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Production and Marketing of Wind Energy in India through Cooperative Basis

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INTRODUCTION

Energy is the keystone of human life and prosperity as well as a vital component of environmental rehabilitation. The growth of human population and the development of civilization can be partially attributed to energy and its uses.

Energy is an essential input for agriculture, transportation, communication, and all other economic activities. Ever since, the beginning of civilization, man has been using energy in one form or the other. The most useful forms of energy are heat, light, and sound. In short, modern society is totally energy based. Any shortage or imbalance will lead to adverse economic consequences. The realization is that energy is the ultimate resource and is a key factor for economic growth and development. The awareness of growing problem associated with its supply, has raised its importance in national planning. It is reported that energy has become a major constrain to development especially for those countries like India which are deficient in fossil fuels and the balance of payment situation continues to be difficult.

Energy is one of the prime movers of economic growth and development of India. Energy is needed for economic growth, for improving the quality of life and for increasing opportunities for development. Internationally, Non-OECD countries account for 93% of the projected increase in world primary energy demand. China overtook the United States in 2009 to become the world's largest energy user despite its low per capita energy use – contributes 36% to the projected growth in global energy use

The 12th Plan (2012-2017) envisaged capacity addition of about 80,000 MW to meet the demand projections of the country. On the other hand, Planning Commission wanted the target to be 1, 00,000 MW, as the power demand is very high.

IMPORTANCE OF ENERGY SOURCES

- Energy is the heart of most critical economic, environmental and developmental issues facing the world today. Clean, efficient, affordable and reliable energy services are indispensable for global prosperity. Particularly, Developing countries need to expand access to reliable and modern energy services if they are to reduce poverty and improve the health of their citizens, while at the same time increasing productivity, enhancing competitiveness and promoting economic growth.
- Worldwide, approximately 3 billion people rely on traditional biomass for cooking and heating and about 1.5 billion have no access to electricity. Up to a billion more have access only to unreliable electricity networks. The "energy-poor" suffer the health consequences of inefficient combustion of solid fuels in inadequately ventilated buildings, as well as the

economic consequences of insufficient power for productive income-generating activities and for other basic services such as health and education. In particular, women and girls in the developing world are disproportionately affected in this regard.

- A well-performing energy system that improves efficient access to modern forms of Energy would strengthen the opportunities for the poorest few billion people on the planet to escape the worst impacts of poverty. Such a system is also essential for meeting wider development objectives.
- At the global level, the energy system – supply, transformation, delivery and use – is the dominant contributor to climate change, representing around 60 per cent of total current greenhouse gas (GHG) emissions. Current patterns of energy production and consumption are unsustainable and threaten the environment on both local and global scales.

ROLE OF ENERGY FOR THE DEVELOPMENT OF INDIAN ECONOMY:

India spent $150 billion on crude oil imports last fiscal. India imports nearly 80% of its crude requirement. Sharma said the inflated import bill was largely on account of a rise in crude prices. With imports far outstripping exports, the country's trade deficit for the fiscal widened to $185 billion, prompting Sharma to term it "an area of concern and a big challenge for the current year". "It is beyond us to control or regulate crude prices in the world market," the minister told in a news conference at New Delhi. "But India has a strategy to increase exports". India spent a staggering $ 160 billion to import crude oil, an amount equivalent to more than half of the country's total earnings from exports during the same period.

India imported $156.97 billion worth crude oil and products but ended up with a net import bill of $98.14 billion thanks to product exports of $58.84 billion. Oil imports account for 34 per cent of the total import bill and a dollar increase per barrel raises trade deficit by $900 million. Trade deficit, the largest chunk of the current account deficit, has put pressure on the rupee which fell today to 61.20 a dollar, near the all-time low of 61.21 recorded. “In the financial year, the union government had kept aside Rs 3.75 lakh crore for oil import. India have already crossed the limit and spent Rs 4 lakh crore, India spent $169 billion on oil imports.

INDIAN POWER SECTOR: DEMAND AND SUPPLY GAP:

In spite of a total installed power generation capacity of about 223 GW (as of April 2013), India is still struggling to meet increasing power demand. Government of India came up with the Electricity Act in the year 2003 to reform the unorganized power sector in India. EA-2003 has helped to improve efficiency and has brought some much needed order in the overall power sector. However, we are still facing severe power cuts and many regions in India are still lacking something as basic as an electricity connection. Recent structural reforms in the power sector will take some time for complete implementation. In the short to medium term, supply-demand mismatch and limited ability of the financial systems to support subsidies are expected to push consumer tariffs upward.

The reasons behind low power generation and hence increasing Supply-Demand Gap;

1. Electricity generation in India is predominantly based on coal. India has enough coal reserves in its forests areas. However, due to strict forest clearance regulations, this coal cannot be utilized very often for power generation.
2. The quality of coal is not up to the grade which is considered best for power generation.
3. Coal India Limited -a public sector company, is the major supplier of coal for power plants in India; hence it has a monopoly in the market.

Frequent increase in price of imported coal is not fitting in the cost per unit structure as promised in PPA, resulting in restricted generation. Recently Indonesia has increased the price of coal in international market.

4. Production of gas in the Krishna Godavari (KG–D6) basin has also dropped by more than 60% from two years ago. It has resulted in lower or no power generation from gas based power plants.

TABLE: 1 ENERGY REQUIREMENT AND INSTALLED CAPACITY IN INDIA

Energy Requirement			Peak Demand		Installed Capacity Required	
(Billion kWh)			(GW)		(GW)	
GDP growth at	8.0%	9.0%	8.0%	9.0%	8.0%	9.0%
2003-04	633	633	89	89	131	131
2006-07	761	774	107	109	153	155
2011-12	1,097	1,167	158	168	220	233
2016-17	1,524	1,687	226	250	306	337
2021-22	2,118	2,438	323	372	425	488
2026-27	2,866	3,423	437	522	575	685
2031-32	3,880	4,806	592	733	778	960

Source: IMaCS Research

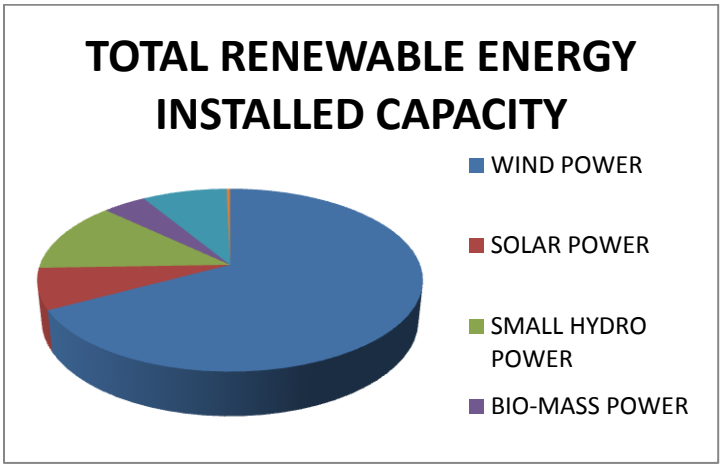
Table: 1 clearly shows that the energy requirement and installed capacity at national level. According to the table, the demand for power is 633 billion KWH in the year 2003-2004. However at an average GDP growth rate of 8%, the overall demand increase at peak level 89 GW and installed capacity required 131 GW in the same period.

The projection for the year 2016-2017 and the year 2031-32 constantly increases to 1524 KWH and 3880 KWH respectively. At the same time the peak demand also increasing to 226 GW and 952 GW in the same period and the installed capacity required is estimated to be ranging from 237 GW to 960 GW in the mentioned period. The research found that the energy requirement, peak demand installed capacity required is increasing at a higher rate year by year.

RENEWABLE ENERGY IN INDIA

India was the first country in the world to set up a ministry of Non- conventional energy resources, in early 1980s. India's cumulative Grid interactive or Grid Tied Renewable Energy Capacity (excluding Large Hydro) has reached 29.9 GW of which 68.9% comes from wind, while solar PV contributed nearly 4.59% of the Renewable Energy installed capacity in India.

DIAGRAM: 1 TOTAL RENEWABLE ENERGY INSTALLED CAPACITY



Source: Compiled data (Renewable energy in India)

Diagram: 1clearly explained about that total renewable installed capacity in India.

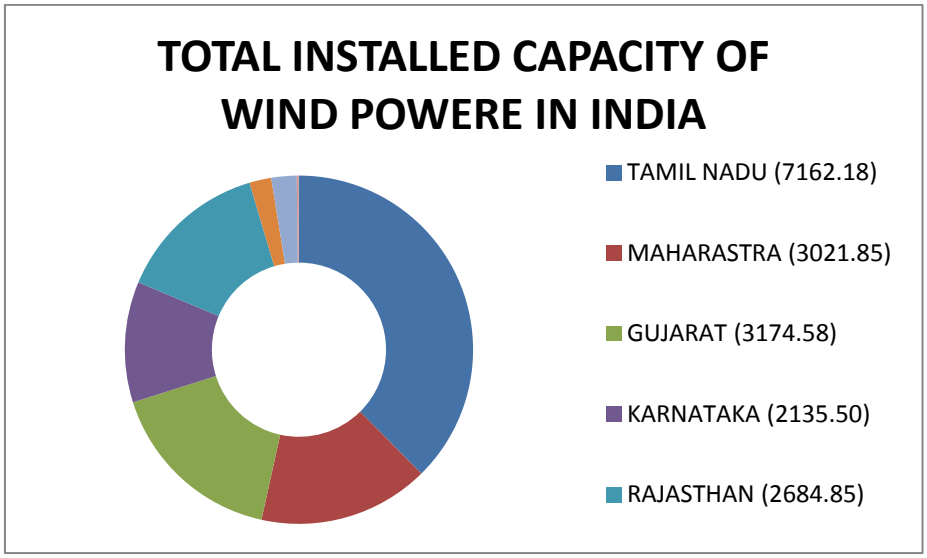
According to the table there are six major sources of energies are available. The source of wind power 20,149.50(MW) out of 22,989.2(MW) installed capacity occupying first place, compared with solar and other sources of energy so, that the researcher suggested that India should come forward to installed and produced the wind firms and fulfill the demand of public.

WIND POWER IN INDIA

The development of wind power in India began in 1990s and has significantly increased in the last few years. Although a relative new comer to the wind industry compared with Denmark or the US, domestic policy support for wind power has led India to become the country with the fifth largest installed wind power capacity in the world.

The total installed capacity of wind power in India was 19,051.46 (MW)

DIAGRAM: 2 TOTAL INSTALLED CAPACITY OF WIND POWER IN INDIA



Source: Compiled data (Wind power in India)

Diagram: 2 States that the installed capacity of wind power in India. According to the table, the state of TamilNadu has more installed power capacity MW compare with other states in India. According to the table, TamilNadu plays a vital role and it has over 7162.18 MW. Gujarat, Maharashtra, Karnataka and Rajasthan occupying 2, 3, 4 and 5 places. The remaining states, installed capacity of wind power 3rd and 2ndand single digit (MW). The researcher suggested that state of TamilNadu is the most powerful one in the aspect of installed power capacity so, that this is the right time to introduce and install the windmill. The government of TamilNadu should motivate those who are involving the wind power generation and provide necessary steps to promote.

WIND ENERGY PRODUCTION ON COOPERATIVE BASIS: A PROPOSAL

There is a vast scope of wind energy production on cooperative basis, provided concrete steps are taken at a gross root level. Concerted efforts must be taken and priorities are to be immediately attended to if the proposal needs to succeed in all places. An attempt is made here to chalk out the method of promoting cooperatives for the wind energy production. The proposal covers various features of a cooperative society already in operation.

INTRODUCTION

A wind turbine cooperative, also known as a wind energy cooperative, is a jointly owned and

democratically controlled enterprise that follows the cooperative model, investing in wind turbines or wind farms. The cooperative model was developed in Denmark. The model has also spread to Germany, the Netherlands and Australia, with isolated examples elsewhere. Winds of 60 km per hour hit us as soon as we alighted from the bus at Hvide Sande – "White Sand" – on the west coast of Denmark, home to a community-owned wind energy projects comprising three 3MW turbines. All that could be heard was the powerful wind: the generators cannot be heard over the considerable sound of the wind.

Wind plays a big role in this area of Europe: 87 percent of the country's electricity consumption that day was covered by wind power, and, in Denmark as a whole, €16 million from local residents is being invested in renewable energies. The three wind turbines at the Hvide Sande harbour were set up in December 2011. 80% of the wind farm is owned by the HolmslandKlit Tourist Association foundation, a local business fund which initiated and financed the project. Hvide Sande's North Harbour Turbine Society I/S pay an annual rent of €644000 to the local harbour. The other 20% is owned by local residents living within a 4.5 km radius, as per the guidelines set out by the Danish Renewable Energy Act. This wind co-operative has 400 local stakeholders, and with an annual return of 9 to 11% the turbines are expected to pay for themselves in 7 to 10 years. The fund is used to initiate new business initiatives for the benefit of the harbour and local municipality.

WINDMILL MODELS FOR COOPERATIVE BASIS IN INDIA

I. Pattern, area of operation and membership
II. Objectives and functions
III. Organization and Management
IV. Sources of finance
V. Methods of Business models

(i)Pattern Area of operation & membership:

The proposed pattern will have two – tier structure of organization under primary industrial co-operatives societies. Un parallel with the district and national level industrial co-operatives. The area of operation of co-operative society is proposed may be restricted at Taluk level, So that the total number of such societies will be around 10 at the maximum for Districts. These societies are primary. The state federation of wind energy production and making co-operatives could be organized with the primary as constituents' members. The members of the wind energy production of industrial co-operatives at primary level need not necessarily the land owner/site. The members would be even the unemployment educated and uneducated; to whom the society would entrust the developmental work

(ii)Objectives and functions

The main objectives of the proposed societies:

✓ To survey the total potential area under wind farms in the area of operation both under individual or institutional ownership and government ownership.

✓ To arrange for suitable sites for windmill with the help of members in the specified locality.

✓ To provide a necessary equipments and technology for development of wind farm by members.

✓ To provide training and member education facilities related to the operation of wind farms.

✓ To have tie-up arrangement with the financing agencies including co-operatives for refinance facilities in one and for team lending to the members in the others and to create a market for producers energy from such needed areas and thereby to repay the loan.

(iii) Organization and management:

The Organization and management of the proposed sector will be as usual in the case of Industrial cooperative sectors functioning in Tamilnadu. It means that both the Democratic as well as paid management to the found in the new type of societies proposed. Renewable energy requires new organizational structures and alliances, when local people own the wind farms, and share in the benefits, they will support them.

It won't be NIMBY (Not in My Back Yard), it will be POOL (Please On Our Land)."

(iv) Sources of finance:

In a self-supporting system of finance is best suited for wind energy production co-operative societies under proposal. In fact, there was a society in Danish & Denmark countries which was run in self-supporting system the member had contributed the maximum to the organization of the societies by which they have produced wind energy. The source of finance for the proposal societies will be as follows:

1. Entrance fees
2. Share capital
3. Deposits
4. Reserve fund
5. Government grants
6. Borrowing from NABARD, co-operatives and other institutions
7. Subsidies if any

(v) Methods of business models:

The development of wind energy production and selling them at profitable rates to private as well as Government To contribute and fulfill the demand supply gap of energy through wind farm

Community shared ownership

In a community-based model, the developer/ manager of a wind farm shares ownership of the project with area landowners and other community members. Property owners whose land was used for the wind farm are generally given a choice between a monthly cash lease and ownership units in the development. While some community wind projects, such as High Country Energy in southern Minnesota, issued public shares after the project's formation, investment opportunities are usually offered to local citizens before the wind development is officially created

Municipal

Some places have enacted policies to encourage development of municipally owned and operated wind turbines on town land. These projects are publicly owned and tax exempt. An example is the Hull Wind One project in Massachusetts' Boston Harbor in 2001. A 660 kW wind turbine was installed, and is still a great example of small scale commercial wind.

Conclusion

India is the fifth largest producer of wind energy at world level. The wind energy sector alone constituting 68% of the total renewable energy in the country. Various approaches of cooperatives to wind energy have also been outlined which are attractive increasing the levels of interest. Cooperatives can be adopted to suit all types of situation and there are also various advisory bodies who can offer information and guidance. Cooperatives are owned by their local members rather than outside investors. The Cooperative may develop and maintain a wind-energy project that would meet the expectations of inside investors.

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