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Wind Generators and Birds: Power Politics?

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Lately, a number of articles have been published in various periodicals bringing attention to a problem that is occurring on wind farms. It seems that dead birds have been found at a few locations. Some writers have even gone so far as to dub the wind generators “raptor-matics” and cuisinarts of the sky!”

Many *Home Power* readers considering a wind generator have asked about the seriousness of this problem. They are concerned that if they install a wind generator they will be responsible for batting birds all over the neighborhood. It's time to address this potentially serious issue.

All of the studies done to date on bird mortalities associated with wind power have been done on wind farm-sized equipment. We'll take a look at this problem, what conclusions have been drawn, and speculate on why. From there, we'll apply this information to home sized systems.

Early Indications

The problem of bird deaths associated with wind farms stems from reports filed with the California Energy Commission (CEC) in the early 1980's. At the time, the California wind farms were growing in number and size. Because some of the casualties were protected species, the CEC felt that the matter should be investigated further.

What the CEC discovered was that the reports were true. Dead birds were indeed found on the ground at the wind farms. Many of the birds were at one location, the Altamont Pass east of San Francisco. To make matters worse, they were raptors: red tailed hawks, kestrels, & golden eagles. More studies were ordered.

Stakeholders

I need to digress and say that I had little idea of the extent of the bird/wind turbine problem before delving into it. I had read many of the same news reports that some concerned readers had, but not much more. After quite a bit of research, I unearthed more about dead birds than I ever thought existed. I found that some exhaustive studies have been funded to the tune of millions of dollars to determine both the extent of the problem and what can be done to soften the environmental impact of wind power. One company, Kenetech, has spent more than \$2 million on one study for one location. This is obviously serious business, as big money is on the table!



The stakeholders spending time and money on the issue are not restricted to wind farm companies. Key players from government and regulatory agencies, besides the aforementioned CEC, include the US Department of Energy (DOE), the National Renewable Energy Laboratory (NREL), and the US Fish and Wildlife Service. Involved energy interest groups range from the Electric Power Research Institute (EPRI), the research association for the utilities, to the American Wind Association (AWEA) and the National Wind Coordinating Committee (NWCC) under the auspices of President Clinton's Global Climate Change Action Plan. Environmental players run from the National Audubon Society to the Union of Concerned Scientists, and virtually everyone in between.

The research is being conducted on various levels. AWEA has compiled a list of well over 110 studies and reports known to have been done worldwide on bird deaths associated with wind farms. Some studies focus on retrieving carcasses from wind farms and determining the cause of death. Others describe the videotaping of birds interacting with wind turbines. And some studies involved the selected release of birds in wind farms. Let's look at some of the findings to date.

Death By....

The CEC found 108 bird deaths from 1984 through 1988. Seventy-two of the deaths were collision related and 36 were electrocutions. A two year study (1989 to 1991) conducted in California's Altamont Pass found 183 bird mortalities. Of these, 55% were determined to be collisions with wind turbines or their structures, 11% were collisions with wires, 8% were electrocutions, and 26% were unknown. The startling discovery was that 66% of these accidents involved raptors.

The situation with electrocutions has been known for decades. Birds light on wires and power poles. When their wings span the distance between two hot wires or a hot and ground wire, the bird completes a circuit and draws tremendous amounts of current. The result is instantaneous death.

Mechanical solutions to bird electrocutions are under continuous development by the electric power industry. For example, spacing wires further apart works well with smaller birds, but is impractical for larger birds with greater wing spans, such as raptors. They tend to perch, as well as nest, on the power poles themselves. Over the years, the electric power industry has developed a variety of anti-perch mechanisms. These devices, which deter birds from landing on power poles, are usually quite effective.

The good news is that spread wires and anti-perching devices have reduced bird electrocutions by 90%. Most electrocutions can be avoided. Also good news is that many of these techniques are considered state of the art for new power generating facilities, including wind farms.

Motion

All studies conducted indicate that birds avoid moving objects, such as the blades of an operating wind turbine. All birds, that is, with the possible exception of raptors. Our understanding of what raptors perceive and comprehend gets a little fuzzy here.

Most of smaller bird carcasses found at the wind farms were determined to have died in collisions with wires, apparently while trying to land. Like tree branches, wires are prime perching material for birds. Collisions with intended perches is a relatively common cause of death in the bird world.

Most of the dead raptors appear to have died in collisions with the wind turbines or their towers. They just seem, to fly into the towers, or the generating mechanisms on the tower, or even the blades themselves. Non-rotating blades! There is no evidence that large numbers of raptors are being batted out of the sky by rotating blades. Why, then, all the dead raptors?

It is well known that raptors are not the most graceful of landers in the bird world. It has long been established that the mortality rate for raptors in their first year of life is a startling 30%, due mainly to collisions. It appears that they don't have as keen an eyesight, in terms of contrast and differentiation, as popular culture attributes to them.

There are two other factors at play in raptor collisions under normal conditions. First, raptors apparently

concentrate on finding prey and not paying attention to their surroundings. As someone who habitually drives off the road and into ditches for lack of attention to the task at hand, I can certainly empathize with this problem. (So far I've been lucky!) Second, all birds, with the exception of raptors, change course to avoid objects in their path of flight. It's not understood why, but raptors do not necessarily practice this same avoidance behavior. We do know that when they spot prey, their concentration increases and they speed up in flight. However, they do not always take evasive action when approaching obstacles.

If this sounds ridiculous to you, and you believe that we know all there is to know about our world, consider the following. We all know that owls, another raptor, have very large eyes. Owls are nocturnal, that is they are active at night. We have always attributed their success as night hunters to their apparently keen eyesight. Recent studies indicate that owls have exceptionally acute auditory skills. They are able to detect time lapses in sound of three ten-thousandths of one second. Studies showed that owls can determine the location of moving prey in total darkness with absolute accuracy by sound. So much for what we think we know about keen-sighted owls!

An explanation for the high mortality of raptors in wind farms is taking shape. Sort of!

Discrepancies

Concern about migratory birds is always near the top of the list when the wind farm question comes up. Many people have speculated that large numbers of birds would be killed by flying through a wind farm while migrating. However, studies indicate that migrating birds fly between 1000 and 10,000 feet far above the 80' to 160' towers that most wind turbines are mounted on. The situation in San Geronimo Pass near Palm Springs exemplifies what I mean. The pass intersects a major migratory flyway in the western US. In 1986, 69 million birds flew through the pass during the Spring and Fall migrations. Only 38 dead birds were found, none of them raptors. Statistically, while it is true that birds are dying, these numbers are insignificant. Bird mortality in this case was only .00006% of the total migrating population.

Part of the apparently high bird mortality in Altamont Pass may be that it is the largest of our three major wind farms in California. More than 6500 turbines are in the Altamont. The Tehachapi Pass has 5200 turbines and the San Geronimo Pass has 3000. In addition, the turbines in the Altamont represent many different designs and configurations and are on a great variety of tower structures.

However, studies on bird mortality in wind farms are not all consistent. The numbers of bird deaths in other wind farms do not mirror, percentage-wise, those found in the Altamont Pass. For example, only nine dead raptors were found in Tehachapi Pass between 1984 and 1988, and another four from 1988 through 1991. While Tehachapi contains 80% of the total number of turbines that exist in the Altamont, raptor mortality in Tehachapi was less than 13% of that in the Altamont Pass between 1984 and 1988, and only 4% between 1988 and 1991. So, what exactly is going on in the Altamont Pass?

The Altamont Dilemma

There appear to be other factors at play in the bird mortalities at the Altamont Pass than just large arrays of wind turbines. Research originally intended to shed light on what some thought was a simple problem, wind turbines killing birds, has only complicated matters by unearthing a part of Nature in turmoil.

Geographically, the Altamont Pass is east of San Francisco. This part of California, including the adjacent Central Valley and Livermore Valley, have seen intensive land development pressures in recent years. Many animals, especially reclusive species such as raptors, migrate out of developing regions to avoid human harassment. They also follow the migration of their prey.

We now have a situation where wildlife, feeling the pressure of urban development and human harassment of their territories, have migrated in to the Altamont Pass area. From all the evidence, this reaction by wildlife to urban sprawl only to encounter wind turbines appears to be unique to the Altamont area. None of California's other wind farms are experiencing similar pressures. The same is true of wind farm developments in other parts of the United States, including Minnesota, Iowa, Texas, and New York.

The influx of certain wildlife species in the Altamont area has not gone unnoticed by farmers and ranchers. Concerned with an explosive rodent population, some of these farmers and ranchers have turned to various means of chemical control. For example, reports indicate that one area farmer admitted to using eleven tons of chemical poisons to control ground squirrels. Shades of Silent Spring and the '60's! We might be on to something here.

Haven't we learned in the last three and a half decades that these poisons travel up the food chain from prey to predator? Must we go through these battles again? To date, most bird mortality studies have focused on the wind turbines themselves as the bad guys whacking

birds out of the sky, and what can be done to alter their structures. I could find only one reference in one study dealing with possible heavy metal poisoning of these raptors. Hasn't it occurred to anyone that maybe these birds are being drugged stupid and this is the reason that are smashing into the wind turbines in the Altamont Pass? Only Paul Gipe, in his soon-to-be released book *Wind Energy Comes of Age*, has postulated that "residential poisons...may predispose birds to collision."

Perspective

As indicated in some of the previous examples, scientists consider the low numbers of bird deaths in wind farms biologically insignificant, especially when compared to other human causes of bird mortality. For example, automobiles are responsible for some 57 million bird deaths every year! More than 97 million birds die by flying into plate glass every year! And about 1.5 million birds die from collisions with structures (such as towers, stacks, bridges, buildings) every year.

Examples of bird's problems with structures is highlighted in a DOE report. The report cites a tally of 2700 annual bird collisions with a TV tower in Florida over an eleven year period. In another instances, 800 to 1400 birds were killed every season for five years in collisions with a radio tower in North Dakota. I don't mean to make light of a grave situation, but viewed in this context, the 183 bird deaths in the Altamont Pass over a two year period of time is a small number indeed.

Paul Gipe puts the statistics somewhat in context for us. In Altamont Pass, the world's largest and most complex wind farm (with over 6500 turbines), bird mortalities range from .024 to .059 birds/turbine/year. Why, then, have some parties made such a big deal of this issue?

Power Politics?

By now, you may have the impression that I think this problem has been blown out of proportion? You're right. But that doesn't exonerate one from doing some major soul-searching. This is a guilt issue for the wind industry.

Is bird mortality a serious problem? Very much so. It is a moral consideration — at least for some of us — as well as having legal ramifications. It is a federal offense to knowingly injure or kill a protected bird, such as a red tail hawk, kestrel, or golden eagle. Some zealots have actually threatened wind farm operators with prosecution for the incidental death of birds due to the routine operation of wind turbines. Has the same threat been made to the utilities whose highlines have wiped

out birds? I hardly think so. How about anyone who has ever hit a bird with their car or had a bird careen into their picture window? Highly unlikely. Why then, have the wind farms been singled out?

One can only speculate, especially when one takes a long look at who is framing the issues in terms of pro-birds/anti-wind. According to Gipe in *Wind Energy Comes of Age*, "Sweden's nuclear lobby has begun using the bird issue to discredit wind energy...Groups as diverse as...the West Virginia Coal Association have publicly aligned themselves with opponents of local wind projects on the grounds that wind turbines kill birds."

What's going on here? One wonders if this is really an issue, or just power politics as usual? Whatever the motive, the tactic has been successful. Right or wrong, the popular press has picked up another hot-button issue. The headlines read: Wind Generators Kill Birds! Unfortunately, the public has begun to doubt the value of wind power in our energy mix. To quote Gipe again, "...the American public perceives the problem is more widespread than it really is, and perception is reality in politics."

Environmental Ramifications

Renewables, including wind power, are meant to be a sane and gentle alternative to conventional energy sources : nuclear, coal, and petroleum. Renewables, including wind power, avoid the environmental impacts associated with these conventional fuels. These impacts include land disruption due to fuel extraction, material transportation, waste disposal, air and water pollution, destruction of habitat, and who knows what else in the case of nuclear power.

I hate to say this because I'm really making myself vulnerable, but maybe we need to accept these bird deaths as part of doing business as human beings. After all, we are the ones using the electricity. Donald Aiken of the Union of Concerned Scientists has made the case that we accept bird deaths in other human activities. Driving cars and having picture windows in our homes claim an order of magnitude more birds than do the wind farms. No one has suggested that we eliminate cars or windows.

Again, I am not making light of this issue, but only trying to put it in context. To quote Paul Gipe one last time, "California's wind plants offset fourteen times the oil spilled by the Exxon Valdez...It will take wind turbines in the Altamont Pass 500 to 1000 years to kill as many birds as the Exxon Valdez oil spill." I think I'll stick with my wind generators.

Around The World

Again, the situation in the Altamont Pass appears to be a unique one. There is only one other place in the world that is experiencing comparable bird deaths. This is just north of the Straights of Gibraltar in Spain. This is the area where Spain is closest to Morocco between the Atlantic Ocean and the Mediterranean Sea. Migratory birds flying from Africa to Europe catch a ride on the thermals as they approach the high ridges of Gibraltar after crossing the Straights.

In the last few years, these same ridges have seen an influx of commercial wind turbines. The idea was to put these thermals to use generating electricity. Higher than normal bird deaths have been reported in the wind farm during spring migration for the last two years. Speculation is that the birds riding the thermals cannot get enough lift to clear the ridges and the turbines, especially during marginal wind conditions. The unfortunate result is that some birds have met their demise in some of the turbines.

Unlike the situation in Altamont Pass, the problem here is clear cut. As a result, the wind farm will not be operating this spring during migration time. This will allow scientists time to observe the migration, evaluate the problem, and postulate on some solutions. A wise decision, indeed.

Lessons For Us

Let me preface my conclusion by saying that Lake Michigan Wind & Sun has hundreds of wind generators located all across the country and in 29 foreign countries. These are all residential-sized units ranging from a few hundred watts to 20Kw. I have no experience with commercial or wind farm-sized equipment.

We have never gotten a report of a bird kill from any of our customers. Reports that we get from the field combined with our experience indicates that all birds shy away from the rotating blades of a wind generator. This isn't to say that they won't go near the tower while the blades spin. My three wind generators and towers are favorite perching spots for our local feathered friends. But as soon as the wind begins blowing, and the jennys cranks up, they're gone.

Some of you may recall that I reported back in HP#30 that one of our wind generators took out a goose one night. Extensive review of that incident revealed that this was pure speculation on the part of our insurance agent. Even though a dead bird was never found, it seemed to the agent like a logical thing to put down on a form. So much for filling out every blank space on forms.

I can honestly say to anyone interested in installing a wind system and concerned with bird deaths that wind power is perfectly compatible with all wildlife, including our feathered friends. I feel good about the fact that, as an individual, birds can breathe a little easier because of the fossil pollution my wind generators displace.

Access

Mick Sagrillo ponders the Zen of wind power at Lake Michigan Wind & Sun, Ltd., E 3971 Bluebird Rd., Forestville, WI 54213



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Key words: bird; wind turbine; wind farm; power line; mast; window; building; fence. Introduction. Man-made structures have many effects on.Â bines, birds collide with a wide range of other. structures, including communication masts, tall. buildings and windows, power lines, and fences. Although a wealth of literature exists on the. subject of bird-strike with structures, much of it. Wind Power + Birds - Free download as PDF File (.pdf), Text File (.txt) or read online for free.Â Extensive bird Advancements in Bird Life research has been done with large wind generators and has shown that bird Preservation strikes do occur but are relatively rare. Furthermore, although no formal studies have been conducted with residential wind generators like those produced by Large wind farms have made Southwest Windpower, bird strikes are even rarer. This is due in part to their significant advances in reduc- shorter towers. 30-110 ft (9-30 m) and relatively small blades, 3-12 ft (1-3 m) ing their impact on birds. in diameter. Wind Generators and Birds: Power Politics? Mick Sagrillo. Â©1995 Mick Sagrillo. Lately, a number of articles have been published in various periodicals bringing attention to a problem that is occurring on wind farms. It seems that dead birds have been found at a few locations.Â Many Home Power readers considering a wind generator have asked about the seriousness of this problem. They are concerned that if they install a wind generator they will be responsible for batting birds all over the neighborhood. It's time to address this potentially serious issue. All of the studies done to date on bird mortalities associated with wind power have been done on wind farm-sized equipment. We'll take a look at this problem, what conclusions have been drawn, and speculate on why. Wind power or wind energy is the use of wind to provide mechanical power through wind turbines to turn electric generators for electrical power. Wind power is a popular sustainable, renewable source of power that has a much smaller impact on the environment compared to burning fossil fuels. Wind farms consist of many individual wind turbines, which are connected to the electric power transmission network. Onshore wind is an inexpensive source of electric power, competitive with or in many places Wind power generation is power generation that converts wind energy into electric energy. The wind generating set absorbs wind energy with a specially designed blade and converts wind energy to mechanical energy, which further drives the generator rotating and realizes conversion of wind energy to electric energy. The commonly used wind power generation systems include the direct-driven wind power generating set and the double-fed wind power generating set; the direct-driven wind power generating set is connected to the grid through a full power converter, while the double-fed wind power gener...