

## Role of Wind Energy in Generating Electricity as a Renewable Energy

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### DESCRIPTION

Wind energy is a promising and rapidly growing renewable energy source. Wind turbine investment costs have decreased over time, making wind energy financially viable with conventionally produced electricity. To estimate the cost advancement of ever-larger turbines, size scaling in the form of a power function, experience curves, and progress rates are used. Scaling and progress rates are rarely used in life cycle assessment to estimate the environmental effects of wind energy. This perspective summarises how the tendency toward larger turbines impacts the sustainability level of the electricity generated.

As renewable energy technology advances and grows in popularity, wind farms like this one are becoming more common along hills, fields, and even offshore in the ocean. Windmills have been used for at least three thousand years, primarily to grind grain or pump water. Windmills were used to generate electricity in the twentieth century, and development toward modern wind turbine technology began in the early 1970s. Between 1998 and 2011, the number of wind power systems increased by 25-30% per year. As a result, wind power is the fastest growing energy source. The total global wind power generation in 2011 was 560 TWh, with a total installed capacity of 237 GW at the end of the year.

The increase is due to the rapid introduction of modern technology, which has resulted in the implementation of new ideas for electric generation systems, an increase in the size of wind power plants, a reduction in environmental impact, and a significant decrease in cost per produced kWh.

One important driving force behind the rapid growth is the growing concern for the environment. To create this type of system, knowledge from various fields such as meteorology, aerodynamics, mechanics, electric machinery, and power systems must be combined. This article focuses on the fundamental characteristics of wind power plants that are incorporated into a

larger power system with multiple power sources. Wind energy generation has increased significantly over the last 30 years. Wind energy technology advancements have reduced the cost of generating electricity from wind. Wind power has grown as a result of government mandates and financial assistance for renewable power in the United States and other countries.

Many scenarios and plans in various countries suggested that by 2050, up to 40% wind infiltration could be safely assumed. In this regard, power consumption will not rise to 74000 TWh/yr, but will remain at a low of 40000 TWh/yr. The expected reasons are

- Substantially increased energy efficiency
- Climate change
- Significant variants in trends due to social, political, and economic factors.
- Technological advancement and other competing technologies, and so on.

Wind energy would seem to be a fundamentally simple technology: a set of turbine blades powered by the wind turn a mechanical shaft that connects to a generator, which generates electricity.

### CONCLUSION

Wind energy will become one of the most prominent and frequently used renewable energy sources in the coming decades. There are significant challenges to overcome, but they all appear to be solvable.

Wind energy could generate about 10% of the electricity used in the United States, if research and development efforts are successful.

With the substantial environmental and societal advantages of wind energy, a strong wind industry will be competitive in supplying wind turbines to the rest of the world.

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