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Eco-Friendly Energy in South Manchester of the Country

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ABSTRACT: India is one of the fastest growing economies in the world. Energy is an important constituent of infrastructure and it plays a crucial role in the economic development of a country. Energy is an essential input of all productive economic activity, the process of economic development inevitably demands increasing higher level of energy consumption. Search for alternative energy sources particularly renewable energy sources such as wind power has become a compelling necessity. Tamil Nadu ranks first in the Country with the installation of 3525.11MW.

KEYWORDS: GDP, Renewable, Non-Conventional, MNES

I.INTRODUCTION

India is one of the fastest growing economies in the world. Energy is an important constituent of infrastructure and it plays an important role in the economic development of a country. The most important single factor which can act as a constraint on economic growth of a country is the availability of energy. To realize the growth in GDP, it is necessary that corresponding growth in demand of primary energy as well as electricity is estimated and plans are made to meet the demand. There is a direct correlation between the degree of economic growth, the size of per capita income and per capita consumption of energy. Since energy is an essential input of all productive economic activity, the process of economic development inevitably demands increasing higher level of energy consumption.

Classification of Energy

The major sources of energy may be broadly classified into Commercial Energy and Non-Commercial Energy. Commercial Energy consists of coal, petroleum and electricity. Non- Commercial sources of Energy consist of firewood, vegetable waste and dried dung. Both Commercial and Non-Commercial sources together referred to as Conventional Sources of Energy which can be stored. Energy resources are further classified into Non-Renewable and Renewable Energy. Non-Renewable power resources comprise fossil fuel, such as coal, oil and natural gas. Renewable resources comprise bio-mass energy, solar energy, small-hydro power projects, energy from waste and wind energy. Thus, wind energy comes under the Non-Conventional Renewable Sources of Energy.

Energy Scene in India:

Government of India into taking aggressive steps to promote renewable energy. The first major step was the creation of a Commission of additional sources of in 1980. This was followed by the formation of the Department of Non conventional energy sources in 1982. In 1987, the Government set up the Indian Renewable Energy Development Agency (IREDA) to channelize funds towards the renewable sector. In 1992, the Government changed tracks and sets up a new Ministry of Non- Conventional Energy sources (MNES). It is only one of its kinds in the World. These new non-conventional sources of energy like bio-gas, solar energy and wind power may also meet energy needs of the rural areas new thrust is given on environment friendly decentralized energy systems all over the world and India had taken lead in this regard by setting up a commission for additional sources of energy on March 12, 1981 and development of Non-Conventional Energy Sources on September 6, 1982.

Today India is the World's **fifth** largest producer of wind power after Denmark, Germany, Spain and the USA. More than 95 per cent of the nation's wind energy potential is concentrated in five states, Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra, and Gujarat.

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Wind potential:

A notable feature of the Indian program has been the interest among private investors in setting up of commercial wind power projects. The gross potential is 48,561 MW and a total of about 14,158.00 MW of commercial projects have been established.

The installed capacity which was about 40 mw by the beginning of 1992 was increased to about 1340 mw by the end of March 2001. Centre for wind Energy Technology (C-WET) has been established as an autonomous institution.

Wind Energy Development in Tamil Nadu

Tamil Nadu is an India's sixth-most populous state, has emerged as a major hub for renewable energy over the last decade. It is considered as a seventh destination among wind power potential areas of the country. It is endowed with three prominent passes having high wind potential, due to the tunneling effect during South-West monsoon.

Name of the Pass	Districts	Annual average wind Speed (km/hr)
Palghat Pass	Coimbatore, Tirupur, Erode	18-22
Shencottah pass	Tirunelveli, Tuticorin	18-22
Aralvoimozhi Pass	Kanyakumari	19-25
Kambam Pass	Dindigul	19-25

Tamil Nadu ranks first in the Country with the installation of 3525.11MW. 61 per cent of the National Installed capacity of the wind farms has been contributed by Tamilnadu. The single largest area of private wind farms of the country is in Tamil Nadu with an installed capacity of over 415 MW and this is next only to the cluster of wind farms existing at California in United States of America. The First wind Monitoring Station of India was established in Sulthanpet, Coimbatore District in 1986 and India's largest rating of WEG (2mw) is installed only in Tamil Nadu.

Wind Energy development in Coimbatore District

Coimbatore and Tirupur district are bounded by the Western Ghats by North and South west and enjoys pleasant climate throughout the year with heavy rainfall. To the west is the Palghat gap, the only major pass in the long stretch of the Ghats abutting Tamil Nadu and Kerala. The wind flows through Palghat gap serve as source of alternate wind energy in the area were being identified as high wind prone zone. In Coimbatore District, the wind mills are normally installed with 239kw and 250kw capacity and wind mills with 750kw are very rarely installed. Normal height of a wind mill is 50 meter. The cost of a wind mill depends upon its capacity to generate energy. During the study period the number of wind mills and total installed capacity of Palghat pass. Installed capacity of individual WEGs ranges from 200 KW to 2000 KW.

Significance of the Study

Search for alternative energy sources particularly renewable energy sources such as wind power has become a compelling necessity. Hence great awareness has been created among the industrial sector to accept wind power as a solution to the prevailing energy crisis.

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Limitations of the Study

- The scope of the present study is limited because it is confined only to understand the trends of generation and distribution of wind energy in one District.
- The study is based on secondary data and it has its own limitations.
- The findings of this research work are applicable only to the chosen area and it may not be generalized.

II. RELATED WORK

Previous studies related to the objectives are carefully studied and derive the inference for the preparation of this report is as follows

Aviral Kumar Tiwari¹, (2011) examined static and dynamic causal relationships between primary energy consumption, gross domestic product, and CO₂ emissions for India during the period 1970-2007. Since GDP explains 75.9% of the forecast error variance of primary energy consumption, whereas primary energy consumption explains only 0.96% of the forecast error variance of GDP.

A. K. Singh • S. K. Parida (2012) presents the progress made by wind energy in the recent years, and discusses the potential of this technology also investigate the wind energy plants and projects in India. It can be concluded from this analysis that wind energy utilization in India and throughout world has sharply increased.

B.

GOLLAGARI Ramakrishna, RENA Ravinder (2013) reveals that India is energy insecure, in spite of an increase in energy efficiency. It seems energy consumption and GDP are bidirectional related at the aggregate level. In view of these findings some policy suggestions have been provided.

Vinoliya.A Kerlin Antony, Dr.K.Malar Mathi,(2013) found that under Coimbatore and Tirupur districts wind circle, more number of wind mills has been installed in Pollachi area followed by Dharapuram, Coimbatore and Palladam while comparing with other areas in this circle. Also wind mill industry in Coimbatore and Tirupur region has recorded a considerable growth during the year 2007, 2008, and 2009.

III. TEXT INPAINTING

A brief discussion of the methods and procedures followed in the study is given in this part.

Objectives of the Study

Within the State Coimbatore and Tirupur District has a prominent share in wind energy generation. Hence the researcher has made an attempt to study the Generation and Distribution of Wind Energy in Coimbatore and Tirupur District for a period of 10 years from 2000 to 2014. This period is chosen in order to have a high potential, increased number of wind turbines, positive generation growth and up-to-date will be available, with the following objectives.

The **main objective** of this study is identification of the performance of wind energy. The **specific objectives** are:

- Understand the total installed capacity in Coimbatore District.
- Found the achievement and potential of wind energy generation in Coimbatore District.

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Secondary Data

The relevant secondary data were collected from Annual reports published by MNRE, IREDA, Electricity Board different magazines published by the private wind farms like Wind Power Producers' Association namely WINDPRO and, Journals and also from Newspapers and Websites.

Analysis of Data

The data gathered from both primary and secondary sources were analyzed with the help of Averages, Percentages and Tabulation and Graphic representation. The analysis of the collected data helped the researcher to find out the installed capacity, achievement and potential of wind energy generation.

IV. EXPERIMENTAL RESULTS

In the following pages the report presents an analytical discussion of the Achievement and Potential of Wind Energy Generation in Coimbatore District for the period 2000 to 2014 based on the objectives. In India, Tamil Nadu has got the first place in wind energy generation, because nature has endowed the State of Tamil Nadu with 4 passes. In the State, Coimbatore District has a favorable situation and the contributory share is quiet satisfactory over the years

Percentage share of Installed capacity of wind energy in Coimbatore district in Tamil Nadu

Table-1

Year	Installed capacity- Tamil Nadu	Installed capacity - Coimbatore	% Share	Generation- TamilNadu	Generation - Coimbatore	% Share
2000	798.58	9.45	1.18	1.02	0.43	42.16
2001	812.63	7.92	0.97	1.09	0.45	41.13
2002	856.66	24.51	2.86	1.26	0.48	38.19
2003	990.26	49.36	4.98	1.31	0.55	42.15
2004	1361.49	198.02	14.54	1.71	0.75	43.76
2005	2040.22	422.7	20.72	2.26	1.21	53.54
2006	2897.78	266.22	9.19	3.44	1.94	56.33
2007	3475.69	218.22	6.28	5.27	2.52	47.84
2008	3856.76	201.7	5.23	6.07	2.63	43.36
2009	4287.74	213.97	4.99	6.66	3.47	52.14
2010	4889.76	572.25	11.70	8.15	3.64	44.69
2011	5887.16	633.62	10.76	8.72	4.62	52.98

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2012	6970.62	235.36	3.38	9.76	6.26	64.12
2013	7055.47	32.65	0.46	12.95	5.35	41.32
2014	7252.60	113.4	1.56	10.93	4.90	44.83
Total	53433.42	3199.35	5.99	80.59	39.20	48.64

The table explains greater percentage share in Installed capacity and generation. Installed capacity share is around 11 percent whereas generation share is more than 50 per cent. Generation share is comparatively greater than Installed capacity. Palghat pass has a favorable climate for generation like wind speed, density of air, wind velocity, favorable atmosphere in winter. Since Coimbatore has got good atmosphere in wind energy generation its contribution to total state wind energy is phenomenal.

Achievement and Potential of Wind Energy Generation in Coimbatore District

The gap between the achievement and potential constitutes the extent of deficit or surplus in generation. In general, the 1 mw capacity wind mill can generate minimum 2.0 mw energy. This minimum possible potential includes capacity of wind mill, availability of wind, atmosphere, technical and administrative factors.

The relation between the existing installed capacity, minimum possible generation and actual generation in Coimbatore District during the study period is given in the following table. It can be examined for the objective of find out the achievement and potential of wind energy generation in Coimbatore District

Achievement and Potential of Wind Energy Generation in Coimbatore District

Table-2

Year	Installed capacity	Minimum possible generation	Actual Generation	Surplus (+) / Deficit(-)
2000	9.45	18.9	0.43	-18.47
2001	7.92	15.84	0.45	-15.39
2002	24.51	49.02	0.48	-48.54
2003	49.36	98.72	0.55	-98.17
2004	198.02	396.04	0.75	-395.3
2005	422.7	845.4	1.21	-844.2
2006	266.22	532.44	1.94	-530.5
2007	218.22	436.44	2.52	-433.9
2008	201.7	403.42	2.63	-400.8
2009	213.97	427.94	3.47	-424.5

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2010	572.25	1144.5	3.64	-1141
2011	633.62	1267.24	4.62	-1263
2012	235.36	470.72	6.26	-464.5
2013	32.65	65.3	5.35	-59.95
2014	113.4	226.8	4.90	-221.9
Total	3199.35	6398.72	39.20	-6360

Source: TNEB Report

The table clearly states the fact that the minimum possible generation was not obtained the study period. There is enormous potential is identified in the Coimbatore district. Wind turbines depend on wind and since Mother Nature is unpredictable, it cannot be said for certain how much energy a turbine will produce on any given day. Prevailing winds are a good indicator of where to build turbines, but the wind does not always blow. Also, the strength of the wind varies and since most large scale turbines need at least 10mph to get started, if there is only a breeze, no energy will be converted. Generation depends upon wind speed, density of air, wind velocity, direction of wind; also it depends on policy facilitation of TANGEDCO. There is enormous potential for growth of the sector in the state. With greater technological advances and policy frame work of TANGEDCO, the sector is bound to grow further.

V.FINDINGS AND SUGGESTIONS

Energy is a critical infrastructure on which the socio-economic development of India depends. The availability of reliable and quality power at competitive rates to industries will give an edge in becoming globally competitive and help in exploiting the hidden potentials of the country's capabilities. Hence an attempt is made by the researcher to study the generation and distribution of wind energy in Coimbatore District from 2000 to 2014 with the following objectives.

The following are the key findings of the study

- Potential has not been fully utilized due to lack of Investment; lack of strict enforcement, Weak transmits. Wind energy generation also depends to a large extend on the number of wind mills and its capacity, wind speed, density of air, wind velocity, favorable atmosphere in winter, air density is heavier than in summer. Weak transmission infrastructure, Delay in payment which dampers investors' interest.
- Generation share is comparatively greater than Installed capacity. Palghat pass has a favorable climate for generation like wind speed, density of air, wind velocity, favorable atmosphere in winter. Since Coimbatore has got good atmosphere in wind energy generation its contribution to total state wind energy is phenomenal
- There is enormous potential for growth of the sector in the state. With greater technological advances and policy frame work of TANGEDCO, the sector is bound to grow further.

SUGGESTIONS

- The following are the suggestions offered based on the analysis.

To promote wind energy in Coimbatore District

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- To establish the wind farms in new locations in Coimbatore District, the infrastructures like approach road, grid for the power evacuation and substations are to be developed which will help for the easy transportation of the megawatt machines.
- The new locations in the Coimbatore District classified as industry backward areas, which will have benefits from the State Government.
- The potential offered by wind energy in India is vast but it is not harnessed effectively. It is essential that the Central and the State Government particularly Tamil Nadu may extend its full support by way of institutional assistance and the rebates.
- The Tamil Nadu government may give a capital subsidy to the new entrants to the wind sector.

Implications and Future Work

Findings suggest that the availability of a improvable wind resource is not a constraint for wind to play a major role in India's electricity future. This is an important contrast with the previous official estimate of the potential, which, if fully exploited would have provided only about four percent of electricity demand (in energy terms) in 2022. The technical feasibility of integrating large quantities of wind energy needs to be assessed systematically. However, experience from operation of existing power systems in such places as Denmark and Germany and several studies, have indicated the techno-economic feasibility of such integration given effective planning, policies, and programs,

VI.CONCLUSION

Harnessing power from the wind is one of the cleanest and most sustainable ways to generate electricity as it produces no toxic pollution or global warming emissions. Wind is also abundant, inexhaustible, and affordable, which makes it a viable and large-scale alternative to fossil fuels. Despite its vast potential, there are a variety of environmental impacts associated with wind power generation that should be recognized and mitigated.

REFERENCES

1. Aviral Kumar Tiwari, " Primary Energy Consumption, CO2 Emissions and Economic Growth: Evidence from India", SEE Journal, November 2011, pp.93-113. 2011
2. G.Balachandar, "Green Power sector may miss target 2nd year in a row", THE HINDU, Jan 18, 2014, ISSN No 0971-751x.
3. G.Balachandar, "Renewable capacity addition lower in H1", THE HINDU, , ISSN No 0971-751x. Nov5, 2014
4. Chary, Swaroop R; Bohara, Alok K, "Energy Consumption in Bangladesh, India, and Pakistan - A Cointegration Analysis", ProQuest, 23 August 2014.
5. GOLLAGARI Ramakrishna, RENA Ravinder, "An Empirical Analysis Of Energy Consumption And Economic Growth In India: Are They Causally Related?" STUDIA UBB, OECONOMICA, Vol. 58, Issue 2. 2013
6. Jie HUANG et al., "Simulation analysis on policy interaction effects between emission trading and renewable energy subsidy, J. Mod. Power Syst. Clean Energy (2013) 1(2):195-201. 2013
7. Radzi Anis & Droege Peter, "Latest Perspectives on Global Renewable Energy Policies", Curr Sustainable Renewable Energy Rep (2014) 1:85-93. 2014
8. T.Ramakrishnan, "Marginal capacity addition casts a shadow over Wind Energy", THE HINDU, , ISSN No 0971-751x. Apr 9, 2014
9. A. K. Singh • S. K. Parida, "Evaluation Of Current Status And Future Directions Of Wind Energy In India", Springer-Verlag Berlin Heidelberg, Clean Techn Environ Policy (2013) 1, pp.:643-655. 2013.
10. M.Soundarya Preetha, "Wind Energy Generation on upswing in State", THE HINDU, . ISSN No 0971-751x. May 15, 2014
11. Vinoliya.A Kerlin Antony, Dr.K.Malar Mathi,() "An Insight into the windmill Industry (With special Reference to Coimbatore and Tirupur Districts)", Asian Journal of Multidimensional Research, vol.2, Issue4 April 2013. PP.33-45. 2013
12. 18. Wolfram Catherine, Shelef Ori, and Gertler Paul, "How Will Energy Demand Develop in the Developing World?", Journal of Economic Perspectives, Volume 26, No.1, Winter 2012, Pages 119-138. 2012
13. Zhongfu TAN et al., "Potential and policy issues for sustainable development of wind power in China, J. Mod. Power Syst. Clean Energy (2013) 1(3):204-215. 2013

WEB SITES

1. <http://www.census.en.nic.in>



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(An ISO 3297: 2007 Certified Organization)

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2. www.ge.wind.energy.com
3. <http://ireda.nic.in>
4. www.seawestpower.com
5. www.tneb.org
6. www.windpower.dic
7. www.windpowerindia.com
8. www.mnre.gov.in
9. www.indiawindpower.com
10. <http://www.cwet.tn.nic.in>