



POWER CRISES & RELEVANCE OF RENEWABLE ENERGY

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INTRODUCTION :

Energy is the power or capability to do a required piece of work. Energy is the foundation of our industrial, commercial, agricultural and domestic developmental activities.

The Indian economy utilizes variety of energy sources, both commercial and non-commercial. Fuel wood, animal waste and agricultural residue are the traditional or 'non-commercial' sources of energy that continue to meet the bulk of the rural energy requirements, even today. However, the share of these fuels in the primary energy supply has declined from over 70% in the early 50's to a little over 30% as of today. The traditional fuels are gradually getting replaced by the "commercial fuels" such as coal, lignite, petroleum products, natural gas and electricity.

The use of Electricity is basically is on accounts for: (1) Industrial (2) Commercial & Residential (3) Agriculture and Irrigation. In developing countries, 30% dwellings are yet to be provided with electricity supply. The development of the Nation is generally compared by the per capita consumption of electricity.

Indian Power Scenario

The all India aggregate installed capacity of electric power generating stations under various utilities as on 31.03.2012 was 199.87





GW comprising 38.99 GW of hydro, 131.60 GW of thermal, 4.78 GW of nuclear and 24.5 GW Renewable Energy Sources (RES). The percentage share of hydro, thermal, nuclear and RES stood at 19.50 %, 65.84 %, 2.39 % and 12.25 %, respectively.

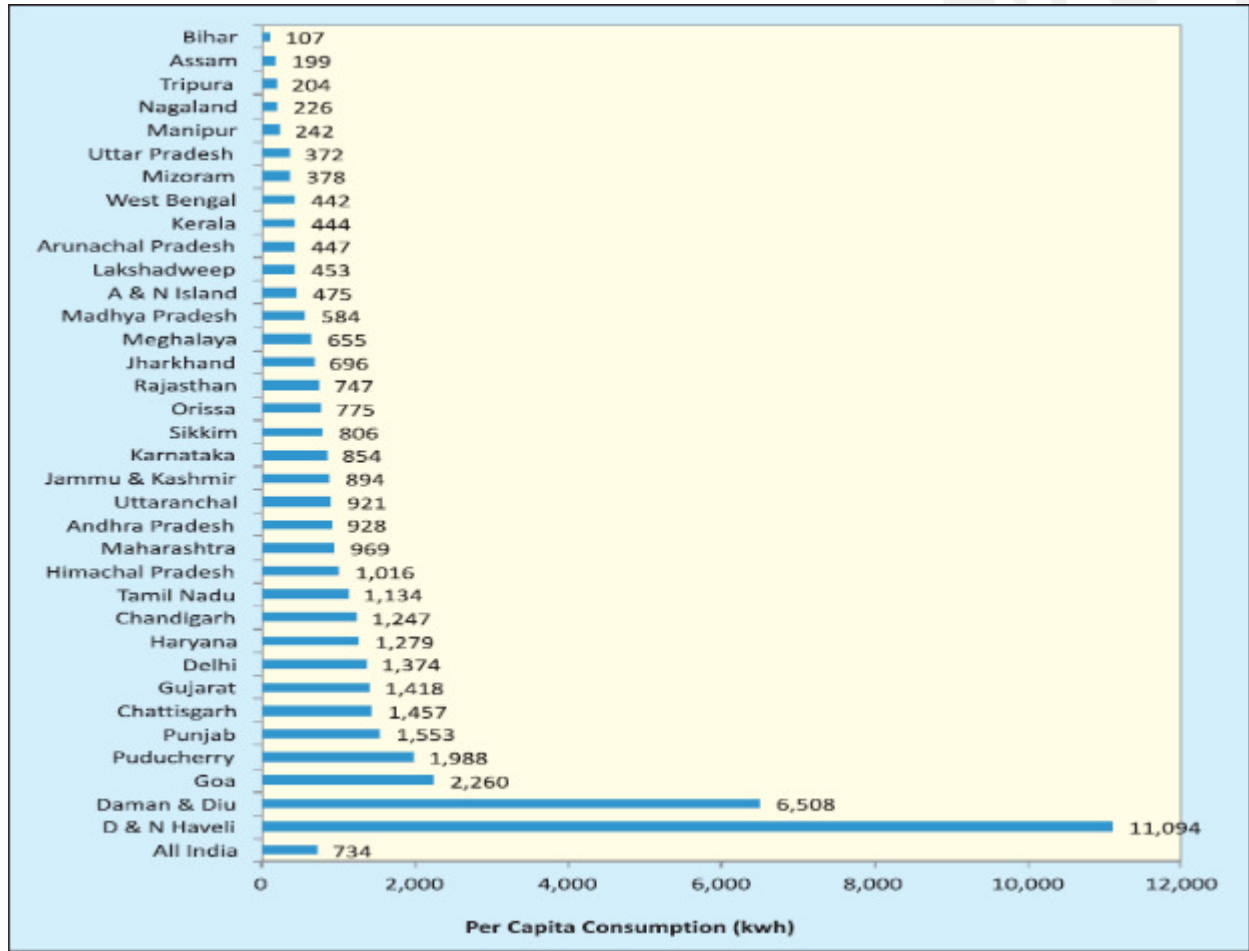
Industrial and Domestic sectors are the most energy guzzler sectors compare to other sectors. Sector wise Consumption of Electricity (Utilities) during 2010-11 shows indicates I) Industry - 39%, II) Domestic - 24%, III) Agriculture - 19%, IV) Commercial - 10%, V) Others - 6%, VI) Traction and Railways - 2%.

Per Capita Energy Consumption

India's per capita consumption is only about 779 units as on year 2011-12. India's per capita energy consumption is marginally above as compared to the China's while comparing to the US it is only one seventh as on current.

A perusal of the per capita consumption levels of some of the States gives an idea of the extent of deprivation in India when it comes to electricity consumption. Some of the state crosses the threshold limit of our national average per capita energy consumption. Recent power failure in Northern region was the result of over power drawl by few States.





Source : Planning commission of India - 2011-12

Power Shortage Scenario

Type	Values	Values
Year	2010-11	2011-12
Energy Required	861,593 MUs	933,741 MUs
Energy Available	788,355 MUs	837,374 MUs
Shortage	73,236 MUs	96367 MUs
Shortage	8.5%	10.3%

As in previous years, during the year 2010–11, demand for electricity far outstripped availability, both in terms of base load energy and peak availability. Base load requirement was 861,593 MUs against availability of 788,355 MUs, a 8.5% deficit. In 2011–12, a base load energy deficit and peaking shortage is 10.3% and 12.9%, respectively.





Region	Energy Requirement Deficit, %	Peak Demand Deficit, %
Northern	-7.7	-9.6
Western	-13.4	-13.9
Southern	-13.3	-15.2
Eastern	-6.8	-5.8
North Eastern	-11.2	-10.5
All India	-11.1	-12.1

Source : CEA - Feb 2012

Central Electricity Authority anticipated the peaking shortage would prevail in all regions, varying from 5.8% in the eastern region to 15.2% in the southern region. India also expects all regions to face energy shortage varying from 6.8% in the eastern region to 13.4% in the western region. Five States with largest power demand and availability, as of 2011-12, were Maharashtra, Andhra Pradesh, Tamil Nadu, Uttar Pradesh and Gujarat.

Despite of rural electrification program, yet approximately 400 - 450 millions of Indians lose electricity access during blackouts. Out of total of about 5.93 lakh census villages (2001 Census), village electrification has been completed in about 84% of the villages. Around 35 - 40% of the population still lives without access to electricity.

To satisfy the future energy requirement and avoiding the power shortages, below projections are important for the economical growth and sustainable development.





Years	Energy (Billion kWh)				Projected Peak Demand (GW)		Installed Capacity Required (GW)	
	Total		At Bus Bar					
GDP Growth Rate	8%	9%	8%	9%	8%	9%	8%	9%
2003-04	633	633	592	592	89	89	131	136
2006-07	761	774	712	724	107	109	153	155
2011-12	1097	1167	1026	1091	158	168	220	233
2016-17	1524	1687	1425	1577	226	250	306	337
2121-22	2118	2438	1980	2280	323	372	425	488
2026-27	2866	3423	2680	3201	437	522	575	685
2031-32	3880	4806	3628	4493	592	733	778	960

Source : The Indian Energy Book 2012

Relevance of Renewable Energy

Shortage of electricity supply, lack of willingness to implement the energy action plan & policy, economic growth, increasing prosperity & urbanization, rise in per capita consumption, and spread of energy access are the key factors for substantially increasing the total demand for electricity. Thus there is an emerging energy supply-demand imbalance in terms of both capacity (i.e. MW) and energy (i.e. MWh). Also considering the limited sources of conventional energy and pollution created from the usages of different conventional energy, renewable energy is one of the best options for creating the sustainable development of the country.

Improving the efficiency and adopting the renewable energy to provide economic services meets the dual objectives of promoting sustainable development and of making the economy competitive.





Renewable Energy Potential

Renewable energy can be categorized in to two parts i) Grid interactive power (GIP) ii) Off-grid / Captive Power. The installed capacity of GIP as on March 2012 from renewable energy sources is 24.5 GW which comprises of 16.17 GW wind energy, 3.3 GW small hydro energy, biomass 1.14 GW, baggase cogeneration 1.95 GW, waste to energy 0.0253 GW and 0.481 GW from solar.

As per the information published by the Ministry of New & Renewable Energy, the total estimated medium-term potential (2032) for power generation from renewable energy sources is as follows –

Sources/Systems	Estimated Mid Term Potential (2032) in MW
Wind Power	45,000
Bio-Power (Agro residues & Plantations)	61,000
Co-generation Baggasse	5,000
Small Hydro (up to 25 MW)	15,000
Waste to Energy	7,000
Solar Photovoltaic	50,000*
Total	1,83,000

Source: NEP 2012

*As per National Solar Mission, 1,00,000 MW shall be installed solar generation capacity by 2030 and 2,00,000 MW by 2050

During the 12th and 13th plans, capacity addition is expected to be more than the 11th plan capacity addition from renewable sources. Considering 14,000 MW capacity addition from renewable during the 11th plan, the expected capacity additions during 12th and 13th plan are about 18,700 MW and 31,000 MW respectively.





Indian Renewable Energy Market

A number of facts and factors which make the Indian renewable energy market exciting for entrepreneurs and investors are -

- 1) India is the most developed renewable energy market in South Asia region
- 2) It is the third most attractive country to invest in renewable energy
- 3) The utilization of renewable energy sources is still relatively low in India, thus presenting excellent business potential
- 4) India has 8th ranking in clean energy technology investment
- 5) The country is emerging as one of the largest potential source of Certified Emission Reduction (CER) and Renewable Energy Certificates (REC)
- 6) In wind energy sector, India has the 7 topmost wind turbine manufactures among the world top ten manufactures
- 7) In Clean Energy Sector, employment opportunities upto 1 million will be created upto 2025

CONCLUSION :

A cursory look at the history of human civilization development will make it abundantly clear that energy forms the backbone. To meet the energy requirement, conventional energy is not sufficient.

Developing renewable energy can help India to increase its economic benefits, reduce environmental impacts, energy security benefits, reduce fossil fuels demands, lower its carbon intensity, contribute to a more balanced regional development, and realize its aspirations for economic leadership.

