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Wind Energy and Its Consequences on Environment

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Wind energy and its consequences on the environment

Introduction

Currently, energy consumption has increased economic growth worldwide. Thus, there is the rapid advancement of alternative renewable energy sources in the competitive global economy. There has been a rapid transformation of energy production due to an increase in demand for power, thus resulting in to increase in wind energy production to meet the needs. Wind energy has been the fastest-growing renewable energy source used commercially to run essential services in various places in the world, particularly in the United States (Wiser et al. 2015). However, wind energy is associated with multiple environmental and social effects resulting from its consistent use. It has great source potential, modest, durable, stable pricing, and relatively favourable environmental qualities.

Methodology

The methodology describes the procedures used in the generation of wind power. Electricity is produced from the wind via the kinetic energy generated by air in motion. It is then converted into electrical energy utilizing wind turbine transformation systems. Firstly, the wind hits the turbine's blades, making them rotate and turn the turbine which is attached to them. A moving shaft connected to a generator will convert kinetic energy to rotational energy, creating electrical energy via electromagnetism (Blaabjerg & Ma, 2017). The length of the turbine and blades determines the quantity of energy which can be transformed from the wind. The productivity is relative to the measurement of the blade and the cube of the velocity of the wind. Ideally, power produced increases with the increase of wind velocity.

Results

There is wide application of Wind energy in the modern world. Different countries have embraced the use of wind energy to run their industries. The table below summarizes the total wind power used and contribution of wind energy to the total energy production in European countries

Country	Total wind power in (MW)	Contribution of wind energy to the total energy production (%)
France	10358	4.0
Germany	44947	12.0
U.K	13603	11.0
Netherlands	3431	5.6
Poland	5100	6.2

The above countries use wind energy to propel the boats in seas when transporting materials or people from one location to another. This has made transport affordable since wind energy is cost-effective compared to fuel energy. It is also used in various water pumping wind mails in to draw underground water for irrigation, domestic use, and recreation purposes. These pumps are cost-effective, require low maintenance as opposed to other fuel pumps. Several flour mill companies use wind energy to grind their grains, such as wheat, maize, and corn, into flour (Blaabjerg & Ma, 2017). The use of wind power will decrease the cost of production, leading to

a reduction in the price of flour. Moreover, wind energy is used to produce electricity which has wide applications all over the world.

The use of wind energy has helped to minimize the risks of air pollution compared to electricity production projects that depend on the burning of fossil fuels like natural gas. Fossil fuels are known to discharge carbon dioxide, nitrogen oxides, sulphur dioxides, and particulate matter harmful to both humans and plants, thus causing economic damage. The table below compares the amount carbon dioxide and its impact on the environment.

Energy	Carbon dioxide emission (g/kWh)	Environmental impact
Wind	12	Minimal
coal	1001	Poor
ocean	8	Minimal
Hydroelectric	4	Minimal

The wind turbines are used to improve existing farms, which benefit the economy in local areas where most turbines are located (Wagner, & Mathur, 2018). Farmers can still carry out their activities since the turbines occupy a small piece of land. Similarly, the farmers receive additional income for renting their lands to the wind power plant vendors.

One of the major uniqueness of wind power is its renewability because the air in motion will never run out. Typically, the source of wind energy is infinite. Due to accessible energy sources, the wind turbine produces the cheapest power in the world. There are no sudden hikes in cost since the power produced is sold continuously at fixed prices (Wagner, & Mathur, 2018).

Furthermore, the production of wind energy has developed faster, thus creating job opportunities to service it. The design, production, installation, maintenance creates employment opportunities.

Discussion

However, the development of wind power has several environmental impacts which lead to unfavourable conditions. The technology creates unwanted sounds such as mechanical and aerodynamic noises. The turbine's electrical and mechanical parts produce mechanical noises while the blades' relations with the wind make aerodynamic noise. The noise produced impacts the mortality of particular bird species, such as bats attracted by the sounds produced by the rotating turbines (Chipindula et al. 2018). Recently, research has shown that a vast number of bat fatalities have been evident at utility-scale wind energy firms, specifically those situated in forested areas and agricultural farms. The birds are hit and killed by rotating turbine blades, and elements that elevate the risk include increasing the size of the blades, modifications of the land when installing the wind turbines, and low wind velocities at night. The size of the blade is believed that it will increase the danger area for the bird which approaches higher altitudes, touching the turbines. Modifications will attract more species near the wind turbines due to the creation of suitable conditions for some insects, which are the food for bats.

Equally, offshore electricity power projects have similar effects on several marine birds, even though the deaths related to offshore electricity power plants are minimal compared to onshore power plants. These projects will affect fish and other aquatic flora and fauna. Some studies have found that these turbines can increase the number of fish and perform artificial reefs (Chipindula et al. 2018). However, the impact differs from one location to another, and thus more research is necessary for offshore wind projects to confirm these claims.

The impact of wind power plants usually differs subject to the site used. The wind power plants set in flat areas usually occupy considerably large land compared to those in hilly areas. This is because the turbines are spaced to some diameter, thus using large pieces of land. Again, offshore wind plants need vast pieces of land as the turbines are more extensive than their land-based equivalents. Subject to their locations, such offshore plants can compete with some ocean happenings like recreational activities, fishing activities, petroleum extraction, navigation, and aquaculture practices (Wang, & Wang, 2015). Thus, employing poor techniques in design and sitting can result in adverse land-use effects of offshore and various land-based wind schemes.

The wind projects installed in different areas also produce a lot of noise. One turbine can produce sounds that can be perceived from long distances. Loud noises usually increase stress which can result in illnesses. This has made many individuals' lives turned upside down because of noise pollution from turbines. Although, governments' emphasis is to site power plants away from the community, many firms disregard this law (Wang, & Wang, 2015). Therefore, this is why many people do not find it suitable to install them around their homes due to the risks their pose.

Setting up wind power plants usually requires land clearing to install the turbines, access roads, and construction stage areas. This has resulted in deforestation, deaths of some vital plant species, altered drainage patterns, loss of some natural habitats, pollution and sedimentation of marine ecosystems in many areas where these projects are embraced (Wang, & Wang, 2015). As a result, the land left bare will be eroded during heavy rainfall, leaving the land unproductive for farming practices. This would result in the migration of animals and people due to adverse climatic conditions that may cause drought and famine.

Wind energy emits a minimal amount of carbon dioxide during its installation and maintenance stages. The amount released is much less compared to the power plants based on fossil fuels. The gas produced is usually used by plants in photosynthesis as opposed to other fuel power plants that emit harmful gases to the environmental species. Water consumption in the power plant greatly reduces since wind energy does not require water to generate power. Hence, water conserved is used in aquatic species and for irrigation purposes (Chipindula et al.2018). This would help to solve world food security, thus eradicating drought and famine.

Additionally, wind energy projects are the best tourist attraction in many developed countries. They provide information on how comprehensive turbine functions or extensive knowledge on wind energy specifically for individuals interested in wind power research (Wang, & Wang, 2015). Besides, various wind power plants allow free access to the general public, thus providing beneficial opportunities for hiking, camping, and different recreation activities.

Conclusion

Wind energy is the most effective source of power. Even though it does not produce much electricity than other fossil fuels, it is a primary renewable energy source in many countries such as the United States. When it is located in suitable places away from peoples' homes, it can be very effective since they b cannot be affected by the turbine noise, which causes health challenges.

References

. Wiser, R., Lantz, E., Mai, T., Zayas, J., DeMeo, E., Eugeni, E., ... & Tusing, R. (2015). Wind vision: A new era for wind power in the United States. *The Electricity Journal*, *28*(9), 120-132.

Blaabjerg, F., & Ma, K. (2017). Wind energy systems. *Proceedings of the IEEE*, *105*(11), 2116-2131.

Chipindula, J., Botlaguduru, V. S. V., Du, H., Kommalapati, R. R., & Huque, Z. (2018). Life cycle environmental impact of onshore and offshore wind farms in Texas. *Sustainability*, *10*(6), 2022.

Wagner, H. J., & Mathur, J. (2018). Wind Energy Today. An *Introduction to Wind Energy Systems* (pp. 1-6). Springer, Cham.

Wang, S., & Wang, S. (2015). Impacts of wind energy on the environment: A review. *Renewable and Sustainable Energy Reviews*, *49*, 437-443

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GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8