



A Study of Renewable Energy Systems in India

KEYWORDS

Renewable energy source, India, Power Scenario, Sustainable development, Load Generation Balance Report (LGBR)

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ABSTRACT *In today's date, India is a large consumer of fossil fuel such as coal, crude oil etc. The rapid increase in use of Non renewable energies such as fossil fuel, oil, natural gas has created problems of demand & supply. Because of which, the future of Non renewable energies is becoming uncertain. Also India has had a negative Energy Balance for decades, which has resulted in the need to purchase energy from outside the country to fulfill the needs of the entire country. Even though, The Ministry of Power has set an agenda of providing Power to All by 2012. This makes everyone to think, how this will be going to happen? The answer found is presented in this paper called "Renewable Energy Sources – Policies of India"*

INTRODUCTION

India has a large amount of, supply of renewable energy resources & hence India has decided to organize a program for proper utilization of renewable energy resources. As a result of which, India is the only country in the world to have an exclusive ministry for renewable energy development, The Ministry of Non-Conventional Energy Sources (MNES). The analysis of need of renewable energy sources, the policies of India through MNES, Legal aspect of Government of India about renewable energy sources, sources of renewable energy available in India, Estimates of potential capacities of India from renewable energy

sources is presented in this paper.

Current Scenario of Conventional Energy Sources in India.

At present India is a large consumer of fossil fuel such as coal, crude oil etc. Over a past few decades, energy is needed for everything. The electricity requirement is increasing at an alarming rate due to increased population & industrial growth. This rapid increase in use of energy has created problems of demand & supply. Because of which, the future of Non renewable energies is becoming uncertain.

India ranks sixth in the world in total energy consumption. Coming to power generation in the country, India has increased installed power capacity from 1362MW to over 112,058MW since independence & electrified more than 50,000 villages. This achievement is impressive but not sufficient. It is matter of concern that 44% of households do not have access to the electricity & as many as 80,000 villages are yet to be electrified. It indicates that India has had a negative Energy Balance for decades. Actual power supply during 2013-2014 is given in table 1 below.

	Energy (MU)	Peak (MW)
Requirement	1,002,257	135,918
Availability	959,829	129,815
Shortage	42,428	6,103
(%)	4.2	4.5

Table 1: India's Energy balance

As per 16th electric power survey, the anticipated demands require an additional 1,00,000MW supply. In other words, the achievements of more than 5 decades need to be reproduced in the next decade. The task is overwhelming but not unachievable, because India has significant potential for generation of power from renewable energy sources.

As India has a large amount of, supply of renewable energy resources, India has decided to organize a program for proper utilization of renewable energy resources. As a result of which, India is the only country in the world to have an exclusive ministry for renewable energy development, The Ministry of NonConventional Energy Sources (MNES).

Policies of India for renewable energy sources.

Today, India has significant potential for generation of power from renewable energy sources. India's search for renewable energy resources that would ensure sustainable development and energy security began in early 70's of the last century. Consequently, use of various renewable energy resources and efficient use of energy were identified as the two thrust areas of the sustainable development.

The few important steps taken by the Ministry of India for development of renewable Energy sources are recapitulated below:

- India has among the world's largest programs for renewable energy. India's activities cover all major renewable energy sources of interest to us, such as, biogas, biomass, solar energy, wind energy, small hydro power and the other emerging technologies. In each of these areas, India has programs of resource assessment, R&D, technology development and demonstration. Several renewable energy systems and products are now not only commercially available, but are also economically viable in comparison to fossil fuels, particularly when the environmental costs of fossil fuels are taken into account.
- Realizing the need for concentrated efforts in this sector, The Government of India established a Commission for Additional Sources of Energy (CASE) in the Department of Science and Technology, in 1981. The

mandate of CASE is to promote research and development activities in the field of renewable energy.

- CASE was formally incorporated in 1982, in the newly created Department of Nonconventional Energy Sources (DNES). In 1992 DNES became the Ministry for Nonconventional Energy Sources, commonly known as MNES.
- India has a vast supply of renewable energy resources, and it has one of the largest programs in the world for deploying renewable energy products and systems. Indeed, it is the only country in the world to have an exclusive ministry for renewable energy development, the Ministry of Non-Conventional Energy Sources (MNES). MNES was renamed the Ministry of New and Renewable Energy.
- India has pioneered in the world in many administrative actions of renewable energy promotion such as:-
 - 1) Electricity regulatory commission within liberalized market-1991
 - 2) Mandatory environmental audits for power projects -1992
 - 3) Energy conservation bill -2000
 - 4) Renewable Energy promotion bill- 2005.
- The Ministry is encouraging the setting up of grid-interactive power projects based on renewable energy through private investment route.
- The State Nodal Agencies are responsible for promotion and development of private sector projects by way of providing necessary clearances, allotment of land, allotment of potential sites in case of SHP pro-

jects and facilitating power purchase agreements etc.

- State Electricity Regulatory Commissions (SERCs) are determining tariffs by taking into account the submissions of all stakeholders, including consumers.
- A number of leading financial institutions and banks are financing renewable energy based power
- Legal Provisions:- Under the Electricity Act, 2003, the Central Government, from time to time, is responsible for preparing the national electricity policy and tariff policy, in consultation, among others, with the State Governments for the optimal utilization of all resources, including renewable sources of energy.

The range of activities of Ministry covers

- Promotion of renewable energy technologies
- Renewable energy resource assessment
- Production of biogas units, solar thermal devices, solar photovoltaic, cooks stoves, windenergy and small hydropower units.
- Strengthen India's energy security
- Find A viable solution for rural electrification
- Administered pricing mechanism
- Optimum utilization of existing assets
- Adoption of energy efficient technologies in giant industries

REFERENCE

- Sukhatme, S. P., Meeting India's future needs of electricity through renewable energy sources. *Curr. Sci.*, 2011, 101. | Sukhatme, S. P., Addendum to 'Meeting India's future needs of electricity through renewable energy sources'. *Curr. Sci.*, 2012, 102, 959-960. | Sharma, S., True electricity demand and the critical role of renewable energy sources. *Econ. Political Wkly*, 2012, 47(24). | Narayanan, K. G., Potential of renewable energy in meeting future needs of electricity. *Curr. Sci.*, 2012, 102, 1088-1089. | Chokshi, A. H., Nuclear riddles: TINA and NIMBY. *Curr. Sci.*, 2012, 102, 1096-1098. | Mitavachan, H. and Srinivasan, J., Is land really a constraint for the utilization of solar energy in India? *Curr. Sci.*, 2012, 102. | Hossain, J., Sinha, V. and Kishore, V. V. N., A GIS based assessment of potential for wind farms in India. *Renew. Energy*, 2011, 36, 3257-3267. | Phadke, A., Bharvirkar, R. and Khangura, J., Reassessing wind potential estimates for India: economic and policy implications. Report No. LBNL-5077E Revision 1, Lawrence Berkeley National Laboratory, 2012; http://ies.lbl.gov/India_Wind_Potential | Ministry of New and Renewable Energy, Government of India; www.mnre.gov.in and mnre.gov.in/pdf/mission_document_JNNISM.pdf | Goldemberg, J., Johansson, T. B., Reddy, A. K. N. and Williams, R. H., Basic needs and much more with one kilowatt per capita. *Ambio*, 1985, 14, 190-200. | Load Generation Balance Report for the Year 2014-15 by Central Electricity Authority |