

Wind Turbine Noise and Air Pressure Pulses; by Willem Post, dated 7 October, 2011

The 21 wind turbines of the Lowell Mountain facility will emit noises and air pressure pulses from:

- machinery in the nacelle
- the blades as they slice through the air at up to 200 miles mph
- irregular, low frequency air pressure pulses from the rotors.

The rotor blades create air pressure pulses due to the air being compressed when the blades pass the mast. As the 3-bladed rotor turns at 20 to 25 rpm at higher wind speeds, these pulses have a frequency of 1.0 to 1.25 Hz and travel great distances, a mile or more for large, utility-size wind turbines.

Noises and pressure pulses are emitted 24/7/365, for 20 or more years.

Government Noise Codes: Traditionally, state and local government codes dealt mostly with measured sound values that are weighed (adjusted) using the A scale which covers most of the audible frequencies. For lower frequencies, such as those emitted by large wind turbines, additional scales need to be used as follows:

Infrasound vibrations (air pressure pulses) less than 20 Hz; dB weighed with the G scale, dB(G).
Low frequency noises, LFN, in the range of 20 - 200 Hz; dB weighed with the C scale, dB(C).
Most audible noises in the range of 200 - 20,000 Hz; dB weighed with the A scale, dB(A).

Typically, acoustic engineers hired by governments have never dealt with frequencies less than 20 Hz and do not have any knowledge regarding the health impacts of less than 1.25 Hz air pressure pulses that are 24/7/365.

They know the government codes, the outcome government regulators are expected to hear and conduct their tests according to standard procedures using mostly the A scale. Wind turbine vendors dutifully report sound levels adjusted to the A scale and everyone is happy. The LFN and infrasound are ignored.

According to the US EPA, noise levels above 45 dB(A) disturb sleep and most people cannot sleep above noise levels of 70 dB(A). In Maine, government codes require noise levels not to exceed 45 dB(A) for wind turbines. The LFN and infrasound are not mentioned.

Health Impacts: At less than 20 Hz (infrasound) and above 20,000 Hz (ultrasound) most people do not "hear" noise, but a person's ears and body are sensitive to infrasound vibrations which cause nausea, headaches, sleeplessness, elevated blood pressure, palpitations, tinnitus, imbalance, dizziness, etc., in SOME people who "live" about 1/2 mile or less from large, say 2 MW, utility-size wind turbines.

Most peoples' heart beat is less than 1.25 Hz, or a 75 pulse rate. People who live close to large wind turbines in Falmouth, MA, and in Ontario, Australia, etc., have complained about feeling internal pressures and having heart troubles and other symptoms which they did not have before the wind turbines were installed.

The pressure pulses often are amplified indoors due to resonating of house walls. The symptoms mostly disappear after people move away and reappear after they move back. After many complaints over a long period of time, the Falmouth ruling council finally slowed down the wind turbines at higher wind speeds by partially feathering the blades.

Larger Wind Turbines, Stronger Vibrations: The symptoms studied up till now typically are from exposure to the LFN and infrasound from smaller wind turbines, say up to 2 MW, with 290 ft diameter rotors, as on Lempster Mountain, NH.

The 3 MW Lowell Mountain wind turbines, with 367.5 ft diameter rotors, on 275.6 ft masts, on 2,000 ft high ridge lines, will have greater impacts over larger areas. See website.
<http://www.wind-watch.org/documents/low-frequency-noise-from-large-wind-turbines-2/>

The relative amount of LFN is greater for large turbines (2.3-3.6 MW) than for small turbines (less than 2 MW). The difference is statistically significant for one-third-octave bands in the frequency range 63-250 Hz.

During the day, ambient audible noise (background noise) in rural areas is much greater than at night, whereas the wind turbine noise is greater at night than during the day, because of greater wind speeds. The result is that rural people notice audible wind turbine noise much more at night than during the day. Wind turbine vendors arrange field trips for the public during the day from May-September when wind speeds are typically low.

Dealing With Complaints: Because there were relatively few wind turbines in the past, complaints were few. As wind turbines became more numerous and larger, complaints became more numerous.

Dismissing the effects as mostly psychological and saying the physical effects are due to something else is not an option; there are just too many people, in too many geographical areas, living too near large wind turbines, with too many complaints. It is better to deal with the problem.

One way to deal with it is to have sufficient distance between people's houses and utility-scale wind turbines to ensure people are not disturbed by noise and vibrations. Various studies show people living in flat terrain with wind turbines should be at least 1.25 miles (2 km) from such wind turbines. People living in mountainous terrain with wind turbines on ridge lines should be at least 2 miles (3.2 km) from such wind turbines. Such distance standards are becoming more prevalent in Europe, Australia, etc.

After numerous complaints from people near wind turbine facilities, the Maine Board of Environmental Protection has finally adopted by a 5-4 vote to new rules that lower from 45 decibels to 42 decibels the maximum allowable noise from wind farms between 7 p.m. and 7 a.m., as measured from houses and other "protected locations" within one mile of the turbines; a good step in the right direction, but inadequate for rural settings.

Vermont state officials are rushing to have as many wind facilities built as possible before the federal 30% cash subsidy bonanza expires in 2015.

Because of this rushing, they have not heeded, or played down, or dismissed, the environmental concerns and the complaints from people who live near the Lowell Mountain wind turbine facility. They likely will also not heed the complaints from the fauna and flora currently inhabiting this pristine ridge line.

Because of them, Vermonters are in danger of losing an international reputation of being preservers of their environment and in danger of losing a part of their soul.

Vermonters ARE in favor of renewable energy, but NOT AT ANY COST, and they certainly do not like to be rushed, forever ruin parts of their state, to beat arbitrary subsidy deadlines.

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