

## Looking for Wind Industry Leadership in Reducing Noise Impacts

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Published by Renewable Energy World, February 22, 2011. See this url for article with links to some of the sources, and comments from readers:

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The wind industry is at an important fork in the road regarding community noise standards. After years of successfully using relatively small setbacks in farm and ranch country, recent years have seen a surge of noise complaints, troubling annoyance-level surveys, and widespread fear of new wind development. Though sound levels of 45-50dB have been taken in stride by many, even most, places where early industrial wind development took place, it's becoming apparent that for some types of communities, sound levels of even 40dB are triggering high levels of community push-back. The industry's first responses to this emerging problem have been counterproductive: discounting the prevalence of complaints, vilifying acousticians seeking to understand the shift, and most fundamentally, insisting to county commissions nationwide that "widely accepted" community noise standards that have worked elsewhere are applicable everywhere. It's high time that forward-looking industry insiders take the lead in forging a more flexible, collaborative relationship with communities, acknowledging that the noise tolerance we are used to is not universal: some rural regions are far less amenable to moderate, yet easily audible, turbine noise. Companies that accept this fact — rather than ignoring or fighting it — will build corporate reputations that could make them the go-to developers across much of rural America.

A few tidbits highlight just how counterproductive the current entrenched "everything is fine" stance has become. In many places, developers have been reduced to spending time and money arguing about whether sound levels monitored at 1-3db above regulatory limits (imperceptible to barely perceptible differences) are caused by turbine noise or ambient noise. We can't accept or imagine that the problems are rooted in a regulatory limit that may be 10dB too high for local tolerance. The exceedingly unusual situation in Mars Hill, Maine — where a low ridge shelters many homes within 1200-3000 feet, combined with an exemption allowing noise to 50dB — has become a public-relations disaster. It's the Altamont of noise issues: a real outlier with its high proportion of nearby residents complaining of noise intrusions and health effects, yet fueling the perception and fear that this is how all wind farms are. Even in "wind-friendly" Europe, the EWEA

says that 40% of projects end up in court, with another 30% slowed by local opposition.

If our current approach to siting really is just fine, why the widespread resistance? Many still insist that noise issues are *not* widespread, a simple case of vocal malcontents. But the few solid surveys that have tracked community response to wind farm noise paint a more troubling picture. Even the widely-cited Pederson-Waye-van den Berg work from Scandinavia, when vetted to tease out the rural responses from mixed rural-suburban studies, suggests rural annoyance rates of 25% as noise passes 40dB, and 40% at 45dB. Chris Bajdek, in a 2007 paper aimed at helping the industry alleviate noise fears, suggests that 44% of those within about 1900 feet of a typical wind farm would be “highly annoyed”, and that only as sound drops below 40db (at around a half mile), will annoyance drop substantially. He cites a survey from Wisconsin that found similar results, with about 50% of respondents living within a half mile saying noise is a problem; over a third of those between a quarter and half mile had been awakened by turbines.

While of course community noise standards never aim to *eliminate* negative impacts, few would suggest that disrupting a third to half of the nearby population is an acceptable goal. It’s become clear, in both experience and the literature, that modern turbines trigger adverse reactions at lower sound levels than other community noise sources.

A growing number of acoustics professionals have been proactively seeking answers to why this may be, some looking at characteristics of turbine noise for clues, and others at psychoacoustics and rural “place identity.” These researchers appear to be coalescing around recommended wind farm noise standards of 30-35dB, which do in fact come closer to the familiar goal of keeping new noise intrusions to within 5-10dB of existing ambient conditions (rural night ambient is often around 25dB, even when winds aloft trigger turbines into action).

Unfortunately, this work has been relentlessly attacked by many in the industry, despite the fact that these more cautionary acousticians aren’t activist yahoos, but longtime industrial and military consultants with decades in the field of noise control. It’s time to step back from stubborn “lines in the sand” and really assess what they’re finding.

Though some noise issues had cropped up by 2000, and were increasingly a topic of concern by the middle of the decade, George Kamperman and Rick James brought these early observations together and put their reputations on the line with their 2008 “How-to Guide” for wind siting. Paul Schomer, Director of noise standards for the Acoustical Society of America and Chair of several US and ISO noise committees, has been on the forefront of identifying more effective protocols for assessing pre-existing ambient noise in rural areas. Malcolm Swinbanks, an international figure in infrasound and low-frequency noise, has detailed the ways that turbine sound spectrums, which are heavily weighted with complex low frequency and infrasonic

components, will often be perceptible well below the levels suggested by pure-tone perception curves. Robert Thorne, in New Zealand, has focused his research on the effects of moderate noise, stressing that dB levels are not the only (or even the primary) driver of negative community responses. Rob Rand has recently pointed out that the EPA's 1974 "Normalized Ldn" method of community response prediction (which adds adjustments for very rural areas and new noise sources) suggest the likelihood of "Widespread Complaints" in rural areas experiencing turbine noise at 35dBA; at 45 dBA, the predicted community reaction is "Vigorous Community Action." And everyone's favorite lightning rod (for both praise and vilification), Rick James, has done extensive field work at locations where noise complaints have arisen, finding complex and highly modulated infrasound components (often 30-40dB of modulation, several times per second, peaking to 90dB in the lowest frequencies), as well as audible "blade swish" at much higher than normal levels (up to 10-13db). All this work is ongoing, offers useful tools for analysis, and deserves more than the facile brush-offs it often receives.

While there clearly *are* communities where 50dB has been accepted, there are just as clearly others where 40dB has been problematic. Thorne and Pederson suggest that rural "amenity" or "place identity" may offer some clues: in some rural areas (perhaps where most land is under cultivation, as in Iowa), turbine noise is considered insignificant, while in others (perhaps where there are more small woods and open fields in hay, along with more non-farming residents), any clearly audible noise intrusions, especially at night, can be problematic.

The apparent fact is that "widely accepted" community noise standards of 45-50dB are not applicable everywhere; those companies that begin working *with* these differences will be rewarded by community acceptance and eased permitting. Despite protestations to the contrary, it's clear that lower noise standards (or the accompanying larger setbacks) won't kill the US or Canadian wind industries, especially when combined with provisions for waivers when neighbors agree to closer siting. Look at Oregon, with its effective 36dB limit, which is in the midst of a wind boom.

A few years back, the Alberta oil and gas industry went through a similar transformation, when coalbed methane compressors became the first 24/7 noise source in rural areas that were well-accustomed to the industry's presence. At first, companies were caught by surprise at the complaints. Then, most aimed to do the least noise-control necessary to meet the province's noise standard; slightly faulty noise models led to many costly retrofits. But eventually, some companies became proactive and committed to always using state-of-the-art noise control enclosures from the start. The added costs, though significant, paid off when concerned locals could visit nearby installations that truly did keep noise at minimal, usually inaudible, levels at homes. These companies found themselves able to move new projects forward with much less local resistance. This is where we are with wind farm noise. It's time to get creative, and become constructive citizens by working

with, rather than against, regional differences in how communities define the local quality of life.

Author Jim Cummings can be contacted at the Acoustic Ecology Institute (link to <http://AcousticEcology.org>). He is attending the AWEA Project Siting Workshop in Kansas City next week, where he looks forward to meeting other attendees, and sharing some friendly discussions and exasperated responses to these themes.