

The Brief Study on the Wind Energy

Namrata Arya

SOBAS, Sanskriti University, Mathura, Uttar Pradesh, India

Email Id- namrata.sobas@sanskriti.edu.in

ABSTRACT: The technique utilized for producing electricity or mechanical power by wind energy or wind power is described. The wind turbine transforms kinetic energy into mechanical power into wind and wind. This mechanical power is employed for the specified job (e.g. water pump or grinding grain) and also for the electrical conversion via a generator. This article focuses on wind energy as a meaning for wind energy and wind energy growth every day for electricity generation. This review discusses the different data and analyses with various tools. This article also offers the wind turbine power generation systems that are employed by wind energy use for power generation. The possible wind turbine paths can help the country's future electrical demands, such as reducing carbon emissions, improving air quality and reducing the use of water.

KEYWORDS: Energy, Electricity, Production, Renewable, Wind.

INTRODUCTION

Wind energy is wind use for providing the electric generator for electrical power via wind turbines. Wind power is a typical sustainable, renewable energy source with lesser impact on the environment than fossil fuel burning[1]. Wind energy is utilised to create mechanical or electrical energy either directly or indirectly. In particular, WECS (Wind Energy Systems), which turns wind energy into electricity, is a key component for wind turbines. The WECS are complex devices consisting of several subsystems and pieces that transmit electromechanical energy. The most essential aspects of a wind turbine are the wind turbines because they transform

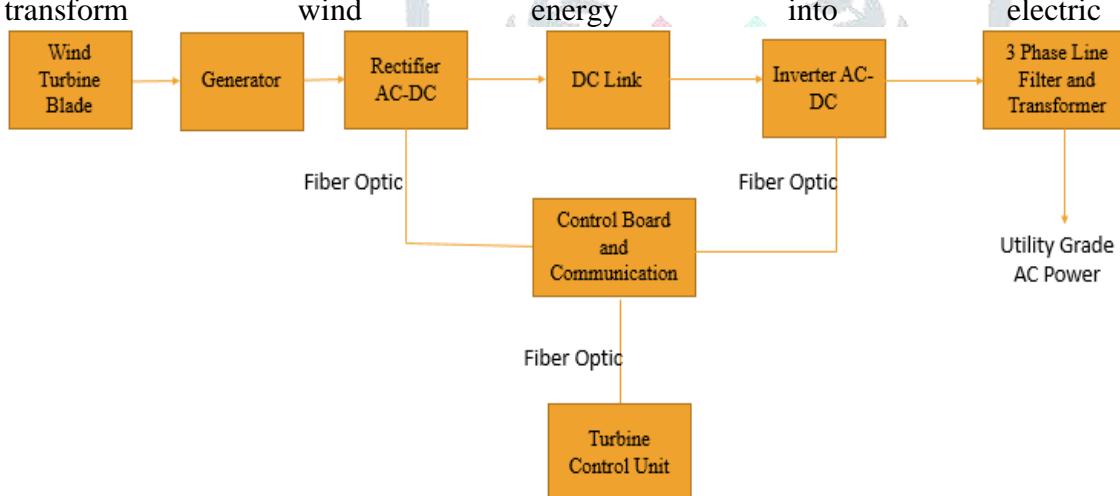


Figure 1: Block Diagram for the Wind Turbines Powers Production Systems.

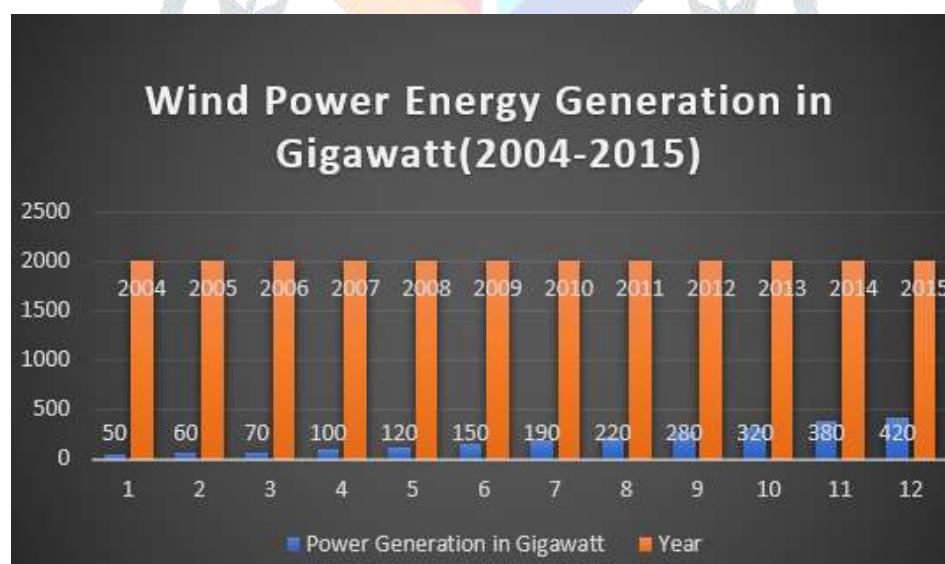
Figure 1 shows the standard block diagram of contemporary wind turbines. The wind generator is shown in a genuine block, and the choice of sources plays an important part in the transformation of wind energy. The current wind generator is split into two categories: wind turbines with a horizontal axis, which are comparable to wind turbines used for power pumping, and wind turbines with a vertical axis, similar to the Darrieus wind turbines, called after their French manufacturer. In many important contemporary wind turbines, the horizontal axis wind generator is employed[3].

In locations where there is a lot of wind, wind turbines were erected. The wind's height in the sky is higher than on the ground[4]. The optimum site is away from large structures to prevent turbulence. Turbulences are the link between different wind forces, when they encounter the real barriers. Wind turbine with horizontal axis gathers wind energy in the opposite wind direction [5]. From 2004 to 2015, the global electricity output in gigawatts is shown in Table 1.

Table 1: Install Power Production Worldwide in Gigawatt from the Year 2004 to the 2015.

Years	Power Production(in Gigawatt)
2015	420
2014	380
2013	320
2012	280
2011	220
2010	190
2009	150
2008	120
2007	100
2006	70
2005	60
2004	50

The visual depiction of wind power generation in gigawatt is shown in Figure 2. This chart illustrates the year-by-year value of power generation, as this graph indicates, the wind energy generation in 2004 is only 50 gigawatts but by 2015 is up to 420 gigawatts[6].

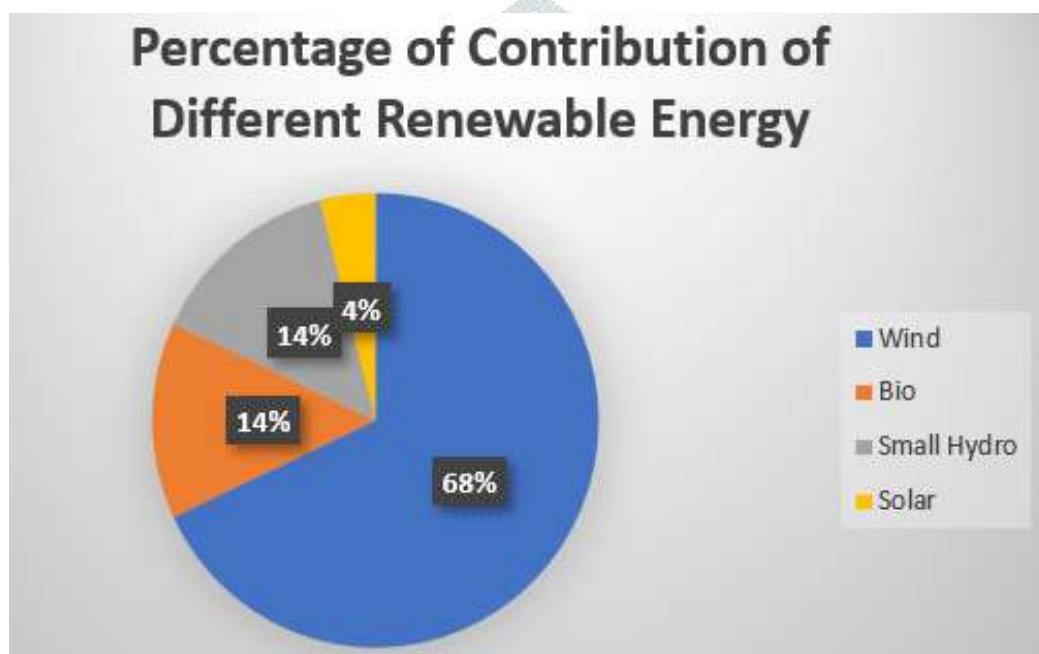
**Figure 2: Graphical Representation of Wind Power Energy Production from the Year 2004 to the year 2015.**

Renewable energy is highly significant as a generator of electricity. They have a great deal of renewable energy for energy generation, and every renewable energy contributes differently to the creation of electricity. Table 2 illustrates the percentage contribution from the distribution of renewable energy (such as wind, bio-energy, hydro and solar energy)[7].

Table 2: Contributions of the Power Generations from the Renewable Energy.

Renewable Energies Distribution	Value in Percentage
Small Hydro	14
Solar	4
Wind	68
Bio	14

The pie chart showing the proportion of renewable energy contributions to electricity generation is shown in figure 3. As illustrated in Figure III, renewable energy is a maximum of wind energy generated by 68% of the blue part of the pie diagram and renewable energy is a minimum contribution of 4% of the solar energy generated by a yellow portion of the pie diagram[8].

**Figure 3: Pie Chart Shows the Percentages of Contributions of the Renewable Energy.**

There are many wind turbines for the creation of electricity by using wind energy as a renewable energy, and they come down every day since wind generates greatest energy. Table 3 displays the turbine capacity installed from 2001 to 2015 in India(Megawatt)[9].

Table 3: Install Capacity of Turbine in India(in Megawatt)

Year	Install Capacity in the India(Megawatt)
2015	25000
2014	22000
2013	20000
2012	18000
2011	16000
2010	14000
2009	12000
2008	10000

2007	8000
2006	7000
2005	5000
2004	4000
2003	3500
2002	3000
2001	2500

Figure 4 illustrates the megawatt capability of the graphic display system in India. This chart shows an exponential increase in the value of turbine installation for wind-energy generation in India between 2001 and 2016. In 2015, the energy generating value is just 2500 watts, about 10 times that is 25000 watts[10].

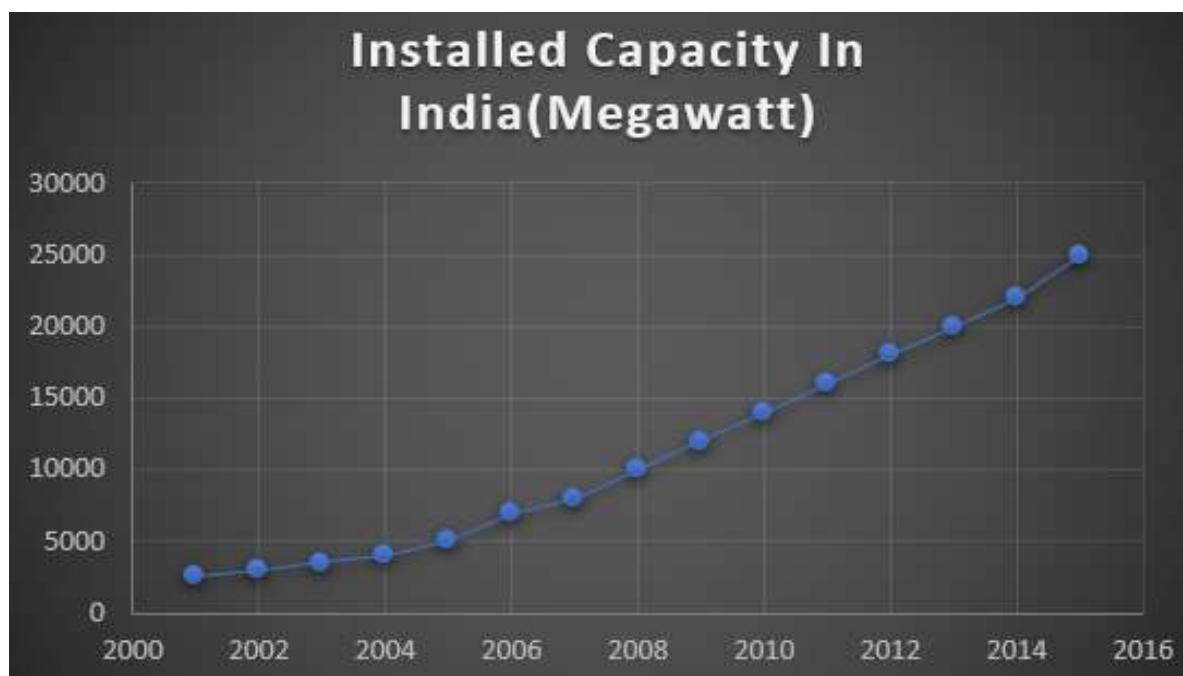


Figure 4: Graphical Representation of Install Capacity in India.

1. Usage Of Wind Energy

There are lots of usage of wind energy some are given below:

1.1. For Produce Wind Powers:

Electricity generating is one of the most common wind energy uses. During this phase, the wind turbine collects wind energy. When the wind drives the turbine, a rotor starts spinning, generating energy.

1.2. In the Transportation:

Another use of wind energy is transport. For thousands of years, wind energy has been employed to navigate civilizations. According to experts, sailing has existed somehow since at least 500 BC. In recent years both large and small boats have been able to sail under the influence of the wind [3].

1.3. In the Food Productions:

In the food sector, wind power has long been employed. The windmill is often used for frying grains before the industrial revolution so that it may be used to produce foodstuffs like as bread. Such techniques have become outdated with the introduction of power and engines in more contemporary times. As a result, producers are now in a position to more rapidly process items such as flour.

2. Benefits And Drawbacks Of Wind Power

Wind energy is wind use for providing the electric generator for electrical power via wind turbines. Wind power is a popular sustainable energy source with a lesser environmental impact than fossil fuels. Some of the benefits of wind are listed below:

2.1. Wind Create Jobs:

The wind industry in the United States employs over one lakh people, and the wind turbines technician is 1 of fast growing occupations in the nation. Wind have capacity for support greater than six lakh workers in installation, manufacturing, supporting and maintenance, service by year 2050, according's to Wind Visions Reports[4].

2.2. Wind Powers Are Cost Effective:

It is now one of the most cheap renewable energy technologies accessible and expenses range from 4 to 6 percent per kilowatt an hour, depending on wind energy and funding initiatives [5].

2.3. Wind Enable United States Industry Growths and United States Competitiveness:

The yearly investment in the United States economy represents about ten billion dollars in new wind projects. The US has huge domestic wealth and a highly educated populace, enabling it to engage globally in the renewables industry.

2.4. It is Clean Fuels Source:

Wind power does not contaminate the air such as a fossil combustion power plant, such as natural gas or coal that release particulate matter, nitrogen-oxides, and sulfur-dioxides that cause difficulties in human health and economic harm. There are no air emissions caused by wind turbines, greenhouse gases or acid rain [6].

LITERATURE REVIEW

The following are the various scientists and their study on the subject of wind power: The most significant needs for the world's people, the economy and social growth are raised by Ravindra B. Sholapurkar et al. researches energy. Around 87% of the world's fossil fuels have oil. India ranks fourth in the world in terms of wind energy generation. In the previous five years, India's wind energy has increased by about 17 percent.

In recent years, concerns have grown with respect to renewable energy sources, notably wind power for generating electricity, research by Devashish et al. In order to develop a way to utilise wind energy efficiently, engineers and scientists have carried out numerous experiments and tests.

The energy studies of M. M. Joselin Herbert et.al are vital components for socioeconomic change and growth. For example, wind energy is a form of renewable energy that is indigenous to the area and can assist minimise fossil fuel dependence. The sun fills up the wind continually and it is an indirect energy source. The sun's uneven heating of the atmosphere of the ground causes the wind[9].

The research of alternate energy sources, wind conversion devices have been focus points. Sujoy Chakraborty et al. Since the start of the 21st century, new and renewable energy sources (RE) including wind energy have been an issue. Electricity production sources are becoming increasingly important.

DISCUSSION

After studying and analysing above, the wind power author found that the researcher analysed diverse data statistically but could do better if it had no such analytical tool for distinct data. The researchers had a better understanding of wind energy. This article focuses on wind power and wind energy increase day after day for electricity generation. This review examines the different data (including installation power production worldwide in gigawatt from 2004 to 2015, turbine installation capacity in India, addition of energy capacity from 2012 to 2017 and contribution from renewable energy generations) and analyses these data with the help of different analytical tools, etc. This paper also gives information about systems for wind turbine power production, which are used to generate electricity by using wind energy, using wind energy, using benefits, etc. (Wind generating jobs, wind power generation is cost-effective, wind power is cost effective, etc.) and disadvantages.

CONCLUSION

The study focuses on wind energy and includes the definition of wind energy (the process in which wind is employed for electric or mechanical energy production is discussed by wind energy or wind power. Wind turbines turn filaments into wind and wind into mechanical power). Wind energy is rising every day in order to generate electricity. This research examines different statistics and their interpretation using different analytical techniques. The article explores further the creation of electricity using wind turbines and the common diagram of the blocks of contemporary wind power generating systems as well as the different data and analyses. The possible path for wind power to support the future demands for electricity in wind turbines in order to contribute to the nation's future energy needs, including targets such as reducing carbon emissions, improving air quality and reducing water consumption.

REFERENCES

- [1] E. K. Akpinar and S. Akpinar, "An assessment on seasonal analysis of wind energy characteristics and wind turbine characteristics," *Energy Convers. Manag.*, 2005, doi: 10.1016/j.enconman.2004.08.012.
- [2] A. Srivastava, S. Dwivedi, and A. K. Mishra, "Investigating the role of air-sea forcing on the variability of hydrography, circulation, and mixed layer depth in the Arabian Sea and Bay of Bengal," *Oceanologia*, 2018, doi: 10.1016/j.oceano.2017.10.001.
- [3] E. Lunney, M. Ban, N. Duic, and A. Foley, "A state-of-the-art review and feasibility analysis of high altitude wind power in Northern Ireland," *Renewable and Sustainable Energy Reviews*. 2017, doi: 10.1016/j.rser.2016.08.014.
- [4] M. P. Meredith and A. M. Hogg, "Circumpolar response of Southern Ocean eddy activity to a change in the Southern Annular Mode," *Geophys. Res. Lett.*, 2006, doi: 10.1029/2006GL026499.
- [5] C. Ilkiliç, "Wind energy and assessment of wind energy potential in Turkey," *Renewable and Sustainable Energy Reviews*. 2012, doi: 10.1016/j.rser.2011.11.021.
- [6] M. Zhu *et al.*, "Reconstruction of the mass balance of Muztag Ata No. 15 glacier, eastern Pamir, and its climatic drivers," *J. Glaciol.*, 2018, doi: 10.1017/jog.2018.16.
- [7] A. Hepbasli and O. Ozgener, "A review on the development of wind energy in Turkey," *Renewable and Sustainable Energy Reviews*. 2004, doi: 10.1016/j.rser.2003.10.006.
- [8] E. Martínez, F. Sanz, S. Pellegrini, E. Jiménez, and J. Blanco, "Life-cycle assessment of a 2-MW rated power wind turbine: CML method," *Int. J. Life Cycle Assess.*, 2009, doi: 10.1007/s11367-008-0033-9.
- [9] H. Balat, "Wind energy potential in Turkey," *Energy Exploration and Exploitation*. 2005, doi: 10.1260/0144-5987.23.1.51.
- [10] BP, "BP Statistical Review 2011," *Nucl. Energy*, 2011.