

Environmental Aspects And Impact Of Wind Energy Systems

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"Where the quality of life goes down for the environment, the quality of life goes down for humans."

– George Holland

Introduction to Wind Energy and Environmental Trade-Offs

It is genuinely a great idea to generate electrical power from a natural source of energy that is completely free of cost and help depending less on the fossil fuel energy generation that is quite expensive in many ways especially the environmental cost associated with it. However, using this turbine method for electricity generation is also not without environmental hazards and recently, environmental movements are gaining strength and popularity among eco-friendly groups and individuals.

Environmental Concerns Associated with Wind Power

As compared to fossil fuel plants, wind energy power plants pose far less danger to the environment. However, environmentalists have raised a number of concerns related to windmills, such as the death of birds and bats, noise in the air and the visual impact they make on the environment. Despite that, the wind itself masks much of the sound produced by windmills, yet they are accused of making noise in the environment. The work in progress by engineers in recent years on the designs of windmills that produce the least noise while operating, and the newer models of wind turbines are less noise-making than the earlier ones. With the increased efficiency of new windmill turbines, the wind is used more as a rotational torque than an acoustic power. New models of turbines have a useful feature of enhanced aerodynamics that uses the mechanic of changing the width of the blade according to the flow of the wind, such as "upwind" and "downwind." In addition to these, the positioning, siting and insulation materials are also being used to minimize the effect of noise made by the turbines. Two major features of wind turbines generating noise in the air are gearbox rotation and mechanics of the system and the sound made by the blades of the machine. The noise generation phenomenon has taken a form of aerodynamic concern and significance.

Visual and Landscape Impact

Aesthetics associated with windmill's visual impact on the natural looks of the landscape is another concern of environmental activists and scholars. Wind turbines are highly visible because of their large sizes and thus are said to distort the natural visualization of the landscape. Again the proper siting for the installation of the turbines can help reduce the bad visual impacts caused. One of the most effective and widely used techniques to avoid the bad visual impact of windmills is the lower concentration of turbines installed in a single area. The newer models being efficient in operations and looks are also helpful. Most of the windmills are located on the private farmlands. An average windmill farm can have 20 turbines and demands an area of at least one square kilometer, yet the actual area covered by turbines will be 5%. The remaining land can be utilized for many other purposes, such as farming and agricultural activities.

Shadow Flicker and Local Effects

The people of the area in which the wind turbine is installed are also affected environmentally by the shadow flickering of turbines. That is, when the blades of the turbine move in the sunshine, they cause moving shadows on the nearby area of land, it changes the intensity and flow of light depending upon the different times and seasons of the year.

Pollution Advantages of Wind Energy

Windmills are different from other power generation technologies for not producing any air emissions. The potential hazardous material is a small quantity of lubricating oil, fluid insulations and hydraulic fluids. Thus, there is far less soil, water and surface pollution associated with the windmill power generation method. The potential interaction with the satellites and radars by wind turbines is another issue raised by technical and scientific concerns. Windmills, like all other power generating systems, generate both the magnetic and electric fields.

Wildlife and Bird Mortality

Last but not least, the most serious biological issue associated with the installation of windmill power generators is the death caused by birds and bats. Environmentalists and animal and wildlife agencies and associations have fought for the cause to precede it politically on policy-making forums. However, for years, the wind turbines have been operating with the least harm to the birds and animals in the area of their installation. The government and non-governmental associations have been working in collaboration with each other to conduct surveys and research on the issue that how many birds and bats are actually killed by the installation of windmills and to what extent the turbines are really a threat to the lives of the birds and bats especially that recently has been projected as a species that

is endangered to wipe out by the turbines. The line of Indiana bat is especially said to be engaged to an end by the installation of wind turbines in the area of Appalachian, where the impact of wind turbines on the environment has gained controversial popularity among rural and local communities. A huge Windmill is going to be constructed at the top of the mountain of Appalachian to gain energy from the strong breezes of the town. However, there is a concern raised by bat lover David Cowan, who has always been caring for the bats. Have been a gray cover throughout his life and did not want any possibility to arise that would hurt rather than kill the bats in the area. A windmill will obviously cause the eradication of bats at a massive level slicing them by the huge blades. "Any energy development is going to have environmental impacts that are going to concern somebody" (John D. Echeverria, 1). The quote shows that Cowan is right in raising concern in the court.

The Indiana Bat Controversy

Will it fail the fight for Indiana Bat? The divide among the environmentalists can save one cause only, either the energy or the decreasing line of Indiana bat. Endangered species need a handsome amount of attention from the state and communities as well. The environment provides power resources such as breezes to windmills; windmills shall not be destroying the beauties of an environment.

Another reason Cowan righteously brought the case to trial in the district court in Greenbelt was the first-ever case of the Species Endanger Act against wind power projects. The presidential policy of doubling up on energy resources made the energy farms expand and enhance their capacity. The main concern of Cowan is the rare species of brown, grey Indiana bat line whose eight inches body weight is equivalent to putting three pennies together, with outstretched wings, declining in number by half as compared to 1967. The fact that approximately 130,000 bats are at their life risk if the windmill is installed is acknowledged by both parties. The defendant party is just giving a chance by saying, "Let us roll the dice and see what happens," such an approach does not comply with Congress's policies.

Some people argue that there are rare chances that Indiana bats are going to travel to the turbine as in summers 2005-6 a consultant tried to catch them by putting the nets around, but no Indiana was found at or near the site. Besides, there is no evidence of the killing of Indiana by tribune nationwide. They put forth that energy plants are environment-friendly and will provide jobs in the area. The reason behind opposing the power project installation is the fact that Indiana bats, in the fall season, travel from caves to forests to spend spring and summer and tend to fly by the turbines, risking their lives.

This, however, is a weak argument as it is quite clear that an enormous number of bats have been killed by the blades of windmills around the country, and concerns have been raised about how the killings can be avoided or lessened.

Cowan is too sensitive to the issue of bat killings that he says, "I think if the turbines kill one Indiana

bat, that ought to end it,”

Conclusion

In conclusion, the endangered species need a handsome amount of attention from the state and communities. Any project of power plantation in the rural area is going to hurt some of the environmental features, the birds especially are the beauty of the environment, and if they get killed by the energy plantations, the eco-friendliness goes useless. For that reason, communities should stand guard to save the natural beauties and species that are struggling to survive on Earth, such as grey Indiana bats, whose line is getting shorter day by day on the planet.

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