

Removing the Resistance to Wind Energy

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

"One of the fastest ways to build the clean energy economy is to allow more people to benefit from it" (K, 2014, p.1). Energy production in our modern world comes in many different forms and the global social drive to find cleaner and cheaper ways to produce energy is increasing.

One growing form of renewable energy is wind turbines. Wind turbines have many advantages over traditional power, such as lower cost and renewable energy, but some challenges come along with it such as the difficulty of transportation and noise pollution ("Energy Efficiency & Renewable Energy", p.1). Since wind energy is cheap and does not have any major roadblocks besides social rejection, the ultimate goal is to make it more acceptable to people and their communities. If offshore wind energy can become more common, the prices will be driven down and even more people will benefit from this cheap energy (O'Boyle, 2018, p.2).

Offshore wind energy is not a new idea, but it is now experiencing rapid growth and becoming more common globally. But there is currently only one offshore wind energy farm in the United States (Woods, 2019, p.1). One drawback is that a lot of expensive infrastructure has to be built up first, in order to mass-produce offshore wind energy. According to the Social Construction of Technology theory, the most helpful thing for the implementation and production of wind energy is getting American citizens to see the benefits. As society embraces wind energy, people will vote for it and push for initial funding and allow offshore wind turbines to be built in more places (Creative, 2019, p.1).

Literature Review

Society needs to first accept and then drive the production of offshore wind turbines before offshore wind turbines can become more commonplace. According to the social construction of technology, human action shapes technology. People supporting and wanting offshore wind energy is what will push offshore wind turbine technologies to become both cheaper and more common. People resist onshore wind due to the noise and turbines being visible against the skyline, but putting wind farms offshore removes those obstacles. Before offshore wind farms can be developed, the government, which is directed by society, has to first allow wind farms to be built out in the ocean. For the first few wind farms, the government may need to incentivize offshore wind farms to help companies get over the initial infrastructure cost that goes into constructing them. In the past, there have been people protesting against new wind farms which has resulted in having more turbine restrictions, which has resulted in them being more expensive to build, or not even being built at all. This has been a problem in the United States and also in other countries with wind energy production (Deutsche, p.1). In all cases, the bottom line is for people to realize wind turbines are overall a great way to produce energy. The social implications of wind farms needs to first be considered in order for wind energy production to rapidly develop.

Methodology

The research for this paper was conducted through combining sources from many different locations. As we live in the age of information, the resources to fully understand and evaluate the research topic can be found online. I was able to find

studies that had been done in other countries that have already integrated offshore wind turbines. I was also able to find information on the solutions those countries had to the technological and social issues with turbines offshore placement. I also analyzed existing research data and compiled information from online sources to produce a well-rounded question on whether moving wind energy production into the ocean will remove the barrier for people who resist it. My primary source of information is from case studies about building wind turbines in other countries and analyzing previous data and studies. This is because of the massive amount of data already out there on the internet on this subject; It would be expensive and time consuming to produce new less accurate data in order to research this important question.

Research

There are many issues and controversies surrounding the area of producing clean energy, but offshore wind turbines are the best possible solution to fill the needs of clean renewable energy. Many scientists say that being able to produce more renewable energy will reduce global warming. Much of society would agree that “renewable energy is a warranty for human survival” (Zafar, 2020, p.1). As there is much controversy over the feasibility and soundness of offshore wind turbines, and because we already implemented power sources such as nuclear power, we have to consider the economic and implementation cost of such a strategy (Fialka, 2020, p.1).

History of Wind Turbines

There are many ideas that led to the turbines and wind energy that we now have today. Being able to harvest the energy that passes over our head is one of the major ideas behind forming the use of wind turbines. The idea of getting electricity by putting blades in the sky has been around for a long time. First appearing in the 8th century in the Middle East and Weastern Asia, they were used for turning pumps and other laborious tasks. They were used in manufacturing before steam engines and during “windmill popularity in 18th and 19th century, Europe housed around 200 thousand of them” (“History of Windmills”, p.1.) As electricity became more commonplace, windmills have evolved into massive turbines that can harvest a large quantity of energy from the wind.

Individuals Against Wind Energy

The value of using the energy that we already have easy access to is one of the driving factors. An impactful driving force behind harnessing wind energy is valuing our earth and viewing change or harm to our earth as a bad idea. Being able to gain energy for human use without majorly disturbing or using up resources on Earth is considered a large gain. As the drive and technology for wind energy has grown turbines, have become more efficient in producing energy for their size and cost. Nevertheless, issues with them have surfaced along with the advances and growing popularity of turbines. They have been protested against because they obstruct the landscape. Because they are so huge and usually put on the top of hills, they obstruct the landscape and can be easily seen against the skyline. What used to be a natural view of the hills has turned into a view of an energy factory. Because the natural landscape is disturbed and

changes the view for a very large area, people have been against having turbines installed in their area.

Another issue that has surfaced is that turbines kill birds. While this has been a very publicized issue, more research has shown it is not as significant of an impact as it was originally thought. Turbines are estimated to kill between 200,000 to 750,000 birds a year. While that is a lot of birds “In contrast to the 5 billion birds killed annually as a result of encounters with a variety of hazards ranging from domestic cats to building glass, turbines are a much smaller risk” (Clark, P.1). While not as significant as originally thought, it is still an issue that needs to be addressed.

A third issue that has surfaced is due to the size of the turbines. The larger turbines become the more efficient they become for the cost. The roads to where the turbines are being built have become a design limitation due to the increasing size of the turbines. Also, the costs of transporting large quantities of these large parts on roads has increased and caused delays. Because of these new larger and more efficient generation of turbines, building turbines onshore has become more of an issue.

The Issues with Turbines

Moving turbines offshore would solve most of the major issues with wind turbines. The view is still obstructed for major offshore wind turbines near the shore, but turbines can be placed far offshore where they cannot be seen from land. This solves the issue of turbines obstructing the natural landscape for people who live in the area.

The issue of bird killing is solved by offshore turbines. While turbines kill around 1.2 birds per year on land, they kill fewer birds out at sea. Because there are very few

birds that far out in the ocean, the odds of a turbine randomly hitting a bird are low. Mark Lyas at *Environmental News* said of offshore wind turbines, "There is very little evidence of any harmful impact on birds: some species of duck have been shown to take minor migratory detours to avoid wind farms, but many other seabirds tend to skim along the water surface well below the spinning turbine blades" (Lynas p.2). Because there are fewer birds out at sea and the species of birds that are out at sea avoid turbines, putting turbines offshore solves the problem of turbines killing birds.

Offshore turbine placement also solves the issue of transportation. When turbines are built offshore, they can be transported on massive ships to the install location. This does not disturb traffic during the installation process and reduces the cost of installation. Building them offshore allows even, larger turbines to be built. Currently the largest onshore wind turbine in the world is 4.8 MW made by GE (Pomerantz p.2), but the largest offshore wind turbine is made by Siemens and is an impressive 14MW with a blade sweeping area of 9.6 acres (Parnell p.1). Because there is completely open access to offshore turbines many of the major obstacles can simply be overcome by building turbines offshore. Placing turbines out in the ocean not only has great benefits for wind power but it also removes the land barriers that prevent massive wind turbines to be installed there and is a cost saver in the long term.

Currently it is more expensive to build and maintain offshore wind turbines than onshore ones. This is largely due to the infrastructure and technology in place for onshore wind turbines that is not in place for offshore wind turbines. While cost is still an issue for offshore wind turbines it is decreasing with new advancements in technology and building up of infrastructure. As more offshore wind turbines are built, the cost is

expected to go down. With installing offshore wind turbines “Virginia could meet at least 83 percent of its current electricity generation, eliminating the need for all the state’s fossil fuel power plants, and saving ratepayers nearly \$1.9 billion each year” (W, p.1). Even though offshore wind turbines are more expensive than onshore ones they are still cheaper than today's other major electricity production methods.

Space offshore

One of the issues that are brought up is that in the United States a lot of the land where people live is not near the ocean. While this is, true “80 percent of the population of the US lives near the coast” (Walt p.4). Because a large population of the United States lives near the ocean, offshore wind is a viable option for a majority of the United States.

Because the depth offshore is sometimes too deep to install turbines, especially if they are being installed out of the line of sight of shore, traditional turbine structures will not work in all cases. Floating offshore turbines are being developed and are part of the key to fully develop offshore turbines. The “National Renewable Energy Laboratory (NREL) has estimated the United States has over 4,000 gigawatts (GW) of offshore wind potential, enough to power the country four times over” (Small, p.1). Therefore not only does offshore wind turbines solve most of the issues with wind turbines but we could power most of the United States with offshore wind energy.

Conclusion

Offshore wind is something the people in the United States should push for. Wind energy is often praised for being a clean and renewable energy source for all of our

power needs. However, wind energy still has some issues. It is known for killing birds, for producing noise pollution in near urban areas, and disrupting the landscape and ruining natural areas.

Offshore wind turbines would solve most of those problems. Very few birds fly that far offshore and the few types who do avoid turbines as they are the only obstacle out there. If a turbine makes noise out in the ocean and there is no one there to hear it then it effectively does not make any noise. Turbines that are placed far offshore do not disrupt the natural landscape near where anyone lives. While the landscape is, being changed far out in the ocean, the only people it affects are people far offshore in boats that are rare.

We also saw how building increasingly larger onshore turbines has become more of an issue with the size limitations of the roads but building turbines offshore allows these new larger and more efficient turbines to be installed. Because offshore turbines are the solution to fixing the major issues with turbines, more offshore turbines should be encouraged to be built.

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