



# Wind Power Myths vs. Facts

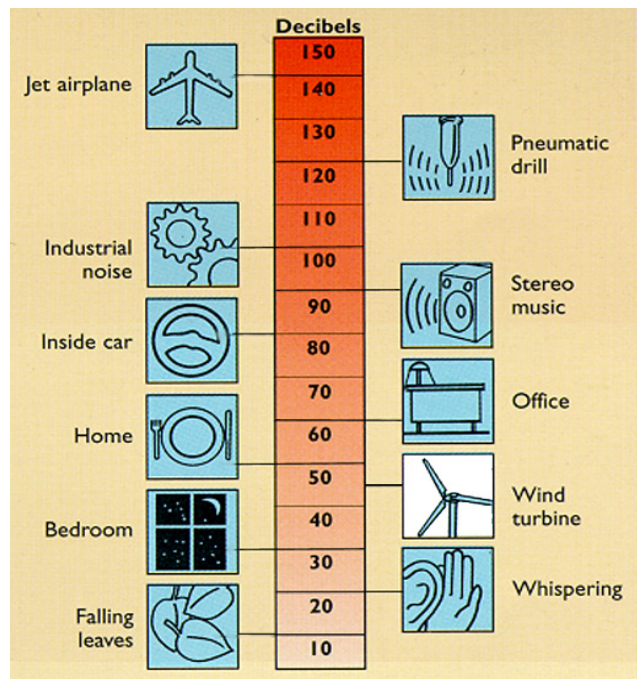
As wind power generates more electricity in the U.S. and moves into new areas of the country, more people are being introduced to wind turbines in their communities. Wind power is still a relatively new technology, and a number of myths - some based on old technologies, some based on misunderstandings - are endlessly repeated by opponents of wind power. This document dispels some of the most common myths about wind power with real facts.

## *MYTH --- Wind Turbines Are a Nuisance*

### *“Turbines Are Noisy”*

**Fact: Wind turbines are quiet.** An operating modern wind farm at a distance of 750 to 1000 feet is no noisier than a kitchen refrigerator or a moderately quiet room. The sound turbines produce is similar to a light whooshing or swishing sound, and much more quiet than other types of modern-day equipment. Even in rural or low-density areas, where there is little additional sound to mask that of the wind turbines, the sound of the blowing wind is often louder.

Exceptions to quiet operating turbines can occur in two instances - with older turbines from the 1980s and with contemporary turbines in some types of hilly terrain. Modern wind turbines have been designed to drastically reduce the noise of mechanical components so the most audible noise is the sound of the wind interacting with the rotor blade. However, in some hilly terrain where residences are located in sheltered dips or hollows downwind from turbines, turbine sounds may carry further and be more audible. This effect can generally be anticipated and avoided in the development process through adequate setbacks from homes.



### *“Turbine Lighting Is Excessive”*

**Fact: Lights at wind farms are non-intrusive, and improvements in design will make them even less so as the technology expands.** The Federal Aviation Administration (FAA) recommends lighting for most structures more than 200 feet in height to ensure aviation safety.

The wind industry is working with the FAA to test safe and non-intrusive lighting plans for wind farms.

*“Nearby Residences Will Be Affected by Shadow Flicker”*

**Fact:** Shadow flicker is the term used to describe what happens when rotating turbine blades come between the viewer and the sun, causing a moving shadow. **Shadow flicker is almost never a problem for residences near new wind farms, and in the few cases where it could be, it is easily avoided.** For some who have homes close to wind turbines, shadow flicker can occur under certain circumstances and can be annoying when trying to read or watch television. However, the effect can be precisely calculated to determine whether a flickering shadow will fall on a given location near a wind farm, and how many hours in a year it will do so. Potential problems can be easily identified using these methods, and solutions range from providing an appropriate setback from the turbines to planting trees to disrupt the effect. Normally, shadow flicker should not be a problem in the U.S. because at U.S. latitudes (except Alaska) the sun’s angle is not very low in the sky. If any effect is experienced, it is generally short-lived, as in a few hours over a year’s time.

*“Turbines Interfere with Television and Other Communications Signals”*

**Fact: Interference is rare and easily avoided.** Large wind turbines installed at wind farms can interfere with radio or television signals if a turbine is in the “line of sight.” Improving a receiver’s antenna or installing relays to transmit the signal around the wind farm solves this problem; both solutions are common practice in modern wind energy development.

*“Turbines Are Ugly”*

**Fact: Beauty is in the eye of the beholder.** Many people feel wind turbines are majestic. Wind farm developers have computer-modeling tools that accurately depict virtual views from given spots in the surrounding area. Careful design of a wind project can alleviate many visual concerns.

**MYTH — Wind Turbines Do Not Benefit Local Communities**

*“Wind Projects Harm Property Values”*

**Fact: There is no evidence that the presence of a commercial windfarm within sight of a property systematically decreases that property’s value.** In fact, a nationwide study conducted in 2003 surveyed property near multiple wind farms and found that not only do wind farms not harm property values, but that in some cases the values increased.

*“Wind Projects Depress Tourism”*

**Fact: There is no evidence to indicate that wind turbines drive tourists away.** In some areas, wind turbines even draw tourists. Local governments frequently work with developers to install information stands and signs near wind farms, as well as pull-off areas, similar to “scenic overlooks”, from nearby roads. Surveys of tourists have

**“There is so much demand to view the wind turbines that the county is creating a pull-off area and working with the project owner to create an informational kiosk. The wind project has become a destination spot for tourists visiting nearby ski resorts and parks.”**

*Robert Burns, Executive Director  
Tucker County Development Authority, West Virginia*

found that the presence of wind turbines would not affect the decision of most visitors to return. The thousands of turbines in Palm Springs, California, have had no negative impact on the tourism business; on the contrary, the local tourism center organizes bus tours to the wind farms.

*“Wind Projects Don’t Contribute to the Local Tax Base”*

**Fact:** Installing millions of dollars of equipment in most areas greatly increases the local taxes assessed, and wind farms are no exception. Wind farms support the local tax base, helping to pay for schools and roads far more than their impact to local facilities. One large (108-turbine) project in rural Prowers County, Colorado, increased the county’s tax base by 29%.

**What 1,000 Megawatts of Wind Brought to Texas**

Taxable value of wind power plants: *\$777 million*

Property tax payments to local school districts:  
*\$11.6 million in 2002*

Landowner royalty income: *\$2.5 million in 2002*

Wind-related jobs: *2,500*

Economic development associated with a new wind farm extends far beyond taxes to increased employment, directly from the wind farm operation and construction, and to money pumped in the local economy through services needed to support a large construction project, including increased hotel stays and restaurant revenues.

**MYTH --- Wind Turbines Aren’t Safe**

*“Blades Cause Dangerous Ice Throws”*

**Fact:** Ice throw, while it can occur under certain conditions, is of little danger. Setbacks typically used to minimize noise are sufficient to protect against danger to the public. In addition, ice buildup slows a turbine’s rotation and will be sensed by a turbine’s control system, causing the turbine to shut down.

*“Turbines May Throw Blades or Collapse”*

**Fact:** Modern wind turbines are so safe they successfully operate near schools, in urban settings and densely populated areas, and in rural communities. Blade throws were common in the industry’s early years, but are unheard-of today because of better turbine design and engineering. Utility-scale wind turbines are certified to international engineering standards, such as those developed by Germanischer Lloyd or Det Norske Veritas, and these include ratings for withstanding different levels of hurricane-strength winds and for other criteria. There are thousands of turbines installed in Europe and thousands in the U.S. - wind turbine standards ensure a high level of operational reliability and safety in the U.S. and worldwide.

**MYTH --- Wind Turbines Harm Wildlife**

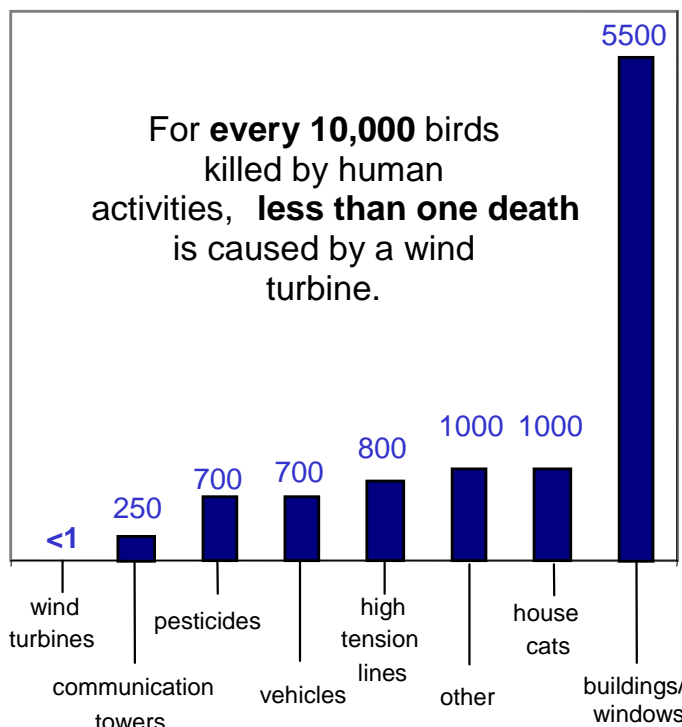
*“Turbines Kill Many Birds and Bats”*

**Fact:** Wind energy development’s overall impact on birds is extremely low compared with other human-related activities. No matter how extensively wind is developed in the future, bird deaths

from wind energy are unlikely to be ever more than a small fraction of bird deaths caused by other human-related sources, such as cats and buildings.

Raptor kills (of eagles, hawks, and owls) are a problem at one large older wind farm in California, in Altamont Pass, built in the 1980s. Wind farm operators there have worked with wildlife officials and experts to reduce the impacts on raptors, and those efforts continue today.

Prior to 2003, bat kills at wind farms studied were low. However, the frequency of bat deaths at a newly constructed wind farm in West Virginia in 2003 has caused concern. In response, AWEA and several of its member companies entered into a three-year cooperative effort with Bat Conservation International, the National Renewable Energy Laboratory, and the U.S. Fish and Wildlife Service to research wind/bat interaction and test ways to reduce bat mortality. That research is ongoing, and information about the results is being published as they become available.



Data source: Erickson et al., 2002, Summary of Anthropogenic Causes of Bird Mortality.

Despite the minimal impact wind development has on bird and bat populations in most areas, the industry takes potential impacts seriously. In addition to special initiatives such as those described above, avian studies are routinely conducted at wind sites before projects are proposed. Pre-construction wildlife surveys are now common practice throughout the industry.

#### *“Wind Projects Fragment Wildlife Habitat”*

**Fact:** Wind farms are most often built in areas close to transmission lines where habitat has already been modified and fragmented, typically by farming and ranching. And, wind energy has a light footprint, with only the turbine itself, along with some roads and power lines, impacting the land, while pre-existing land use continues around the turbines as before. Windy land can also often be found in undeveloped areas, however, so habitat fragmentation can be a concern, especially in unbroken stretches of prairie grasslands or forests. The industry supports more research to better understand the extent of possible habitat or wildlife impacts in these areas, but those impacts must be balanced against the effects of not developing renewable energy sources and thereby aggravating global warming and pollution pressures on wildlife and their habitats--not just in prairie or forest areas, but around the world.

***MYTH — Wind Turbines are Expensive and Unreliable***

*“Back-up Generation Is Needed for All Wind Turbines”*

**Fact:** Because of the grid’s inherent design, there is no need to back up every megawatt of wind energy with a megawatt of fossil fuel or dispatchable power. The electric grid is designed to have more generation sources than are needed at any one time because no power plant is 100% reliable. It is a complicated system designed to absorb many impacts, from electric generation sources going out of service unexpectedly to industrial customers starting up energy-intensive equipment. The grid operator matches electricity generation to electricity use, and wind energy’s variability is just one more variable in the mix.

***Findings of the Utility Wind Interest Group (an organization of some 55 utilities that have wind power on their systems) in November 2003:***

"The results to date also lay to rest one of the major concerns often expressed about wind power: that a wind plant would need to be backed up with an equal amount of dispatchable generation. It is now clear that, even at moderate wind penetrations, the need for additional generation to compensate for wind variations is substantially less than one-for-one and is often closer to zero."

One of the most authoritative studies, conducted in 2004 for the Minnesota Department of Commerce found that adding 1,500 megawatts (MW) (enough wind to meet the needs of more than 400,000 homes) to the system of a major utility, Xcel Energy in Minnesota, would require only an additional 8 MW of conventional generation to deal with added variability.

Many sources of electricity considered highly reliable suffer from unexpected outages: for instance nuclear reactors and coal plants that shut down, often at short notice, for safety repairs or maintenance. Yet no one proposes to back up a coal or nuclear power plant with a similar amount of dedicated generation from another plant. The reality is that wind energy is naturally variable, but not unreliable. Wind farms are built in windy areas, and seasonal and daily wind generation patterns can be anticipated. Denmark and utility systems in regional areas elsewhere in Europe operate with 10-15% or more of their power coming from wind, without increased reliability problems or need for additional back-up power plants. And in contrast to conventional power plants, wind farms need not shut down altogether for maintenance and repairs—a turbine fault, when it occurs, can be repaired while the other turbines continue to operate.

*“Wind Turbines Operate Only a Small Fraction of the Time”*

**Fact:** Wind turbines generate electricity most (65-80%) of the time, although the output amount is variable. No power plant generates at 100% “nameplate capacity” 100% of the time.

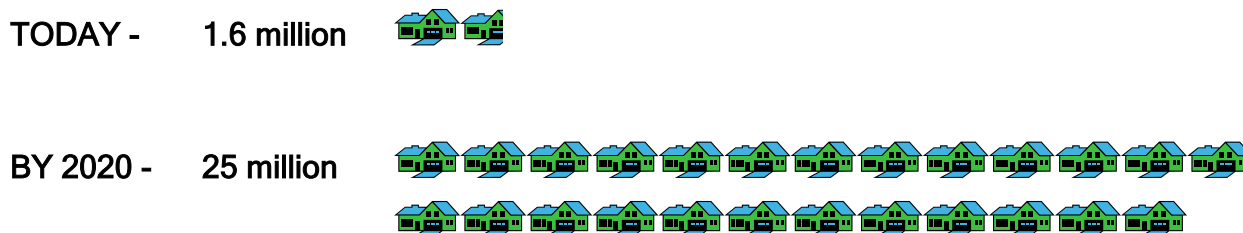
Nameplate capacity refers to the maximum generation potential of a power plant. A conventional power plant is occasionally closed for maintenance or repairs, or runs below full capacity to best match demand. Wind farms are built in areas where the wind blows most of the time, but because of variations in speed, a wind farm will generate power at full rated capacity about 10% of the time, and on average throughout the year the plant will generate 30% to 35% of its rated capacity. A utility in the Northwest, PacifiCorp, added 20% of its wind projects' nameplate capacity into its baseload calculation in the utility’s 2004 Integrated Resource Plan. This indicates that utilities with experience with wind energy on their system consider it able to provide some consistent power on a regular basis. The full plan can be accessed at <http://www.pacificorp.com/File/File47422.pdf>.



*"Wind Energy Will Never Provide More Than a Little Electricity"*

**Fact:** The U.S. Department of Energy estimates America's wind energy potential to be much larger than total U.S. electricity consumption today. Tapping only a fraction of that potential would provide a significant part of America's electricity supply. In the United States, wind energy currently produces approximately 17 billion kilowatt-hours of electricity, equivalent to powering about 1.6 million average American homes year-round. A typical one-megawatt turbine generates enough electricity for 300 homes. With policies to remove barriers to wind energy development, by 2020, 100,000 MW of wind energy could be installed, providing at least 6% of electricity generated in the U.S., or about the same amount as hydropower today. Wind energy is poised to be a significant part of America's diverse energy portfolio.

### American Homes Served by Wind Energy (in millions)



*"Wind Turbines Are Inefficient"*

**Fact:** Wind turbines are efficient, and that is part of their beauty. One of the simplest ways to measure overall efficiency is to look at the "energy payback" of an energy technology, i.e., the amount of energy it takes to produce a given amount of energy.

The energy payback time for wind is in fact similar to or better than that of conventional power plants. A recent study by the University of Wisconsin-Madison calculated the average energy payback of Midwestern wind farms to be between 17 and 39 times as much energy as they consume (depending on the average wind speeds at the site), while nuclear power plants generate only about 16 times and coal plants 11 times as much energy as they consume.

Wind turbines are also highly efficient in a larger sense: they generate electricity from a natural, renewable resource, without any hidden social or environmental costs—there is no need to mine for fuel or transport it, no global warming pollutants created, and no need to store, treat, or dispose of wastes.

*"Wind Energy Is Expensive"*

**Fact:** Wind energy is now in a range that is competitive with power from new conventional power plants. The up-front, capital cost of wind energy is more expensive than that of some traditional power technologies such as natural gas. However, there are no fuel costs, and in good locations the "levelized" cost (which includes the cost of capital, the

**"The new wind farm that Xcel Energy is building near Lamar will save consumers \$4.6 million in their power bills."**

- From Xcel Energy testimony to the Federal Energy Regulatory Commission, June 16, 2003

cost of fuel, and the cost of operations and maintenance over the lifetime of the plant) of wind energy can now be very competitive with that of other energy sources.

*“Wind Energy Is Heavily Subsidized”*

**Fact: Every energy technology is subsidized. Wind energy is no exception.** Wind receives a tax credit that provides an inflation-adjusted 1.5 cents for each kilowatt-hour generated, over the first ten years of the project. This credit reduces the tax liability of a wind farm, but is not a subsidy of public money flowing to the wind farm owner.

Other energy sources receive subsidies in many forms, including tax deductions, loan guarantees, liability insurance and leasing of public lands at below market prices. Some, like the depletion allowance for oil and gas, are permanent in the tax code. Additional indirect subsidies include federal money for research and development programs and policy provisions in federal legislation. The largest subsidy, however, may be an invisible one—the fact that the environmental impacts from fossil fuel use are not reflected through higher costs of those energy sources. Instead, all of society must pay the price for dirty air, polluted water, health costs, global warming, fuel spills, and cleanup and disposal of fuel byproducts attributed to traditional energy sources. Clean, renewable, domestic wind energy produces no emissions, requires no fuel and the cost is fixed and predictable over time.