

Sustainable Renewable Energy Development in India Through Ministry of Non- Conventional Energy Sources

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ABSTRACT

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). Since its formation, the Ministry has launched one of the world's largest and most ambitious programs on renewable energy. Based on various promotional efforts put in place by MNES, significant progress is being made in power generation from renewable energy sources. India emerged in 2008 as an aspiring producer of solar PV. Both National and State Governments announced new policies to support solar PV manufacturing in special economic zones, including capital investment subsidies of 20 percent. These policies led to USD 18 billion in new solar PV manufacturing investment plans or proposals by a large number of companies.

We know where the non renewable energies – coal, oil and gas – are located and how these fuels are transported, combusted, and the power transmitted throughout the country over the power grid. Now, let's look at the renewable energies hydro, solar, wind and biomass. According to the Energy Information administration (EIA) the annual average increase will be about 4.0 percent from 2002 to 2025. The projected growth in net electricity consumption for emerging market economies is driven in large part by Gross Domestic Product (GDP) and population growth assumption. It makes sense to the authors that all efforts and investment should consider accelerating these sustainable energy resources before committing to the same fossil fuel path as western nations. The fossil fuel strategy will surely bring price volatility from dwindling supplies and added pollution from carbon combustion.

Tapping India's wind, solar, biomass, and hydro could bring high quality jobs from a domestic resource. Renewable energy is the measure of the development of a nation like India extensive development of the renewable energy resources on the Indian subcontinent through MNES booming economic growth, rapid Industrialization and high standard of living of global population demand more and more energy in different forms.

Keywords : Renewable energy resources, wind, solar, biomass and hydro etc.

1. INTRODUCTION

Emerging and developing countries have 80% of the world's population but consume only 30% of global commercial energy. As energy consumption rises with increases in population and living standards, the need to expand access to energy in new ways is growing as is the awareness of the environmental costs.

Increased recognition of the contribution that renewable energy (RE) can make to energy independence, climate change mitigation, rural development, improved health and lower health costs (linked to air pollution), is shifting RE from the fringe to the mainstream of sustainable development. India has a vast supply of renewable energy resources, and it has one of the largest programs in the world for

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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). Since its formation, the Ministry has launched one of the world's largest and most ambitious programs on renewable energy. Based on various promotional efforts put in place by MNES, significant progress is being made in power generation from renewable energy sources.[1]

2. INDIAN ENERGY FACTS

The economy of India has the second-fastest rate of increase in GDP in the world – 7.1% in 2008. The country accounts for a third of the world's population without access to electricity. Five different ministries have structurally handled the Indian energy sector, among them the Ministry of New and Renewable Energy. India is probably the only country in the world with a dedicated ministry for renewable energy development. The country ranks sixth in the world in terms of total energy consumption and needs to accelerate development of the energy sector to meet its growth aspirations. Though rich in coal and abundantly endowed with renewable energy in the form of solar, wind, hydro and bio-energy, India has very small hydrocarbon reserves (0.4% of the world's total). Being a net importer of energy, more than 35% of the country's primary energy needs are ensured through import.[2]

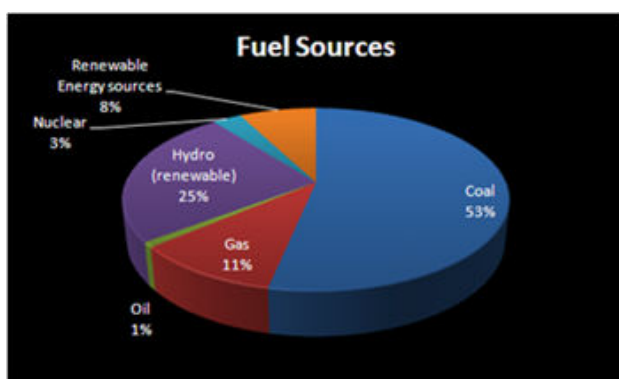


Fig. 1. Source: India Energy Data, Statistics and Analysis- Oil, Gas, Electricity, Coal

3. UNLIMITED POTENTIAL FOR SOLAR PV IN INDIA

India is a beautiful country well-known for spicy food, people and long hours of sunshine. Even the hours of sunshine in Spain can by no means compete with, for instance, the State of Rajasthan in India. This State, with between 1800 and 2200 hours of sun each year, is putting together a plan to develop at least 50 MW of PV power plants. And this is only the beginning. The potential for solar PV in Rajasthan, with its vast area of sunny desert, is infinite. And India has many more States with great potential, Gujarat, for example, where a 500 MW plan was commissioned recently. Although the feed-in tariff proposed by the Indian national government is not particularly attractive (15 INR/kWh for 10 years), Indian PV project developers are queuing up. More than three gigawatts of proposals have been submitted. Clearly, many developers recognize the long term potential of this country with its ever increasing GDP.[3]



Fig.2. The Ministry of Power has set an agenda of providing Solar PV Power to All by 2012.

India emerged in 2008 as an aspiring producer of solar PV. Both National and State Governments announced new policies to support solar PV manufacturing in special economic zones, including capital investment subsidies of 20 percent. These policies led to USD 18 billion in new solar PV manufacturing investment plans or proposals by a large number of companies. The optimum use and development of various forms of energy and making energy available at affordable rates is one of the primary concerns of the Government of India. India's energy supply comes from different sources: coal, hydropower, oil and gas, and various form of non-conventional energy. Looking at the need for an appropriate energy policy to sustain faster and more inclusive growth, the Government of India has recently brought out an Integrated Energy Policy linked with sustainable development that covers all sources of energy and takes into consideration all aspects of

energy use and supply, including energy security, access and availability, affordability and pricing, as well as efficiency and environmental concerns. The Policy states that solar power particularly could be an important player in country attaining energy independence in the long run.[4]

4. ENERGY GENERATION AND CONSUMPTION FROM 2000 TO 2008

India relies heavily on coal energy to produce electricity. A strong second is hydro power, followed by natural gas. The consumption of all renewable energies represents fully one third of the total consumption. This is a significant figure, and we will see later that this sector has a great future. Following table 1, table 2 and table 3 of the actual plants and installations for producing power based on to renewable energies. We will show that only a small fraction of the potential capacity of renewable energies is currently being tapped.[5]

Table - 1

Table: Total Renewable Electricity Net Consumption (Billion Kilowatt-hours)

2000	2001	2002	2003	2004	2005	2006	2007	2008
76.604	76.829	67.777	79.783	89.951	108.817	122.688	135.515	130.568

Table: Total Electricity Net Consumption (Billion Kilowatt-hours)

2000	2001	2002	2003	2004	2005	2006	2007	2008
375.394	384.906	403.74	428.18	457.027	483.256	525.372	568.0002	NA

Table - 2

Table: Total Electricity Net Generation (Billion Kilowatt-hours)

2000	2001	2002	2003	2004	2005	2006	2007	2008
529.122	549.749	565.277	600.525	630.867	661.801	711.547	761.6742	787.5465

Table: Total Renewable Electricity Net Generation (Billion Kilowatt-hours)

2000	2001	2002	2003	2004	2005	2006	2007	2008
76.604	76.829	67.777	79.783	89.951	108.817	122.688	135.515	130.568

Table - 3

Table: Total Electricity Installed capacity:

2000	2001	2002	2003	2004	2005	2006	2007	2008
112.1854	122.725	127.013	131.662	137.292	142.932	149.669	158.953	NA

Table: Total Renewable Electricity Installed Capacity (Million Kilowatts)

2000	2001	2002	2003	2004	2005	2006	2007	2008
26.81537	28.418	29.314	32.397	34.673	37.676	42.119	44.437	NA

NA=Not available

5. PROJECTED ENERGY CONSUMPTION OF INDIA FOR 2030

Currently, 45 percent of households in India do not have access to electricity. New legislation has set a target of electrifying all households by 2010. As in the past, the ongoing challenge in providing electricity is the ability of the poor to pay. India announced plans in March, 2005, to continue subsidizing electricity consumption for rural and poor households that use less than 30 kilowatt hours per month.[6]

india: projection of renewable electricity generation capacity under the energy [r]evolution scenario IN GW							
	2005	2010	2015	2020	2030	2040	2050
Wind	4	12	29	69	143	200	224
PV	0	0	2	10	118	486	1,093
Biomass	0	1	4	8	19	41	70
Geothermal	0	0	0	2	6	18	30
Solarthermal	0	0	0.5	3	23	70	151
Ocean energy	0	0	0	1	3	5	11
Total	4	13	35	92	310	819	1,579

Fig. 3. MNE Estimates of Potential Capacities from Renewable Energy Sources (in GWs)

6. CONCLUSION

India is a nation in transition. Considered an "emerging economy," increasing GDP is driving the demand for additional electrical energy, as well as transportation fuels. India is a nation of extremes. Poverty remains in areas with no energy services, while wealth grows in the new business hubs. Coal fired generation currently provides two thirds of the

generation capacity, and hydropower supplies the other third. Yet, India is blessed with vast resources of renewable energy in solar, wind, biomass and small hydro. In fact, the technical potential of these renewables exceeds the present installed generation capacity.

Unique in the world, India has the only Ministry that is dedicated to the development of renewable energies: Ministry of Non-Conventional Energy Sources (MNES). This bodes well for the acceleration of renewable development throughout the nation -- both to meet the underserved needs of millions of rural residents and the growing demand of an energy hungry economy. The development and deployment of renewable energy, products, and services in India is driven by the need to decrease dependence on energy imports sustain accelerated deployment of renewable energy system and devices expand cost-effective energy supply augment energy supply to remote and deficient areas to provide normative consumption levels to all section of the population across the country And finally, switch fuels through new and renewable energy system/ device deployment.

REFERENCES

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- [3] The Energy & Resources Institute (TERI)
- [4] Trade Team Canada Environment (TTC Environment)
- [5] U.S. Energy Information Administration (EIA)
- [6] Global Energy Network Institute (GENI)