utility-scale projects, development should be permitted if there are significant economic and societal benefits to Vermonters, and all other Certificate of Public Good criteria are fulfilled.
- (3) ANR should complete its natural resource inventory and mapping project to identify resources that may affect siting for the build-out of renewable energy projects, including utility-scale wind generation.
- (4) The Department of Public Service, the Agency of Natural Resources, and the Public Service Board should consider developing generic siting guidelines for developers of wind projects, to aid permit process uniformity and provide guidance on aesthetics and other common issues. Regarding consistency among siting renewable resources, refer to Section 5.10.6 Regulatory System—Recommended Improvements.
- (5) Site decommissioning plans for utility-scale wind projects should continue to cover criteria for deconstruction and remediation upon permanent retirement of each turbine, where appropriate, as well as the entire site.
- (6) Radar-activated hazard lighting of turbines should be use when possible.
- (7) For wind siting, and all other Section 248 siting proceedings, the DPS and the PSB should develop a mediation program to be used to resolve disputes among parties. Mandatory mediation at points in the process should be considered.”

Excerpted from Vermont's Energy Plan Section 5.8.4

Who decides whether and where to site wind?

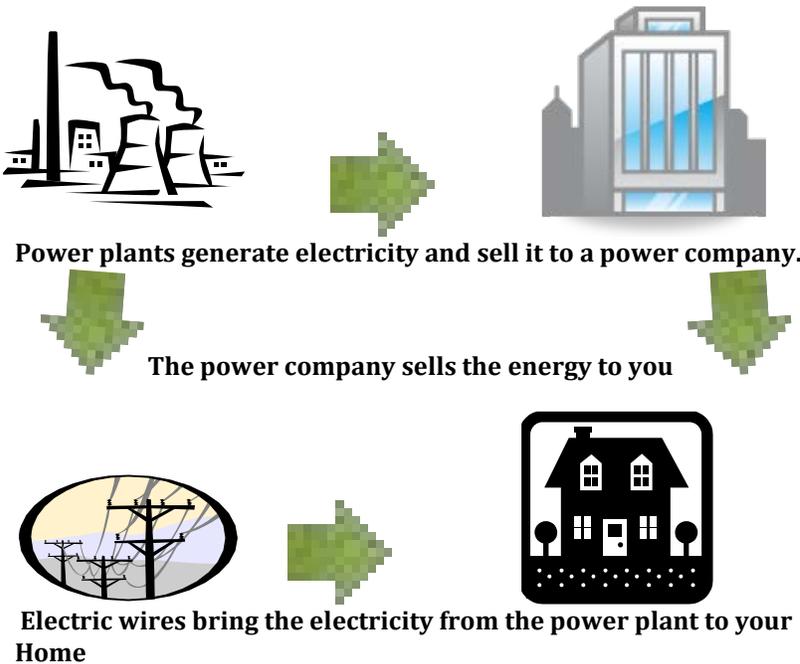
How we get our power:



Although the energy plan sets goals for renewable energy, the State of Vermont does not generally build, own or operate energy generating facilities. Most Vermont families and businesses buy power (electricity) from a power company.

Electric power companies sometimes generate their own electricity, but more often they contract with an energy generation company to buy energy they then resell to their customers. For example, Green Mountain Power, Vermont's largest power company, purchases power from a number of sources including Hydro-Quebec, a large hydro-electric facility in Canada, and from Entergy-Vermont Yankee, a nuclear power plant in Vernon, Vermont (in coming years we will be getting power from the Seabrook nuclear power plant in New Hampshire).

Here is how it works:



Not everyone gets their power from an electric power company.

The City of Burlington generates electricity for its own residents through a biomass energy plant that burns woodchips, and some businesses, farms and homes generate their own energy from solar, wind, biomass or methane. Some Vermonters buy power from an electric cooperative (a company owned by the users who are "members".) Most Vermonters buy their energy from a power company.

Government sets rules that power companies must follow:

Power companies are regulated utilities. This means that, although they are private businesses whose goal is to make a profit for their shareholders (the owners of the business), everything they do is overseen by the state in order to protect the consumer (those of us who buy energy). This is necessary because consumers have no choice in what company to buy electricity from. The state is split into service areas with each power company having the sole right to sell electricity in a particular part of the state.

Power companies are overseen by Vermont's Public Service Board.

The Public Service Board is a three member board, appointed by the governor and confirmed by the senate. This board supervises the rates (how much the utility can charge the customer), the quality of service, and the finances (to make sure they do not go out of business and leave customers without service) of Vermont's public utilities: electric, gas, private water companies and telecommunications. They operate like a court. Board decisions are appealed to the Vermont Supreme Court.



David Coen, Jim Volz and John Burke make up the Public Service Board.
Artwork by Steve Weigl. Reprinted with permission.

The Public Service Board (PSB) has to approve of the rates that customers are charged for electricity, and they have to give their permission before a power company can agree to buy power from a generator. The board must also approve of all new energy generating facilities, including renewable energy. It is the PSB's job to decide whether the new rates, power purchase agreements and/or new energy facilities are in the best interest of the customers (you and me) and that they meet Vermont's policy objectives.

The Developer:

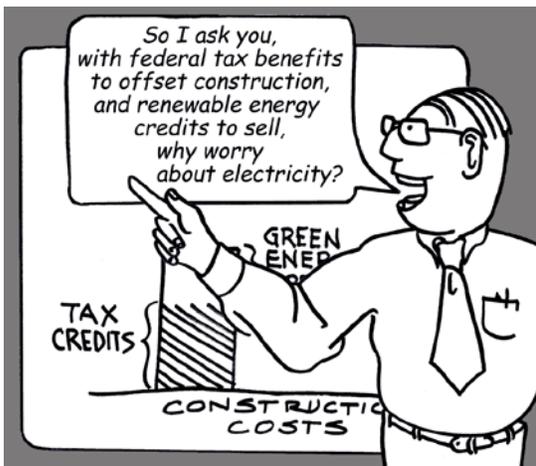
In most cases high elevation wind projects get started when a renewable energy developer identifies a site that the developer believes would be a good place to generate wind power.

Developers consider many things besides the wind resource when deciding whether to develop a particular project.

- Who owns the land? Is the owner willing to sell or lease the property?
- How close is the site to power lines so that the electricity generated by the project will be easy to get to market? (The more power lines they have to put up the more costly and complicated the project will be.)
- How close is the project to homes and businesses? Will the community support the project? Are there neighbors who will be directly impacted by the project and do they object to the development?
- What are the potential environmental impacts?
- What permits are required before the project can go forward?
- Will the project be profitable? Is there a market for the energy? How much will it cost to build and run the wind project and how much can they charge for the electricity? Are tax breaks or other government subsidies available?

Who owns the ridgelines?

Only 3% of Vermont's total land area is windy enough for a commercial wind project using today's technology. Most of this land is owned by individuals or businesses. Less than one percent of this land is publicly owned (State or Federal land.) In most cases public land is excluded from wind development because of development restrictions.



Check it out for yourself!

The Vermont Renewable Energy Atlas will let you see where our best renewable energy resources can be found.

<http://www.vtenergyatlas.org/>

Permits and Approvals:

A wind project requires a number of permits and approvals before it can be built. This process can take years to complete since it requires a variety of studies and the development of technical information and a rigorous public process.

The environmental impacts of wind development are considered by both the Public Service Board and by the Agency of Natural Resources. The review is rigorous since a ridgeline wind project involves cutting down forest, blasting bedrock, construction of roads, and building concrete turbine pads.

The board and the agency can place conditions on these projects to minimize their negative impacts, and they can require the developer to offset the potential environmental damage. Here is a brief description of the required approvals:

Public Service Board- “Certificate of Public Good”:

Before the wind developer begins construction the Vermont Public Service Board must find that the project “promotes the general good of the state.” The board may only approve the project if it finds that it meets a number of criteria, including:

- the project is necessary to meet the present and future demand for electricity which could not otherwise be provided in a more cost effective manner through energy conservation;
- the project will provide an economic benefit to the state and its residents;
- the project will not have an undue adverse effect on aesthetics, historic sites, air and water purity, the natural environment and public health and safety;
- the project will comply with the state’s environmental requirements which include impacts to wildlife habitat, water quality and wetlands.

Members of the public may speak at public hearings and send the PSB written comments about why they believe the project is, or is not, in the state’s best interest.

Check it out for yourself!

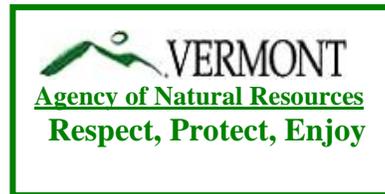
See all of the criteria the PSB considers before it decides whether to issue a certificate of public good:

<http://psb.vermont.gov/forconsumersandthepublic>

A “public advocate” from the Public Service Department participates in the proceedings. Local governments, neighbors and nonprofits such as environmental organizations, public interest groups and business associations may also participate in the proceedings and comment on whether they believe the project is in the public good. Vermont’s Agency of Natural Resources plays a special role in the PSB proceedings because ANR scientists are called upon to provide expert information about the environmental impacts of a proposed project.

Agency of Natural Resources:

The Agency of Natural Resources (ANR) manages the state's natural resources and oversees Vermont's environmental regulations.



ANR’s process for reviewing ridgeline wind development involves a number of steps, some of which begin well in advance of an application to the PSB. Here is how it often works:

- 1. Preliminary meeting.** Meet with ANR staff to discuss proposed development. ANR staff will explain what information the agency will need to review the project.
- 2. Resource Assessment.** Developer will need to collect information to help determine what the environmental impacts of the project might be. This may include, for example: identifying potentially vulnerable areas, like steep slopes wetlands and streams and ravines or gullies; taking an inventory of wildlife habitat in the area, including whether the project is in the migratory path of birds and bats; finding out whether there are rare, threatened and endangered species and significant natural communities (combinations of species) in the area; and, identifying whether significant view-sheds will be impacted, (considering views from publicly held lands, hiking trails, highways and recreational areas.)
- 3. Wildlife and resource management studies.** The developer conducts a variety of studies. Studies can look at any and all of the issues involved in the resource assessment described above, and the studies include such things as plans to prevent water pollution and habitat destruction as well as plans to restore habitat that might be disturbed by the project. These studies could take a year or more to complete!
- 4. ANR review.** ANR reviews all of the studies and plans and then works with the applicant to find options that will minimize the project’s environmental impacts. This could include moving parts of the project to a less sensitive area, doing ongoing studies to monitor the effect of the project on wildlife, and the conservation of land to offset environmental impacts. ANR provides the PSB with testimony and opinion on the impacts of the project and whether or how those impacts may be mitigated.

5. PSB process. The PSB considers the environmental impacts of the projects when it decides whether to approve the project. ANR lawyers and scientists provide information to the board to help them make an informed decision.

6. ANR permits. Not only do wind developers need to go before the PSB for a certificate of public good, but, with the exception of very small projects, they must also get environmental permits from Vermont's Agency of Natural Resources (ANR). These may include:

- Stormwater permit - requires best practices during construction to prevent stormwater runoff from harming headwater streams.
- Stream alteration permit – ensures that work in streams don't cause damage downstream and if there are new culverts or bridges built that they protect the aquatic habitat.
- Wetlands permit to protect important wetlands and the area around them.
- Water supply permit - if a significant amount of groundwater or surface water is used during construction.
- Takings permit for the taking (killing) of threatened or endangered species.
- Heavy cut permit if there is a lot of forest being cut down.

In addition to state permits a wind developer may also need to obtain Federal water quality permits from the United States Army Corps of Engineers.

ANR's permit process allows members of the public to comment on proposed permits. If the developer or members of the public do not agree with a permit issued by the agency they can appeal the permit to the PSB

If the wind developer or one of the groups or individuals who participated in the PSB proceedings does not agree with the Certificate of Public Good decision or the PSB decision reviewing the ANR permits, they may appeal these decisions to the Vermont Supreme Court.



A wind farm in Searsburg, Vermont provides energy to over 2000 households.

Check it out for yourself!

Take a look at the Vermont Agency of Natural Resources' draft guidelines for wind developers to get a better idea of all of the steps involved in getting permission to build a ridgeline wind development.

<http://www.anr.state.vt.us/site/html/plan/DraftWindGuidelines.pdf>

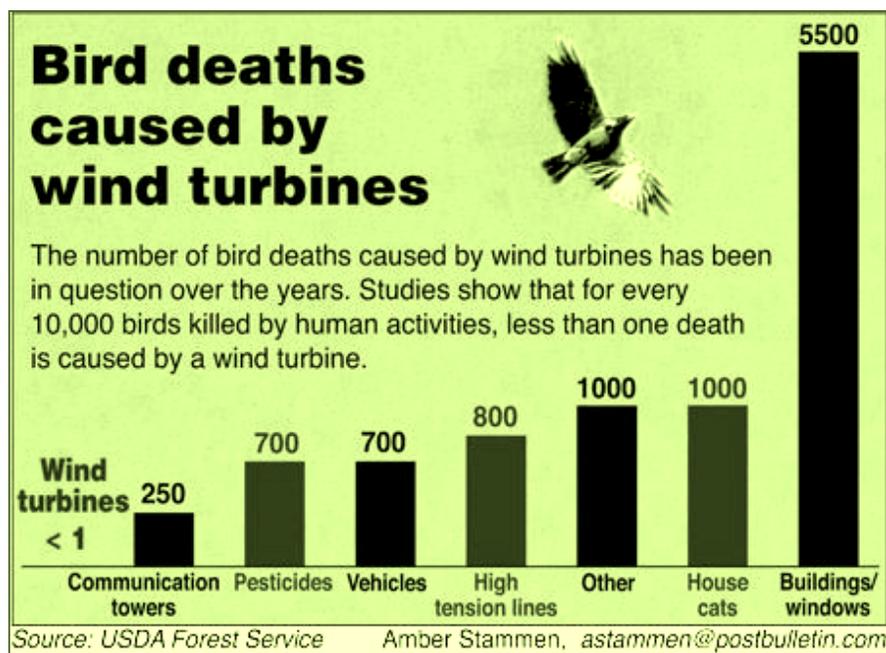
Environmental Impacts of Wind Power:

High elevation wind projects are major development in what is generally a highly sensitive natural environment. Consequently, there are a number of environmental issues that must be considered before a wind project will be approved.

High elevation streams and headwaters: Ridgeline development may include blasting and construction on ridgelines. Headwater streams may originate near the site of this construction. Headwater streams are usually our highest quality waters and the source of water for downstream tributaries that provide clean drinking water for people and habitat for plants and animals.

High elevation streams may be more vulnerable to damage from sediment and erosion because they are often bordered by steep valleys. Too much sediment has the potential to harm the fish and other organisms living in streams. For this reason, a wind developer will likely be required to implement best management practices to avoid and minimize erosion from the construction site to prevent sediment that could affect the streams from leaving the site.

Impacts on birds and bats: Bird and bat deaths at wind turbine sites have been of great concern and controversy among environmental conservation groups and fish and wildlife agencies. In 2009 the U.S. Fish & Wildlife Service estimated that 440,000 bird deaths occur per year as a result of U.S. wind turbines.



Some argue that wind power should not be singled out and that wind turbines are an insignificant cause of bird and bat fatalities compared to other causes.

The issues with bats are made more complex because of other serious threats to our bat population. Because of White Nose Syndrome, Vermont has lost over 90% of some bat species and a number of bat species are now on the Endangered Species List so that they cannot be killed without getting a permit from ANR. Wildlife biologists believe that for these bats to recover we must do everything we can to minimize further bat deaths.



The public service board generally requires wind developers to minimize impacts on bird and bat life. Generally, the developer monitors the bird and bat life in the proposed wind turbine locations to estimate the impact turbines might have on the wildlife in that area.

Developers use radar to collect data on the number of birds and bats that fly through the target area and the elevation at which they are flying. With this information developers identify migration routes, primary breeding grounds, and high traffic areas. This could also allow them to place turbines in areas that will have less impact on birds and bats. The PSB can also require the developer to change how they operate the wind turbines to minimize bird and bat deaths and ANR can require operational adjustments to protect endangered bats.

Check it out for yourself!

See the US Geological Service's article, Bat Fatalities at Wind Turbines. www.fort.usgs.gov/batswindmills/

Significant wildlife habitat: Some wildlife species in Vermont require specific types of habitat to survive and successfully reproduce. We refer to these habitats as “significant”.

In Vermont, significant habitats include deer winter habitat, and concentrated feeding habitat for black bears. It includes travel corridors for black bears, wetlands that support waterfowl nesting, high elevation areas where rare songbirds nest and habitats for threatened and endangered species, among others.

Deer yards: Deer winter habitat is sometimes referred to as a deer yard. White-tailed deer in Vermont live near the northern limit of their range in eastern North America. To cope with Vermont’s severe climate, deer have developed a survival mechanism that relies upon the use, access, and availability of deer yards. Deer yards are areas of mature or maturing softwood cover -- hemlock and white pine in the southern part of the state, and white cedar, spruce, and fir in the north -- that provides protection from deep snow, cold temperatures, and wind. Wintering areas do not change significantly between years and can be used by generations of deer over many decades if appropriate habitat conditions are maintained.

Bear habitat: Eastern black bears require forests for survival, but not just any wooded area will do. Bears need stands of oak and beech trees that produce nuts for food in summer and fall. Bears also need wetland forest habitat, where they get food in spring. Because bears use different habitats seasonally, they must also have a way to move among them. Bears travel through "corridors" to move across roads or through developed areas from one habitat area to another.

Bears are large animals, and they require large, unbroken areas of habitat. Through careful management of habitat, today's Vermont black bear population is robust.

Vermont’s significant wildlife habitats require special attention to ensure that they are not lost or impacted by development. Wind energy projects are often proposed in remote forested areas where these habitats are located. The Vermont Agency of Natural Resources assesses the effects of proposed wind energy projects on significant wildlife habitat and works to guide the design of these projects to avoid, minimize, and when necessary mitigate impacts to them.



Habitat fragmentation: Vermont's Wildlife Action Plan identified habitat fragmentation as the highest-ranking threat to Vermont's wildlife. All animals need a place to live and wildlife generally does best when they can live and travel in areas that are not interrupted by roads, buildings, dams or human activity.

According to the PSB "fragmentation alters interior forest wildlife habitat, impairs movement of some wildlife species, changes natural ecological processes such as surface water drainage and the susceptibility of trees to blow down by high wind events, and increases the likelihood of introducing non-native, invasive plant species.

High elevation wind projects create areas where the forest is cut down and the area is blasted, the soil is removed and is replaced by roads and concrete pads with wind turbines on them. Because these are sensitive forested areas it raises concerns about the fragmentation of animal habitats. In Vermont, black bears, moose and fishers need a lot of space to roam, and the fragmentation of their habitat by high elevation wind development is an environmental concern.

Maintaining a landscape in which forests and other natural habitats are ecologically connected to each other is thought to be the best strategy for allowing species to shift their ranges as our climate changes.

In some cases the PSB has required wind developers to set aside land for permanent conservation when it finds that in doing so it can offset the effects of habitat fragmentation.

Vermont is 78% forested, so why be concerned about wildlife?

Although Vermont has a lot of forest, we have only a few large blocks of forest located far from development. Much of our forest is split into smaller parcels by roads and other development.

Smaller parcels of forest may be fine for some wildlife species, but large forest blocks provide better habitat (and reduce potential conflict with humans) for lynx, American marten, black bear, river otter, northern goshawk, red shouldered hawks and others.

As the number and size of blocks decrease, it becomes more difficult for these species to survive.

Check it out for yourself!

Read the Vermont Forest Roundtable Report:
<http://svr3.acornhost.com/~vnrcorg/frt/report.htm>

Neighbors' concerns:

In addition to concerns about the environmental impacts of a wind development, the people who live close to a proposed development may have additional concerns.

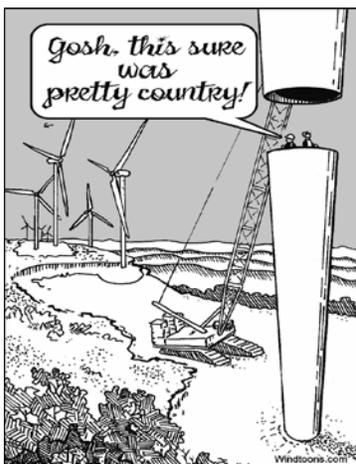
People who oppose a wind development project who live nearby the proposed project have expressed a variety of concerns; that it will ruin their view, hurt their ability to sell their property, make it harder to attract tourists, and create noise that will disturb their sleep and affect their ability to enjoy their property. Some feel strongly that our ridgelines should be left undisturbed, to preserve Vermont's wild places. Some hikers and outdoor enthusiasts are concerned that high elevation wind farms will change the hiking experience by interrupting the views and will be development in areas that had been wilderness. Some specific concerns are discussed below.

Aesthetics: Vermonters value the aesthetic beauty of Vermont's landscape and depend on the natural beauty of the state to entice tourists that will support the economy. Wind turbines are 400 to 500 feet tall, which make them quite visible.

Ridgelines are very visible places for development. This is because they create a dividing line between earth and sky (horizon line). Most of our ridgelines are undeveloped so when we put a wind tower on the top of our mountains it causes a change in the horizon that is very noticeable.

Whether wind turbines on ridgelines detract from the view is subjective; it depends upon an individual's preference and opinion.

Some Vermonters find wind turbines ugly and industrial looking. Other Vermonters see wind turbines as a part of our working landscape and find them interesting or exciting to see.



Check it out for yourself!

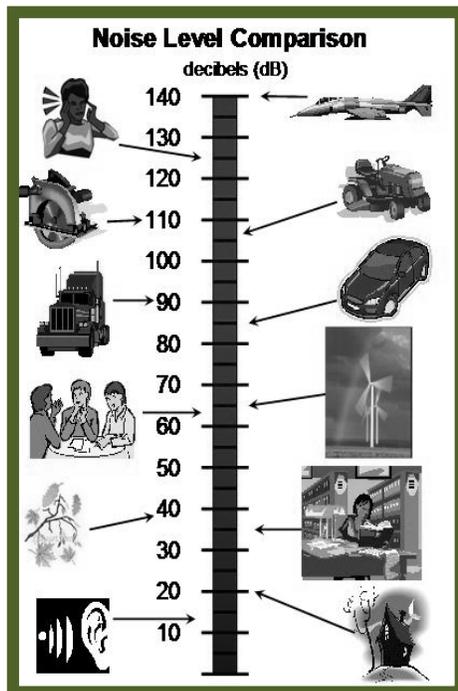
Wind Energy and Vermont's Scenic Landscape: publicservice.vermont.gov/energy/ee_files/wind/vissering_report.pdf

Lights: The Federal Aviation Administration (FAA) requires the installation of warning lights on structures greater than 200 feet tall. Since wind turbines are usually between 300 and 400 feet tall, they need to comply with this rule and install flashing red lights to use at night.

Lights on wind turbines may create a source of 'light pollution,' or unnatural light, that may bother neighbors and detract from viewing the stars in a clear night sky. The PSB can require wind developers to use special lights that use radar so they only turn on when a plane or helicopter is in the area.

Noise: The sounds associated with wind turbines are a concern especially to those living or recreating near wind development. Wind turbines are associated with two types of sounds: the wind rushing through the turbine blades and the sound of the turbine generator. Questions have been raised about whether the noise can have health and safety impacts.

Engineers have created designs to reduce noise. Today's wind turbines are more efficient and are able to convert wind energy more quietly, but noise can still be a factor depending upon your location and the individual. Studies from other countries about the impact of low frequency noise also raise potential concerns.



USDA Natural Resources Conservation Services

What about wildlife?

Noise standards for wind turbines look at how they might disturb humans. They do not generally exist for wildlife, except in a few instances where endangered species may be impacted. According to the US Fish and Wildlife Service, findings from recent research show the need to better address noise-wildlife issues.

[fws.gov/windenergy/docs/Noise.pdf](https://www.fws.gov/windenergy/docs/Noise.pdf)

Check it out for yourself!

California Public Utilities Commission on the impact of low frequency noise:

www.cpuc.ca.gov/environment/info/dudek/ecosub/E1/D.8.2_AStudyofLowFreqNoiseandInfrasound.pdf

Australian review of studies related to low frequency noise and health.

www.nhmrc.gov.au/files_nhmrc/publications/attachments/new0048_evidence_review_wind_turbines_and_health.pdf.

Every source of electricity generation has some environmental impact. One goal of Vermont's Energy Plan is to transition the state to forms of electric generation that are more environmentally friendly. This includes harnessing energy from the wind.

That being said, policy makers do not contemplate that all of Vermont's ridgelines will be covered with wind turbines. When it comes to decisions about whether to build wind farms on Vermont's ridgelines the environmental agency, the public service board and the courts must determine whether the development will cause an undue adverse impact to our natural environment. When they do that they consider the impact of the turbines on our environment, our neighbors and on our communities as well as the environmental, energy and economic benefits they provide.



What do you think?

1. Steve Wright, an opponent of high elevation wind development said, “The pursuit of large-scale, ridgeline wind power in Vermont represents a terrible error of vision and planning and a misunderstanding of what a responsible society must do to slow the warming of our planet. It also represents a profound failure to understand the value of our landscape to our souls and our economic future in Vermont.” Do you agree or disagree with this statement, and why?
You can read Steve Wright’s opinion editorial, and then read a rebuttal by Lawrence Mott, in the appendix.
2. Avram Patt, a supporter of high elevation wind development said, “By developing commercial-scale wind, we make a real difference for the planet. Intermittent sources like wind and solar cannot at this point supply all the power we need on the grid, but they can supply a whole lot more than we have now. Every kilowatt-hour generated by a wind tower is one that does not need to come from other sources. That is real progress, and wind can be major part of our future.” Do you agree to disagree with this statement, and why?
You can read all of Avram Patt’s opinion editorial, and then read a rebuttal by Lukas Snelling, in the appendix
3. Do you believe it would be better to have wind energy development on remote unfragmented ridgelines (areas that are not broken up by roads or development) where there are few people to be directly impacted by the project, or in more developed areas of the state where there is likely a greater impact on people but less adverse effect on wildlife?
4. Do you think it is important to look at how much a particular wind development will off-set or reduce the use of, and need for, carbon emitting sources of energy, or is it enough that it is a renewable energy source that, combined with others that will come on line in the near future, will make a difference?
5. Should we think regionally about renewable energy? Agricultural landscapes in New York, for instance, are growing wind turbines faster than they grow corn because the wind resource is significant. Off shore wind (putting turbines in the ocean) in Maine and Massachusetts has tremendous potential. Should we protect Vermont’s ridgelines and wild places and instead focus wind development in places are already de-forested, or in the ocean?
6. When you turn on the light switch or your computer where do you want your energy to come from? What mix of generation types would you favor?

APPENDIX

The Not-So-Green Mountains

By Steve Wright
September 28, 2011

This op ed is by Steve Wright, an aquatic biologist, is a former commissioner of the Vermont Fish and Wildlife Department.

BULLDOZERS arrived a couple of weeks ago at the base of the nearby Lowell Mountains and began clawing their way through the forest to the ridgeline, where Green Mountain Power plans to erect 21 wind turbines, each rising to 459 feet from the ground to the tip of the blades.

This desecration, in the name of “green” energy, is taking place in Vermont’s Northeast Kingdom on one of the largest tracts of private wild land in the state. Here and in other places — in Maine and off Cape Cod, for instance — the allure of wind power threatens to destroy environmentally sensitive landscapes.

Erecting those turbines along more than three miles of ridgeline requires building roads — with segments of the ridgeline road itself nearly half as wide as one of Vermont’s interstate highways — in places where the travel lanes are now made by bear, moose, bobcat and deer.

It requires changing the profile of the ridgeline to provide access to cranes and service vehicles. This is being accomplished with approximately 700,000 pounds of explosives that will reduce parts of the mountaintops to rubble that will be used to build the access roads.

It also requires the clear-cutting on steep slopes of 134 acres of healthy forest, now ablaze in autumn colors. Studies have shown that clear-cutting can lead to an increase in erosion to high-quality headwater streams, robbing them of life and fouling the water for downstream residents, wild and human.

The electricity generated by this project will not appreciably reduce Vermont’s greenhouse gas emissions. Only 4 percent of those emissions now result from electricity generation. (Nearly half come from cars and trucks, and another third from the burning of heating oil.)

Wind doesn’t blow all the time, or at an optimum speed, so the actual output of the turbines — the “capacity factor” — is closer to about one-third of the rated capacity of 63 megawatts. At best, this project will produce enough electricity to power about 24,000 homes per year, according to the utility.

Still, wind does blow across Vermont's ridgelines. The Vermont Public Interest Research Group, for instance, has suggested that wind power could provide as much as 25 percent of the state's electricity needs, which would require turbines on 29 miles of ridgeline. Other wind advocates, notably David Blittersdorf, the chief executive of a wind and solar power company in Williston, Vt., has urged that wind turbines be placed along 200 miles of ridgeline in the state.

But it is those same Green Mountain ridgelines that attracted nearly 14 million visitors to Vermont in 2009, generating \$1.4 billion in tourism spending. The mountains are integral to our identity as the Green Mountain State, and provide us with clean air and water and healthy wildlife populations.

Vermont's proud history of leadership in developing innovative, effective environmental protection is being tossed aside. This project will set an ominous precedent by ripping apart a healthy, intact ecosystem in the guise of doing something about climate change. In return, Green Mountain Power will receive \$44 million in federal production tax credits over 10 years.

Ironically, most of the state's environmental groups have not taken a stand on this ecologically disastrous project. Apparently, they are unwilling to stand in the way of "green" energy development, no matter how much destruction it wreaks upon Vermont's core asset: the landscape that has made us who we are.

The pursuit of large-scale, ridgeline wind power in Vermont represents a terrible error of vision and planning and a misunderstanding of what a responsible society must do to slow the warming of our planet. It also represents a profound failure to understand the value of our landscape to our souls and our economic future in Vermont.

Wind Farms: Large, Visible ... and Necessary

By Avram Patt

January 31, 2012

This op-ed is by Avram Patt, general manager of Washington Electric Cooperative, which serves over 10,500 member households and businesses in 41 Vermont communities.

Vermont has been discussing commercial-scale wind development for about 10 years. In 2005, Washington Electric Co-op announced our support of First Wind's project in Sheffield and committed to purchasing a portion of the electricity.

We stuck our neck out on behalf of that project. We attended meetings and hearings in the Sheffield area, and wrote about it in our newsletter and elsewhere and discussed it at our member meetings. Members of WEC's board of directors visited wind farms in other states and countries, talked to local people, and assessed for themselves what these

projects looked like and how people felt about them. The majority of WEC members have supported our involvement, but we've also heard from some who don't.

There has been a lot of misunderstanding and also misinformation about wind projects generally in Vermont. So I am writing to discuss not just the Sheffield project, but utility-scale wind development in general.

Let's start by agreeing that wind towers are huge. In Vermont they must be located on certain ridgelines because that is where the wind resources are. There is no question that they are very visible and they change the landscape in their vicinity. They can be heard from some locations. Building a project is also a major construction event. It requires the clearing of some land and the building of narrow roads. As with any major construction, including a renewable-energy project, there is environmental impact.

With that said, here is what we also need to understand: By developing commercial-scale wind, we make a real difference for the planet. Intermittent sources like wind and solar cannot at this point supply all the power we need on the grid, but they can supply a whole lot more than we have now. Every kilowatt-hour generated by a wind tower is one that does not need to come from other sources. That is real progress, and wind can be major part of our future.

We can't just do the small stuff. Vermonters are, in fact, generating their own power at their homes and businesses in increasing numbers, mostly with solar but also some wind. And small-scale commercial projects (2.2 megawatts or less) are being built around the state because of financial incentives created by our Legislature.

But we need to understand some equivalents: One wind turbine on a 400-foot tower at Sheffield has a capacity of 2.5 megawatts. There are 16 such turbines at Sheffield and that project will generate enough power for the equivalent of 16,000 homes. (The Lowell Mountain project now under construction is somewhat larger.) To generate as much power as just one of those large turbines, we would need to put up well over a thousand home-scale turbines, each on its own 100-foot tower. That's around 20,000 100-foot towers to generate as much as the whole Sheffield project. Generating the same amount of kilowatt hours from a commercial solar energy project would take at least 400 acres of photovoltaic panels. That's the reality, although it is very hard to imagine those numbers on Vermont's landscape.

In coming years, we are likely to begin seeing a real move away from liquid fossil fuels, especially for transportation. While that's a good thing for the environment, it could eventually increase Vermont's demand for electricity by as much as 30 percent. If we truly want to move to cleaner energy sources, we need to do the small stuff, but we have to do some big projects too.

Mountains are not being blasted apart. Yes, there is blasting and land clearing during construction, whether it's a wind farm or new development up the sides of mountains in our ski resort communities.

However, when all is said and done, a wind farm has a relatively small physical footprint. The 16-turbine Sheffield project involved the clearing of approximately 63 acres for all the turbines and the roads combined, of which about 39 acres are now being left to re-vegetate (this was already occurring when I was at the site in the fall). Much of the land has been used for logging and other purposes in generations past, and some of the new 16-foot-wide roads follow old logging roads. Wildlife returns after construction, as it has at Sheffield.

There have been planning and siting discussions about wind development for more than 10 years now. While it is understandable that Vermonters who only recently started considering this issue might think there is no planning involved, there was in fact a Wind Siting Consensus Building Project sponsored by the Department of Public Service in 2002. The final report, detailed descriptions of the sessions that were conducted under the auspices of the Woodbury Dispute Resolution Center, and other papers are all available on the department's website under "Renewables."

The process included people from regional planning commissions, several hiking clubs, environmental and forest advocacy groups, utilities, developers, and state officials. Vermonters should take a look at the maps the participants reviewed. They show exactly where the best wind resources in the state are, just based on meteorological data. When one eliminates any sites on land where such development is legally prohibited, there are fewer potential sites. After then eliminating locations that are not reasonably close to existing transmission lines, very few feasible sites are left.

These are the maps developers start with, and they have been publicly available for all to see for 10 years. Although full consensus on this issue is unlikely, the few locations where wind projects might be feasible are also no secret.

We have been debating wind in Vermont for years. The discussion has involved genuine public processes in addition to the years of public regulatory proceedings for specific projects. Wind projects are large, even the relatively small ones being built or considered in Vermont. We can call them "industrial" or not, but in my job I am confronted by the urgency of our planet's condition and by our limited options. WEC moved away from nuclear power years ago. Although we buy power from Hydro Quebec, I am very aware of the impact of those massive dams and the hundreds and hundreds of miles of giant transmission towers that are needed to bring Vermont's share to the border. As I said, our options and our time are limited.

So I am not afraid to say that, in addition to far-greater efficiency in our energy use, and in addition to a lot more small-scale solar, wind, and other renewable projects becoming highly visible all across our landscape, we are in need of some serious industrial solutions as well, and soon. That's the harsh reality.

We can no longer afford not to look at where our power comes from. We do need to accept wind into a few selected places in our landscape and to understand what it actually

does for us. We have accepted ski areas on some of our most prominent mountains and everything that comes with that. We have, in the past, accepted logging roads throughout our hills and forests almost everywhere, including at what are now wind sites. We should insist that any projects be developed to the highest environmental standards and have the least-possible impact. But we have to put the benefit on the scale of impacts as well, otherwise this is not an honest conversation.

We are going to have to change the face of the planet in small ways in order to stop the damage we have done and are continuing to do in our ever-more-desperate attempts to get at the Earth's fossil fuels. The alternatives all have consequences, too, but I would rather live with those consequences.

A response to “The Not-So-Green Mountains”

**By Lawrence H. Mott
October 4, 2011.**

This op-ed is by Lawrence H. Mott, a board member of Montpelier-based Renewable Energy Vermont and principal consultant at SgurrEnergy Inc. a renewable energy consultancy firm.

Opinions on the merits of various generation sources are the sign of our struggle to change. Last week's New York Times op-ed “The Not So Green Vermont” by Steve Wright, republished on VTDigger.org on Sept. 29, is exactly that: the words of an individual spurred on by a small and vocal group in the small state of Vermont.

This description of disaster is a means to attract attention after not getting their way during a long, detailed and very public process of determining the public good of this generation project under our permitting law: Section 248 (a Certificate of Public Good is required for an electric project).

The findings of this regulatory process, garnered from the diverse parties that participated, the multiple public hearings conducted, the regular dose of media discussion and letters are what represent our state, our people and clearly our goals as described in the recently released (Sept. 11) draft state Comprehensive Energy Plan which calls for significant additions to renewable electric generation, a shift in our heating and transport energy methods, furthering our intense smart grid integration and major investment in efficiency in all sectors. The 63 MW Kingdom Community Wind project in Lowell, Vt., is a part of this effort, which includes an effort to save our Green Mountains from ongoing acid rain from Midwest coal generation (which has killed pine trees and impacted vegetation on the very ridges Mr. Wright highlights).

Vermont is not under attack, Vermont has one of the strictest permitting climates, strongest land use regulations, and multiple active groups ensuring that forests remain connected, streams are not clouded with runoff and habitat preserved. Wind farm permits have been denied in our state, significant changes and mitigation have occurred during the process to obtain an approval,

the Department of Natural Resources imposes conditions of the projects, as well as enforces and fines for failure to abide. The wind farm roads are required to be reduced in size once the project is constructed. Mr. Wright's own town in Craftsbury, which is nearby, has no official position on the project, although he refers to the town as having one.

We have the lowest electric demand of New England, one of the lowest carbon footprints from our significant portions of hydro and nuclear electricity, as well as a leading energy efficiency program and efficiency expertise born here. Vermont is furthering this, and doing it where we can. We have an entrepreneurial spirit for creating and doing the right thing, as well as forward-thinking companies and the key here: progressive electric utilities that are making investments in our energy future.

Green Mountain Power, Washington Electric Co-op, Burlington Electric Department and even the publicly-traded CVPS have all made investments in, purchased long-term power from, and in the case of Green Mountain Power, have developed and are building another wind project: the Kingdom Community Wind project. They are doing this to diversify their portfolios, preparing for our single 39-year-old nuclear plant's 2012 shut down and, most importantly, to offer what their customers are asking for: local, renewable energy in their back yard (two polls conducted over the past three years show over 80 Percent and 90 percent approval, and one of the polls explicitly asked if you want it in your back yard, conducted via Vermont Dept. Public Service <http://cdd.stanford.edu/polls/energy/2008/vermont-results.pdf>)

Vermont has wind, solar and biomass resources, and we are working to harness them all, large and small. We have progressive net metering legislation as well as a focus on medium-scale generation via our Standard Offer program. For utility scale wind, we have hundreds of miles of north/south ridges that are exposed to the westerly prevailing winds.

To date, we have one 6 MW wind farm (Searsburg) operating, a 40 MW wind farm coming on line this fall (Sheffield) and a handful in development; therefore, we are behind our nation and our goals to build more of this mature and cost-effective electric source. Even if we eventually build out enough wind for 25 percent of our electric needs, this would require roughly 4 percent of our ridgelines (and important to note is the use of 5 percent of ridgeline would additionally provide over 50 percent of an electric-powered transportation resource (see: <http://www.vpirg.org/repowervt>), thereby addressing the issue

Mr. Wright correctly raises on offsetting transport and heating emissions. All of the above wind farm areas would not include sites our environmental and historic groups have noted to be preserved, and in several areas, the wind farms would help preserve habitat by placing large tracts in productive use. One can witness the bear fur on a Searsburg wind turbine tower door to see how the bears found a scratching post.

The northern forest is not being torn apart by these plans; in fact, even the most zealous wind person would say the state will likely only support about a dozen wind farms and most of these less than 75 MW in parts of the state where wind resource and transmission exist. These farms offer the promise of a significant portion of our small demand, as well as dollars circulating in state. Neighboring states have, if anything, found tourism bolstered by wind farms, and a working landscape enhanced by local generation, local jobs.

I would counter Mr Wright's perspective, and say the environmental groups have taken a stand and a clear one: An Oct. 10, 2010 joint press release: "The Conservation Law Foundation (CLF), Vermont League of Conservation Voters Education Fund (VLCVEF), Vermont Natural Resources Council (VNRC) and Vermont Public Interest Research Group (VPIRG) support the development of wind energy in Vermont. This collective statement of support for wind, and other renewable energy technologies, is based on our deep concern that society has not moved fast or aggressively enough to address the most urgent environmental crisis in human history: climate change." (entire release: <http://www.vnrc.org/article/view/33455/1/4913/>)

We all love our Green Mountains and are proud of our efforts in helping green the planet.

Rebuttal to Avram Patt

By Lukas Snelling
February 8, 2012

This op-ed is by Lukas B. Snelling, the executive director of Energize Vermont, a nonprofit, statewide, Rutland-based, renewable energy advocacy group.

I am writing in response to Avram Patt's Opinion piece titled, "Wind farms: Large, visible ... and necessary" published by VTDigger on Jan. 31, 2012. While Mr. Patt made some interesting points, there are issues in his piece that must be addressed.

For example, he asserts that there is a one-to-one ratio between wind power generated and the reduction of power generated from other sources. There is no reliable data to support this assertion. Here in the New England grid with the inefficient ramping of natural gas plants wind may be actually increasing GHG emissions rather than reducing them. We don't know.

The capacity numbers Patt presents for Sheffield are inaccurate. While the "nameplate" capacity of those turbines might be 2.5MW, the most optimistic estimates are that the turbines will produce around 30 percent of their theoretical potential. These are the numbers the developer provided the Public Service Board. Project supporters and press often overstate how much production we can actually expect from these destructive projects in their attempts to defend them.

Patt's claim that "mountains are not being blasted apart" glosses over the truth. The mountains in Lowell are, in fact, being blasted apart. There GMP has blasted away at so much mountain they have created new 40-foot cliffs that previously weren't there. Additionally, they have created miles of bulldozed roads and turbine pads in what once was untouched forestland, headwaters and wildlife habitat. This description is apt, and it is happening right here in Vermont, and is unlike anything happening at our ski resorts.

Patt suggests it is time to move because we have been discussing the issue for years. Years of planning unfortunately are not the same as experiencing the impacts firsthand. With two operating projects, three others approved or under construction, we are now just beginning to understand the full-scale impacts of these developments. Now is a good time to pause and take look at what is really happening.

I agree with Patt that the most valuable thing we can contribute to the fight against climate change is, in fact, our ridges. Our most valuable resource, though, is not the wind that blows across them, but the habitat they create. As climate change happens, plants and animals under stress will need refuges, places where they can go to survive. Unspoiled mountain ridges are the best refuge available, and that's one thing that Vermont has that few other places do.

We must respond to climate change, but we should do it in the most effective ways. We can't have both big wind and unspoiled ridgelines in Vermont. By developing our ridgelines to take advantage of a mediocre resource, we are destroying a premium resource.

Lastly, Patt is unnecessarily negative about the outlook of smaller community-scale renewable energy projects. Solar is undergoing a historic cost decline, and innovative energy storage technologies will be available in the next couple of years. Imagine how we will feel if we sacrifice our mountains now for technology that is outdated in a few short years.

We have two paths, the first is doom and gloom and sacrifices our unspoiled mountains. The second saves the resource Vermont is uniquely positioned to contribute to the cause, and harnesses the power of our communities to overcome the challenges we all face. I'll take the second, and keep the mountains.