

# Wind Turbine Noise: A Real Headache, But Not Why You Think

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Sleep deprivation, elevated stress levels, headaches, feelings of nausea – symptoms described by a number of Falmouth residents living near the town-owned wind turbine off Blacksmith Shop Road. What they want to know: is noise from the turbine causing these problems, or is it all in their heads?

The answer, according to Dr. Robert J. McCunney, may lie somewhere in-between.

Dr. McCunney spoke before more than 70 people last week at a forum co-sponsored by the Cape and Islands Renewable Energy Collaborative (CIRenew) and the New England Wind Energy Education Project (NEWEEP) entitled “Wind Turbines – Noise & Health: Fact Vs. Fiction.”

Dr. McCunney is a staff physician at Massachusetts General Hospital, a clinical faculty member at Harvard Medical School, and a research scientist at Massachusetts Institute of Technology, and served on a joint American Wind Energy Association/Canadian Wind Energy Association panel to study the health effects on wind turbine noise.

The information Dr. McCunney presented at the forum, held at Upper Cape Cod Regional Technical School, was drawn from two peer-reviewed studies of the effects of wind turbine noise on human health, conducted in Europe in 2007 and 2009.

The reports focused on three aspects of wind turbine operations: the audible “swish swish” sound of a turbine’s blades, and the low-frequency sound and ultra low-frequency “infrasound” generated by the turbine’s motor.

Infrasound is defined as a sound with a frequency of 20 hertz (Hz), which is below the range of normal human hearing; human speech ranges from 500 and 20,000 Hz. According to Dr. McCunney, infrasound can become audible at higher decibel (dB) levels; wind turbines generate infrasound at 50 to 70 dB, which is below audible levels.

The sound of the turbines cutting the air falls in the 500 to 1,000 Hz, which qualifies as neither infrasound or low-frequency sound, Dr. McCunney added.

The studies cited by Dr. McCunney indicated that there is no clear connection between low-frequency noise or infrasound and adverse health effects. Several other studies

mirror those findings, and the World Health Organization (WHO) in 1999 declared that inaudible low-frequency noise was not a health concern.

“There’s no reliable evidence that infrasounds below the hearing threshold produce physiological or psychological effects,” he said, referring to the WHO report.

Moreover, Dr. McCunney said the federal Food and Drug Administration (FDA) has approved the use of infrasound at 70 dB for therapeutic massage purposes. “The FDA is not an easy organization to get something through,” he noted.

One of the arguments in support of what has been dubbed “wind turbine syndrome” comes from the person who coined the phrase: pediatrician Dr. Nina Pierpont, author of “Wind Turbine Syndrome – A Report on a Natural Experiment.”

The book is a study of 10 families (38 individuals total) showing, according to Dr. Pierpont’s official website, a “seemingly incongruous constellation of symptoms” that comprise wind turbine syndrome, including irregular heartbeat, nausea, tinnitus (a persistent ringing in the ears), headaches, vision problems, and sleep disturbance.

Dr. Pierpont maintains in her book that the low-frequency noise generated by wind turbines is the root cause for this condition, which is currently not recognized by any medical organization in the US as a legitimate diagnosis. Dr. McCunney said his research turned up no scientific studies of or research on wind turbine syndrome.

He pointed out that Dr. Pierpont’s book was not peer-reviewed, the strongest level of scientific research. He further noted that most of the 36 references he found to “vibroacoustic disease” – ailments caused by low-frequency vibrations, such as wind turbine syndrome – came from a group of Portuguese scientists conducting case studies, the weakest level of scientific research.

## **Sound Equals Fury**

Then there is the audible sound of the blades cutting the wind, which Dr. McCunney said is, in his experience, most often what disturbs people living near turbines and is the likely cause for their reported health issues.

The noise generated by the blades moving through the air generally falls within the 35 to 45 decibel range as measured from 984 feet from the source (as per the National Research Council). An Ontario Public Health Agency study indicated that a wind farm (a facility comprising multiple turbines) generates between 30 and 50 dB as measured at a distance of just over 1,100 feet.

The NRC said the noise of a single turbine is 90 to 105 dB as measured at the source.

In comparison, the human voice during a whisper is about 20 dB, normal conversation ranges from 50 to 70 dB, and a jet engine registers 140 dB. The medical community

considers prolonged exposure to sound registering 85 dB – the noise level generated by busy city traffic – to pose a risk to human hearing, while sound on the high end such as a jet engine or shotgun blast (155 dB) can cause instant damage.

In its 2009 report the Santa Fe, New Mexico-based Acoustic Ecology Institute (AEI) stated that the ambient noise levels for a typical rural neighborhood at night is 30 dB, “so, it is not that hard for wind farms to become a new and dominant acoustic presence.”

In some communities in the US, the AEI reported, a setback standard is adopted for onshore wind turbines based on the turbine’s height: the distance between the turbine and a home should be at least five times the height of the turbine.

Although the sound of the blades moving through the air is undeniably audible over significant distances, Dr. McCunney said the evidence indicates that any health problems are linked less to the sound quality itself and more to whether the listener regards the sound as “annoying” – the definition of which is highly subjective.

Referring back to Dr. Pierpont’s book, Dr. McCunney said the symptoms that allegedly come with wind turbine syndrome “seem to be what’s been described about 30 or 40 years ago in the context of annoyance from noise” rather than low-frequency vibrations.

“The similarity between symptoms of noise annoyance and those of wind turbines indicates that this diagnosis is not, at least according to many, a pathological effect but an example of the stress effects of exposure to noise of virtually any type,” Dr. McCunney said.

However, that conclusion did not sit well with several members of the audience, who said they lived near the Falmouth turbine, located at the town’s wastewater treatment facility. During a question-and-answer sessions, people challenged Dr. McCunney’s conclusions, presenting their own symptoms as evidence that the turbine was causing health problems.

Dr. McCunney did not dispute their claims that they were dealing with health issues ranging from sleep deprivation to chronic headaches, but reiterated that the root cause was the turbine’s audible noise and their individual and subjective reactions to it.

Those reactions, he said, may be influenced by an individual’s pre-existing opinion of wind turbines.

The European studies drew the conclusion that a small percentage of people reported being annoyed by sound levels of up to 35 dB, but as shown in a 2009 cross-sectional study conducted in the Netherlands, among 2,000 people living within a mile and a half of wind turbines, people who reported being annoyed by the sound of the turbines also reported disliking the turbines for other reasons: aesthetics, lack of economic benefits such as lower utility rates, et cetera.

“This has been a recurring theme I’ve seen in the research on wind turbines,” Dr. McCunney said. The Swedish study in 2007 interviewed 750 people living at least 1,968 feet from wind turbines, and that study found that “those who had an unfavorable attitude toward wind turbines were over 13 times more likely to report being annoyed by [the noise].”

He did not have a firm explanation as to why very young children, who ostensibly do not have opinions on wind turbines, also experience these symptoms, but said the concept of annoyance is very relative.

“Annoyance means different things to different people,” Dr. McCunney said. “Annoyance could be standing too long in a line at the post office or being stuck in traffic...it’s hard to get an objective definition of what annoyance means in terms of the health implications.”

A few members of the audience challenged Dr. McCunney’s objectivity, pointing out his work on the American Wind Energy Association/Canadian Wind Energy Association panel. “I approached this topic honestly, with no axe to grind,” he said. “I approached this thinking that I’m balanced, but I understand because of my conclusions people might think otherwise, but that’s the way it goes.

“My goal here is that if you’re going to be making public policy based on science, to try to make it on the best available interpretation of the science as you can,” Dr. McCunney said. “My bias is, make sure that you interpret the science in a proper way for public policy.”