Trend of Wind Turbines in Gadag District, Karnataka State

Dr. Shridhar Mudakavi[1], Dr. Aravind A. Mulimani[2]
[1]Guest Faculty, Dept of Geography
[2]Professor and Chairman, Dept of Geography
[1, 2] Karnatak Science College, Dharwad, Karnatak University, Dharwad, Karnataka State. India

Abstract- *The present paper is focused on trends of wind turbines in the Gadag district. Wind energy is one of the fastest growing alternative energy form of energy generation due to the increasing cost-competitiveness, environmental awareness and political pressure. The wind turbine has evolved into a highly specialized device whose configuration, size and technological sophistication are the mater for its function. The study area, located in the western part of northern Karnataka lies between 14º 56' to 15º 53' North latitude and 75º 17' to 76º 02' East longitudes. It has an area of 4656 Square Kilometres with a population of 10,64,570 (2011). There are 346 settlements and nine towns have been distributed in the five Talukas of the study area..There are 750 Wind turbines have been installed by Wind World India Limited, Suzlon Energy Limited, Bhoruka Power Corporation Limited and some other companies in various settlements in the district from 1996 to 2016. The main objective of the study is discussing the trends of wind turbines. The study is based on the secondary source of information and has been collected from the Karnataka Renewable Energy Development Limited (KREDL) and the analytical method has been employed and accordingly discussed.*

Keywords- Wind Turbine, Growth, Alternative Energy and Companies

I. INTRODUCTION

The extraction of power from wind is not a new concept; it is as old as the civilization. In the ancient time, the wind power ships have used and gained the wind mills and accordingly adopted the mechanism for the generation of wind through the machine. Therefore, the wind turbines have been designed and installed and paved the way for an established industry.

Machines are manufactured with a capacity from a few Kilowatts to several Megawatts. Most of the machines are built for electricity generation, either linked to a grid or in an autonomous mode (Siraj Ahmed, 2013). Wind energy is currently the fastest growing form of energy generation due to the increasing cost-competitiveness, environmental awareness and political pressure (Kamau, 2010). The wind turbine has evolved into a highly specialized device whose configuration, size and technological sophistication are the mater for its function. The horizontal axis orientation continues to be dominant in wind power production, as it has been for most of the modern era.

A wind turbine is a device, that converts kinetic energy from the wind into mechanical energy. If the mechanical energy is used to produce electricity, the device may be called a wind generator or wind charger. If the mechanical energy is used to drive machinery, such as for grinding grain or pumping water, the device is called a windmill or wind pump. Wind turbines, like aircraft propeller blades, turn in the moving air and power an electric generator that supplies an electric current. The wind turbine is nothing but it is the opposite of a fan. Instead of using electricity to make wind, like a fan, wind turbines use wind to make electricity. The wind turns the blades, which spin a shaft, which connects to a generator and makes electricity (Wind Energy Development Programmatic Environment Impact Statement information Center, USA).

II. STUDY AREA

Gadag district is being the study area, located in the western part of northern Karnataka lies between 14º 56' to 15º 53' North latitude and 75º 17' to 76º 02' East longitudes. It has an area of 4656 Square Kilometres with a population of 10,64,570 (2011). The density of population is 229. There are 346 settlements and nine towns have been distributed in the five Talukas of the study area (Fig No : 1). The literacy is recorded with 75.12 has compared to the state average (75.60) is much lower. It has drought prone characteristics and not much prosper in agriculture activities. The socio-economic activities are have been carried out with availability of the limited resources prevailed in the study region. It is situated at 660 meters above the mean sea level and wind speed remains in the range of 0.3 meter/Per second to 11.0meter/per second. According to Meteorological Department. Karnataka Renewable Energy Development Limited (KREDL, 2016) concerned, it has approved the wind velocity as suitable for

wind power generation in the district. The present study is mainly focusing on the growth of wind turbines and distribution of turbines in the study area. There are 750 wind turbines has been installed in various settlements in the district from 1996 to 2017.

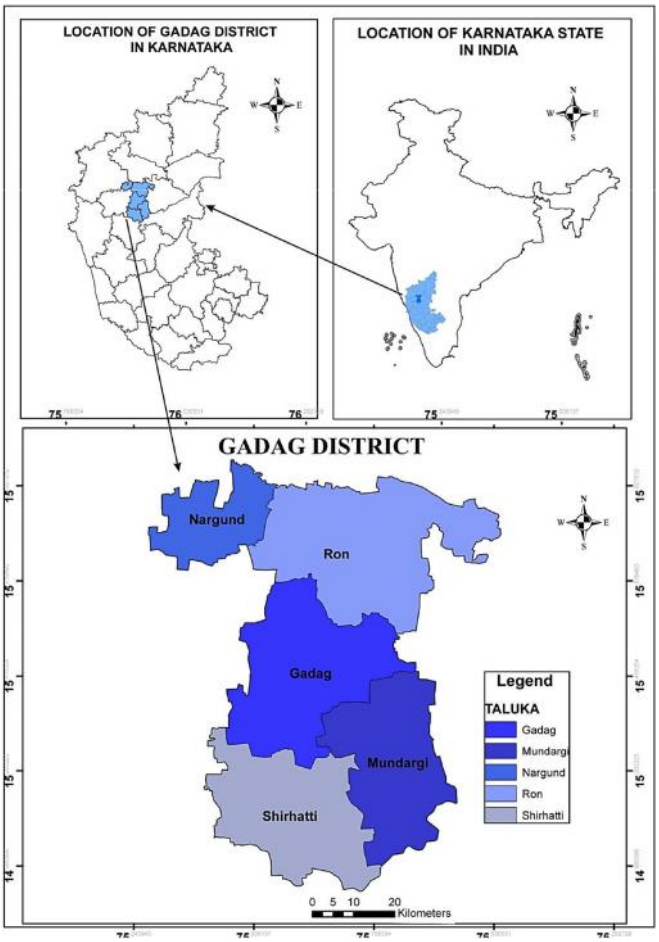

Fig No : 1

III. OBJECTIVES

The main object of the paper is focused on to analysis the growth of wind turbines in the study area.

IV. HYPOTHESIS

It is hypothesed that that growth of wind turbines are an outcome from the physico- climatic characteristics.

V. DATA BASE AND METHODOLOGY

The study is based on the secondary source of information and has been collected from the Karnataka Renewable Energy Development Limited (KREDL), related to the location and year of installation of wind turbines. The collected information has brought in the form of tables and maps. The analytical method has been employed and accordingly analyzed.

VI. ANALYSIS

In India, the demonstration type of wind energy projects were started in 1985 with 69.6 Mega Watts of energy generation at various locations in India. Subsequently, in 1986 five wind farms were started with a capacity of 3.3 Mega Watts of generation. The first commercial wind power generation set up at Kattadilalai, Muppandal in Tamil Nadu State in 1990. Until 1992, many wind turbines were installed in coastal areas of Tamil Nadu, Gujarat, Maharashtra, and Orissa States. After 1996, India has seen steep growth in wind power production and emerged as Asia's biggest and tallest wind turbine was built in Kutch region of Gujarat State in 2004 (Ravindra B. and Yagesh S. 2015).

Karnataka State is being the Fifth highest installation of Wind turbines followed by Tamilnadu, Maharastra, Gujarat and Rajastan States in the India. There are 3841 Wind turbines have been installed in 16 District. In 1994-95 Five Wind turbines are started with a capacity of 0.550 Mega Watts power generation in Talakavery, Madikeri, developed by Karnataka State Small Industries Development (KSSIDC). Today, there are 3841 Wind turbines have been installed with a capacity of 4654.835 Mega Watts power generation.

Gadag is district being the study area and is situated at 659.8 meter above sea level where wind speed remains in the range of 6.4 to 7.0 meter per second, as per the Meteorological Department. Karnatak Renewable Energy Development Limited (KREDL) has also approved the wind velocity as suitable for wind power generation in the district. Gadag distinct has a privilege to get the first wind turbine in the state in 1996, which was installed by National Environment Protection Council India Limited (NEPC India Ltd) at Kappattagudda, near Nagavi village. Now, 750 Wind turbines have been installed by Wind World India Limited, Suzlon Energy Limited, Bhoruka Power Corporation Limited and some other companies. Five major companies – Wind World India, Suzlon Energy, Bhorukar Power Corporation, JNI Investments and Trading and Tejasri Developers were asked to meet 75 percent of allocated capacity of the district. Until now, Suzlon Energy has commissioned units with an installed 125 mega watts out of 185 mega watts allotted to it. Enercon India has commissioned 186 mega watts out of 315 mega watts allotted, according to Karnatak Renewable Energy Development Limited (KREDL) records.

VII. GROWTH OF WIND TURBINES IN GADAG DISTRICT

In the study region, there are 750 wind turbines has been installed in various settlements in the district from 1996 to 2016. The year wise analysis has been made to understand in the varies settlement for the installation of wind turbines in the district.

TABLE NO 1: GROWTH OF WIND TURBINES IN GADAG DISTRICT.

Sl No	Installation Year	Name of the Settlements	No of Settlements	No of Wind Turbines
01	1996	Kappattagudda	01	15
02	1998	Beladhadi	02	15
		Mallasamudra		
03	2002	Kappattagudda	----	11
04	2005	Hosur	01	31
		Kappattagudda		
05	2006	Harogeri	08	75
		Hirewaddatti		
		Kalakeri		
		Kappattagudda		
		Kelur		
		Mustikoppa		
		Machenehalli		
		Majjur		
		Rantur		
06	2007	Harti	08	166
		Kurthakoti		
		Sirunji(Sirund)		
		Kappattagudda		
		Korlhalli		
		Mundaragi (Rural)		
		Shingatalur		
		Nargund		
		Gajendragad		
07	2008	Asundi	07	166
		Beladhadi		
		Binkadakatti		
		Harti		
		Kanavi		
		Kurthakoti		
		Mulagund		
		Venkatapur (Inam)		
		Jyalawadagi		
		Kappattagudda		
		Shingatarayanakeri		
08	2009	Beladhadi	04	90
		Binkadakatti		
		Harti		
		Hosur		
		Hulakoti		
		Kanavi		
		Mulagund		
		Narsapur		
		Shirol		
		Sirunji(Sirund)		
		Kappattagudda		
		Goudageri		
		Naregal		
09	2010	Kalasapur	03	16
		Rajur		
		Vadegol		
10	2011	Advisomapur	04	26
		Kalasapur		
		Papanasi		
		Sambhapur		
11	2012	Yalishirur	01	17
12	2014	Advisomapur	03	64
		Kalasapur		
		Nabhapur		
		Nagavi		
		Papanasi		
13	2015	Beladhadi	01	23
		Yelishirur		
		Gojanur		
14	2016	Abbigeri	02	35
		Magadi		
	Total		44	**750**

Source: Compiled fromKarnatak Renewable Energy Development Limited (KREDL), 2016-17.

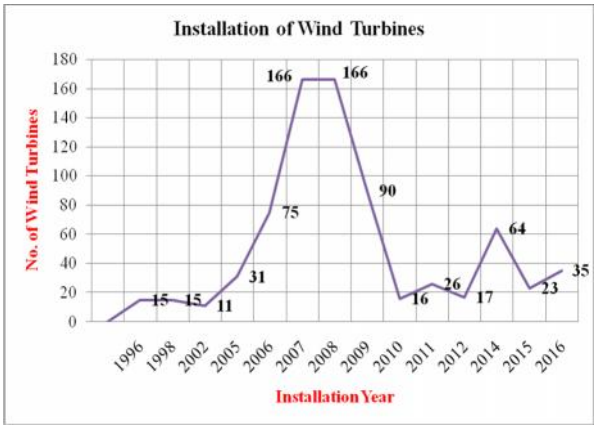

Fig No: 2

In the year 1996, first of its kind that the wind turbine installed in the Kappattaguddaof Mundaragi taluk with 15 turbines. Later on in 1998, 15 turbines have added and installed Beladhadi and Mallasamdra of Gadag taluk. Between 1999 to 2001 there is no wind turbine have not been set up in the study region. Again in 2002, 11 turbines have installed in Kappattagudda. In 2005, 31 turbines have installed in Hosur (Gadag) and Kappattagudda. In 2006, 75 turbines have installed in 09 settlements. 166 wind turbines have been installed in 09 and 11 settlements in the year of 2007 and 2008 respectively (Table No : 1 and Fig No : 2). In 2009, 90 turbines have installed in 13 settlements. In 2010, there were 16 wind turbines are installed in 03 settlements. In 2011, 26 turbines have installed in 04 settlements. In 2012, 17 turbines installed at Yelishirur settlements. In 2014, 64 wind turbines installed in 05 settlements. In 2015, 23 turbines have installed in 03 settlements. Recently, 35 wind turbines are installed in two settlements in the year of 2016. Therefore, the growth of wind turbines are an outcome from the physico-climatic characteristics hypothesis has been accepted.

VIII. CONCLUSION

Gadag district is one of the leading districts of wind turbine installation in the Karnataka state next to Chitradurga district. There are 750 wind turbines have been installed in 44 settlements in five talukas from 1996 to 2016, which is good sign for the development of wind energy in the study area. Out of 750 wind turbines, 497 wind turbines have been installed in the year of 2006 to 2009 within the span of three years 253 installations are an indication of fast growth rare in the study area.

REFERENCES

[1] Kamau, J. N, Kinyua, R, and Gathua, J. K. (2010) : 6 Years of Wind Data for Marsabit, Kenya Average Over 14m/sat 100m Hub Height: An Analysis of the Wind

Energy Potential. Renewable Energy: An International Journal, Vol-35, No-6, PP. 1298-1302.

[2] Ravindra B. SandYagesh S. M (2015) : Review of Wind Energy Development and Policy in India;Energy Technology and Policy. An Open Access Journal. Vol-2,Issue-1, PP. 122-132.

[3] Siraj Ahmed (2013): Wind Energy: Theory and Practice, PHI Learning Private Limited, Delhi. ISBN-978-81-203-4490-7.

[4] http:/www.kredl.kar.com: Karnatak Renewable Energy Development Limited (KREDL).

[5] http://windeis.onl.gov/guide/basics: Wind Energy Development Programmatic ESI: An Online Public Information and Involvement Resource.