

# Beaver Ridge Wind, LLC

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## Wind Frequently Asked Questions

- Q. Does wind power really reduce air pollution?
- R. Absolutely! Anti-wind groups continue to spread the lie that wind power does not reduce air pollution. This is not a subject that needs another moment of debate. It is a clear and simple fact accepted by everyone outside the anti-wind lobby that new wind power generation in Maine will reduce air pollution. You do not need to take our word for it. Below are references to affirmations of this fact by a Task Force appointed by the Governor of the State of Maine, the Maine DEP, and the US Department of Energy.

The Task Force appointed by the State of Maine to investigate wind power found that: “wind power projects do result in reductions of atmospheric greenhouse gases and other air pollutants (specifically, but not limited to CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, and mercury – see Appendix L). The Task Force recommends that, with input from DEP and PUC, this issue be put to rest by a dispositive policy statement from the Legislature.” (Final Report Of The Governor’s Task Force On Wind Power Development - February 2008, page 18)

David Littell – Commissioner, Maine DEP presented the following to the Maine Land Use Regulatory Commission in August of 2007 (slide 20):

- Wind Generation has no direct emissions
- Wind displaces generation that does emit SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub>, among other pollutants
- Therefore wind can help the state meet its emission reduction commitments under multiple programs
- In doing so, wind generation makes it easier and less costly to meet its obligations
- And, it makes it easier overtime to lower the compliance caps further reducing emissions

The U.S. Department of Energy found that the U.S. could produce 20% of its electricity from wind power by 2030. ([www1.eere.energy.gov/windandhydro](http://www1.eere.energy.gov/windandhydro)) The DOE report found that doing this would reduce emissions of carbon dioxide (CO<sub>2</sub>), the leading greenhouse gas, by 25 percent! This would be an amount equal to 825 million tons of CO<sub>2</sub> – the equivalent of taking 140 million cars off the road.

It is a fact that our current reliance on fossil fuels like natural gas, oil and coal to produce electricity is causing significant harm to human health and contributing to global climate change. Electricity generation with fossil fuels is responsible for almost 40% of carbon dioxide (CO<sub>2</sub>) emissions, over 20% of nitrogen oxide (NO<sub>x</sub>)

emissions, almost 70% of sulfur dioxide (SO<sub>2</sub>) emissions, and 40% of mercury emissions in the United States. Other pollutants from burning fossil fuels include volatile organic compounds (e.g., benzene, dioxins) and heavy metals (e.g., arsenic, lead). (U.S. Department of Energy – Wind Energy And Air Emission Reduction Benefits: A Primer – February 2008 NREL/SR-500-42616)

A decision not to build new wind power generation is a decision to allow much more of these harmful pollutants to enter our air causing serious risk to human health.

- Q. But, because wind power is intermittent isn't it necessary to keep fossil fuel plants online and running all the time?
- R. No. Maine still has so little wind power generation that no additional fossil fuel back up is required for a new wind plant. This will be true for quite some time as explained by the following response to this question by the Maine Public Utilities Commission:

The intermittent nature of wind power will not result in any additional need to keep fossil fuel generators "on-line" to provide backup energy when the wind facilities are not generating. Current regional rules already require that a certain amount of "reserve" generation be available in the event of generator outages. The amount of reserves is based on the size of the largest resources in the region. For New England, the largest resources are Seabrook [Nuclear](1,200 MW) and the Hydro-Quebec Line (1,700 MW). Thus, a number of wind facilities spread across the region of the capacities contemplated would have no effect on the operation of the region's reserves." *MPUC presentation to the Land Use Regulatory Commission August 1, 2007.*

Even once the thresholds discussed by the PUC above are exceeded (many years from now) the notion that wind generation will need a 1 for 1 backup does not hold water. Wind plants are small and distributed. When it is not windy along the coast it can be windy in northern Maine. Adding a network of smaller and geographically diverse wind generators makes our grid more reliable than continuing the current system of relying on a few large central power plants that can trip offline in an instant. Today it is also possible for the operators of the power grid to forecast electricity production from wind farms several days in advance. This will make sense to anyone who uses a daily weather forecast on the radio, TV or internet. Weather forecasters can tell the grid operators what to expect several days in advance in terms of wind speeds. This allows grid operators to plan for a high level or low level of wind production as appropriate. In addition modern wind turbines can actually provide valuable grid support – referred to as ancillary services.

- Q. Doesn't Maine have excess power generation today? I have heard wind opponents say that new wind farms will not provide any real benefit to Maine consumers because the power will be sold out of state.

- R. Maine does have excess electricity generating capacity today. However, new wind power generation is still a cornerstone of the State of Maine's plans for increasing energy independence, reducing price volatility and providing energy security just as it is at the Federal level. New wind plants do provide real tangible benefits to Maine residents. A much longer answer from the Maine Public Utilities Commission is included below if you would like a more detailed response:

“The wind farm opponents are incorrect. Despite the fact that Maine has excess generation and is currently a net exporter of electricity, the development of new diverse generating facilities (i.e. facilities that are not fired by natural gas) in Maine and throughout New England is crucial to the economic needs of Maine. As explained in detail in the MPUC review comments in both the Kibby and Stetson [wind] projects, Maine and New England are over-reliant on natural gas generation. This over reliance on natural gas has resulted in large increases in electricity prices, substantial price volatility, and a less reliable system. For the reason specified below, the addition of new diverse (non-gas) generating resources spread throughout Maine and New England will have a moderating effect on electricity prices and price volatility, and result in a more secure system.

As more non-gas generation is added to the mix, cheaper gas resources and non-gas resources will set the clearing prices in a greater number of hours. This would have the general effect of reducing both the level and volatility of electricity prices throughout the region. To the extent new generation is constructed within Maine's borders, the benefit to Maine consumers is more direct in that the result would be lower prices within the Maine zone. In addition, any overall reduction in the demand for gas that results from the addition of non-gas resources in the region should have the effect of reducing the price of natural gas which translates into lower electricity prices. Moreover, a reduction in the region's reliance on natural gas would result in a more secure system that is less vulnerable to gas shortages and thus less susceptible to curtailments and blackouts. The addition of new generation within Maine has the additional benefit of making it less likely that shortages of electricity that may occur in the rest of New England would effect service in Maine. For example, if the addition of new resources in Maine increases the amount of time that transmission constraints out of Maine exists, the ISO-NE is less likely to require rolling blackouts in the region to include Maine.” MPUC presentation to the Land Use Regulatory Commission August 1, 2007.

- Q. Will the wind farm reduce my electricity rates?

- R. New wind power facilities in Maine will result in lower rates and a more secure energy supply for all Maine consumers.

The Maine Energy Council (MEC) was created by the Legislature in 2006 under LD 2041 to evaluate matters affecting electricity supply and costs to Maine consumers and to provide recommendations to the Governor, the Public Utilities Commission and the Legislature. The MEC stated in an April 2007 report: “The

development of renewable generation resources in Maine and throughout the region has the potential to reduce and stabilize electricity costs to Maine consumers, enhance system reliability and reduce the impact on the environment from the generation of electricity.”

Q. Will local contractors and workers be used during construction?

R. Yes. Local contractors provide the most economical and - in most cases - the best help! Our record on this is clear. A list of local and Maine based companies that were used on the Beaver Ridge Wind project in Freedom Maine are included below:

Construction:

1. Reed & Reed (Woolwich)
2. Cianbro (Pittsfield)
3. CMP (Augusta)
4. Dragon Cement (Thomaston)
5. Sullivan And Merritt Constructors Inc. (Scarborough)
6. John Works (Jackson)
7. WTW Earthworks (Freedom)
8. Clint Spaulding Family Trucking (Freedom)
9. J & S Sand Gravel & Fill Inc (Thorndike)
10. Clayton Larrabee (Knox)
11. RLC Engineering (Augusta)
12. GZA Geo Environmental (Portland)
13. Lucas Tree Experts (Portland)
14. Lane Gray Surveying (Belfast)
15. Coutts Brothers (Gardner)

Q. Will local people be used in ongoing operations and maintenance?

R. Yes. We need people who live very close to the wind turbines for ongoing operation and maintenance. Again our record on this is clear. A list of the companies we are currently using on the Beaver Ridge Wind project for operations and maintenance is below:

Ongoing Operations and Maintenance Work

1. Waldo Electric (Montville)
2. Liberty East Electric (Liberty)
3. Ron Price (Freedom)
4. RLC Engineering (Augusta)
5. GE service technicians (Stetson and Mars Hill Maine)

Q. What kind of wind turbines do you use?

R. This will depend on turbine pricing and availability. At our Beaver Ridge Wind project in Freedom we used General Electric 1.5 SLE turbines. These same

turbines are also used at the First Wind projects in Mars Hill and Stetson Maine and at the Fox Islands Wind project on Vinalhaven Island. Using the same turbines is helpful from a spare parts and operations and maintenance perspective. There are more than 12,000 GE 1.5 series turbines in operation around the world today. Some details on the GE 1.5 SLE are included below.

- 1,500 kW - Nameplate Capacity Per Turbine
- 262 Feet – Typical Hub Height
- 15 Feet - Diameter of Tower At Base
- 7 Feet - Diameter of Tower At Top
- 123 Feet – Typical Blade Length
- 11 Tons – Typical Blade Weight
- 236 Tons – Typical Total Weight (excluding foundation)
- 10.1 to 20.4 - Range of Blade Revolutions Per Minute
- 1.15 Acres (50,000 square feet) - Area Swept By Blades
- 7.8 mph - Wind Speed At Hub Height To Produce Energy
- 27 mph - Wind Speed To Produce Nameplate Capacity

Q. What experience do you have?

R. Mark Isaacson, Richard Silkman and Andrew Price (MIRSAP) developed the Beaver Ridge Wind project in Freedom Maine. MIRSAP formed a partnership with Patriot Renewables in 2007 and together we constructed, own and operate the project. Beaver Ridge Wind was the second wind project to achieve commercial operation in the state of Maine. A few additional details on the Beaver Ridge Wind project are included below:

- 3 General Electric 1.5 SLE Wind Turbines
- 4,500 kW - Total Nameplate Capacity
- November 1, 2008 - Commercial Operation Date
- 12,500,000 kWh - Expected Average Annual Production
- Enough to power 2,000 homes - Using 500 kWh Per Month
- 1st Wind Farm Located In CMP Territory
- 2nd Operational Wind Farm In Maine
- Interconnection - CMP Transmission Line In Thorndike

In addition, Mark Isaacson, developed and has been an owner/operator of the Worumbo Dam on the Androscoggin River in Lisbon Falls, Maine since 1988. The Worumbo Dam is a 19.4 MW facility that produces 87,500 MWh per year. It is the only dam in Maine to be certified as “low impact” by the Low Impact Hydropower Institute.

Mark Isaacson and Richard Silkman founded Competitive Energy Services (CES), an energy consulting and advisory firm based in Portland Maine. Mark and Richard continue to be managing members in CES which helps institutions and business procure energy for about 13,000 different accounts. Andrew Price has worked at Competitive Energy Services since 2001 and is currently the senior analyst. A sister company to CES, Maine Renewable Energy, has long been the

only supplier of renewable power to residential and small commercial customers in the State of Maine.

Q. Are wind turbines efficient?

R. Wind turbines are the most efficient form of power generation! Because they require no fuel input they are in fact 100% efficient. It is true that they produce power only between 30% and 40% of their rated capacity on average over the course of a year. Do not confuse this with being inefficient, however. Wind turbines are available to generate power over 95% of the time – this is better than most fossil fuel plants. The time they are sitting idle on a calm day does not make them inefficient.

Wind turbines also have a very favorable “energy balance” or “pay-back-time”. Wind turbines produce more energy in the first 3 to 6 months (the exact time depends on the site – a very windy site would be close to 3 months while a less windy site would be close to 6 months) than it takes to manufacture and construct the turbine. The United Kingdom Department for Business Enterprise & Regulatory Reform (formerly Department of Trade and Industry) calculated that wind farms produce over 50 times more energy during their lives than required to manufacture and erect.

<http://www.berr.gov.uk/energy/sources/renewables/explained/wind/myths/page16060.html#12>

The 3 turbine Beaver Ridge Wind project in Freedom Maine is on track to produce enough electricity this year to serve 2,000 average homes – each using 500 kWh per month.

Q. Does Maine have a good wind resource?

R. Yes! Generally, speaking Maine is in the top 20 states in terms of wind power production potential. Anti-wind groups will tell you that only the western mountains of Maine or off the coast have wind resources that are adequate to be developed. This is simply not true. We have been monitoring wind speeds at several sites in Waldo and Penobscot Counties with our own meteorological towers since 2004. Although results are very site specific, many locations over 800 feet in elevation have wind speeds that are conducive to producing clean electricity.

Q. Do wind turbines kill birds?

R. Yes, but not as many as your house cat. The American Wind Energy Association has a fact sheet on birds available on their website at ([http://awea.org/pubs/factsheets/Wind\\_Energy\\_and\\_Wildlife\\_Mar09.pdf](http://awea.org/pubs/factsheets/Wind_Energy_and_Wildlife_Mar09.pdf)). According to AWEA: “Avian studies have been carried out at many wind farm sites. They show that bird kills per megawatt (MW) average one to six per year or less. Individual bird deaths due to wind development will never be more than a very small fraction of those caused by other commonly accepted human activities and structures--house cats kill an estimated 1 billion birds annually in the U.S.

alone, buildings 100 million to 1 billion, automobiles 60-80 million, power lines hundreds of thousands to as many as 175 million, according to the U.S. Fish & Wildlife Service (<http://birds.fws.gov/mortalityfact-sheet.pdf>) and other sources.”

According to Greenpeace, World Wildlife Foundation, and Friends of the Earth: “wind energy is one of the most environmentally benign ways of producing the electricity we need to power our daily lives. If we don't switch to cleaner forms of energy, climate change will severely and irrevocably alter much of our landscape as well as the animal and plant life it contains.”

[http://www.yes2wind.com/visual\\_effect\\_debunk.html](http://www.yes2wind.com/visual_effect_debunk.html)

Because wind power reduces air pollution that causes acid rain, mercury poisoning, smog and global warming, expanding the use of wind is key to reducing human impact on threatened and endangered species around the world.

Q. How long do wind turbines last?

R. Expected life for a wind turbine is 20-25 years. Over this time various parts will need to be replaced just like they would in a car or an airplane. At the end of their lives it is extremely likely that they will be replaced with newer more efficient designs. The very first of the mass-produced turbines celebrated its 20th birthday in May 2000. The Vestas 30kW machine has operated steadily throughout its lifetime, and so far, none of the major components have had to be replaced.

Q. Do wind turbines frighten livestock or pets?

R. No. Wind turbines are a common sight in farmer's fields. Cows and horses can and do graze up to the base of the turbines. In fact, wind turbines might be the only hope for many small scale farmers in Maine to save their farms.

Q. Wind opponents tell me that wind turbines will spoil the scenic views in town.

R. Beauty is certainly in the eye of the beholder but many folks consider wind turbines beautiful. The quote below was emailed to us by a resident of Freedom who has a prominent view of the Beaver Ridge Wind turbines from inside their home:

“I just wanted to share with you ...( I should have taken a photo) but it would not have captured the beautiful site of two of the windmills facing my window this morning and turning like magic... The blades were rotating like a dance...the white of the snow and the sunlight hitting the columns was just wonderful! I am embarrassed to say how long I simply stood and watched...thank you for having the insight and resourcefulness to add to the beauty of my view.”

We certainly do not expect everyone to share this sentiment but encourage everyone to consider the issue of visual “impact” objectively. You can decide for yourself if you think wind turbines are beautiful, ugly or neither by viewing the three turbines in nearby Freedom Maine.

Keep in mind that we all use electricity every day. Currently your electricity is generated far away in someone else's backyard and transmitted to you over long distance power lines in more backyards. Wind turbines are one of the most benign ways to generate the electricity that we all use every day. If we do not choose to rapidly adopt wind power and other forms of renewable energy today - climate scientists tell us that global climate change will dramatically alter our landscape in ways that will be much more transformative.

Q. Is global warming really a problem in Maine?

R. Yes. It is a problem for Maine, a problem for the U.S. and a problem for the world. The consensus view of most climate scientists is that we have a very short period of time to stop and then reverse the accumulation of heat trapping gases in the atmosphere. Wind power is the cheapest and fastest renewable resource that we can deploy on a large scale to reduce our emissions of global warming gases in the short term.

On April 17, 2009 the Environmental Protection Agency said greenhouse gases pose a danger to the public health, finally clearing the way for federal regulation. From the EPA press release:

“After a thorough scientific review ordered in 2007 by the U.S. Supreme Court, the Environmental Protection Agency ....confirms that greenhouse gas pollution is a serious problem now and for future generations...EPA's proposed endangerment finding is based on rigorous, peer-reviewed scientific analysis of six gases – carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride – that have been the subject of intensive analysis by scientists around the world. The science clearly shows that concentrations of these gases are at unprecedented levels as a result of human emissions, and these high levels are very likely the cause of the increase in average temperatures and other changes in our climate.

The scientific analysis also confirms that climate change impacts human health in several ways. Findings from a recent EPA study titled “Assessment of the Impacts of Global Change on Regional U.S. Air Quality: A Synthesis of Climate Change Impacts on Ground-Level Ozone,” for example, suggest that climate change may lead to higher concentrations of ground-level ozone, a harmful pollutant. Additional impacts of climate change include, but are not limited to:

- increased drought;
- more heavy downpours and flooding;
- more frequent and intense heat waves and wildfires;
- greater sea level rise;
- more intense storms; and
- harm to water resources, agriculture, wildlife and ecosystems.”

Q. Is global warming really a threat to our national security?

R. Global warming is likely to impact the poorest citizens of the world the most. This raises questions of morality. We argue about whether wind turbines might impact our view while many in 3<sup>rd</sup> world countries risk being displaced by famine, flood and drought caused by rapid global climate change. Beyond the morality issue history has taught us that the increasing disenfranchisement of the poor directly impacts our own national security in the US. In their April 17, 2009 press release naming global warming gases as a public health threat the EPA also addressed the national security issue:

“In addition to threatening human health, the analysis finds that climate change also has serious national security implications. Consistent with this proposed finding, in 2007, 11 retired U.S. generals and admirals signed a report from the Center for a New American Security stating that climate change “presents significant national security challenges for the United States.” Escalating violence in destabilized regions can be incited and fomented by an increasing scarcity of resources – including water. This lack of resources, driven by climate change patterns, then drives massive migration to more stabilized regions of the world.”

A significant increase in our use of wind power, along with increased power generation from our other indigenous resources such as biomass, hydro, solar and a simultaneous improvement in energy efficiency and energy storage technology can cut our dependence on foreign sources of fossil fuels.

Q. Will my taxes go down?

R. A wind project will certainly provide significant tax relief to any town that chooses to host one. Exactly, how much tax relief depends on several factors outside of our control. We have no say in how your town chooses to spend its tax dollars. However, any town that does not choose to dramatically increase spending will certainly see a significant benefit. Lower taxes are an important and direct benefit of a wind farm to every resident in the town. Tax relief is more important than ever considering the state of the economy today.

Taxes are another issue that anti wind groups use to confuse and mislead local voters. As a recent example an anti wind group in Jackson published a news letter in March 2009 indicating that the Beaver Ridge Wind project was somehow shortchanging the town of Freedom. This anti-wind group pretended to be incredulous that the Freedom project had started operation in November 2008 and had not paid any taxes by March 9, 2009 – the date the newsletter was published. The authors apparently have never paid taxes themselves and are entirely unfamiliar that there is a schedule associated with tax payments. Typically real property taxes are assessed each and every year based on the value and ownership of the property on April 1. Assessments for new projects are often not complete until mid or late summer but they will still be as of April 1. Freedom is working on a tax bill for Beaver Ridge Wind but as of April 20, 2009 we have not received it. This is not unexpected or unusual– it is just the normal process.

- Q. What is a TIF?
- R. Tax Increment Financing. Anti-wind groups will tell you that TIFs are simply tax shelters for unscrupulous wind developers. This is certainly not the case. TIFs are not the best route for all towns and each town will need to make their own determination about whether a TIF makes sense. In some cases TIFs can be used to provide a benefit to both the town and the developer. Only in these win-win situation are TIFs likely to be successful.

A TIF does not affect the assessment of a project by a town or the taxes that are paid. Instead a TIF affects where the tax proceeds go. Without a TIF taxes from a wind project would go into the town's general fund. With a TIF taxes from a wind project would go into a specific town economic development fund. Money in the development fund can often be shielded from State revenue sharing requirements. TIFs, therefore are commonly used to preserve more of the tax dollars associated with a wind project in the host community. The downside is that the town has to accept some limitations on how it uses the tax dollars. In addition the benefit comes from sheltering some of the town's tax base from the revenue sharing process that allocates responsibility for each town's contribution to schools. Some argue that this is unfair to the other communities.

TIFs also get a bad rap as it is common for some of the benefit realized by the town to be returned to the wind project as an incentive to locate in the community. Tax benefits are commonly used to promote desirable activities. Wind power production is a clean renewable business that imposes few burdens on the town in the form of services. It is not surprise that many towns want to attract this sort of taxpayer. The important point to remember is that the towns that implement TIFs do so because they also stand to benefit from the TIF agreement – it is not just a give-away to the wind project.

To the best of our knowledge Freedom is the first town to host a wind project in Maine that has decided against using a TIF.

- Q. Can a wind developer depreciate the wind farm so that they pay lower taxes in the future?
- R. No. Just like you cannot depreciate your house for purposes of paying local taxes we cannot reduce our tax liability to the town by simply depreciating the wind turbines. A good example of this is found in the hydroelectric industry. Many of the hydroelectric facilities in the state of Maine are very old – some over 100 years – yet they are paying more taxes today than ever as the facilities have increased in assessed value as the value of electricity has increased.
- Q. Can wind turbine flicker cause epileptic seizures?

R. No. Wind turbines simply spin too slowly to cause epileptic seizures. Shadow flicker is related to rotor speed and the number of blades. The GE 1.5 has 3 blades and the rotational speed is between 10 and 20 RPM. This corresponds to a flicker frequency of less than 1 Hz (alteration per second). Such low frequencies are considered to be completely harmless to human health. The Epilepsy Foundation notes that 2% of the population suffers from epilepsy and only 5% of people with epilepsy experience problems with certain types of flashing lights or flickering. The Epilepsy Foundation indicates that at frequencies below 2 Hz this problem should be eliminated.

Q. Will wind turbine flicker bother me?

R. The state of Maine requires a detailed study of flicker for all new wind projects. This study will detail the number of hours – if any – flicker will be noticeable at each house near a new wind development. This study needs to be done before any new wind project is certified to be built by the State. Remember that flicker can only occur if all of the following occur at the same time:

- It is daytime
- There is no cloud or fog cover
- There is enough wind for the turbine to be operating
- The wind orientation is such that the wind turbine is turned to be perpendicular to the sun and the receptor (person)
- There are no obstacles (trees) to break up the flicker
- The sun is low enough in the sky (usually only early morning or late afternoon). Flicker is less of a problem in the US (and Maine) than in much of Europe because we are further south and the sun is higher in the sky.

Q. Are wind turbines safe?

R. Yes. There are more than 100,000 commercial scale wind turbines operating world wide. To the best of our knowledge there has only been one wind-turbine-related death of a member of the public—in the entire world—and that of a parachutist in Germany who jumped into a turbine. Saying no to wind power is the saying yes to burning more fossil fuel in power plants and we know that this is causing sickness and death in Maine today by fouling our air and water.

Other progressive communities in New England are placing large commercial scale wind turbines at schools and places of worship. Turbines are built within a few dozen feet of school athletic fields and buildings (Hull 1, Hull MA; Holy Name School, Worcester, MA; Portsmouth High School, Portsmouth, RI), a few hundred feet from homes (Hull 2, Hull MA), on college campuses (Mass Maritime Academy, MA), at places of worship (Portsmouth Abbey RI), and in the middle of large cities (Toronto, CA). Just like our turbines on Beaver Ridge in Freedom, these turbines are not fenced in and are generally fully accessible to the public. THIS WOULD NOT BE POSSIBLE IF WIND TURBINES WERE DANGEROUS.

Q. What about Ice Throw?

R. Ice can accumulate on wind turbines and it is certainly important to use common sense when approaching a wind turbine during the winter. This is also true for buildings in Portland that shed ice onto heavily traveled sidewalks and the trees around your house. Modern wind turbines have heated sensors that continuously monitor wind speed and blade speed. Ice is heavy and will cause turbines to spin much more slowly than normal for a given wind speed and the turbines can therefore detect if there is a serious icing event. Vibration sensors also continuously monitor for a blade imbalance that can result from icing.

Q. What about Fire Hazard?

R. Only 100 to 200 gals of oil is contained in the nacelle. These are WIND machines and oil is only used in certain hydraulics and in the gear box. This is less petroleum than a large truck contains. There is no need for the local fire department to fight fires up in the sky. In the unlikely event that there is a fire caused by a wind turbine the job of the fire department would be to contain it from spreading on the ground. Wind turbines are designed to be struck by lightning without damage. Blades and turbines are fully protected from lightning strikes. Modern blades can be struck several times without harm. Blades have sensors that tell technicians when they have been struck.

Q. Will wind turbines produce noise or vibrations that are harmful to health?

R. EnRad Consulting, a third-party evaluator hired by the Maine DEP to review noise assessments from wind developers in the state of Maine has advised the DEP to reject arguments that turbines produce noise or vibration that is harmful to health saying in response to a recent application before the Maine DEP that the "Maine Center for Disease Control and Prevention "finds no evidence in peer-reviewed medical and public health literature of adverse health effects from the kinds of noise and vibrations associated with wind turbines other than occasional reports of annoyances." See EnRad review of First Wind's DEP application for the Rollins Mountain Wind Project.

Q. Are wind turbines noisy?

R. As with visual preferences we have found that sound is largely in the ear of the beholder. The best way for you to answer this is to listen to one yourself and we encourage you to visit one of the operational wind farms in: Freedom, Mars Hill, Stetson, Vinalhaven or Kibby Township Maine.

It is certainly true that wind turbines produce sound when they operate. The sound is mostly from the blades moving through the air but at times it is also possible to hear the gearbox in the nacelle. The sound will change depending on the speed of the wind and therefore the speed of the blades passing through the air. Most modern wind turbines are variable speed, meaning that when wind speeds are low they turn more slowly and produce less sound than when wind speeds are high. When it is calm wind turbines will produce no noise. Standing beneath an

operational wind turbine you will not have any trouble carrying on a conversation in a normal voice.

An extensive sound study is required by the State of Maine for any large wind turbine development. This study will show expected sound levels around each wind turbine.