

Advantages and Disadvantages of Wind Power

The advantages of wind power are that the wind blows for free; it can stop, but we can't use it up. Harvesting wind energy is relatively benign. No resources are consumed, and virtually no pollution is emitted. It is a domestic resource, and wind farms can be located on vacant land, in farm fields, or offshore. They do not disrupt farming operations or significantly reduce yields, and they provide supplementary income that can be a significant boon for rural areas.ⁱ These are substantial advantages!

The primary disadvantage of wind power is that the wind is fickle. If the wind is too slow, the turbine won't turn; if it is too high, the turbine has to feather itself to avoid being blown apart. Thus, turbines typically produce only 25-40% of rated capacity.^j In addition, wind power requires a back-up power source that can supply energy when the wind isn't blowing. The redundancy is expensive, and if it comes from fossil fuels, it partially undoes wind power's pollution and greenhouse gas advantage. Even when the wind is good, it doesn't blow at a single velocity, but constantly changes.^k In the white papers on electricity, we noted that variations in power supply and demand place challenges on the electrical grid: the whole grid can collapse in a widespread blackout. Thus, wind power poses a challenge for grid operators, and there may be limits to the amount of wind power that can be accepted onto the grid. Denmark is currently the country that derives the highest fraction of power from wind energy, at 20%.^l

There has been concern that the rotating blades of a wind turbine pose an unacceptable threat to birds and bats. Wind turbines do kill birds, but so do traditional power plants, power lines, cars, tall buildings, pet cats,^m plate glass windows, pesticides, pollutants, etc. The number of birds killed by wind turbines is considered small, perhaps even trivial, compared to the number killed by these other causes.ⁿ However, if tens of thousands of wind turbines are built, this may become a more significant concern.

Concern has also been raised over the noise created by the rotating blades. Anything with moving parts creates noise, and wind turbines are no exception. Anytime you discuss noise, however, you have to ask "Compared to what?" Wind turbines are quiet compared to coal fired plants. Further, wind farms are located in windy places, and the wind itself, blowing through a tree, through a field of corn, or across one's ears creates noise. A modern wind farm 350 meters (1150 ft.) away generates 35-45 dB (decibels) of noise, whereas the noise in a quiet bedroom is 35 dB.^o Thus, compared to ambient noise in the windy locations where they are situated, wind farms are not very loud.

Finally, aesthetic objections have been raised. Wind turbines, as we saw in the previous white paper, can be quite large, and a wind farm can dominate a landscape. There are some locations where aesthetic concerns would be significant—scenic or historic areas for instance. In other instances, aesthetic objections may not seem legitimate—the land may be unremarkable.

Government will need to develop processes that ensure wind farms intrude as little as possible on other important values, but which also prevent them from being held hostage by unreasonable resistance by a disaffected minority.

ⁱ Nersesian, Roy. (2007). *Energy for the 21st Century*. Armonk, NY: M.E. Sharpe.

ⁱⁱ European Wind Energy Association, <http://www.ewea.org/index.php?id=180>.

ⁱⁱⁱ The number of birds killed by cats is astounding. One study estimated that between April 1 and August 31, 1997, the 9 million cats in Great Britain killed 25-29 million birds. Woods, Michael, McDonald, Robbie, & Harris, Stephen. *Predation of wildlife by domestic cats in Great Britain*. The Mammal Society. Retrieved online 12/31/2007 at http://www.abdn.ac.uk/~nhi775/cat_predation.htm.

^{iv} Efforts to determine the total number of birds killed by the several thousand wind turbines around the globe has yielded varying estimates. A brief discussion with citations to primary sources is in *Wind power*. Wikipedia. Retrieved online 12/29/2007 at http://en.wikipedia.org/wiki/Wind_power. See also a discussion in Lomborg, Bjorn. (2001). *The skeptical environmentalist*. Cambridge, England: Cambridge University Press.

^v The Scottish Office, Environment Department, Planning Advice Note, PAN 54, Annex A: Wind Power, A.27. Renewable Energy Technologies, August, 1994. Cited on the website of the British Wind Energy Association, <http://www.britishwindenergy.co.uk/ref/noise.html>.