Old Bird Inc.

Advancing Automatic Detection of Flying Vertebrate Collisions at U.S. Wind Energy Facilities

Response to U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy regarding its Request For Information DE-FOA-0000929 CFDA Number: 81.087.

William R. Evans, Executive Director
6/30/2013

Executive Summary

This is a response to the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy regarding its Request For Information DE-FOA-0000929 CFDA Number: 81.087. The response involves questions 1 & 2 in the RFI and pertains to the development of automatic processes for detecting flying animal collisions at modern wind energy facilities. The response discusses the status of the development of such technology by the nonprofit Old Bird Inc. and the financial and logistical barriers that DOE might assist with to advance the process.

General recommendations for DOE's consideration:

TECHNICAL

1. Continue to provide financial assistance and foster the circumstances for the development of automatic flying vertebrate collision detectors.
2. Issue and fund an RFP specifically for automatic flying vertebrate collision detection.

LOGISTICAL

1. Provide incentives for wind developers to participate in collision detection studies (i.e., financial, technical, legal).
2. Coordinate with U.S. Fish & Wildlife Service on the development of collision detection technology.

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June 30, 2013

To: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy

Re: RFI DE-FOA-0000929 CFDA Number: 81.087. Response to questions 1 & 2.

A manufacturing challenge and opportunity for land-based and offshore wind technologies exists regarding automatic detectors of avian and bat collisions at wind farms. In 2012 DOE funded an Oregon State University study (Robert Suryan PI; $600k) approaching this issue.

The need for automated detection of avian collisions at offshore wind energy facilities was identified in a Minerals Management Service (now BOEM) data gap analysis on the ecological impact of US offshore wind energy in 2007.[1] That investigation spawned a research effort on the topic that was published by the New York State Energy Research & Development Authority (NYSERDA) in 2012.[2] The report for that study presents a history of such research in Europe and references an additional line of flying vertebrate collision detection research in the US – that by Pandey et al. through the California Energy Commission.[3]

The goal of developing and implementing automatic avian and bat collision detection systems involves technical and logistical challenges. In the former there are different design and engineering approaches one might take. For the US to achieve the best result in automatic flying animal collision detection it would be helpful if DOE facilitated and weighed multiple approaches. This could be done by expanding the OSU research program to include other approaches (for example, including the inexpensive approach outlined in our NYSERDA report), or perhaps to have a specific RFP on the topic of automatic flying animal collision detection systems that can draw in previously existing and new lines of research for consideration. At some point it might be productive for DOE to host an evaluation of the different design and engineering approaches with one another concurrently at a terrestrial wind project where a robust on-ground fatality study was concurrently underway. While one can fire tennis balls to preliminarily evaluate the effectiveness of different collision detection methodologies, ultimately it will be the proof

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[1] Michel, J., Dunagan, H., Boring, C., Healy, E., Evans, W., Dean, J.M., McGillis, A. and Hain, J. 2007. Worldwide Synthesis and Analysis of Existing Information Regarding Environmental Effects of Alternative Energy Uses on the Outer Continental Shelf. U.S. Department of the Interior, Minerals Management Service, Herndon, VA, MMS OCS Report 2007-038. 254 pp. (For online access, go to www.boem.gov and search for 2007-038).

[2] Evans. W.R. 2012. An Evaluation of the Potential for Using Acoustic Monitoring to Remotely Assess Aerial Vertebrate Collisions at Industrial Wind Energy Facilities. New York State Energy Research and Development Authority, Albany, NY. NYSERDA Report 12-26. December 2012. 17 pp. (For online access, go to www.nyserda.ny.gov/Publications/Research-and-Development-Technical-Reports/Environmental-Reports.aspx and scroll down to report 12-26. Or, download from www.oldbird.org/nyserda/nyserda.htm).

[3] Pandey, A., Hermence, J. and Harness, R. 2006. Development of a Cost-Effective System to Monitor Wind Turbines for Bird and Bat Collisions—Phase I: Sensor System Feasibility Study. California Energy Commission, PIER Energy-Related Environmental Research. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2007-004

from corroboration with actual fatalities documented that will convince the wind industry, wildlife regulatory agencies, and the public that flying animal strike detection devices are effective.

From our research, I think the technical problems for automatic flying animal collision detection are not difficult and simply need a sustained focus from the development to the implementation stage. The latter stage of how such technology will be incorporated into the wind industry would also benefit from DOE facilitation and guidance. At present, wind developers are unlikely to volunteer to put these devices on their turbines and there is an increasing trend for the wind industry to screen avian impacts from the public. I think this is a mistake and ultimately promotes distrust and slows down wind energy development. If in fact there is no avian collision problem, then there should be no problem in presenting the collision results to the public. Automatic collision systems at wind energy facilities on Federal lands or at projects receiving tax payer assistance should be like earthquake monitoring data -- the data should be online for the public (e.g., schools) and researchers to access.

For terrestrial projects like those in California around Altamont Pass, where large raptor collisions are an issue, the potential exists to have a simple $2k automatic collision detection system as a standard accessory on every modern wind turbine. As I note in my NYSERDA report, one of the most useful results from these devices for offshore wind facilities may be to demonstrate simply that very few collision events are occurring. If substantial collisions are detected, then the problem turbines could be outfitted with more expensive (~$70k) thermal imaging technology (e.g., Desholm et al. 2006)[4] to determine the species being impacted. We don't need species information if there are no collisions, yet if we don't document that collisions are insignificant then the offshore wind industry is faced with a sprawling unknown regarding avian impact. The potential capabilities of a simple and relatively cheap avian collision detector are worth exploring because they would potentially improve our knowledge base about the scale of flying vertebrate impacts, reduce overall cost to the wind industry in assessing impacts, and potentially remove barriers to offshore development based on uncertain impacts to flying vertebrates.

With regard to the collision detection initiative of our nonprofit, we have demonstrated and reported the feasibility of a time-delay approach to detecting flying animal collisions at 1.5 MW wind turbines at the Maple Ridge Wind Project in northern NY (Evans 2012). We have gained additional confidence in our approach by carrying out collision detection analysis at a mock nacelle we built (unpub. data), and have put together a prototype collision detector with off the shelf audio equipment at less than $4k per unit. This cost would be substantially reduced if we tailored the circuitry & design, and produced batches of at least 100 units. That step awaits further documentation of the method's effectiveness.

Besides the financial barrier for this research, there is the problem of finding a wind energy facility in our region to cooperate with in carrying out the next phase of testing. We need to initially test our prototype at perhaps a half dozen turbines (this involves mounting four acoustic sensors on each nacelle) for 6 months so that we can tweak our

[4] Desholm, M., Fox, A.D., Beasley, P.D.L. and Kahlert, J. 2006. Remote Techniques for Counting and Estimating the Number of Bird/Wind Turbine Collisions at Sea: a Review. Ibis 148:76-89. http://www3.interscience.wiley.com/cgi-bin/fulltext/118619860/PDFSTART

software, and yes, fire a few tennis balls to simulate collisions. As we are based in Ithaca, NY, the most convenient wind projects to carry out the test would be those in NY. We have approached several NY wind projects directly and found there is no incentive for them to work with us. In our litigious environment, wind project owners are understandably reluctant to participate in research that will lead to more information about their project's avian impacts. Ultimately, automatic collision detection may in fact reduce costs to wind developers.

We approached NYSERDA to help facilitate our study, but the climate for cooperation with wind developers has changed over the past decade and NYSERDA currently has no working relationship with any wind project owners or developers in NY (NYSERDA, pers. comm. 2012). In the meantime, we have been waiting for an opportunity to test our prototype collision detector in a situation where New York Department of Environmental Conservation, (which oversees environmental impact assessment of wind energy in NY) or the U.S. Fish & Wildlife Service has some leverage to encourage a wind developer to let us conduct our tests in conjunction with their bird and bat fatality study. We've focused on wind projects in NY so we can minimize travel costs and because the region has a relatively high rate of avian and bat collisions, which would speed up the evaluation process.

If there was a DOE program that offered wind energy projects an incentive to participate in automatic collision detection research, this would greatly facilitate testing collision detection equipment and methodology. Such an incentive might include financial support for a wind energy facility's technicians to install temporary sensors on the wind turbine along with assistance (financial or legal) to allay concerns with wind turbine warranties and other insurance & legal issues.

Respectfully submitted,

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