

Summary of Articles on Wind Turbines and effects on Health

Health Effects Related to Wind Turbine Noise Exposure: A Systematic Review, Schmidt and Klokker, published 12-4-2014

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4256253/#pone.0114183-Yano1>

This is a study of peer reviewed reports including four case studies (report adverse health effects that are hypothesized to be a result of exposure to wind turbines. Contribute weak evidence as can be affected by bias) and 26 cross-sectional studies (which compare subjects with low or no wind turbine noise exposure to those with high exposure. Also subject to bias and can suggest associations but not causations). None of the included studies discussed low frequency noise or infrasound.

The authors noted a dose response relationship between noise and noise annoyance, sleep disturbance, and psychological distress. There was no statistically significant evidence of an association with tinnitus, hearing loss, vertigo, or headache.

Of note:

- Noise from wind turbines was reported as more annoying than noise from road traffic, airports, and trains at similar loudness (decibels)

- Economic benefit was negatively associated with annoyance (ie – those who were financially compensated tended to be less annoyed)

- <10% of the population will be annoyed at sound exposure <35 decibels

- Impact of wind turbine noise is stronger for people living in rural areas with less background noise.

Public Health Impacts of Wind Turbines, published 5-22-2009

The Minnesota Department of Public Health agreed to evaluate health impacts from wind turbine noise and low frequency vibrations in response to the proposed building of two large wind turbine farms. The largest turbines studied were 325" tall. The proposed requirements of the restrictions were at least 5 rotor diameters between turbines and the closest residential properties, and maximum night time noise in residential areas of 50 weighted decibels. They studied noise, vibration and shadow flicker by reviewing studies from Sweden, United Kingdom and Netherlands as well as case reports.

Conclusions:

- Noise annoyance is worse the closer to wind turbines, when able to visualize the turbines, and in rural and hilly areas.

- The low frequency noise continues over a further distance as it is not attenuated as much by atmosphere and is not diminished as much by doors, walls, and windows so is more likely to be appreciated indoors.

- The most common complaints are sleeplessness and headaches.

- Complaints increase when loudness is greater than 35 decibels.

Wind Turbines Make Waves: Why Some Residents near Wind Turbines Become Ill, Havas and Colling, published 9-30-2011

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The authors describe many of the symptoms felt to be due to wind turbine noise and try to figure out why some people near wind turbines are more sensitive to them than others. They hypothesize electrosensitivity which is more common in children, the

elderly and those with underlying health issues. This article quotes mostly case reports in addition to military and government studies that look at noise, infrasound, and electromagnetic waves – most not specifically looking at wind turbines but extrapolating findings to possible effects by wind turbines. For example, infrasound studied in military pilots is felt to cause symptoms of dizziness, nausea, and GI upset due to resonance affecting the balance system in the inner ear. A second example is a study of “sick building syndrome” in a Minnesota school system due to voltage spikes from poor power quality, improved once power line filters and surge suppressors were installed. As wind turbines produce both infrasound and voltage spikes, the authors propose that this will cause the same symptoms in subjects exposed to wind turbines.

Proposal:

- Build wind turbines as far from residences as possible

- Improve power quality by installing power line filters and surge suppressors