

# Harnessing the Wind on Tug Hill

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## TUG HILL COMMISSION ISSUE PAPER SERIES

### TUG HILL COMMISSION

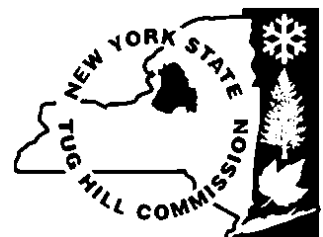
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The Tug Hill Commission *Technical and Issue Paper Series* are designed to help local officials and citizens in the Tug Hill region and other rural parts of New York State. The *Technical Paper Series* provides guidance on procedures based on questions frequently received by the Commission. The *Issue Paper Series* provides background on key issues facing the region without taking advocacy positions. Other papers in each series are available from the Tug Hill Commission at the address and phone number on the cover.

## **Wind Energy Development on Tug Hill Poses Big Questions for Local Government**

Wind turbines to produce electricity on a large scale – “wind farms” – have been constructed, and more are currently being proposed, for parts of Tug Hill. The first of these in the region was Maple Ridge Wind Farm (phases I and II), of which the first phase was completed in 2004, and the second in 2006. Large-scale wind farms are still a relatively new occurrence in the northeast, and since they are new there are many questions that do not have clear answers. Who reviews such a project? State and federal agencies may have review authority, but that review may not address local concerns. Additionally, this may be the first time an agency has needed to review a large-scale wind project, and they may not have all the answers immediately.

What is the local benefit of a wind farm? Wind farm development can have a significant local economic development payment. There are payments to local governments similar to payments in lieu of taxes. There are also payments to landowners on whose property a wind turbine is located, which may help the economics of local farming operations, or may provide an exit strategy for farming operations that are marginal. Wind farm construction provides added employment, an additional demand for large supplies of gravel, and use of heavy equipment, most often sourced locally. Purchases of fuel, food, and living accommodations for added workers during construction give a boost to the local economy. Once operational, a wind farm offers stable, well-paying local employment.

Will local people receive cheaper electricity? Since the electricity generated from a wind farm is sold at prices set in the wholesale market, the same as electricity generated from hydropower, nuclear, natural gas, and other sources, there is no near-term benefit of reduced energy costs of local governments or citizens. In New York, the cost of energy is set by the marketplace, and the cost of energy transportation or delivery remains regulated by the NYS Public Service Commission. Wind farm operators are typically not legally set up to deliver electricity directly to retail customers. It would take a special arrangement and much creative thinking to realize reduced energy costs to the community from a wind farm, though this is theoretically possible.

What are potential concerns for municipalities? The largest concerns are how the wind farm looks, impacts on roads and lands during construction, lighting of the turbines at night, and removal of wind turbines should the owner go out of business or otherwise abandon the wind farm. There are also possible impacts on farmers in terms of creating obstacles for plowing, other farm management issues, noise, and television reception issues.

Wind energy development on Tug Hill continues to hold potential promise and potential pitfalls. This paper attempts to address questions about local economic benefit, the effect on natural resources, reviewing and permitting a wind farm, and highlights the important role local review may play.

## **Interest in Wind Energy on Tug Hill**

Although interest in using the wind to create electricity came to the forefront in the region at the end of 1999 and beginning of 2000, it was not the first time a company had investigated the feasibility of harnessing the wind resource on Tug Hill. Niagara Mohawk Power Corporation installed test wind turbines in the Harrisburg, Martinsburg, and Copenhagen areas in the early 1990's to examine the potential for wind-generated electricity. Those wind turbines were removed several years later and Niagara Mohawk never developed the sites. The test data collected by those wind turbines, however, was actively sought after by companies assessing the potential for wind farms in the northeast portion of Tug Hill in later years. Additionally, the New York State Energy Research and Development Agency (NYSERDA) has reformulated and updated wind data for the entire state. The data is available online at <http://nyswe.awstruewind.com/>.

Wind energy developers try to meet certain criteria when looking for potential wind farm sites. Wind resource, land use, and proximity to the electrical grid are three of the primary considerations. Tug Hill's elevation and proximity to winds coming from Lake Ontario create relatively windy conditions. Tug Hill and Lake Ontario are considered to have some of the best wind resources in the state, outside of the Adirondack and Catskill Parks. However, wind development potential in the Adirondacks and Catskills may be limited by regulations on land use in the two parks, as well as public concerns.

## **Why the renewed interest in wind power in the past decade?**

Today's wind farms essentially produce two products: electrical energy, which is a physical commodity sold into the statewide utility grid, and "renewable energy credits" (green tags), which are certificates that entitle the holder to claim the environmental attributes or benefits associated with the generation of renewable electricity. There have been significant federal tax credits for wind farms in the past several years, which have made building them financially attractive for developers. There is also a value placed on the renewable energy credits generated by a wind farm, which brings a second source of income to the project owner.

Technology improvements have also made sites attractive for wind development that would not have been considered 10 or 20 years ago. Improved turbine components are more efficient and can generate enough power to make development economically feasible. Since the 2001 terrorism events, the United States has focused on energy issues much more, and communities are recognizing the need for more renewable energy.

State policies that encourage renewable energy development have also increased the attractiveness of wind power. Many states offer incentive programs that encourage private companies to purchase green/renewable energy, like wind-generated electricity, as well as solar and other green technologies. A complete inventory of green energy incentives for all U.S. States can be found online at [www.dsireusa.org](http://www.dsireusa.org).

New York State has established a Statewide Renewable Portfolio Standard (RPS). An RPS requires a certain amount of electricity in New York be generated by renewable resources, such as wind, solar, and hydropower. The New York RPS requires that at least 25% of the retail electricity sales in the State be generated from renewable energy sources within 10 years.

### **What is the recent history of wind energy in the Tug Hill region?**

**Atlantic Renewable Energy Corporation (AREC)**, along with **Zilkha Renewable Energy (ZRE)**, proposed a 300-megawatt (MW) **Maple Ridge (originally Flat Rock) Wind Power** project in the Lewis County towns of Martinsburg, Harrisburg, and Lowville in 1999. (For reference, one MW of power is enough electricity to serve approximately 300 to 500 homes. One thousand MW is the amount of power generated by the average nuclear power plant.) Additionally, the Maple Ridge project submitted an application to the NYS Public Service Commission (PSC) to build a 10.3-mile, 240 kilovolt (kV) transmission line and associated substation and interconnect facility through the towns of Martinsburg and Watson. This transmission facility connects Maple Ridge to Niagara Mohawk's 230 kV Adirondack Line high-voltage transmission grid. Maple Ridge built Phase I (150 MW) of the wind farm in 2004, which was operational by December 2004. Phase I towers are located in the southern portion of the project area, in the town of Martinsburg. The second phase, another 150 MW, became operational in December 2005, in the towns of Harrisburg and Lowville. Since Maple Ridge Wind Farm became operational, operation and ownership changes have taken place. The wind farm is co-owned and co-operated by Horizon Wind Energy and Iberdrola Renewables at the time of this paper's latest revision.

The 1.65 Maple Ridge wind turbines produce approximately 5,225 megawatt-hours (MWh) of electricity each year. The entire project annually produces nearly 900,000 MWh of electricity, which is enough to supply the average annual needs of approximately 90,000 households, or 280,000 people – 2.5 times the population of the Tug Hill region. The electric output from the Maple Ridge Wind Farm is sold into the wholesale electric market at the interconnect point in Watson, with the energy being used by the nearest electric consumers—often including homes, farms and businesses in the North Country. The NYS Energy Research and Development Authority (NYSERDA) buys the majority of the renewable energy credits from Maple Ridge to meet NYS's renewable portfolio standard.

The **Roaring Brook Wind Farm**, located in the town of Martinsburg and being developed by Iberdrola Renewables, is scheduled to start construction on Tug Hill in 2011. The current project design calls for construction and operation of thirty-nine, 2 megawatt (MW) wind turbines located on approximately 5,280 acres of private land. The Roaring Brook project will also involve the upgrade of an existing 10-mile system of unpaved forest roads, and construction of approximately 5 miles of new gravel access roads. Associated facilities include buried electric lines, a construction staging area, and an operations and maintenance building. The project will interconnect to the New York

State National Grid Taylor-Boonville 115 kV transmission line near Lee Road. The interconnection route will be comprised of approximately 5.5 miles of buried electrical line and 3 miles of overhead line. Documentation materials prepared in accordance with New York State's State Environmental Quality Review Act can be found online at Iberdrola Renewables: <http://www.iberdrolarenewables.us/roaringbrook.html>.

An early proposal was put forward by **DP Energy** for a medium-sized project of 30-35 megawatt (MW) (20 to 40 wind turbines) in Harrisburg, just south of Route 177, with a grid connection at the substation in Lowville. At this point in time, that proposal is on hold.

Additionally, Beneficial Renewable Resources LLC, Sarasota, FL, entered five-year wind development leases with 36 landowners in northwestern Lewis County from 2006 to 2008, according to county records. Most of the land is in the town of Denmark, although some parcels are in the towns of Harrisburg, Pinckney and Lowville. However, Beneficial Renewable – which in 2006 also contacted a couple of dairy farmers in the Jefferson County town of Champion concerning potential wind development – has yet to propose an actual project, and the leases don't provide for landowner payments unless development occurs.

Developers may consider other areas of Tug Hill, but Harrisburg, Martinsburg, and Lowville drew initial interest due to the good wind resource, potential availability of wind data from Niagara Mohawk and NYSERDA, and proximity to the electric grid in Lowville.

### **What might the benefits of a wind farm be to the community in which it is located?**

Some of the potential benefits to the community include:

- **Employment—construction:** Local contractors are typically best-positioned to win the road building, excavation, and gravel/concrete hauling and supply contracts for construction of a wind farm. Local ironworkers will be hired to install the re-bar in the tower foundations, and local electricians will be hired to install the miles of underground electrical cable that connect the wind generators.
- **Employment—operation:** Typically a 300 MW wind farm will require about 12 to 18 full-time employees to operate and maintain the facility, with larger projects requiring proportionately more workers. Most of these positions will be for “windsmiths” who operate, repair and maintain the wind turbine generators; the electrical and mechanical skills required for these positions are usually commonplace in farming communities, so local workers are usually hired and trained to fill them. The project manager and support staff are usually also local residents.
- **Tax base:** Payment in lieu of taxes (PILOT) agreements are negotiated with the taxing entities within which the wind farm is located. New projects (Hardscrabble and

Roaring Brook, both being developed by Iberdola) are currently negotiating PILOTs of \$8,000 per MW annually. Annual increases are also negotiated within the PILOT, to correspond with the Consumer Price Index, at a minimum of 2.5%. PILOT agreements for new projects are generally negotiated with the local Industrial Development Agency for a 20-year length. This addition to the local tax base can help pay for more municipal or educational services, reduce real property tax rates, or kept in a reserve fund.

- Lease income: With annual lease payments to landowners currently in the range of \$6,000 to \$8,000 per wind turbine tower, a 300 MW wind farm will inject up to \$2,400,000 of additional income into the local economy each year. Since most wind farms are usually installed on conventional farmland, these rental payments may help to bolster the local agricultural economy.
- Tourism: Experience with operating wind projects elsewhere in New York suggest that a wind farm could generate tourism as people visit the area to see the wind turbines, particularly when they are first constructed. In this case, a wind farm could be seen as a good fit with the idea of Tug Hill as a working farm and forest landscape.

There are other possible benefits that fall into a different category than those listed above, as they raise complicated issues and would require much thought and energy to make reality. However, it is worth mentioning here that:

- Energy costs: It may be possible for lower-cost electricity to be provided to the community; however, this may be complicated and it is not certain yet that it could be done. As discussed above, since the electric energy generated by wind projects in New York is usually sold into the wholesale electric market, at the hourly price set by the New York Independent System Operator, in the short run these projects will not have any impact on local electric costs. However, it is theoretically possible for a Tug Hill wind farm to sell its electric output to either a local electric utility, or a local energy services company (ESCO), passing along any economic benefits to customers of those companies.
- Water pumping: The possibility may also exist to attach one or several wind turbines to a municipal function, such as pumping water for a municipal system. Water could be pumped into storage tanks when the wind is blowing and cheaper electricity from the turbine is available. It may also be possible to devise a system where some electricity was sold to the grid and some electricity was tied to a municipal function, but this would likely be a difficult and complicated arrangement.

## **What does a wind farm look like?**

The wind turbines at Maple Ridge Wind Farm are approximately 400 feet tall (comprised of a 260-foot tower with a 130-foot rotor blade). That is approximately the height of a 40-story building (about 3 times the height of the Dulles State Office Building in Watertown, NY). Towers are generally located about 1,000 feet apart in a row, with each



row about 2,000 feet (1/3 mile) from the next. The 300 MW farm covers an area nearly 12 miles long by about 2 miles wide, though only about 1% of this area is actually removed from agricultural production by access roads, towers, and associated building footprints.



*Maple Ridge Wind Farm*

### **How many landowners would a wind farm affect?**

Developers typically look to lease approximately 80 acres for each turbine, even though the footprint of a project ultimately only requires a fraction of those 80 acres. Assuming an annual lease payment of \$6,000 per wind turbine, total annual lease payments to an individual farmer who owned 240 acres would likely be approximately \$18,000. Turbines being used for new projects are rated for 1.5MW, so a 75 MW project might bring in \$300,000 in total annual revenue to farmers. That amount of money could have a large effect on stabilizing farming in those areas.

### **What arrangements are made with landowners?**

Lease arrangements are made with landowners on whose land the towers are to be located. A 200-500 acre farm would likely accommodate about 3 to 7 towers, which would generate between 4.5 and 10.5 MW. The annual lease payment per wind turbine is estimated by developers to fall in the \$6,000 to \$8,000 range currently. There are also arrangements where landowners may realize a certain percentage of gross revenue, but that is variable. According to developers, 2-3% of the gross revenue generated by each

individual wind turbine would be annually paid to the landowner as a lease payment, but this is negotiated in the lease agreement with the developer. Most of the land is still available for farming or forestry activity. Land that would not be available for continued farming or forestry is that acreage occupied by access roads, the tower base, and accompanying equipment.

## **What kind of liability concerns would landowners with wind turbines on their property have?**

Maple Ridge's lease agreement states that the tenant (company) would maintain a specified level of liability and property insurance, with the landowner's name on the policy. The lease also states that the tenant indemnifies and holds harmless the landowner from any liability or losses resulting from the company's equipment. These are issues that should be addressed by a lease with any company, and the landowner would likely want to have their own attorney review any documents before they are signed. In addition, a landowner may want to consider reviewing his/her own liability and property insurance to assess whether coverage is adequate.



*Fallen turbine in Fenner, N.Y., December 2009, courtesy [The Post Standard](#).*

In December 2009, a wind turbine fell over at the wind farm in Fenner, N.Y. To date, engineers have not been able to determine why the turbine fell. Initial analysis indicated that the turbine was working properly at the time of the collapse, so it is likely that the base itself failed in some way.

Another potential problem that was highlighted on a field trip to the wind energy facility in Searsburg, VT was icing events and the potential safety concerns they raise. At the time a group of local government officials from Tug Hill visited the facility, the area had experienced a relatively major icing event. The group was required to wear hard hats while visiting the site, as the wind turbines will shed the ice as they rotate, reportedly sending ice flying as far as 300 feet. The wind turbines in Searsburg are approximately half the size of those being proposed for Tug Hill, so any installed here could be expected to shed ice even further. This may be a concern where snowmobile trails or winter farm operations might be located close to a wind turbine or series of wind turbines. However, the Searsburg towers are at 2500 feet above mean sea level (msl), whereas in Harrisburg towers would be located at approximately 1700 feet above msl. This may make icing events less frequent and less severe here than in Searsburg.



*Windmills in Searsburg, VT. Note ice on trees.*

Maple Ridge states that its land lease makes it liable for any possible icing problems. The turbines there automatically detect changes in weight on the blades, causing them to shut down, eliminating any throwing of ice. There is also 24-

hour monitoring of turbine data, allowing for manual shut down in icing conditions by operators, who are aware of which turbines are located near trails. However, safety reminders should be and are published in snowmobiling literature as a precaution. Most developers and operators require that hard hats be worn on any of their sites, regardless of the weather.

## **Do wind farms negatively affect property values?**

In May of 2003, the Renewable Energy Policy Project published a study showing that wind farms have not had a negative effect on neighboring property values ([http://www.repp.org/articles/static/1/binaries/wind\\_online\\_final.pdf](http://www.repp.org/articles/static/1/binaries/wind_online_final.pdf)). More recently, U.S. Department of Energy's (DOE) Lawrence Berkeley National Laboratory completed a report based on site visits, data collection, and analysis of almost 7,500 single-family home sales situated within 10 miles of 24 existing wind facilities in nine different U.S. states. Neither the view of wind energy facilities nor the distance of the home to those facilities was found to have any consistent, measurable, and significant effect on the selling prices of nearby homes. The Madison and Fenner wind farms were included in that assessment. Information and links to the full report can be found here: <http://newscenter.lbl.gov/press-releases/2009/12/02/wind-power-property-values/>

## **How does a wind farm affect property taxes and assessment?**

The land occupied by a wind turbine farm would be of greater value than farmland, and the land on which a wind turbine is located would be subject to assessment and property taxation. However, NYS Real Property Tax Law allows a 15-year exemption from any increase in assessed value due to the wind energy system (RPTL Section 487). For example, the wind turbine and associated electrical equipment would be considered tax-exempt. However, heating and cooling equipment for a building at a wind turbine would not be exempt. The county, town, and school district within which the wind energy system is located have the option to adopt the exemption, or not.

## **If tax exempt, how will local tax jurisdictions fare?**

In the case of Maple Ridge, a Payment in Lieu of Taxes (PILOT) agreement was negotiated between the developer and all the local taxing jurisdictions, which include Lewis County, the Towns of Harrisburg, Lowville, Martinsburg, and Watson, and the school districts of Copenhagen, Lowville and South Lewis Schools, for each of the two construction phases. The PILOT agreements were negotiated at just under \$9 million per year, as long as Empire Zone benefits were in place for the project. There was a fallback amount negotiated in the case that the project ever lost those state tax benefits.

In 2009, Maple Ridge Wind Farm's local payments reverted to the fallback amount negotiated in their PILOT for Phases I of the project when Empire Zone benefits for wind projects were rescinded (Phase II never received Empire Zone benefits). The ruling was challenged in court by the developer. In 2010, the Empire Zone benefits were reinstated

for Phase I. Empire Zone benefits are no longer available for new wind development projects.

The Roaring Brook Wind Farm, which is permitted and could begin construction as early as 2011, will not be able to take advantage of the Empire Zone program benefits, as they are no longer available for wind power projects. The developer has negotiated a PILOT for the project with the town, county, and affected school districts.

### **What public reviews must be performed on a wind farm project?**

Several agencies have a review function for wind power projects: the NYS Department of Environmental Conservation, the NYS Public Service Commission, the Federal Aviation Administration, and the U.S. Army Corps of Engineers are four such agencies. Additional agencies with review function may be identified during the project review process. All of these agencies and their roles are discussed throughout this paper, but it is important to highlight the fact that local concerns (for example, setbacks from roads and property lines) might only be addressed by local laws.

In 2002 the state Legislature passed a law (Chapter 252 of the 2002 Session Laws) that exempts wind generation facilities from the definition of a "major electric generating facility" under NYS Public Service Law Article X. This means that wind developers do not need to obtain a "certificate of environmental compatibility and public need" from the Public Service Commission. However, wind power projects are subject to the State Environmental Quality Review Act (SEQRA).

### **What agencies are involved in permitting a new power line and/or a wind farm?**

The New York State Public Service Commission (PSC) requires that a major utility transmission facility obtain a "certificate of environmental compatibility and public need" issued by the PSC (Article VII of the New York State Public Service law). A major utility transmission facility is defined as "an electric transmission line of a design capacity of 125 kV or more extending a distance of one mile or more, or of 100kV or more and less than 125kV extending a distance of ten miles or more." Maple Ridge's transmission line is approximately 10.3 miles long, and therefore triggered Article VII in the development process. Maple Ridge filed a "certificate of environmental compatibility and public need" with the PSC on March 28, 2003.

The PSC also requires that any "major electric generating facility," defined as having a capacity of 80 MW or more, obtain a "certificate of environmental compatibility and public need" issued by the PSC (Article X of the NYS Public Service law). However, as mentioned earlier, the state passed legislation in 2002 that specifies that the term "major electric generating facility" does not include wind generation facilities over 80 MW in Lewis County. Therefore, the Maple Ridge project did not need to obtain a certificate of environmental compatibility from the PSC, but was subject to the State Environmental Quality Review Act (SEQRA).

Through SEQR, the three towns in which Maple Ridge turbines are located completed a coordinated environmental review, with the Town of Martinsburg Town Board designated lead agency, as it contains the highest number of turbines within its boundaries. Maple Ridge submitted their revised SEQR application on or around November 15, 2003, and prepared a Full Environmental Impact Statement (EIS). That EIS is available at the Martinsburg Library, or at the Tug Hill Commission offices in Watertown.

### **What is the Department of Environmental Conservation's (DEC) involvement?**

If construction of a wind turbine or transmission line were to impact a DEC regulated stream or wetland, the developer would be required to obtain a permit from DEC. This would grant DEC at least involved agency status during SEQR. In some cases DEC has taken lead agency status, such as in the Gallo Island wind project. It is likely that the developers siting a wind turbine would try to avoid any sensitive areas, but installation of a transmission line is more likely to run into a situation where a permit is needed.

### **Has eminent domain been used to acquire rights-of-way for installation?**

Under New York State Transportation Corporations Law Article 2 Section 11, "an electric corporation ... shall have power and authority to acquire such real estate as may be necessary for its corporate purposes and the right of way through any property in the manner prescribed by the eminent domain procedure law." The corporation looking to invoke eminent domain must obtain a certificate of the PSC certifying that the right sought to be acquired is necessary and in the public interest, so there will be PSC review of the project if eminent domain is sought. Additionally, eminent domain procedure law has a public hearing requirement.

To date, eminent domain has not been used to locate turbines or power lines associated with wind farms in the region. In the case of the Maple Ridge project, installation occurred only on property owned by willing landowners.

### **Do wind farm projects require local review?**

In Martinsburg, Harrisburg, and Lowville, local land use law requires approvals for wind projects that will trigger the State Environmental Quality Review Act (SEQRA).

The Martinsburg Development Law states that wind power generating facilities are permitted by special permit in a Wind Power Overlay district (WPO). A WPO district may be applied in the Rural Residential District, Agricultural District or the Forest District upon application to the town board. Once a WPO has been adopted, an approved Special Use permit is required by the planning board.

In Harrisburg, the local law adds Wind Power Generating Facilities as a “Special Permitted Use” in AR-1 districts (agriculture) and as a “Not Permitted Use” in the RFC (river front corridor) and H-1 (highway) districts. A “Special Permitted Use” would require action by the planning board. An environmental assessment would be necessary as part of the special permit process.

Lowville zoning law was amended in 2002 to allow wind power generating facilities in zones OC (open space and conservation), AG (agriculture), I-1 (industrial), I-2 (highway industrial), and I-3 (industrial/commerce) upon the completion and approval of a special permit application.

The Town of Denmark, at the time of this paper’s printing, was very close to approving a proposed wind power zoning law. The Town of Vienna is also working on addressing wind power in their zoning regulations. Additional Tug Hill communities that have modified their zoning laws for wind turbines include Champion, Pinckney, Rutland, Turin and West Turin.

### **How can the public be assured that developers operate transparently?**

One way to make sure that companies proposing wind farms in a municipality is reputable is to find out if they have signed on to the New York State Attorney General’s Wind Industry Ethics Code. The voluntary code calls on developers to disclose financial relationships with town officials or their relatives, release written property agreements and establish ethics training for employees. Under the code, developers are not allowed to hire local officials, give gifts worth more than \$10 in one year or pay for an official’s or municipality’s legal fees related to a law enforcement investigation. Violation of the code could lead to civil penalties of \$50,000 for the first violation and \$100,000 for subsequent violations.

### **What are some of the environmental impacts of wind farms?**

Wind turbine construction and operation can impact wildlife, particularly in the form of bird strikes. Any tall structure increases the chance of birds flying into it, but lighted towers at night can cause unique problems. According to research done on the topic, on an overcast night with a lit tower, birds can be drawn into the lit area surrounding the tower. They will then fly in circles to stay in the light, as birds resist flying from light into dark. This increases their chances of hitting the tower or blades. This may be of particular concern in migratory pathways. However, the bird strike issue is likely a larger concern for telecommunications towers and television antennas, which are taller and usually have guy wires. The increased height puts the tower closer to the elevation a migrating bird would likely fly at, and the guy wires increase the odds of the birds hitting something.

Bats also are affected by wind turbines in operation. A June to November 2006 study at Maple Ridge Wind Farm was conducted during an estimated 90 percent of the period during which bats were at risk. The study reported an estimated mortality of 9.2 to 14.9

bats per megawatt per season. The mix of species found at Maple Ridge included a similar mix found at other wind projects, with the largest number of incidents involving hoary bats, smaller number of silver-haired, little brown, red and other relatively common bat species. No bat species listed as endangered on state or federal species lists were reported affected.

Until recently, the reasons for bat fatalities at wind farms were unexplained, with evidence making collisions unlikely. Studies have now shown that bats' lungs are severely affected by the pressure differential created by the movement of the rotors near the area of the towers. This seems to affect all species of bats foraging at night in proximity to the towers.

Visual impacts are also important to consider in an environmental assessment. For Maple Ridge the environmental assessment conducted by the developers looked carefully at whether the towers would be able to be seen from any historic structures or from major highways. Other sites that might be visually sensitive to a wind farm are state forest lands, state or county parks, designated scenic roads or scenic rivers. The New York State Office of Parks, Recreation, and Historic Preservation may be consulted on visual impacts to historic structures.

Noise created by the spinning rotors is also an environmental consideration. The Madison County project hired an outside consultant to do a noise assessment, who found that noise from wind turbines is low enough to correspond to a very quiet rural classification. On field trips to wind energy facilities in Searsburg, VT, and Madison County, N.Y., where local people stood near operating turbines, noise did not generally seem to be a problem or issue.

Generally, wind farm sponsors seek to keep the sound profile of the turbines at or below 50 decibels (dB) at the nearest residential neighbor 95% of the time (for reference, 15 dB is the sound of a whisper, 60 dB is the sound of normal conversation, and a lawnmower is 90 dB). For example, Maple Ridge has designed the turbine layout plan to meet a 1,250-foot minimum setback distance from the nearest non-participating project neighbor. SEQR requires sound modeling as part of the Environmental Impact Statement. Additionally, local laws may address sound requirements and setbacks.

As mentioned previously, impacts to DEC regulated wetlands and streams are also environmental considerations, but are somewhat more easily avoided with careful siting.

### **What are tower safety requirements?**

Local laws that address wind towers often require setbacks from the road, property lines, and/or structures. In Harrisburg, local law requires all wind power generating facilities to be located at least 100 feet plus the height of the structure from road lines, and side and rear lot lines. In Martinsburg, the setback from the road centerline is 100 feet plus the height of structure, setback from side and rear lot lines is 300 feet, and setback from any

existing residential structures is 1500 feet. In Lowville, local law requires a setback of 250 feet from any lot line.

### **How are the towers lit?**

The Federal Aviation Administration (FAA) regulates obstruction lighting for any towers 200 feet or greater. The general procedure for making decisions on the lighting of towers is for the developer to initially to complete a FAA form giving notice of proposed construction. Along with that form the developers are required to submit a site plan with elevation information. That application is sent to the appropriate region (FAA Eastern Region for Tug Hill), which reviews the application, distributes it to other departments within FAA, and consults with other organizations if necessary (for example, the Department of Defense). A determination would then be made as to what marking and lighting would be required on the turbines.

After many years of uncertainty and discussion about how to best light wind turbines for aviation safety, the FAA released an Advisory Circular on Obstruction Lighting and Marking in February of 2007. It can be found at the following website:  
[http://www.airweb.faa.gov/Regulatory\\_and\\_Guidance\\_Library/rgAdvisoryCircular.nsf/0/b993dcdcf37fcdc486257251005c4e21/\\$FILE/AC70\\_7460\\_1K.pdf](http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/b993dcdcf37fcdc486257251005c4e21/$FILE/AC70_7460_1K.pdf) .

At Maple Ridge Wind Farm, approximately 24% of the 195 turbines are equipped with two FAA aviation obstruction beacons consisting of L-864 flashing strobes – red at night, white during the day.

### **What provisions are made to ensure that wind turbines will be removed if/when the developer goes out of business or otherwise abandons the site?**

The lease provided by Maple Ridge states that the turbine owner is obligated to remove any wind turbine generators that have not been in operation or generating electricity for a period of 12 months, and to remove any improvements made to the premises within 6 months of the end of the lease. In a worst case scenario, where the tower and all equipment are permanently abandoned, money from salvaging the materials would likely at least cover most or all of the costs of removal. However, in the case that funds from salvage do not cover removal costs, local municipalities can require the wind farm owner, as part of a decommissioning agreement and Special Use permit (if required), to post financial resources (in the form of a bond) to cover the decommissioning costs to the extent that the salvage value does not cover all costs. Such an agreement exists for the Maple Ridge Wind Farm.

### **Additional Resources**

For more information, contact and/or check out these agency websites:

American Wind Energy Association



[www.awea.org](http://www.awea.org)

Database of State Incentives for Renewables and Efficiency

[www.dsireuse.org](http://www.dsireuse.org)

Horizon Wind Energy

[www.horizonwind.com](http://www.horizonwind.com)

Iberdrola Renewables

[www.iberdrolarenewables.us/](http://www.iberdrolarenewables.us/)

Fenner Wind Power Project

[www.fennerwind.com/home.html](http://www.fennerwind.com/home.html)

Madison Wind Power Project

[www.horizonwind.com/projects/whatwevedone/madison.aspx](http://www.horizonwind.com/projects/whatwevedone/madison.aspx)

Maple Ridge Wind Power Project

[www.iberdrolarenewables.us/cs\\_mapleridge.html](http://www.iberdrolarenewables.us/cs_mapleridge.html)

New York State Energy Plan

[www.nysenergyplan.com/](http://www.nysenergyplan.com/)

New York State Energy Research and Development Authority (NYSERDA)

[www.nyserda.org](http://www.nyserda.org)

New York State Public Service Commission

[www.dps.state.ny.us/](http://www.dps.state.ny.us/)

Roaring Brook Wind Farm

[www.iberdrolarenewables.us/roaringbrook.html](http://www.iberdrolarenewables.us/roaringbrook.html)

Hardscrabble Wind Farm

<http://www.iberdrolarenewables.us/hardscrabble/>