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Scientists Find Successful Way To Reduce Bat Deaths At Wind Turbines

ScienceDaily (Sep. 28, 2009) — Scientists at the University of Calgary have found a way to reduce bat deaths from wind turbines by up to 60 percent without significantly reducing the energy generated from the wind farm. The research, recently published in the *Journal of Wildlife Management*, demonstrates that slowing turbine blades to near motionless in low-wind periods significantly reduces bat mortality.

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"Biologically, this makes sense as bats are more likely to fly when wind speeds are relatively low. When it's really windy, which is when the turbines are reaping the most energy, bats don't like to fly. There is a potential for biology and economics to mesh nicely," says U of C biology professor Robert Barclay, who co-authored the paper with PhD student Erin Baerwald of the U of C as well as with Jason Edworthy and Matt Holder of TransAlta Corporation.

Last year, a groundbreaking Barclay-Baerwald study shed new light about the reasons for bat deaths under wind turbines in the Pincher Creek area. Researchers found that the majority of migratory bats in this southern Alberta location were killed because a sudden drop in air

pressure near the blades caused injuries to the bats' lungs known as barotrauma. Although the respiratory systems in birds can withstand such drops, the physiology of bats' lungs does not allow for the sudden change of pressure.

The next step was to find a way to mitigate the deaths. TransAlta, Canada's largest publicly traded provider of renewable energy, initiated a follow-up study at the same site to determine what could be done.

"Wind power has come of age, so further minimizing the impact of wind farms on the surrounding ecology is always important to our industry," says Jason Edworthy, director of Community Relations for TransAlta. "Working with the university during the course of this four-year study has given TransAlta the opportunity to test real world strategies that benefit affected bat populations and make economic sense."

Until recently, wildlife concerns regarding wind energy focused primarily on bird fatalities. But bat fatalities now outnumber those of birds due, in part, to efforts to mitigate bird deaths by wind turbines.

Most bats killed at wind energy facilities across North America are migratory tree bats, including hoary and silver-haired bats. The deaths occur during autumn migration from Canada and the Northern U.S. to the southern U.S. or Mexico.

"Given that more bat fatalities occur in low wind speeds and the relative ease of manipulating operation of turbines, we examined whether reducing the amount that turbine rotors turn in low wind speeds would reduce bat fatalities," says Baerwald.

Over the one-month experiment total revenue lost from the 15 turbines was estimated between \$3,000 and \$4,000.

TransAlta has already applied the low wind mitigation strategy to the 38 turbines identified in the study area. "The findings from the study area are promising and this new mode of

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operation is now in place and will be applied to new wind farms," says Edworthy.

"Although these are promising mitigation techniques, further experiments are needed to assess costs and benefits at other locations," says Barclay.

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The above story is reprinted (with editorial adaptations by ScienceDaily staff) from materials provided by University of Calgary.

Journal Reference:

1. Baerwald et al. **A Large-Scale Mitigation Experiment to Reduce Bat Fatalities at Wind Energy Facilities.** *Journal of Wildlife Management*, 2009; 73 (7): 1077 DOI: 10.2193/2008-233

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