

**Overview: Wind Turbines**

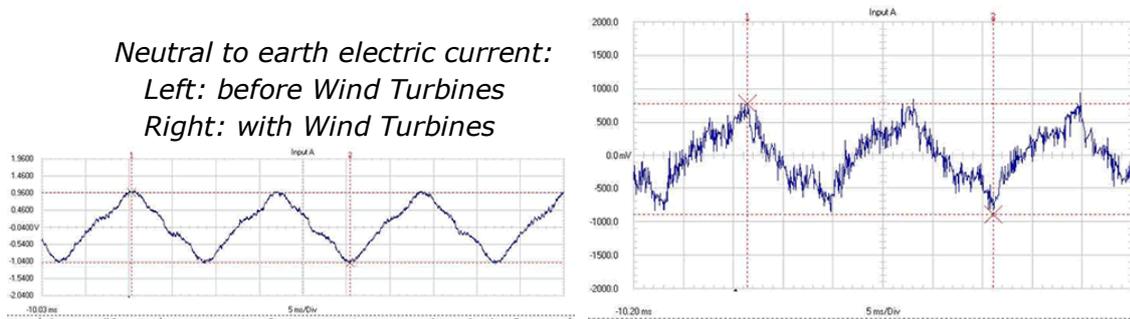
Adverse health effects, like electrosensitivity symptoms, can be caused by:

- 1. Dirty electricity** fed onto nearby power lines
- 2. Stray ground currents**
- 3. Infra-sound** or low frequency acoustic waves

**Dirty Electricity**

**1. High-frequency transient spikes**

Dirty electricity, or high-frequency transient spikes overlying the alternating current 50 Hz sine wave, can be fed from the turbine inverter onto local power cables, into homes and the ground.



Catherine Kleiber: ["Modern Wind Turbines Generate Dangerously "Dirty" Electricity"](#) (Canada Free Press, April 28 2009)

**2. Stray ground current**

Dirty electricity can also be found as stray ground current where there are insufficient neutral or return wires. This is more common in parts of North America than in much of Europe.

**Typical symptoms:**

Tinnitus, headaches, sleeplessness, raised blood pressure, heart palpitations, earaches, chest pressures etc. The symptoms disappear away from the area affected by the turbines.

**Protection:**

In all cases, people should be protected from EMFs generated by Wind Turbines in three ways:

1. All electric power from the turbine inverters should be filtered to remove the high-frequency transient spikes. This should also be done for the homes of all local residents.
2. The power generated by the turbines should not be connected directly to power lines supplying nearby residential properties.
3. A proper neutral system, possibly a five-wire system, should be installed to handle the high-frequency return current in overhead lines.

(Electric Power Research Institute, 1995).

Those people especially sensitive to dirty electricity need further reasonable adjustments.

**Further information:**

- Havas M et al: ["Wind Turbines Make Waves: Why Some Residents Near Wind Turbines Become Ill"](#) (2011)
- Krogh CM et al: ["Wind Turbine Electromagnetic Energy: Exploring Risk of Harm to Human Health"](#) (2019)

**Dairy cows** produce less milk on ground or in buildings polluted with stray ground currents.

- Hillman D et al: ["Relationship of electric power quality to milk production of dairy herds - field study with literature review"](#) (2013)
- Stetzer D et al: ["Monitoring and remediation of on-farm and off-farm ground current measured as step potential on a Wisconsin dairy farm: A case study"](#) (2016)

## Infra-sound

### Set-back: minimum one mile (1.6 km)

The usual set back from residential areas recommended for Wind Turbines is at least one mile, or 1.6 or 1.5 km. This is to protect most people, who are affected subconsciously.

(French National Academy of Medicine, Chouard C-M, 2006)

### Most people are subconsciously sensitive to infra-sound

Sleep is disturbed by Wind Turbines among most people because of infra-sound, just as most people can also be disturbed because of Turbines' electromagnetic pollution. Sleep disturbance is in a dose-response manner, with the greatest disturbance closest to the Turbines, although under some atmospheric conditions infra-sound is non-linear in its propagation effects.

- Ishitake T: [\[Wind Turbine Noise and Health Effects\]](#) (2018)
- Kageyama T et al: ["Exposure-response relationship of wind turbine noise with self-reported symptoms of sleep and health problems: A nationwide socioacoustic survey in Japan"](#) (2016)
- Julia Ageborg Morsing et al: ["Wind Turbine Noise and Sleep: Pilot Studies on the Influence of Noise Characteristics"](#) (2018)
- Michael A Nissenbaum et al: ["Effects of industrial wind turbine noise on sleep and health"](#) (2012)

### Some people are especially sensitive consciously to infra-sound

It is well established that some people, perhaps 10% of the population, are especially sensitive consciously to infra-sound (<20 Hz) from Wind Turbines. The specific symptoms are similar to the specific symptoms of electrosensitivity. Both can involve disturbances to the workings of the inner ear. In both cases it is not only the frequency of the wave but its amplitude and modulation. People especially sensitive to electromagnetic pollution are often more sensitive to noise pollution. Similarly they are often more sensitive to light and chemicals than other people.

### Typical symptoms and sensitivities

In addition to the symptoms listed for dirty electricity and electrosensitivity, common infra-sound symptoms include nausea, dizziness, depression, irritability and sensitivity to sound. Like electrosensitivity, people with compromised myelination may be especially sensitive, since the hairs of the inner ear are myelinated but not those of the outer ear. RF EMF is related to sensitivity to sound and can be used to induce sounds. Human muscles emit low intensity sound waves from motor neurons, just as glucose metabolism emits EMFs. Hypersensitivity is individually differentiated and often inherent in the brain's interconnections.

- Persinger MA: ["Infrasound, human health, and adaptation: an integrative overview of recondite hazards in a complex environment"](#) (2014)

### Abdominal changes, coronary perivascular fibrosis and the blood-brain barrier

Specific health effects of infra-sound include abdominal changes. At some frequencies and intensities, infra-sound changes the heart and make the blood-brain-barrier more permeable.

- Lousinha A et al: ["Infrasound induces coronary perivascular fibrosis in rats"](#) (2018)
- Wnag X et al: ["Effect of low-frequency but high-intensity noise exposure on swine brain blood barrier permeability and its mechanism of injury"](#) (2018)

### Vibroacoustic Disease

As with electrosensitivity, where chronic exposure can lead to hyper-sensitivity, so people chronically exposed to noise pollution can develop vibroacoustic disease. A particular feature of vibroacoustic damage appears to be in the respiratory system.

- Alves-Pereira M et al: ["Vibroacoustic disease: biological effects of infrasound and low-frequency noise explained by mechanotransduction cellular signalling"](#) (2007)
- Castro AP et al: ["Increase in CD8+ and CD4+ T lymphocytes in patients with vibroacoustic disease"](#) (1999)
- José Reis Ferreira et al: ["Involvement of central airways in vibroacoustic disease patients"](#) (2006).