

# Birds, bats, and the trade-offs of wind power

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Outrage erupted worldwide in the spring of 2008 following the deaths of 1,606 ducks that alighted on a tailings pond<sup>1</sup> in northern Alberta, leading to the criminal prosecution of Syncrude Canada Ltd., one of the largest producers of crude oil from Canada's oil sands (Syncrude, n.d.). Yet the fact that a great many more birds and bats are routinely mangled by wind turbine blades at wind farms draws very little attention. This double standard highlights the widespread misperception that so-called "renewable" energy sources do not demand environmental trade-offs.

The latest proof that they do came to light in May with the release of a bird and bat monitoring report from Canada's second-largest wind farm, the Wolfe Island EcoPower<sup>®</sup> Centre<sup>2</sup> (OPA, 2010a). In the first eight months of operation, the centre reported 1,962 bird and bat deaths involving 33 bird species and five bat species<sup>3</sup> (Stantec Consulting Ltd., 2010a, 2010b).

These findings were largely ignored by the same media outlets that for months featured front-page headlines about dead ducks. But as Michael Fry of the American Bird Conservancy notes, "Somebody has given the wind industry a get-out-of-jail-free card" (Bryce, 2009, Sep. 7).

Indeed, it seems that the wind power industry enjoys a degree of political favour that would make most other energy executives green with envy. The province of Ontario, for example, requires utilities to purchase wind power at inflated rates (OPA, 2010b), while British Columbia has mandated an annual quota of electricity from "renewable" sources (BC Hydro, 2010).

The sprawling \$475 million Wolfe Island facility is located in Frontenac Township, Ontario, a few kilometres offshore of Kingston. It features 86 wind turbine generators<sup>4</sup> capable of producing 197.8 MW at full capacity<sup>5</sup> (OPA, 2010a). Commercial operations there commenced on June 26, 2009, under an enviable 20-year "Renewable Energy Supply II Contract" with the Ontario Power Authority (TransAlta, 2010). The project is also subsidized through the federal ecoENERGY for Renewable Power program (Canadian Hydro Developers, Inc., 2009).

The monitoring at Wolfe Island is intended to gauge the effects of the wind turbine generators on bird and bat populations, as required under federal and provincial laws and regulations (Stantec Consulting Ltd., 2010a). The first report, released in February, documented 45 bird fatalities and 45 bat fatalities during May 2009 and June 2009 (Stantec Consulting Ltd., 2010b). The second



report, covering the six months between July 2009 and December 2009, documented 602 bird fatalities and 1,270 bat fatalities (Stantec Consulting Ltd., 2010a). Neither report noted significant effects on waterfowl beyond “avoidance behaviour” (Stantec Consulting Ltd., 2010a).

Lacking a full 12 months of data, the monitoring team has advised against comparing the Wolfe Island findings to studies undertaken elsewhere, noting that there are seasonal variations in bird migration patterns (Stantec Consulting Ltd., 2010a). But provincial officials certainly noticed the Wolfe Island numbers. In response to the May 2010 report, for example, Erin Cotnam of the Ontario Ministry of Natural Resources observed that the number of raptor and vulture fatalities—13 in the six-month period—were “among the highest” of any wind farm in the province (Cotnam, 2010). Environment Canada characterized the raptor fatalities as a “primary concern [that] merits continued, close monitoring” (Read, 2010).

Researchers have devised a number of theories about why birds, with superb vision, and bats, with biological sonar, so frequently collide with whirring blades that, at Wolfe Island, measure 45 metres in length atop masts rising 80 metres from the ground. For example, an optical analysis conducted for the US Department of

Energy cited a phenomenon known as “motion smear” or “motion blur”:

As the eye approaches the rotating blades, the retinal image of the blade (which is the information that is transmitted to the animal’s brain) increases in velocity until it is moving so fast that the retina cannot keep up with it. At this point, the retinal image becomes a transparent blur that the bird probably interprets as a safe area to fly through, with disastrous consequences. (Hodos, 2003)

As for bats, there is evidence that mating behaviour is a factor. Researcher Paul Cryan, writing for the *Journal of Wildlife Management*, suggests that bats mistake the turbines for the high trees they prefer for mating (Cryan, 2008). He notes that “tree bats collide with turbines while engaging in mating behaviours that center on the tallest trees in a landscape.” Others blame “barotrama,” i.e., internal hemorrhaging consistent with trauma from the sudden drop in air pressure at turbine blades (*Science Daily*, 2008, Aug. 28).

A variety of other factors affect collision risks, including weather conditions, topography, the height,

length, and speed of the blades, and lighting that attracts nocturnal migrants (Kuvlesky et al., 2007). Not surprisingly, the worst conditions are found at one of the oldest and largest wind farms in North America: California's Altamont Pass. A 2008 study estimated that 10,000 birds, including dozens of golden eagles and other protected species, are killed there every year (Altamont Pass Avian Monitoring Team, 2008), earning wind turbine generators the moniker "Cuisinarts of the Air."

Colliding with blades is hardly the only risk wind power poses to birds and bats. Researchers have also found that the construction of wind farms and associated infrastructure (e.g., buildings, roads, and electrical transmission lines) renders wide swaths of habitat less suitable for birds (Kuvlesky et al., 2007). Wind farms also require large plots of open land—an estimated 2.5 acres per turbine, on average (Taylor, 2004). As a result, a variety of wildlife are affected.

This is not to say that wind turbine generators should be eliminated. Indeed, proponents such as the Canadian Wind Energy Association stress that far more birds—tens of millions annually—are felled by cats, cars, and collisions with skyscrapers (Erickson, 2001).<sup>6</sup> But if that is a sufficient defence, should not the wind farm lobby have flocked to defend Syncrude Canada Ltd. against prosecution for far fewer deaths than routinely occur at wind farms across the country?

There is no shortage of human ingenuity to solve the myriad challenges posed by wind power and other energy sources. But policy makers and the public should not take political rhetoric at face value and assume the inherent superiority of non-fossil fuel energy sources.

Ultimately, whether wind power is deemed "better" than other forms of energy is, at present, a political decision, not a scientific one. Opinions vary widely about the reliability of oil imports, the environmental impacts of fossil fuels, and the economics of energy subsidies and regulatory mandates.

But even if consensus were achieved tomorrow, sound policy could be crafted only by acknowledging the trade-offs inherent in the production of all types of power.

## Notes

1 A tailings pond is the containment area where water used in bitumen processing is stored to allow residues to settle, facilitating water recycling.

2 The largest is Melancthon Wind Farm, near Shelburne, Ontario, with a capacity of 199.5 MW (OPA, 2010a).

3 The total number of fatalities reported reflects data corrections for carcass removals by predators, detection errors by field personnel, and unsearched areas due to dense vegetation, high water, or other obstacles (Stantec Consulting Ltd., 2010a).

4 In the production of electricity, the wind turns turbine blades that power a generator, and that power is then channeled to a transformer, which converts the electricity to the proper voltage for distribution along the power grid.

5 The actual amount of power generated depends upon wind conditions. In general, wind speeds below 3.5 m/s are insufficient to generate power. Most wind farms operate at about 30% of capacity.

6 Of course, the large differences in fatalities from such sources relate to their ubiquity, i.e., millions of miles of roads, millions of commercial buildings, and millions of cats.



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