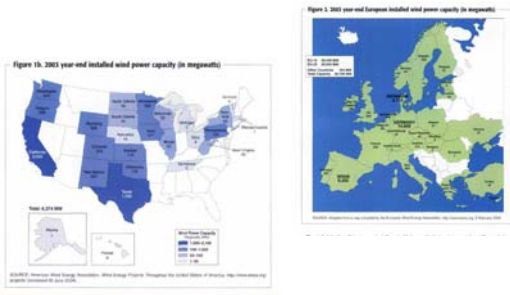


Alternate Energy Options for the University of Wisconsin Green Bay

European vs. United States Wind Energy Installation



Source: Pasqualetti, Martin J. "Wind Power." *Environment* 46.7 (2004): 27.

Aspects of Proposed Energy Bill for the State of Wisconsin

- ✓ Maintaining the Public Benefits Fund strictly to fund renewable energy projects
- ✓ 10% of all energy produced by utilities originate from renewable energy sources by 2015
- ✓ Use of renewable resources by state facilities
 - ✓ At least 10% by 2006
 - ✓ At least 20% by 2011



Bat Mortality Rates due to Wind Turbines

The wind's ability to generate electricity without many of the environmental impacts associated with other energy sources (air pollution, water pollution, mercury emissions, and greenhouse gas emissions associated with global climate change) can significantly benefit all species. Nowadays, wind farms are becoming more commonplace all over the world. Although providing a clean source of electrical power, these structures have the potential to kill both birds and bats. The interaction of bats with wind turbines is, like many other behaviors that bats exhibit, not well understood. One of these reports, "Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting, and Mortality Information from Proposed and Existing Wind Developments," by WEST, Inc., released December, 2002, concludes that "bat collision mortality during the breeding season is virtually non-existent, despite the fact that relatively large numbers of bat species have been documented in close proximity to wind plants. These data suggest that wind plants do not currently impact resident breeding populations where they have been studied in the U.S." (Sagrillo, 2003).

Moreover, the Buffalo Ridge report also comes to the following conclusions: the wind plant probably does not impact bat breeding populations in the project area, and preliminary data indicate that the population of bats susceptible to turbine collisions is large enough that the observed mortality is not sufficient to cause population declines (Johnson, 2003). The study concludes by putting a number on the bat mortality at from 2.45 to 3.21 bat fatalities per turbine, depending on location of the wind farm. The Kewaunee County report came up with similar results. Over the two-year span of that study, researchers documented 1.16 bat fatalities per turbine per year (Howe, 2002). Adjusting for possible sampling error could bring this number as high as 4.26 bat fatalities per turbine per year (Sagrillo, 2003). Like the other studies, the Kewaunee County report found that the bulk of those killed by the wind turbines, over 90%, were migrating bats, not resident breeding populations, and no endangered or threatened species have been involved. We do know that many bats, like birds, die due to collisions with lighthouses, communications towers, tall buildings, power lines, and fences. Nonetheless, as with birds, the number of fatalities due to wind turbines is extremely low compared to collisions with other man-made structures (Johnson, 2003). Wind power and bird/bat population can and do coexist.

Energy Education



When not in use turn off the juice.

Quick Tip: www.RESIDENCE.DOIM.com or SAVEEnergy.net/More!

- In your room:**
- Turn off lights when leaving a room for more than one minute.
 - Turn off appliances such as fans, radios and TV's when leaving a room.
 - Enable sleep mode or turn off computer monitor and printer when not in use.
 - Use power strips (they save energy) but turn equipment on and off individually.
 - Replace desk lights with compact fluorescent light (CFL) bulbs. CFL bulbs use 75% less energy and last 10-13 times longer than standard light bulbs.
 - Prevent energy loss (heat or air conditioning) by keeping doors and windows closed and by sealing drafty areas.
 - Keep your thermostat no higher than 68-70 degrees in the winter and no lower than 75-77 degrees in the summer.

The power to change is in your hands.

- In your bath-room:**
- Turn off water while brushing your teeth or washing your face. Use 1/2 gallon instead of one!
 - Take shorter showers or use water saving showerheads. A 5 minute shower can use 20 gallons of water!
 - Don't flush trash or unnecessary items. Each flush uses 3.7 gallons of water!
 - Completely turn off faucets, promptly report and/or repair leaks.
 - Place the faucet lever in the cold position when using small amounts of water, plus drag the lever in the hot position to use energy to heat water, even though it never reaches the faucet.

- Other Good Habits:**
- Car pool, take the bus, or ride your bike.
 - Carry a reusable water bottle.
 - Reduce, Reuse, Recycle and buy recycled products!
 - Send e-mail as opposed to using paper mail.
 - Avoid disposable plates, cups, and utensils when eating on the go.
 - Do your clothes on a clothesline - skip the dryer!

For more information, visit www.colorado.edu/cccenter



1.5 MW Wind Turbines

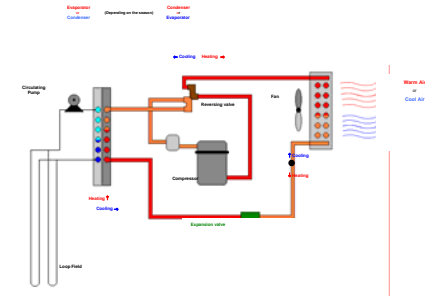
100 KW Wind Turbines



Wind Power Benefits

- ✓ Clean Renewable Energy
 - ✓ No carbon dioxide which contributes to global climate change
 - ✓ No sulfur oxide and nitrogen oxide emissions that contribute to acid rain
 - ✓ No particulate matter emissions
 - ✓ No mercury emissions
 - ✓ Potential to save approximately 210.24 tonnes/year – 3,153.6 tonnes/year of carbon dioxide
- ✓ Educational Opportunities
 - ✓ Numerous professors at the UW-Green Bay expressed an interest in using the wind turbine as an educational tool.
- ✓ Currently the cheapest source of renewable energy
 - ✓ Newly installed wind power is competitive with coal and oil.

Geothermal Energy

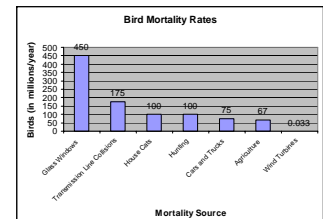


Facility Type	Ton/yr [†]	Cost/yr [†] (low)	Cost/yr [†] (high)
Educational	500	7.8	8.6
Residential	600	6.3	7.2

Bird Mortality Rates due to Wind Turbines

Birds: The issue of bird fatalities arises with every wind power project, and it is not limited to the U.S. (Owen, 2005). Fortunately, the consensus among people who have studied actual wind turbine projects is that the concern about birds is exaggerated. In addition, the Altamont Pass site has vertical spindle turbines that are close to the ground. This technology is no longer used. On the issue of bird migration, the report states that "migrants are typically found at higher elevations," and that migrants tend not to fly in weather with poor visibility reducing the possibility of collisions with the turbines.

On this issue, our group concluded that, because we are considering only one turbine, of a solid tower design, that there will be a minimum impact on birds.



Source: Pasqualetti, Martin J. "Wind Power." *Environment* 46.7 (2004): 37. Johnson, Gregory D., et al. "Collision mortality of local and migrant birds at a large-scale wind-power development on Buffalo Ridge, Minnesota." *Wildlife Society Bulletin* 30.3 (2002): 885.

Potential Funding Sources

- ✓ Public Benefits Fund
 - ✓ Potential to re-direct 40% of funds back into renewable energy projects
- ✓ Public Utility Sponsorship
 - ✓ Incentives to meet their Renewable Energy Portfolio Standards
- ✓ Private Business Sponsorship
 - ✓ Opportunity to take advantage of the Production Tax Credit
 - ✓ Opportunity to bolster public relations