

## 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."**<sup>1</sup>

**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](http://www.20percentwind.org)) finds that wind power can supply 20 percent of America's electricity by 2030 and reduce projected emissions of carbon dioxide (CO<sub>2</sub>), 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.<sup>2</sup>

### **The wind industry takes health concerns seriously**

Any concern that wind turbines may impact someone negatively should be explored. However, we are not aware of any scientifically peer-reviewed information demonstrating a link between wind turbines and negative health effects. Thousands of people around the world live near wind turbines without ill consequences.

### **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. More than 25 percent of the people in the United States live in counties with unhealthy levels of short-term particle pollution.<sup>3</sup> 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.

### **Wind energy can help reduce global warming pollutants**

In 2007, wind energy generation prevented the emission of nearly 28 million tons of carbon dioxide – a greenhouse gas that contributes to climate change. 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.<sup>4</sup> 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, giving it one of the lowest greenhouse gas lifecycle emissions levels of any power technology.



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### Wind plants are generally quiet:

Wind plants are very quiet compared to other types of industrial facilities, such as manufacturing plants. But wind plants typically are located in rural or low-density residential areas, where turbine noise may be more obvious because background noise is lower than in urban areas. On the other hand, the turbine noise may often be masked by the noise of the wind itself - especially since turbines are located where the wind speed is higher than average and because they operate only when the wind is blowing.

### The source of wind turbine sounds

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 sound proofing; therefore, the aerodynamic sound, often described as a “whooshing” sound, is what can normally be heard.

### There is no reliable evidence that low-frequency sound from wind turbines is a problem

Low-frequency sound is generally defined as frequencies between 10 Hz (Hertz, oscillations per second) and 100 Hz. This type of sound has many sources, such as machinery, transportation or the ocean, and is generally always present as an element of background noise. Infrasound is considered to be frequencies below 20 Hz and can be perceived at frequencies as low as 2 Hz. According to a peer-reviewed article in *Canadian Acoustics*, “there is no reliable evidence that infrasound at levels below its hearing threshold has an adverse effect on the body” (p.30) and “infrasound from wind turbines is below the audible threshold and of no consequence” (p.34).<sup>5</sup> Also, low-frequency sound weakens rapidly with distance. The aerodynamic “whooshing” sound described above is not low-frequency sound or infrasound.

### 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 United States.

### 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 necessary to cause seizures in people with photosensitive epilepsy are 3 to 5 flashes per second<sup>6</sup> and large wind turbine blades cannot rotate this quickly.

#### Sources:

- <sup>1</sup> American Lung Association. (2009). An Agenda for Clean Air: Protect the Air We Breathe [http://www.lungusa.org/atf/cf/%7B7a8d42c2-fcca-4604-8ade-7f5d5e762256%7D/PROTECT\\_THE\\_AIR\\_WE\\_BREATHE.PDF](http://www.lungusa.org/atf/cf/%7B7a8d42c2-fcca-4604-8ade-7f5d5e762256%7D/PROTECT_THE_AIR_WE_BREATHE.PDF)
- <sup>2</sup> Department of Energy. (2008). 20% Wind Energy by 2030 [www.20percentwind.org](http://www.20percentwind.org)
- <sup>3</sup> American Lung Association. (2008). State of the Air: 2008. <http://www.stateoftheair.org/2008/health-risks/>
- <sup>4</sup> 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>
- <sup>5</sup> Leventhall, G. (2006). Infrasound from wind turbines – Fact, fiction or deception. *Canadian Acoustics*, 34(2), p.29-36.
- <sup>6</sup> Epilepsy Foundation. (n.d.). Photosensitivity and Epilepsy. <http://www.epilepsyfoundation.org/about/photosensitivity/>