Wind Farm Noise: Moderate but Often Disruptive
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Some local residents asked me to take a look at the recent Guest Viewpoint from Duke Energy about the planned Gail Windpower Project, and to share my experience in studying community responses to similar wind farms in other parts of the country. The Acoustic Ecology Institute produces analyses and layman summaries on various noise-related issues; after assessing a wide spectrum of reports, scientific studies, and personal accounts, our goal is to present a picture that helps makes sense of the confusingly differing viewpoints held by those who are strong advocates for one side or the other. This column will draw on an in-depth presentation on community responses to wind farm noise that I put together at the request of the New England branch of the Wind Powering America program, a wind advocacy project of the US Department of Energy. The full presentation can be found at http://aeinews.org/archives/972

Wind farm noise issues are subtler than the anti-wind groups may fear, but much more real than the industry would like to believe. Note that I don't say "than the industry would like *you* to believe." In general, I don't see the industry as fostering mis-information, so much as being overly satisfied with information that is becoming outdated, especially as we get more experience with community reaction in the upper midwest and northeast. See this column from Renewable Energy World for more on the shift that is taking place: http://aeinews.org/archives/1236

The bottom line, based on what we've seen in other communities, as well as what I've heard myself when visiting wind farms (including the truly impressive Sweetwater wind farm region mentioned in the Duke column), is that wind turbines are often clearly audible to a half mile or so, and somewhat audible beyond that, out to a mile or so at times, depending on wind and topography. At distances beyond a few hundred feet, the noise is never what we'd call objectively "loud," but it is, with some regularity, notably louder than other existing ambient noises, especially in rural landscapes where there are no roads with steady traffic within earshot. It's long been recognized that when a new noise source approaches 10dB louder than existing ambient, it will trigger widespread negative responses. That's at the core of today's increasingly vehement debate about wind farm noise impacts. As many wind farm neighbors have noted with surprise, 45dB can seem startlingly loud in quiet rural areas!

The sound of the turbines at 1500 feet or more is characterized fairly accurately by Duke as a "gentle whoosh," and the levels you'll normally hear at homes (40-45dB) is indeed quieter than a conversation, comparable to the sound you'd hear standing next to your refrigerator or a hundred feet from a road with moderate traffic; of course, many people would say these noises are also unwelcome in their yards or

bedrooms. Still, the turbines themselves put out a LOT of noise: all the current 400+ foot turbines are rated at about 100dB or a bit more, equivalent to a leaf blower or loud stereo at close range. The sound rapidly spreads and dissipates, but there's no denying these are clearly industrial machines.

The turbines begin turning in moderate winds and can reach their maximum speed of about 20rpm (one rotation in three seconds) while the wind at ground levels is still low enough to not cause that much of a rustle in bushes and grass (or in your ears). The sound often pulses as each blade passes through higher winds at the top of the blades, so the noise level rises and falls about once per second. This pulsating quality of the sound is one factor that makes the moderate noise level catch your attention; when you can hear several turbines in different directions, the pulses occur at different times, which for some people becomes distracting, disorienting, or disturbing. Even when the ground winds get higher, so that rustling leaves are as loud as the turbines, the pulsing whoosh is at a lower frequency than the leaf rustle, so remains audible.

The value of wind turbines for those trying to make ends meet on their farms can't be denied; this is one of the win-win aspects of wind development in working landscapes, and Sweetwater is an excellent example. However, in Sweetwater the homes are few and far between, with most turbines in wide-open spaces. I saw only one cluster of homes that seemed close enough to have experienced significant noise impact without being landowners making income. As you'll see in the DOE presentation noted in the first paragraph, there is far less negative reaction to wind farms in towns where nearly everyone is working the land than there is in towns where many people have come for the peace and quiet rather than to pursue a livelihood on a farm.

As for property values, as noted in the Duke article, studies show little effect, but it needs to be stressed that these studies look at homes out to several miles from turbines (they're assessing whether the sight of turbines reduces property values). Both solid studies had few sales within a mile, and hardly any within a half mile; these are the ranges where noise becomes a significant issue, and the authors of both studies stressed that their work did not provide a clear answer about property values at close range.

I certainly don't want to suggest that wind farms are incompatible with rural life, but it's clear from the little peer-reviewed research we have to draw from that people who hear turbines at levels of 40dB or more are quite likely to be disturbed (roughly 25% of rural folks hearing 40dB are bothered, increasing to nearly half at 45dB). Not all these feel they have to move away, but they do say that they are moderately or highly annoyed by noise on a regular basis. About a quarter to a third of these tend to say that the noise disrupts their sleep or otherwise has an impact on their health.

Based on what's been found in other areas where there's a mix of farms and non-farm residents, if turbines were kept a mile from non-participating homeowners (noise at 30-35dB), there would likely be virtually no noise issues; if the limit were a half mile (noise of around 40dB), it's likely that some of the neighbors just beyond that range will be quite disturbed and a few may want to move away. Knowing this, each community needs to find its own balance between protecting neighbors and embracing wind development.

A reasonable solution would be to set higher distance limits to protect neighbors from unwanted noise impacts, while making it easy for landowners who don't mind some new noise to allow turbines to be built closer to their homes. These "noise easements" are one way to acknowledge that some people are more tolerant of noise than others, and to promote wind development without imposing a dramatic change in quality of life on those who especially value the current peace and quiet.

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