

Wind Turbines and Health

The American Lung Association's agenda for the new administration, Protect the Air We Breathe: An Agenda for Clean Air, states

"Climate, energy and clean air are inexorably linked. Solutions that lead to cleaner air must be included in any approach to cleaner, more efficient energy use and reductions in global warming."¹

Wind energy is one such solution - a clean energy source that can provide communities with decreased greenhouse gas emissions, along with air quality improvements and corresponding human health benefits.

**FOR MORE INFORMATION,
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20% Wind Energy and Climate Change

As America and the world grapple with the immense problem of climate change, one energy source stands out as an abundant, affordable and readily available supply option: wind power. The U.S. Department of Energy's 20% Wind Energy by 2030 Technical Report (www.20percentwind.org) finds that wind power can supply 20 percent of America's electricity by 2030 and reduce projected emissions of carbon dioxide (CO₂), the leading greenhouse gas, by 25 percent. Additionally, each megawatt-hour of wind generation can prevent the loss of up to 600 gallons of water from fossil fuel power plant cooling.² This equals over 20 billion gallons of water conserved by the 40,000 Megawatts of wind energy installed and operating at the end of 2010.³

Wind energy can help improve air quality

Air quality has a direct impact on human health. Particulate matter in the air, often as a result of power plant emissions, has been shown to affect cardiovascular and respiratory health. Unhealthy levels of particle pollution can even cause otherwise healthy people to get sick.⁴ The generation of electricity from the wind does not result in any air emissions. By offsetting more polluting forms of energy generation, wind energy can actually improve air quality and our health. The U.S.'s total 2010 wind turbine fleet prevents the emission of

- 75,000 metric tons of sulfur dioxide annually
- 50,000 metric tons of nitrogen oxides annually⁵

Wind energy can help reduce global warming pollutants

The entire fleet of wind turbines operating in the United States as of the end of 2010 will prevent the emission of over 65 million tons of carbon dioxide – a greenhouse gas that contributes to climate change – each year.⁶ Human health can be adversely affected by rising global temperatures. Fewer frost events and longer warm seasons could result in stronger and more widespread allergens and fungal spores, as well as an increase in the spread of exotic diseases.

Health experts also raise concerns of an increased incidence of heat waves and resulting deaths.⁷ Wind energy produces less than two percent of the emissions from coal combustion per megawatt-hour, even when the manufacturing process of wind turbines is accounted for,⁸ giving it one of the lowest greenhouse gas lifecycle emissions levels of any power technology.



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The wind industry takes health concerns seriously

Any concern that wind turbines may impact someone negatively should be explored. Therefore, in 2009, the American Wind Energy Association and the Canadian Wind Energy Association (CanWEA) established a multidisciplinary scientific advisory panel to review current literature on the perceived health effects of wind turbines. The panel's conclusions are

- Subaudible, low frequency sound and infrasound from wind turbines do not present a risk to human health.
- Sound from wind turbines does not pose a risk of hearing loss or any other adverse health effect in humans.
- Some people may be annoyed at the presence of sound from wind turbines. Annoyance is not a pathological entity.
- A major cause of concern about wind turbine sound is its fluctuating nature. Some may find this sound annoying, a reaction that depends primarily on personal characteristics as opposed to the intensity of the sound level.⁹

Wind plants are generally quiet

It is typically possible to have a normal conversation at the very base of an operating wind turbine. The sound heard from wind turbines at a distance, as with other local sources of sound, is affected by many factors – including the wind direction, meteorological conditions, vegetation and other barriers. Site-specific acoustic models can anticipate sound levels at nearby receptors for consideration during project siting. The sounds emitted from wind turbines can be mechanical, from internal equipment such as the gearbox or yaw drive, or aerodynamic, from air moving past the rotor blades. Current turbine designs effectively reduce mechanical sound through soundproofing; therefore, the aerodynamic sound, often described as a “whooshing” sound, is generally heard.

Shadow flicker occurrence is easily calculated

Shadow flicker occurs when the blades of a turbine pass in front of the sun to create a recurring shadow on an object. Computer models in wind development software can determine the days and times during the year that specific buildings in close proximity to turbines may experience shadow flicker. Mitigation measures can be taken based on this knowledge and may include setbacks or vegetative buffers. Issues with shadow flicker are less common in the United States than in Europe due to the lower latitudes and the higher sun angles in the U.S.

Shadow flicker is not harmful to persons with epilepsy

The allegation is sometimes made that shadow flicker from wind turbines can cause epileptic seizures. This is not true—shadow flicker from wind turbines occurs much more slowly than the light “strobing” associated with seizures. The strobe rates generally necessary to cause seizures in people with photosensitive epilepsy are 5 to 30 flashes per second¹⁰ and large wind turbine blades cannot rotate this quickly.

¹ An Agenda for Clean Air: Protect the Air We Breathe. (2009). http://www.npca.org/cleanair/agenda/Protect_the_Air_We_Breathe.pdf

² Department of Energy. (2008). 20% Wind Energy by 2030 www.20percentwind.org

³ American Wind Energy Association. AWEA U.S. Wind Industry Annual Market Report Year Ending 2010.

⁴ American Lung Association. (2010). State of the Air: 2010. <http://www.stateoftheair.org/2010/health-risks/health-risks-particle.html>

⁵ AWEA U.S. Wind Industry Annual Market Report Year Ending 2010

⁶ AWEA U.S. Wind Industry Annual Market Report Year Ending 2010

⁷ U.S. News and World Report. (2008). 10 Ways Global Warming Could Hurt Your Health. <http://health.usnews.com/articles/health/2008/09/15/10-ways-global-warming-could-hurt-your-health.html>

⁸ Kempton, W. & Levy, J. (2007). Harvard School of Public Health. <http://www.ocean.udel.edu/windpower/DE-Qs/IRP-KempLevy-Health.pdf>

⁹ Wind Turbine Sound and Health Effects – An Expert Panel Review. 2009,

http://www.awea.org/policy/regulatory_policy/documents/AWEA_and_CanWEA_Sound_White_Paper.pdf

¹⁰ Epilepsy Foundation. (n.d.). Photosensitivity and Epilepsy. <http://www.epilepsyfoundation.org/about/photosensitivity/>