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Wind Energy: A Sustainable Source of Energy

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Abstract

The present paper has made an attempt to focus discuss the major wind energy production states in India in particular and world in general. The development of any geographical region is largely depends upon the energy and accordingly the socio-economic activities have been carried out along with day to day's activities. Therefore, their would be a greater demand for the energy. The conventional energy is not sufficient to meet out the requirements of not only the day to day's activities but also major economic activities in the world. To compensate the deficiency of this kind of energy, the alternative energy is inevitable. The prosperity of the nation is depends upon the energy. As a result, the alternative energies are ultimate to fulfill the requirements of all kind of activities in the world, where Indian is also not an acception. The main objective of the study is to focus on the wind energy scenario in the world and to study the role of Karnataka State in wind energy production in India.

Wind energy is being sustainable source of energy produced globally. Very few countries are leading in the world to generate all kind of energies to meet out the deficiency of the conventional energy. As per the, Global Wind Energy Council (2014) observation that India is being Fifth Ranking nation in the world for its installation of wind turbines and contribute the energy to the tune of 6.07 percent followed by China, U.S.A, Germany and Spain. India is also placed as a major player in the global wind energy market. The Indian wind energy sector has an installed capacity of 28,082.95 Mega Watts (2016) in terms of wind power installed capacity, Tamilanadu state is leading in wind energy production capacity in the nation. The study is based on the secondary source of information and has been collected from the Global Wind Energy Council and Ministry of New and Renewable Energy (MNRE) Government of Karnataka/India and the analytical method has been employed and accordingly analyzed.

Key Words: Wind Energy, Sustainable Source and Prosperity.

Introduction:

The geographical region is needed to develop through the available resources and their utilization. The process of utilization of the resources is also depends upon the energy sources of the area. The multifold activities are carried out through the energy to the expected level. The survey of energy and its potentiality is the matter for the utilization. The amazing growth of population and their requirements are in alarming rate. To coup up with the utilization of energy is need of the hour and to be harnessed to the expected level. The conventional energy is having scarcity for one or the other reasons and to face the acute shortage of the energy one of the serious issues to carry out the day to day's activities.

Energy is one of the key factors not only to deal the economic activities but also determine the human welfare in all the facets of the life. The development of any nation in the world is largely depends upon the resources utilizations through the energy. Therefore, the variety of the activities and vibrant economy is decided by the energy and also contributing the economic growth of the nation. The amazing growth of population is required the varieties of the economic activities are to be carried out and hence, the energy is an indication for the overall development. The science and technology is

growing very past and helping to improve the economy through the utilization of the energy and determined the quality of the life and the livelihood of the people in any geographical space in the world.

The availability of particular form of renewable energy differs by region, and the potential to use it differs by the technologies available (Elizabeth L Golden, 2011). The alternative energy is also gaining much significance not only to the economic point of view but also to the all the activities of the human being in the world.

The development of any geographical region is largely depends upon the energy and there would be a greater demand for more energy. To compensate the deficiency of the conventional energy, the alternative energies are the need of the hour and hence, there exist the direct relationship between development and energy consumption. As a result, the alternative energies are ultimate to fulfill the all the requirements of the people in the world, where Indian is also not an acceptation under this.

As far as Indian scenario is concerned , it has its own ancient mythology related to the wind energy that the universe and all that it contains is essentially, composed of the Panchatatva or Five basic elements comprising Prithvi (Earth), Jal (Water), Agni (Light), Vayu (Wind) and Aajash (Sky). Besides occupying a central place in mythology where the wind energy has been recognized as an important source provided by nature that can be harnessed and utilized for different purposes and accordingly it beliefs hold good and practices in India.

Objectives: The study has fallowing objectives and are as follows:

1. To discuss the wind energy scenario in the world
2. To discuss the role of Karnataka state in wind energy production in India.

Data Base and Methodology:

The study is based on the secondary source of information and has been collected from The Global Wind Energy Council and Ministry of New and Renewable Energy (MNRE) Government of Karnataka/India. The collected information has brought in the form of tables and maps. The analytical method has been employed and accordingly analyzed.

Wind energy is one of the most important renewable sources of energy and emerged as a major sustainable source of energy. Wind energy is the kinetic (moving) energy of air in motion relative to the surface of earth and the wind vector is considered to be composed of a steady wind plus fluctuation about the steady wind. Wind is promoted nature and sustainable energy resource.

Wind energy as an alternative to fossil, renewable, clean and widely distributed in specific locational characteristics of the geographical area and to generate the energy with acquiring little space and no greenhouse gas emission or waste products, pollution free, eco-friendly and permanent sustainable source energy. Sustainability, means meeting the needs of the present generation without damaging the prospects of future generation (Ghosh,1995). Wind energy is one of the vital inputs for the social and economic development of any nation. It supplies affordable, in exhaustible energy to the economy. It is an alternative clean energy source and has been the world's fastest growing renewable energy source with a growth rate of 28 percent in the last decade (Joselin Herbert 2010). Wind energy is not just another source of energy or electrical power. It has characteristics of the free from carbon emission and to be treated as a white energy. Wind energy contributed significantly to energy security and good quality environment for living beings.

Wind energy is an indirect source of solar energy used since ancient period; particularly Egyptians used wind power for their boats (Athawale, 1994). The history of wind mills rolls back to 3000 years when they were used to pump water. In harnessing wind energy first electrical wind

turbine generator was developed in 1970 and since 1990 wind turbine generator has emerged as a major source of energy. The stimulus for the development of wind energy in 1973 was due to the rising price of oil and concern over limited fossil fuel resources. The present day world depends heavily on fossil fuels to meet energy demands. But much to the expectation of the technical community the world's fossil fuel stock is almost getting depleted due to over usage (Singh and Kasal 2008). The nuclear disasters in Japan and oil spill in Gulf of Mexico have made the world to look for alternate sources of energy especially the wind energy. Wind energy has now established itself as main stream of electricity generation source and play a vital role in an increasing number of countries immediately a longer term energy planes. Wind energy now provides electricity for about 100 million people in 83 countries along with hydro, solar, biomass, geo-thermal and other renewable sources and nearly 25 percent of the world's electricity.

Wind Energy Scenario In The World:

Wind energy is being produced globally and many countries are leading to generate and to compensate the deficiency of the conventional energy. The Global Wind Energy Council (2014) witnessed that India is being Fifth ranking nation in the world for the installed capacity and contribute to the tune of 6.07 percent followed by China, U.S.A, Germany and Spain. India is also be treated as major player in the global wind energy market.

Table 1.1 Major Wind Energy Production Countries in the world.

Sl No	Name of the Country	Wind Energy Capacity (Mega Watts)	Percentage of world Total Wind Energy
01	China	1,14,763	31.05
02	United State of America	65,879	17.82
03	Germany	39,165	10.60
04	Spain	22,987	6.22
05	India	22,465	6.07
06	United Kingdom	12,440	3.37
07	Canada	9,694	2.62
08	France	9,285	2.51
09	Italy	8,663	2.34
10	Brazil	5,939	1.60
11	Rest of the world	58,275	15.80
	Total	**3,69,553**	**100**

Source: Compiled by the researchers from Global Wind Energy Council-2014, Washington D.C, U.S.A.

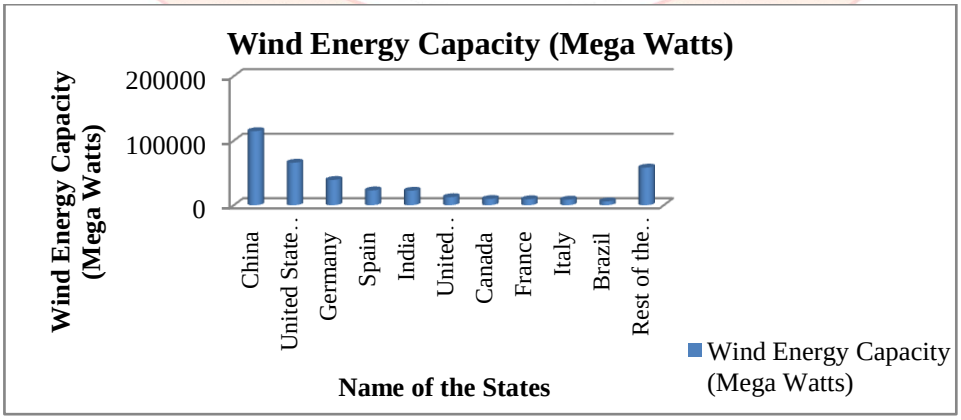

Fig: 01

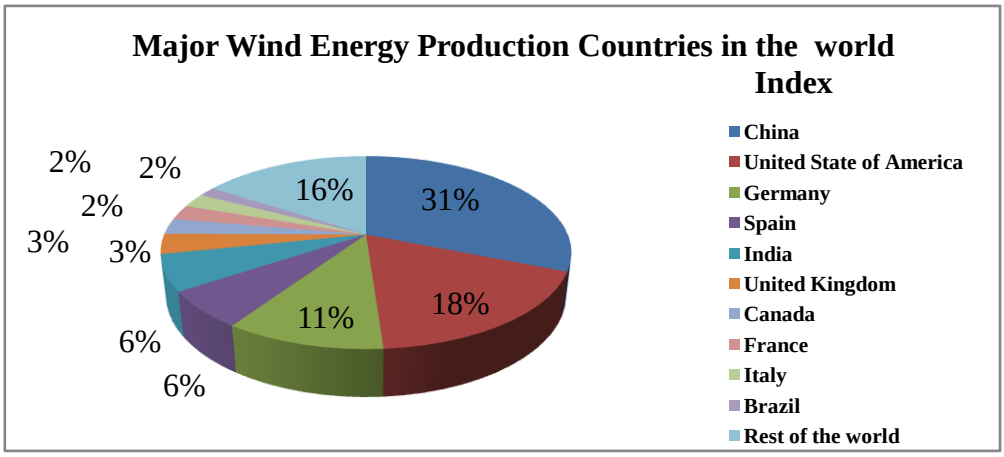

Fig: 02

Worldwide top ten countries have been identified based on the installation capacity to produce the wind energy and wind turbine operating system in the world with 3,69,553 Mega Watts per year (Table 1.1, Fig 01 and 02).The European Union country acquired nearly 1,33,969 Mega Watts capacity. China is leading in the world and rank first in the generation capacity of 11,4763 Mega Watts, (31.05%) followed by United State of America generation capacity of 65,879 Mega Watts (17.82%). Germany is being the third ranking country in the production capacity of 39,165 Mega Watts (10.60%). Spain has the fourth place of capacity of produced 22,987 Mega Watts (6.22%). India has fifth rank it's production capacity is 22,465 Mega Watts (6.07%). United Kingdom secured sixth rank with production capacity of 12,440 Mega Watts (3.37%).Canada is also placed seventh rank with production capacity of 9,694 Mega Watts (2.62%). France has eight ranks with 9,285 Mega Watts (2.51%). Italy is on the ninth ranking position with the production capacity of 8,663 Mega Watts (2.34%). Brazil is also registered its identity by securing tenth rank with the production capacity of 5,939 Mega Watts (1.60%).

Wind Energy Scenario In India:

It is proud that India has a place and identified globally and captured its market securing fifth ranking place in the world. The Government of India is very keen in enhancing its share of renewable energy from 6.9 percent of the total electricity production in the country, to grow to at least 15 percent in the next five years.

The Wind Power Programme in India was initiated towards the end of the Sixth Plan, in 1983-84. A market-oriented strategy was adopted from inception, which has led to the successful commercial development of the technology. The broad based national programmes includes wind resource assessment activities; research and development support; implementation of demonstration projects to create awareness and opening up of new sites; involvement of utilities and industry; development of infrastructure capability and capacity for manufacture, installation, operation and maintenance of wind electric generators; and policy support. The programme aims at catalyzing commercialization of wind power generation in the country. The Wind Resources Assessment Programme is being implemented through the State Nodal Agencies, Field Research Unit of Indian Institute of Tropical Meteorology (IITM-FRU) and Center for Wind Energy Technology, Chennai (C-WET). Wind in India are influenced by the strong south-west summer monsoon, which starts in May-June, when cool, humid air moves towards the land and the weaker north-east winter monsoon, which starts in October, when cool, dry sir moves towards the ocean. During the period march to August, the winds are uniformly strong over the whole Indian Peninsula, except the eastern peninsular coast.

Wind speeds during the period November to march are relatively weak, though higher winds are available during a part of the period on the Tamil Nadu coastline.

Table 1.2 Wind Energy Production States in India.

Sl No	Name of the State	Wind Energy capacity (Mega Watts)	Percentage of India Total Wind Energy
01	Tamilanadu	7,684.31	27.37
02	Maharastra	4,664.08	16.60
03	Gujarata	4,227.31	15.05
04	Rajastan	4,123.35	14.69
05	Karnataka	3,082.45	10.98
06	Madya Pradesha	2,288.60	8.14
07	Andra Pradesh	1,866.35	6.64
08	Telangana	98.70	0.36
09	Keral	43.50	0.16
10	Others	4.30	0.01
	Total	**28,082.95**	**100.00**

Source: Compiled by the researchers from Ministry of New and Renewable Energy, Government of India,2016**.**

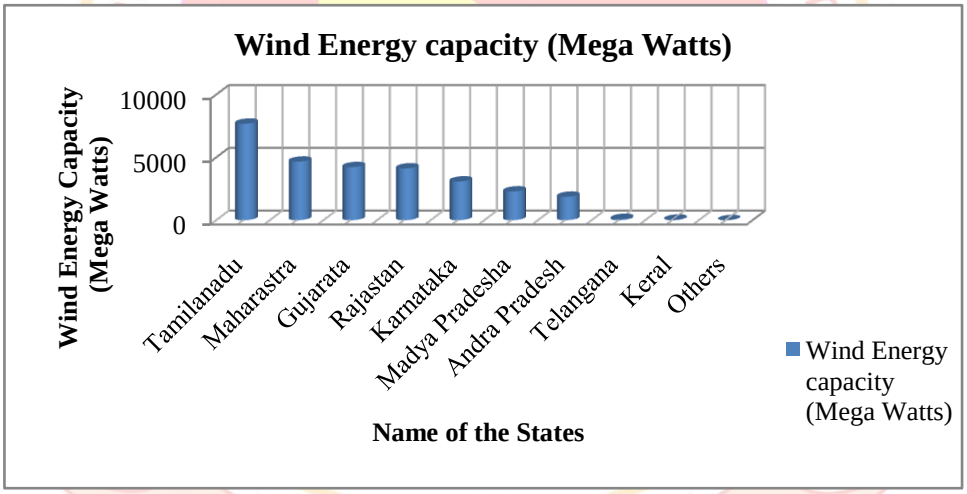

Fig: 03

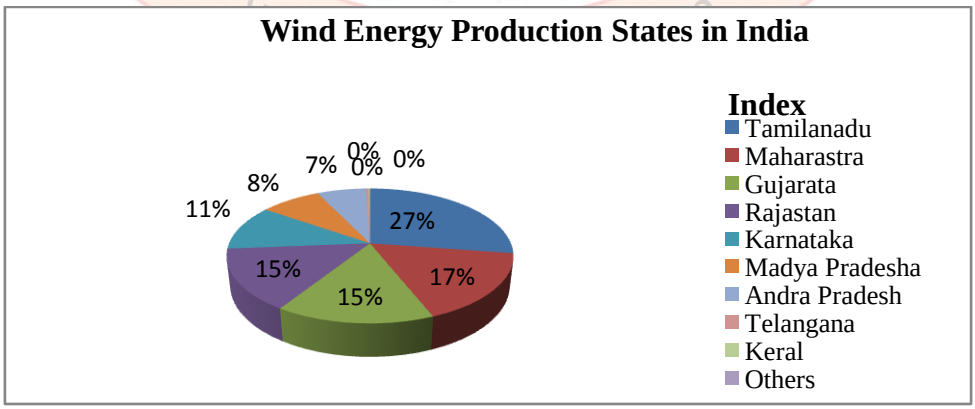

Fig: 04

The Indian wind energy sector has an installed capacity of 28,082.95 Mega Watts (2016). In terms of wind power installed capacity, Tamilanadu state is leading in wind energy production capacity in the nation (Table 1.2, Fig 03 and 04). It has the production capacity of 7,684.31 Mega Watts (27.37%), followed by Maharastra 4,664.08 Mega Watts (16.60%). Gujarata is third rank in the country there production capacity is 4,227.31 Mega Watts (15.05%). Fourth rank is goes to Rajastan for its production capacity of 4,123.35 Mega Watts (14.69%). Karnataka is being the fifth place with production of wind energy is 3,082.45 Mega Watts (10.98%). Mady Pradesh secured sixth place their production is 2,288.60 Mega Watts (8.14%). Andra Pradesh is seventh rank in the production of 1,866.35 Mega Watts (6.64%). Eight rank is Telangana the production of 98.70 Mega Watts (0.36%). Keral is ninth place in the production of 43.50 Mega Watts (0.16%). The remaining States are produced the energy to the tune of 4.30 Mega Watts (0.01%)

Conclusion:

Wind Energy is a sustainable source of energy and is a key factor for all the activities required to the facets of the human being. The prosperity of the nation is definitely depends upon the energy where India is also not an acception. India has a place in the global level and Karnataka State has significance in India in its energy production. The further more energy is to be produced by installing the wind energy turbines in a barren land with wind potential locations. At any cost, the wind installations are to be avoided in the potential agricultural land in the State.

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