S.A.V.V.P. Samiti's

A REPORT ON MINOR RESEARCH PROJECT

" GENERATION OF WIND POWER IN GADAG DISTRICT"

APPROVED BY UGC – IX PLAN

SUBMITTED TO

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Tq: Ron Di: Gadag

FINAL REPORT

" GENERATION OF WIND POWER IN GADAG DISTRICT"

Human have been using wind power for at least 5,500 years t propel sailboats and sailing ships. Windmills have been used for irrigation pumping and for milling grain since the 7 th Century AD in what is now Afganisthan, India, Iran and Pakistan. In July 1887, a Scottish academic, Professor James Blyth, undertook wind power experiments that culminated in a UK patent in 1891. In the US Charles F.Brush produced electricity using a wind powered machine, starting in the winter of 18874888, which powered his home and laboratory until about 1900. In the 1890s, the Danish scientist and inventor poulla cour constructed wind turbines to generate electricity, which was then used to produce hydrogen. These where the first of which was to become the modern form of wind turbine.

In 2010, Spain became Europe's leading producer of wind energy, achieving 42. 976 GWh. However, Germany holds the first place in Europe in terms of installed capacity, with a total of 27,215 MW at December 31,2010. Wind power accounts fro approximately 21% of electricity use in Denmark, 18% in protugal, 16% in Spain, 14% in the Republic of Irlend and 9% in Germany,

Top 10 wind power countries (Feb.2011) – Chaina - 44,733 (MW), United States -40,180 (MW), Germany -27,215 (MW), France 5,660 (MW), United Kingdoom – 5,204 (MW), Canada – 4,008(MW), Denmark = 3,734 (MW),

OBJECTIVES:

(1) To Know Growth & Production of Generation of wind power in Gadag District.

(2) To Know the Environmental Settings of Gadag District. Karnataka.

(3) To Know The Renewable Energy Resource in Karnataka.

(4) To Know the Wind Power Generation in India.

(5) To Know the Problems & Prospectus of Generation of wind power in Gadag District.

The Minor research project is divided into 7 Chapters .

CHAPTER – I INTRODUCTION

Wind power is the conversion of wind energy into useful form of energy such as using wind turbines to make electric power, wind mills for mechanical power, wind pumps, for water pumping, or drainage or sails to propel ships.

Wind power, as an alternative to fossil fuels, in plentiful, renewable, widely distributed, clean, produces no green house as emission during operation and uses little land. The effect on the environment are generally les problematic than those from other power sources. As of 2011 Denmark is generating more than a quarter of its electricity form wind and 83 countries around the world are using wind power to supply the electricity grid. In 2011 wind energy production was over 2.5% of total world wind electricity usage, and growing rapidly at more than 2.5% per annum.

In 2010, Spain become Europes leading producer of wind energy achieving 42976 GWh. However, Germany holds the first place in Europe in terms of installed capacity with a total of 27215 MW at December 31, 2010. Wind power account for approximately 21% in Spain, 14% in the Republic of Ireland and 9% in Germany.

Top 10 wind power countries – China – 75324 (MW) United States – 60007 (MW), Germany – 31308 (MW), Spain – 22796 (MW), India – 18421 (MW), United Kingdom – 8845 (MW), Itally – 8144 (MW), France – 7564 (MW) Canada – 6200 (MW), Portugal – 4525 (MW), Rest of World – 39853 (MW) Total Wind Power capacity of the world is 282587 (MW)

India has the fifth largest installed wind power capacity in the world. In 2009-10 India's growth rate is highest among the other top four countries. As of 31st Jun 2013 the installed capacity of wind power in India was 19661.15 MW mainly spread across Tamil Nadu (7154 MW), Gujarat (3093MW) Maharastra (2976MW) Karnataka (2113 MW) Rajasthan (2355MW) Madya Pradesh (396 MW), Andra Pradesh (435 MW) Kerala (35.1 MW) Orissa (2MW) West Bengal (1.1 MW) and other state (3.20 MW). It is estimated that 6000 MW of additional wind power capacity will be installed in India by 2014. Wind power accounts of 6% of Indias total installed power capacity and it generated 1.6% of the country's power.

There are many small wind farms in Karnataka, making it one of the states in India which has a high number of wind mill farms.

Chitradurga, Gadag are some of the districts where there are a large number of windmills. **Chitradurga alone has over 2000 wind turbines. The 13.2 MW Arasingundi (ARA) and 16.5 MW Anaburu (ANA) wind farms are ACCIONA's first in India. Located in the Davanagere district.** (Karnataka State), they have a total installed capacity of 29.7 MW and comprise total 18 Vestas 1.65 MW wind turbines supplied by Vestas wind Technology India Pvt Ltd. The ARA wind farm was commissioned in June 2008 and the ANA wind farm, in September 2008. Each facility has signed a 20 years Power Purchase Agreement (PPA) with 100% of the output. ARA and ANA are Acciona's first wind frame eligible for CER credits under Clean Development Mechanism (CDM).

CHAPTER-II ENVIRONMENTAL SETTING OF STUDY AREA.

Gadag District is located in the central part of Karnataka State and has a geographical area of 4657 Sq km. Gadag District is bounded by Bagalakot district in the north, Dharwad district in the west, Haveri and Ballary districts in the south and Koppal district in the east. It lies between 75^0 16 to 76^0 03 E longitude 14^0 56 to 15^0 53 N latitude. Gadag district is part of the eastwhile Dharwad District.

According to the Population of India in the Census in the year 2011, Gadag District had population of 1,065,235 of which male and female were 538,477 and 526,758 respectively. In 2001 census, this figure for Gadag District was at 1.84 percent of Maharashtra population.

The average literacy rate of Gadag in 2011 was 75.18 compared to 66.11 of 2001. If things are looked out at gender wise, male and female literacy were 84.89 and 65.29 respectively.

Gadag District is predominantly an agriculture-based district and cultivable land is the backbone of its economy. Agriculture contributes to about 65.5 percent of the income of the district. The main food crops are jowar, wheat, maize and pulses while the important commercial crops are groundnut, chillies, onion and cotton. The major horticultural crops grown in the district are pomegranate, chickoo and flower. Sericulture activity, though made a beginning, is yet to pick up in the district.

Chapter – III RENEVABLE ENERGY RESOURCE IN KARNATAKA

Karnataka is endowed with renewable energy potential like Wind, Hydro,solar, tidal, Geothermal energy resources etc. innovations in wind turbine and micro siting technologies have resulted in accelerated wind farms establishment. There is increasing social acceptance of various solar gadgets with apotential of substantial conventional power savings. Innovations in solar photovoltaic and thermal technology have made it feasible to harness grid and of grid solar power generation projects a reality. Scientific processing and treatment of municipal waste entails power generation besides environment benefits. The bio-degradable Agro residue and waste (biomass) Chemical, Textile, Steel, Cement industry etc. Offers scope for power generation. " The utilization of RE sources for the generation of energy results in zero carbon emissions", Renewable Energy projects have a tremendous potential of generation carbon credits.

There is a potential of about 13000 MW for the development of wind power plants in the state. Wind potential areas in the state are Chitradurga, Gadag, Chikkamanglur, Bellary, Davanagere, Koppal, Bijapur, Bagalkot, Belgaum etc Districts.There is a potential of about

3000 MW for the development of small/Mini/Micro hydel plants in the state. There is adequate availability of agricultural residues (10.5 mill has agricultural land 66.5 lakhs tonn) as well as animal waste from 14 million cattles 91.4 lakhs tons of cattles dung) for establishing Biomass and Biogas plants. As per the study report of HSC on the availability of surplus biomass, 950 MW of power can be generated. Solar is a fast growing clean energy sections of renewable, technological innovations are taking place to make it cost effective. Karnataka is blessed with solar energy, solar insulation available for more than 300 days in a year. Northern districts of the State like Gulbarga, Raichur,Bellary, Bagalkot, Koppal, Belgaum, Gadag, Chitradurga etc are well suitable to harmness solar potential on MW scale.

A. **Small Hydro :** There is potential of about 3000 MW for the development of hydel plants in the state. It is specific site could be river or strem based or canal based, reserves based etc.

B. **Co-generation :** Karnataka has 53 sugar factories generations about 2 lakh tons og bagasse per day. This bagasse is sufficient to

generate about 1500 MW power by using medium/High pressure boiler.

C. **Biomass :** There is adequate availability of agricultural residues (10.5 mill has agricultural land, 66.5 lakh, tone) as well as animal waste from 14 million cattles (1.4 lakh tone of cattle dung) for establishing biomass and biogas plants. As per the study report of IISC on the availability of surplus biomass, 950 MW of power can be generated.

D. **Solar :** Solar is fast growing clean energy sector of renewable, Technological innovations are taking place to make it effective Karnataka. Blessed with solar energy, solar insolation available for more than 300 days in a year Northern districts state like Gulbarga, Raichur, Bidar, Bijapur, Bellary, Bagalkot, Koppal, Belgaum, Gadag, Chitradurga etc are well suited to harness solar potential on MW scale. Solar cities will be developed in the state are Hubli-Dharwad and Mysore. Municipal Corporation has been considered initially for developing as solar cities as per MNR Scheme.

Chapter-IV GENERATION OF WIND POWER IN GADAG DISTRICT

Gadag district in the second in the state of total wind power potential in produces 11.02.28 MW chitradurga district in firs in the state wind power potential it produces 1300 MW.

There are 8 companies situated the different projects in the different that regions in the districts.

The total installed capacity of all the projects are 1110.775 MW the actual capacity produce 531.905 MW.

There are 605 wind electric converters installed capacity of 482.175MW in reftenct bulk meeting points.

Kappatagudda Region.

Kappatagudda region larges producer of wind power capacity in the Gadag District. Wind mast of 80 mtrs height has been installed 234. Wind electric converter installed to produce wind power for different companies viz enercon & KPTC etc total installed capacity 185 MN of power comes fra different places at altitudes.

Suglan infrastructure services wind form at Bagewadi

In the region 20 wind electric converter installed to produce 4.6 MW of power.

Mishi Jayanagar Sugar Ganagapur Gadag

01 wind electric converter produce 30.00 MW of power.

There are after same other companies. Wik a Indofarm (19) contry power ltd (8) at Gajendragad to produce 6.7 MW of power at Gajendragad.

Chapter-V WIND POWER PROBLEMS.

Noise problems

Turbines can, under some circumstances be heard at distances at least as great as 2.5km. While the sound is not loud, some people find it annoying, and at smaller distances (perhaps 1km or less) it may stop some people from sleeping and lead on to anxiety and stress in some people; this, in turn, can lead to health problems.

Power availability and transmission problems

The wind does not blow all the time. When the wind is not blowing wind turbines do not generate power. At times of peak electricity demand on very hot days winds tend to be lighter than average.

When any type of generation is not in the same place as consumption there is the need to transmit the power from one place to another. This requires very expensive high capacity, high voltage, transmission lines. For example, South Australia has much more wind power per capita than other states; if wind generation is high and consumption is low in SA then the power must be sent interstate.

Inequible spread of financial benefit

In early 2013 the farmers who hosted wind turbines were typically paid at least $10 000 per turbine per year by a company runing a wind farm. Their neighbours, who did not host any turbines, received no direct benefit. This, of course, led to envy and resentment.

Invasion of space problems

Some people move to country areas because of the relatively undeveloped feel of the place. Others have lived in an area for a long time and have developed a feeling of attachment to the place as it is and understandably might not think it will be improved by a row of wind turbines on nearby hills.

Aesthetic problems

This is related to the invasion of space problem above. Some people like the look of wind turbines, others hate them; it is a matter of personal preference – 'beauty is in the eye of the beholder'.

Environmental problems

There are a number of environmental concerns that are perfectly valid. Wind turbines do kill some birds and there are problems involved with the necessary distruction of remnant native vegetation and possible erosion problems connected with the building of roads and hardstands. It seems that wind turbines kill a worrying number of bats, but there is a lack of research on this; birds are pretty and visible, bats are rarely seen and are not 'cute and cuddly'.

Chapter-VI WIND POWER IN INDIA

NATIONAL STATUS

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Chapter-VII CONCLUSION.

Minor Research Project was conducted with future prospects & Development in Gadag District.