

A Brief Review on Wind Energy

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ABSTRACT: Wind energies or wind powers defines the procedure in which wind's is used for produce the electricity or mechanical powers. Wind turbine convert kinetic energies into wind and wind converted into the mechanical power. This mechanicals power used for the specific task (like pump water or grind grain), and also used to convert into the electricity through generator. This paper focuses all about the wind energy like meaning of the wind energy and the growth of the wind energy day by day for power generation. This review talks about the various data and their analysis by using different tool .This paper also gives the wind turbine power production systems which is used for power production by utilization of wind energy. The potential path way for the wind powers to contributes to future electricity need of ways for the wind powers to the contributes to future electricity need of nation, with objectives like reduce carbons emission, improved airs quality, as well as reduced waters use.

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

INTRODUCTION

Wind energies are usage of wind for provides mechanical powers by wind turbine for turn the electric generator for the electrical powers. Wind powers are a common sustainable, renewable sources of energy that has a lower environmental effect than burning fossil fuels[1]. Wind-energy is used either directly or indirectly to generate mechanical or electrical energy. The wind turbines are important component of the WECS (Wind Energies Conversion Systems), which transforms wind energy into electricity. The WECS are complicated electromechanical energies transfer device made up of several subsystems and parts. The wind turbines are the most important aspect of a WECS because it converts wind energy into the electrical energies.

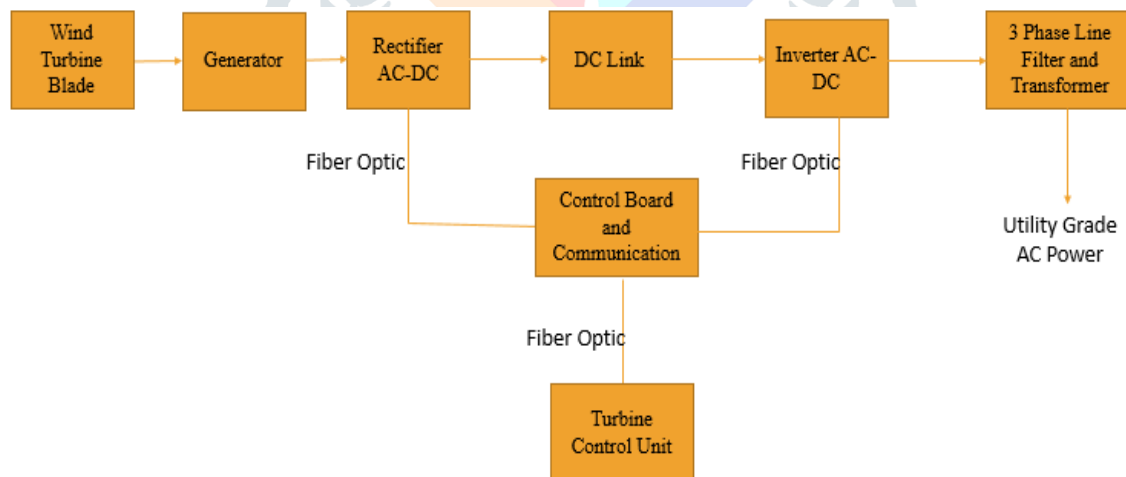


Figure 1: Block Diagram for the Wind Turbines Powers Production Systems.

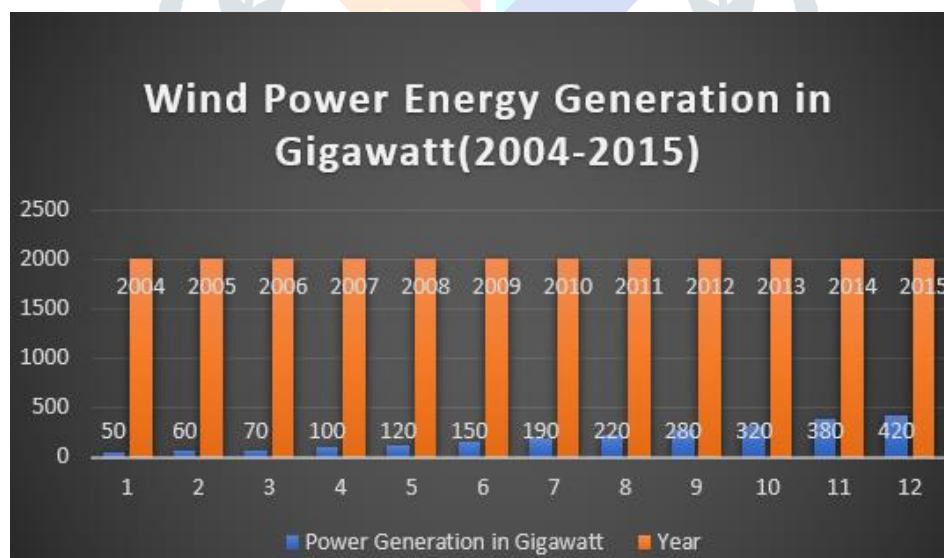
The usual block diagram of a modern wind powers generation systems is seen in Figure 1. The wind generator is depicted in real block, and the source selections plays a significant role in this wind energies conversion. Current wind generator is divided into two categories: horizontal axis wind turbines, which are similar to unique wind generators use for the pumping power, and vertical axis wind turbines, which are similar to an eggbeater-style Darrieus products named after their French maker. Horizontal axis wind generator is used in many major modern wind turbines.

Wind turbines have been built in areas where there is a lot of wind. The height of the wind is higher in the sky than on the earth. To avoid turbulences, the best location is away from tall buildings. Turbulences are the connection between varying wind strength as it meets the real obstacles. Horizontal axis wind turbines collect wind energies in the opposite direction of the wind [2]. Table 1 shows install power production worldwide in gigawatt from the year 2004 to the 2015.

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

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

The Figure 2 shows the graphical representation of wind power energy production in gigawatt. This graph shows the value of power energy generation is increasing from year to year as shown in this graph the value of power generation from wind energy in the year 2004 is just 50 gigawatt but in the year 2015 it reaches to 420 gigawatt.

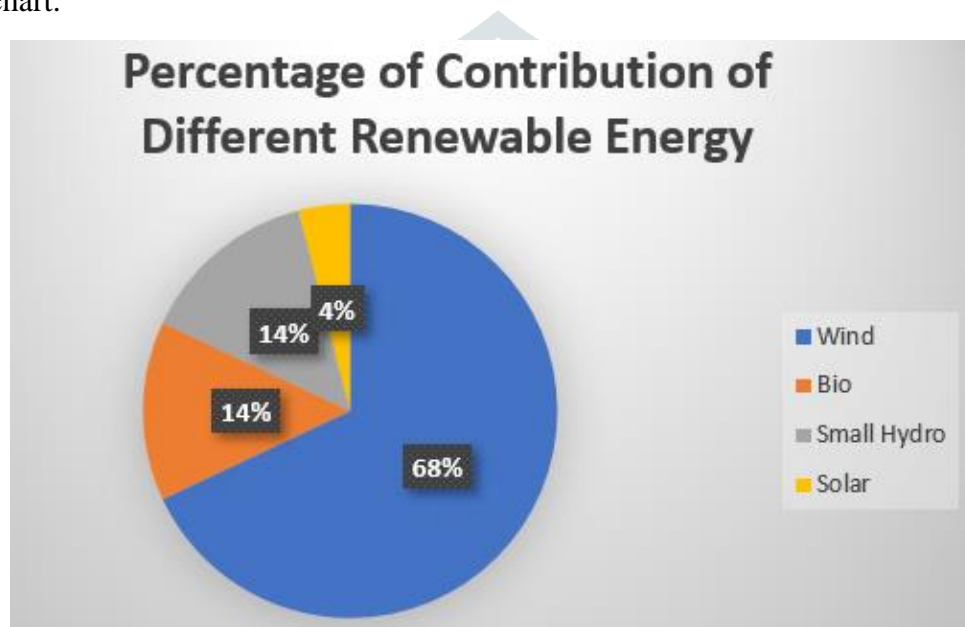
**Figure 2: Graphical Representation of Wind Power Energy Production from the Year 2004 to the year 2015.**

It is very important to use a renewable energy as power generation .They have lots of renewable energy contribution for the production of power and every renewable energy have different contribution for production of power generation. The Table 2 shows the contribution of renewable energy distribution in percentage.

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

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

Figure 3 shows the pie chart which shows the percentage of contributions of the renewable energy for the powers generation. As shown in Figure 3 the contribution of renewable energy for power generations is maximum from wind energy which is 68 percent shown by blue part in the pie chart and the minimum contribution of the renewables for the power generations are just 4 percent by solar energy shown by yellow part in the pie chart.

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

There are lots of installation of wind turbine is used for power generation by taking wind energy as renewable energy and it is increasing day by day because wind is the best source for the production of power. The Table 3 shows the installed capacity of turbine in India (Megawatt) starting from year 2001 to 2015.

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

Year	Install Capacity in the India (Megawatt)
2001	2500
2002	3000
2003	3500
2004	4000
2005	5000
2006	7000
2007	8000
2008	10000
2009	12000

2010	14000
2011	16000
2012	18000
2013	20000
2014	22000
2015	25000

Figure 4 shows the graphical representation install capacity in the India in megawatt. This graph show the value of installation of turbine for power generation from wind energy in the India is increasing exponentially from year 2001 to 2016. The value of power generation is just 2500 watt is 25000 watt in 2015 which is approximately 10 times.

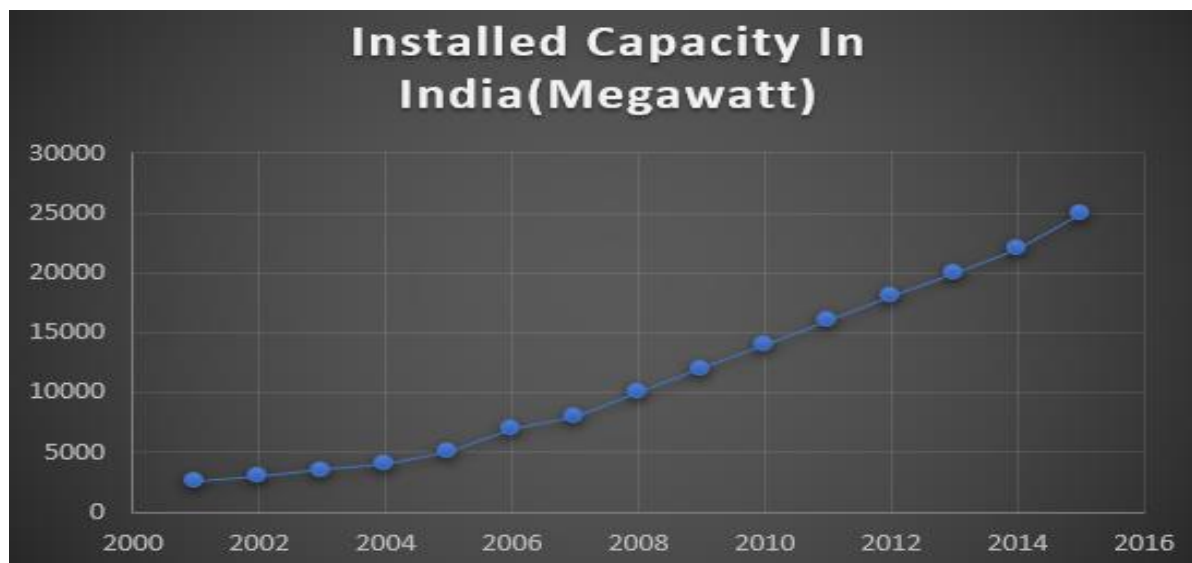


Figure 4: Graphical Representation of Install Capacity in India.

The use of renewable is increasing day by day therefore the energy capacity is increasing day by day. The Table 4 shows energy capacity additions of five years (Wind, Municipal Solid Waste, Bagasse Cogeneration, Small Hydro, Industrial Waste and Biomass) which start from year 2012 to year 2017.

Table 4: Energy Capacity Additions from Year 2012 to 2017.

Source	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Wind	302	301	301	301	301
Municipal Solid Waste	0	0	0	0	0
Bagasse Cogeneration	51	51	51	51	51
Small Hydro	11	11	11	11	11
Solar Thermal, Solar Photovoltaic and others	51	51	51	51	51
Biomass	26	26	26	26	26
Industrial Waste	101	101	101	101	101
Total	541	541	541	541	541

Figure 5 shows the energy capacity addition from year 2012 to 2017. This shows the maximum addition is in wind and the value is 302. The minimum addition is municipal solid waste addition is zero because there is not easy to use municipal solid waste for the production of energy.

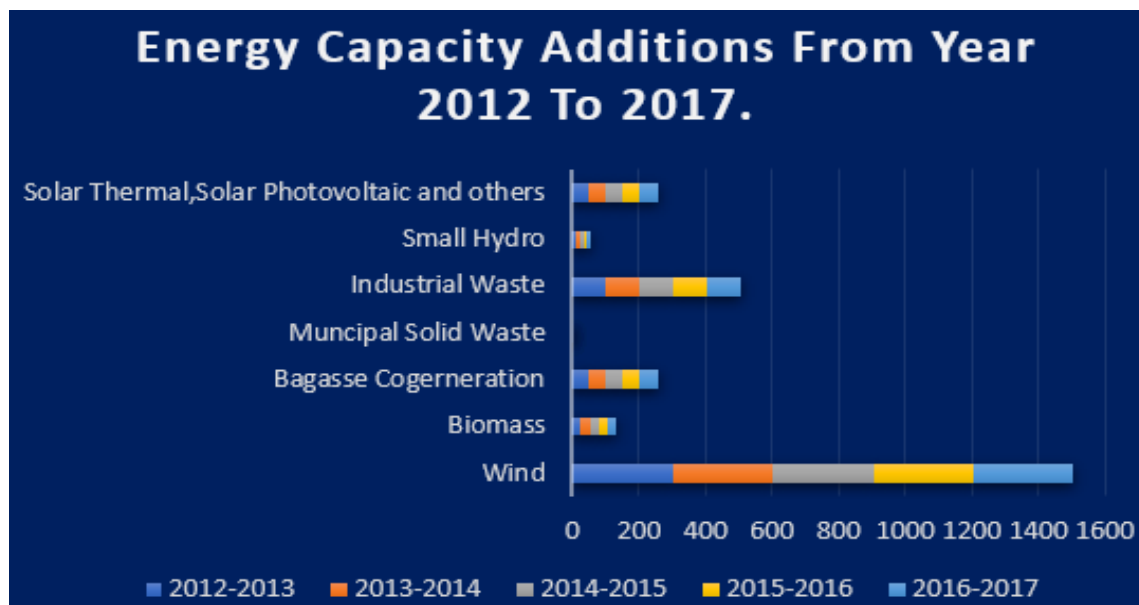


Figure 5: Graphical Representation of Energy Capacity Additions from Year 2012 to 2017.

USAGE OF WIND ENERGY

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

1) For Produce Wind Powers:

The generation of electricity is one of greatest popular applications of the wind energy. Wind turbine captures energy of wind during this operation. When the wind begins to drive the turbine's wheels, a rotor starts to spin, producing electricity.

2) In the Transportation:

Transportation is another use of wind energy. Wind energy has been used for sailing through civilizations for thousands of years. Sailing is thought to have existed in some way since at least five hundred BC, according to researchers. We've seen both big and small ship able of sailing under the influence of the wind in recent years.

3) In the Food Productions:

Wind energy has long been used in the food industry. Windmill is commonly usage for the milling grains prior to the industrial revolution so it might be using to make food like bread. The invention of electricity and engines in more modern times has made such systems obsolete. As result, manufacturers are now able to process products like flour more quickly.

4) For Pump Water:

Wind pump resemble typical windmills in appearance, but in its place of milling grains, they may pumping water. Historically, these systems were used for ground drainage. Owing to the invention of electric engines, wind pump, like windmill use in the food manufacturing, have nearly all replace.

BENEFITS AND DRAWBACKS OF WIND POWER

Wind energies are usage of wind for provides mechanical powers by wind turbine for turn the electric generator for the electrical powers. Wind powers are a common sustainable, renewable sources of energy that has a lower environmental effect than burning fossil fuels. There are lots of advantages of wind energy some are given below:

1) Wind Create Jobs:

The wind industry in a 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) Wind Powers Are Cost Effective:

It's one of most affordable clean energy technology available nowadays, with costs ranging from four to six percent's in one kilowatt per hour, depending on wind power and projects financing [5].

3) Wind Enable United States Industry Growths and United States Competitiveness:

Novel wind developments account for over 10 dollar billions in annual investments in the United States economy. The United State has huge domestic capital and highly educated population, permitting it's to contribute in renewable energies markets on global scales.

4) It is Clean Fuels Source:

Wind energy doesn't pollutes air such as power plant that relays on the combustion of the fossil fuel, like natural gas or coal, which emits particulate matters, nitrogen oxides, as well as sulfur dioxide causing humans health problem as well as economic damage. Wind turbine don't produces atmospheric emission that causes, greenhouse gases or the smog acid rain.

5) Wind's Local Source of the Energy:

The wind supplies in United State is unrestricted and plentiful. Wind powers production in United State has increase at rates of fifteen percent in one year over last ten year, makings it country's major clean energy sources.

There are some disadvantages by using wind energy are given below:

- i) Wind energy is volatile since the quantity of the electricity produced is determined by the wind's speeds and directions.
- ii) Wind turbines have the potential to alter the landscape's appearance.
- iii) Wind turbine may damage habitat of the birds as well as marine life.
- iv) Wind farm may expensive for construct[1].

LITERATURE REVIEW

The numerous researcher and their researches on the topic wind energy are given below: Ravindra B. Sholapurkar et al. studies energy is the most important need as the world's population, economy, as well as socioeconomic development rise. Fossil fuels have about 87 percent of global oil. In terms of wind energy output, India is ranked fourth in worlds. Wind energies in India has grown by around 17 percent in last 5 years. This expanding Indian wind's energy markets is compare to the global picture as well as the state of the Maharashtra in the India, that ranks second in the region, using a comprehensive database. Their study covers the state of wind energy in Maharashtra over last rare years, as well as forecasts for the next rare years, taking into account factors like wind plant installations, total capability, declare wind site, wind powers intensity at various altitudes, and many more. The proposed wind sites with tracking stations and velocity are also included in their study. The importance of that work that's it investigates wind potentials and allows reader for assess the upcoming demand in that area, as well as potential investments in the wind powers generation. It also looks at the spectrum of wind energy growth and investment, as well as the policies that govern it.[2].

Devashish et al. studies in recent years, concerns about renewable energies sources, especially wind energy for electricity generation, have risen in the current years. Engineers and scientists have conducted extensive experiments and testing in order to find a method for the effective use of the wind energies. Our daily activities are heavily reliant on oil, so energy analysis is extremely critical and responsive. Wind energy is still commonly used for the electrical powers generation as result of intensive studies. In their paper, they attempt to provide a brief overview of a wind energies conversion schemes, emphasizing its aerodynamics, electrical, and mechanical dimensions, as well as various control techniques. The importance of the survey results, continuing studies, and future potential upgrades for the wind energies conversion system have all been addressed[3].

G. M. Joselin Herbert et.al studies energy is a necessary component of socioeconomic transformation and economic expansion. Wind energy, for example, is a renewable energies source that is native to the area and can help to reduce reliance on the fossil fuel. The sun constantly replenishes wind, which is an indirect source of the solar energies. Wind's caused by sun's unequal heating's of the earth atmosphere. It is estimated that

the earth's wind provides approximately ten million megawatts of electricity on a continuous basis. Wind energy offers environmentally and flexible sustainable alternate, as well as national energies stability at the time when the diminishing worldwide fossil fuels supplies endanger the global economy's long term viability. Their paper examines wind resource estimation models, site selections models, as well as aerodynamic model that take into account the wakes effect. The numerous current efficiency and reliability assessment models, as well as various issues with wind turbine components (generator, converter, blade and gearbox,) and the grid to the wind energy systems, were addressed. Their paper also examines various strategies and loads for wind energies conversion systems architecture, control systems, and economics[4].

Sujoy Chakraborty et al. studies alternative energy sources, wind energies conversion devices have been focal points. Since the dawn of the twenty-first century, there has been a surge of interest in new as well as renewable's energy sources, including winds energies for electricity generations. Investigators and scientists attempted for speed up the development of solutions for wind energy generation design parameters. Our lives are inextricably linked to the energy and its use, making energy analysis particularly necessary and responsive. Wind energy has quickly gained favor among society, business, and politics as a renewable, realistic, cost-effective, and environmentally sustainable alternative. Wind energy has recently been implemented in a variety of industries as result of comprehensive research on the topic, and it has begun to contend with other energy options. Wind energy is discussed in their paper, and the stochastic nature of the wind, winds power meteorology's, greenhouse-effect, as well as global climates changes are all discussed, as well as the possibility of further debate[5].

DISCUSSION

After the study and analysis of above literature review on the topic wind energy author find that the researcher did the analysis of various data in statistically but they can did it better may be they have no such tool for analysis for different data. This paper focuses all about the wind energy and the growth of wind energy day by day for power generation. This review talks about the various data (such as install power production worldwide in gigawatt from the year 2004 to the 2015, install capacity of turbine in india, energy capacity additions from year 2012 to 2017 and Contributions of the Power Generations from the Renewable Energy) and their analysis by using different tool which is use for analysis such etc.This paper also give the wind turbine power production systems which is use for the power production by use wind energy, usage of wind energies as well as benefits (Wind create jobs, wind powers are cost effective, wind powers are cost effective etc.) and drawbacks(wind turbines have the potential to alter the landscape's appearance, wind turbine may damages habitat of the birds as well as marine life's of winds power etc.)

CONCLUSION

This paper focuses on wind energy, including the definition of wind .The increasing use of wind energy for power generation day by day. This study discusses various statistics and their interpretation using various tools for analysis. This paper further discusses wind turbine power generation systems, which are used to generate electricity using wind energy and the usual block diagram of a modern wind powers generation systems as well as this review talks about the various data and their analysis. The potential path way for the wind powers to contributes to future electricity need of ways for the wind powers to the contributes to future electricity need of nation, with objectives like reduce carbons emission, improved airs quality, as well as reduced waters use.

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