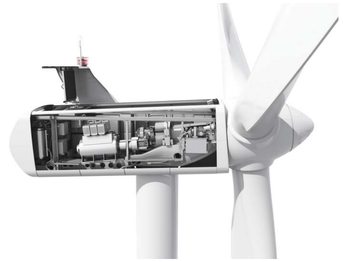
The Turbines

This wind energy project will use a Vestas V100 and Vestas V112 turbine. Vestas, a Danish company, is a long time pioneer in wind energy. It's V100 and V112 models represent the cutting edge of turbine design, built on extensive testing and experience gained from installing more than 48,000 turbines around the world.

The Nacelle



The housing that contains all of the generating components of the turbine. Inside you will find the generator, gearbox, drive train and brake assembly.

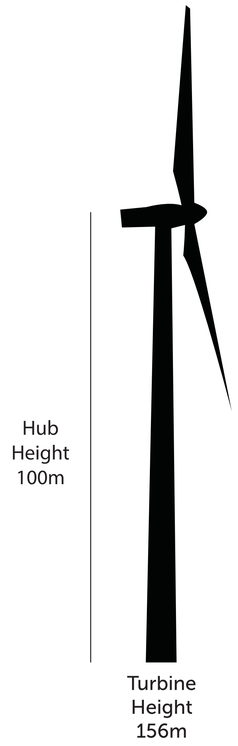
The Blades

The V112 blades are about 56 metres, 184feet, long. Each of the three are made using lightweight composite materials to improve energy efficiency.

The longer the blade, the more wind it is able to capture energy from. The total swept area of the V112 rotor is nearly 2.5 acres.

Because the are so long, the tips of the blades can travel at very high speeds. However, the entire rotor spins at a maximum of around 15 rotations per minute which appears quite relaxed to the observer.

The Height



Wind turbines have to be very tall to access stronger, more constant winds.

The V112 is 156m, 512ft tall from the ground to the highest point of the rotor arc. The V100 has the same hub height with slightly shorter blades, for a total height of 150m, 492ft.

Despite their size, turbines do not have a large footprint. The base of the turbine occupies around 16m², or 172ft².

Manufacturer Specs

Listed values are for V100 [V112 in brackets]

Generator Max Capacity: 2MW [3MW]
Cut-in Wind Speed: 3m/s or 11km/h [same]
Cut-out Wind Speed: 20m/s or 72km/h [25m/s or 90km/h]
Maximum Output at: 12.5m/s or 45km/h [12m/s or 43km/h]
Operating Temperature: -30C to 40C [same]

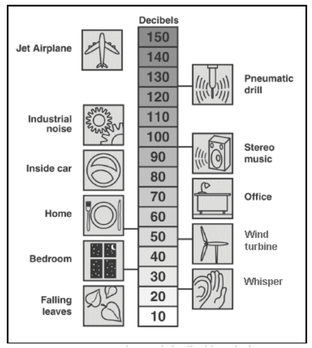
Sound Power: 105 dB(A) [106.5dB(A)]

Rotor Diameter: 100m [112m]
Swept Area: 7850sqm [9852sqm]
Rotation: 8.8-14.9rpm [6.2-17.7rpm]
Brake System: Blade Pitch Control + Hydraulic Disk [same]

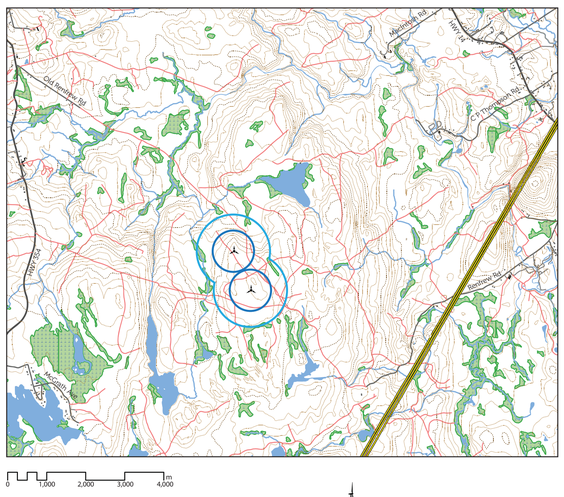
Tower Height: 100m [same]

In addition to manufacturer standard systems, the turbine will will be equipped with an advanced real-time monitoring system. Sensors throughout the nacelle feed operational data to a manned control centre. Any irregularities can be identified 24/7/365 to ensure early preventative action is taken.

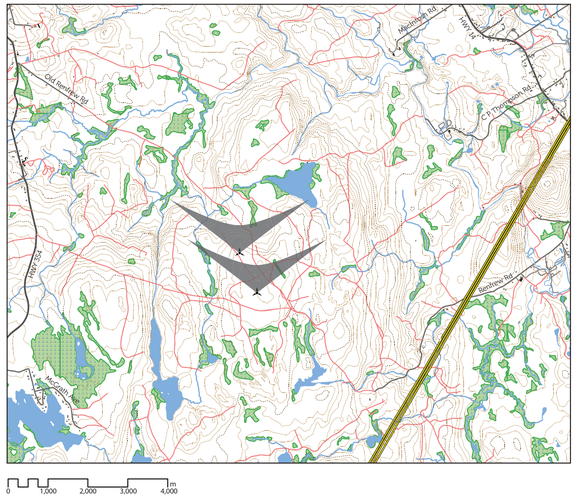
Right:
Typical sound levels; wind turbines are usually regulated to be between 40 and 45 decibels at the nearest dwelling.



Below:
Predicted sound levels. This is a rough preliminary estimate.



3.2km separation distance to scale



Sound

One of the most common concerns community members have when learning of a proposed wind energy project is the question of how the turbine will sound, and how noticeable it will be.

All turbines produce sound if they're producing electricity. Operating turbines are often described as producing an audible "woosh" sound as the blade passes in front of the tower. While the preference for the sound varies by personal taste, the power of the sound is measurable. Due to their size, a turbine's sound cannot be mitigated easily through engineered solutions, such as sound walls that are sometimes built along highways.

The most common method of ensuring wind turbine sound does not adversely affect quality of life is simply by locating them away from sensitive land uses, such as residences. Some debate exists over what distance is appropriate to achieve this, partially due to the fact that the distance sound travels can be affected by site specific factors, such as topography, amount of forest cover, and local weather conditions. Sound levels are investigated using detailed computer modeling software as part of the Environmental Assessment process and the predicted worst-case scenario must fall within acceptable standards.

In Nova Scotia, set-back distances from houses vary by municipality, from around 200m up to 1000m. Our proposed location exceeds even the strictest standards. The nearest cottage is just under 1.5km away, and the turbines are nearly 3.2km from the closest permanent dwelling.

Shadow

Another common concern with large scale wind energy projects is the potential for flickering shadows to be cast on neighbouring houses if the sun is shining directly through the rotating blades.

This issue may be investigated as part of the EA process. However it is likely that given the substantial setback distances to any other building, the Province may not require computer modeling of potential flicker. Research shows that beyond 1km, there is very limited potential for objectionable levels of shadow flicker.

The graphic to the left shows a rough estimate of the maximum shadow zone; modeled for the winter solstice (approx Dec. 21) which is the day when the sun is lowest, and shadows are longest.

Environmental

In conformance with the Environment Act, a full Environmental Assessment is being undertaken as part of this project. Many of the field studies for this are already being conducted, and the public comment period has yet to come. We anticipate the Assessment will be registered in fall of 2013, to allow for the 30 day public review, and 50 day ministerial review to conclude before 2014.

A preliminary investigation in potential environmental impacts was undertaken as part of early project development. Below are some of the findings from that report. These issues and many others will be investigated more thoroughly in the Environmental Assessment report.

No significant watercourse or wetland habitat is affected by the project.

Suitable habitat for 3 species at risk is present at the project site.

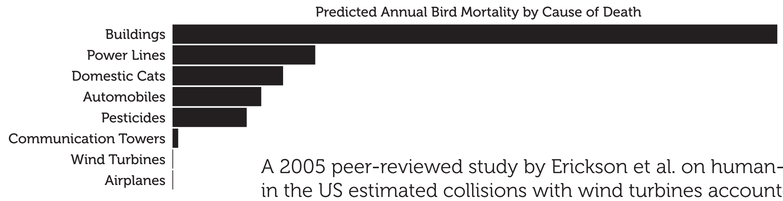
A significant breeding site for bats is located less than 20km away. No impact is expected at this point, but further research is being conducted.

The Cobequid Bay is a globally significant area for birds, and is located under 30km to the north. While no impacts are expected from this development, this will be address in more detail by the Environmental Assessment.

There are protected areas in the general vicinity of the project (such as Municipal Surface Water Supply Areas), but the footprint of this project does not impact them.

Impacts in Context

No development is without its adverse impacts. While we are trying our best to ensure this project is carried out in an environmentally sensitive way, any time people alter the natural world, there are going to be negative impacts. It is important to consider the context of those impacts. For example, wind turbines are known to be a cause of bird and bat kills, but the degree to which they affect bird populations is comparatively small to many other human activities. All things considered, wind energy is still among the most environmentally friendly forms of power generation.



A 2005 peer-reviewed study by Erickson et al. on human-caused bird fatalities in the US estimated collisions with wind turbines accounted for approximately 28,500 deaths out of 500,000,000.