

Wind and Water Power: An Annotated Bibliography

Cheremisinoff, Nicholas P, *Fundamentals of Wind Energy* (Ann Arbor Science, 1978)

Nicholas P. Cheremisinoff provides an argument on the usage of wind power for future energy generation. Though the text is not as technical as other books regarding the mathematics and engineering required of wind power machinery, it does provide a comprehensive summary and useful analysis on the potential that wind-generated power possesses.

The text begins with an exploration into the decline of wind energy, and how the reliability and efficiency of wind power had to improve in order to catch up with the now-mechanised industries.

Throughout the text, Cheremisinoff provides the advantages and disadvantages of wind energy, making note of the different factors, environmental, geographical, and meteorological, that need to be taken into consideration when determining where these wind machines should be located, and whether they would be beneficial at the particular location. He suggests a general methodology when evaluating a region of interest, which, though basic and rather broad, does present a useful checklist of factors to observe when choosing a suitable location for wind machines.

The author also considers the social and economic aspects, regarding both public opinion and aesthetic, as well as the cost efficiency and reliability of wind power. Cheremisinoff is very clear in his views on the importance in considering land use and aesthetic, and argues that the general public must be in favour of wind machines if wind energy has any chance of playing a significant role in the future.

Cheremisinoff concludes the book, emphasising that the ultimate deciding factor in utilising wind power will be dependent on economic factors, and whether building wind machines would be worth the investment.

Davidson, Ros, "Earthquake Experts Disagree On Lessons To Be Learned From Bonus Tremors Experience" (*Windpower Monthly*, Vol 2. (12), December 1986, pp. 11 & 26)

Ros Davidson's article discusses experts' opinions on wind turbines and their resistance to earthquake damage. As of December 1986, there had been no definitive answer for whether, or to what extent, wind generators could withstand seismic waves.

To begin the debate, Davidson states that the impact on wind turbines depends on multiple factors, including the amount of energy released, geology, distance from the epicentre, and the duration and frequency of the seismic waves. Some of the experts suggest that turbines are more sensitive to higher frequency waves, though if they are too flexible, they may bend during the earthquake. On the other hand, other experts have argued that low frequency waves would have a greater impact on less flexible turbines. Other experts, Davidson mentions, disagree with the claims that wind turbines were not resistant to earthquakes, arguing that they are resistant because they have been designed to withstand wind.

Davidson concludes her article by stating that the only thing experts agree on is how the number and scale of earthquakes in California will continue to rise.

Musgrove, Peter, *Wind energy evaluation for the European Communities* (Commission of the European Communities, 1984)

Peter Musgrove's evaluation on wind energy is a study to review contemporary research on wind power, and an assessment on the potential development of wind energy systems in Europe and other countries worldwide. Musgrove begins his report with a summary of the general characteristics of wind turbines, as well as a list of potential environmental and human impacts the turbines may have. Though not particularly in-depth, he does cover most of the major aspects of wind energy systems that could pose a potential issue (for instance, noise, and impacts to birds).

The vast majority of the report is spent discussing a range of European countries (and, on a lesser note, Canada, Japan and the United States), and their previous, and potential, involvement in wind energy developments.

Musgrove concludes his evaluation with his recommendations on how to proceed with the development of wind energy systems between 1983-1985.

Davidson, Ros, "Environmental Issue In Need Of Reality Not Romanticism" (*Windpower Monthly*, Vol 3. (10), October 1987, pp 16-18)

Ros Davidson's article, "Environmental Issue In Need Of Reality Not Romanticism", discusses the clashes between wind power development, and local groups of opposition. Tension between the public and wind energy, she argues, would need to be resolved if more wind turbine sites were to be developed.

The article provides arguments from multiple groups of concern, including residents and environmentalists. Davidson provides an insight into these groups' perspectives, taking quotes both in favour and against wind power development. Regarding environmentalists, an argument is made on behalf of the birds of prey (golden eagles) that are at risk of being killed by the turbine blades. As these birds of prey are protected under federal law, the issue of violating legislation arises. However, Davidson also presents a counterargument, noting that birds are also killed by electrical lines and highways, thus making them no safer for birds than wind turbines.

Residents become some of the most difficult and vocal opponents to wind power, with their issue of romanticism. Davidson states in her article that the public often have an idealised perception of pastoral America, reminiscent of their frontier past, though this is, she considers, unrealistic, as humans have been shaping the landscape of the United States since they first arrived from Europe. The construction of wind power sites would be no different. Residents, Davidson argues, are also against the aesthetics of wind energy, suggesting that the noise and view of these turbines would ruin their romanticised perception of the American countryside.

Davidson concludes her article with the suggestion that the wind industry should reduce the visual and environmental aspects of wind turbines, regarding their impact on the surrounding geography and natural landscape.

Johnson, Lee, "Wise-Wind – Designing for Jobs", (*Wind Power Digest*, (9), Summer 1977, pp. 24-26)

230629, Box 'Windpower Digest 1-13'

Lee Johnson, in his article, "Wise-Wind – Designing for Jobs", presents the argument that the existence of technology should be appropriate for our aims and goals. Technology should be created with the goals in mind, and not created to hinder them, particularly in regards to the future. Johnson defines 'appropriate technology', and explains how some technology has created new opportunities for growth, wealth, and employment, whilst others have hindered these.

The author argues that windmills can be considered appropriate technology, and are created to make clean energy attainable. He states that windmills, in comparison to non-renewable sources such as coal and nuclear power, do not create long-term health problems, do not require waste storage solutions, and do not require radiation decontamination or the evacuation of millions of people if they were to break down.

Johnson further states that they cost less than nuclear power, and are relatively inexpensive and straightforward to construct compared to large power stations. Finally, he concludes with an emphasis on the creation of more employment opportunities with the arrival of wind power projects, and how wind turbine manufacturing could be done locally, thus providing employment to the surrounding population.

Alty, C. J. N, R. W, Todd (eds), *An Alternative Energy Strategy for the United Kingdom* (Centre for Alternative Technology, 1977)

22337, Box G200, Renewable Energy Sources

This report outlines a potential plan for the UK from 1970 to 2025 regarding alternative sources of energy. The main focus is on renewable energy sources, including solar, water, and wind power, though the authors do also briefly examine other energy sources such as coal, and geothermal energy.

In each of the subsections focused on a source, the authors suggest how much energy could be produced if the application of the energy source was utilised successfully. They provide statistical data on energy consumption, and in some cases, the cost of energy. The authors further predict how much of the energy consumed in 2025 would be produced by the renewable energy source, based on contemporary research data and statistical estimations.

In some sections (mainly solar, wind, and water), the authors include information on the advantages and disadvantages of the particular sources of renewable energy, discussing the industrial and economic benefits of providing long-term work. The report suggests that the United Kingdom has the facilities to produce renewable energy machinery, both creating opportunities for exportation, as well as the revival of the United Kingdom's heavy engineering workforce, which had been under-utilised and on the decline.

In the later chapters, the authors attempt to match the renewable energy sources to the needs and demands of the population, highlighting the issues and limitations that come with these energy sources. The report concludes with an examination of the economic and employment implications of renewable energy, touching on the issues of unemployment and changing career options.

Saunders, Robin, 'Water', in *Energy Primer* (Fricke-Parks Press, 1974), 52-73

Robin Saunders chapter, 'Water', focuses on small hydro-plants that can be utilised by individuals and small communities. Multiple factors are considered in the installation of waterwheels. Saunders begins his chapter discussing expenses, as well as environmental disturbances caused by creating dams, and any legislation that surrounds water regulation and water rights. The rest of the chapter is spent explaining the technical aspects of water power, and the installation of water wheels, dams, sluices, pipes, and turbines.

Saunders provides the equations necessary to measure the flow of water, the height of the fall of the water (and subsequently, the water pressure), and the calculations needed when designing suitable channels and other ways to deliver the water to the water wheel or turbine. Graphs and tables are included alongside the measurement instructions, and illustrations provide visuals of the steps in installing water wheels.

Saunders further presents a list of factors that guides the reader in determining the choice of water wheel or turbine best suited for their project. Each type of wheel and turbine is described in terms of its use, its efficiency, and what situation or conditions they have been designed for. The author concludes the chapter with information on power transmission, discussing various types of generators, and a glossary list for the terms used within the chapter.