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ENERGY SECURITY

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ENERGY SECURITY

Introduction

The International Energy Agency (IEA) defines energy security as "the uninterrupted availability of energy sources at an affordable price". Energy security concerns are a key driving force of energy policy. These concerns related to the robustness (sufficiency of resources, reliability of infrastructure, and stable and affordable prices); sovereignty (protection from potential threats from external agents); and resilience (the ability to withstand diverse disruptions) of energy systems.

The National Energy Policy

The National Energy Policy (NEP) aims to chart the way forward to meet the Government's bold announcements in the energy domain. All the Census villages are planned to be electrified by 2019, and universal electrification is to be achieved, with 24x7 electricity by 2022. Our Intended Nationally Determined Contribution (INDCs) target at reduction of emissions intensity by 33%-35% by 2030, achieving a 175 GW renewable energy capacity by 2022, and share of non-fossil fuel based installed capacity in the electricity mix is aimed at above 40% by 2030. In view of the fact, that energy is handled by different Ministries that have the primary responsibility of setting their own sectoral agenda, an omnibus policy is required to achieve the goal of energy security through coordination between these sources. There are four key objectives of our energy policy which are:

Four Key Objectives of Energy Policy

- Access at affordable prices,
- Improved energy security and Independence
- Greater Sustainability and
- Economic Growth.

Improved energy security, normally associated with reduced import dependence. Today, India is heavily dependent on oil and gas imports while also importing coal. Energy security may be enhanced through both diversification of the sources of imports and increased domestic production and reduced requirement of energy. Our fossil fuel requirements, which comprise nearly 90% of our commercial primary energy supply, are increasingly being met by imports. This means that cutting fossil fuel consumption would promote the twin goals of sustainability and security.

Renewable Energy Sources

The steps initiated by the Government to achieve the up-scaled targets of power generation by Renewable Energy and to move towards its goal, *inter-alia*, include suitable amendments to the Electricity Act and Tariff Policy for strong enforcement of Renewable Purchase Obligation (RPO) and for providing Renewable Generation Obligation (RGO).

During the period from April 2016 to January 2017, a total of 1038.422 Billion Units (BUs) of electricity have been generated in the country including 70.129 BU from various renewable energy sources. The State-wise details of the Renewable Energy generated during the year 2016-17 (upto January17) is given at **Annexure-I**.

The Government has **revised its target of renewable energy capacity to 175 GW (Gigawatt) by end of 2022**, making it the largest expansion in the world and providing plenty of opportunities for investors. The New and Renewable Energy sector has witnessed the highest ever-solar power and wind power capacity addition over the last two years since April 2014.

The achievements of the New and Renewable Energy Sector is given in following table:

Key achievements in the sector during the last 2 years are:

- The **world's largest 648-MW solar power plant was commissioned in Tamil Nadu** on September 21, 2016.
- A **157% increase in solar power capacity** addition (4132 MW) during the last two years (FY2014-15 and FY 2015-16).
- **Highest ever wind power capacity addition of 3300 MW** in 2015-16.
- **34 solar parks** of aggregate capacity of 20,000 MW have been sanctioned for 21 states. **INR 356.63 crores** has been released to Solar Energy Corporation of India for the projects.
- **31,472 solar water pumps were installed in 2015-16; this is higher than total number of pumps installed during the last 24 years since 1991.**
- 501 MW grid connected solar rooftop projects have been installed in the country.

The steps taken by the Government to increase the generation of Renewable Energy sources are:

- Incentives in the forms of generation based incentives/subsidies, fiscal incentives such as accelerated depreciation, concessional customs duty, excise duty exemptions, income tax holiday for 10 years and viability gap funding from National Clean Energy Fund (NCEF).

- Up-scaling of the target of renewable energy capacity to 175 GW (Gigawatt) by the year 2022 which includes 100 GW from solar, 60 GW from wind, 10 GW from bio-power and 5 GW from small hydro-power;
- Amendments in the Tariff Policy for strong enforcement of Renewable Purchase Obligation (RPO) and for providing Renewable Generation Obligation (RGO);
- Setting up of exclusive solar parks;
- Development of power transmission network through Green Energy Corridor project;
- Identification of large government complexes/ buildings for rooftop projects; infrastructure status for solar projects;
- Raising tax free solar bonds;
- Making roof top solar a part of housing loan by banks/National Housing Bank (NHB);
- Incorporating measures in Integrated Power Development Scheme (IPDS) for encouraging distribution companies and making net-metering compulsory;
- Raising funds from bilateral and international donors as also from the Green Climate Fund to achieve the target; and
- Creation of Surya Mitras for installation and maintenance of the Solar Projects.

Power Generation Scenario

The Overall generation (including generation from grid connected renewable sources) in the country has been increased from 1173.458 BU during 2014-15 to 1173.603 BU during the year 2015-16 and 1242.010 BU during 2016-17. The annual growth in power generation during recent years is given at **Annexure-II**.

The performance of Category wise generation during the year 2016-17 is given in the following table :-

Table: Performance of category-wise Generation

Thermal Increased by	5.34 %
Hydro Reduced by	0.82 %
Nuclear Increased by	1.34 %
Bhutan Import Increased by	7.11 %
Renewables Increased by	24.46 %
Overall Growth rate	5.83 %

India Energy Security Scenarios (IESS), 2047

In 2013, the erstwhile Planning Commission had undertaken an energy scenario building exercise, called the India Energy Security Scenarios, 2047. The first version of the IESS, 2047 was publicly launched on 28th February 2014. This was further developed by NITI Aayog in 2014-15, the successor institution of the Planning Commission, to incorporate the bold ambitions of the new Government for a large share of clean energy and high growth rate of the Gross Domestic Product (GDP).

The tool has revealed that there is a large potential for India to raise its energy supply from domestic sources, particularly renewable ones. It aims to explore a range of potential future energy scenarios for India, for diverse energy demand and supply sectors leading up to 2047. It explores India's possible energy scenarios across energy supply sectors such as solar, wind, bio fuels, oil, gas, coal and nuclear and energy

demand sectors such as transport, industry, agriculture, cooking and lighting appliances. The purpose of the IESS tool is to engage various stakeholders in the country's energy planning and facilitate informed debates at different levels. This tool will enable policy makers and parliamentarians make a more secure and sustainable energy future for India.

Conclusion

Energy is a key determinant of growth and India needs sustainable energy sources to continue to grow at 7-8 percent annually. Inadequate availability of hydrocarbons along with decline in coal production forces India to remain dependent on oil imports and consequently increase its import bills. India imports approximately 70 percent of its oil, most of it is from the Middle East. In addition, demand for hydrocarbons is rising globally compelling India to ensure energy security, establishing energy security as one of the biggest challenges faced by India. Environmental concerns coupled with inadequate supply of hydrocarbons and natural gas have resulted in India now aiming at a diversified basket of energy.

Fully reliable provision of power and new employment opportunities in the manufacturing sector give extra impetus to India's economic and social development and its transition to an urban society. The additional demands on the energy system come primarily from industry, not only from energy-intensive sectors, but also from other industries that are targeted by the "Make in India" campaign such as textiles, food processing, machinery and industrial equipment. Energy use for road freight, residential consumption and for a more mechanised and productive agricultural sector also rise. To avoid that this extra demand exacerbates energy security and environmental strains requires an even-stronger commitment to energy efficiency as a

central pillar of India's energy strategy, alongside an unwavering push for low-carbon energy and high standards of pollution control.

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Annexure-I

State-wise and Source-wise power generation from various renewable energy sources during the the period of April 2016 to Jan 2017.

(Million Units)						
S. No	State	Wind	Solar	Small Hydel	Bio-Power	Total
1	CHANDIGARH	0.00	12.37	0.00	0.00	12.37
2	DELHI	0.00	4.00	0.00	106.85	110.84
3	HARYANA	0.00	38.74	267.49	87.96	394.20
4	HP	0.00	0.00	1885.33	0.00	1885.33
5	J & K	0.00	0.49	278.24	0.00	278.73
6	PUNJAB	0.00	676.06	372.73	632.44	1681.23
7	RAJASTHAN	4857.24	1740.36	3.83	224.46	6825.89
8	UTTAR PRADESH	0.00	165.56	22.07	2257.69	2445.31
9	UTTARAKHAND	0.00	25.09	726.65	45.57	797.30
10	NTPC DADRI+FBD+ UNCHAHAR+SINGRULI	0.00	38.06	0.00	0.00	38.06
11	OIL INDIA LTD	173.57	19.09	0.00	0.00	192.67
12	CHHATTISGARH	0.00	97.66	39.65	1045.79	1183.10
13	NTPC RAJGARH	0.00	67.59	0.00	0.00	67.59
14	GUJARAT	6578.73	1409.65	20.26	8.16	8016.80
15	MADHYA PRADESH	3015.17	1090.63	189.76	98.80	4394.36
16	MAHARASHTRA	6950.36	464.55	444.34	2152.25	10011.49
17	DADRA AND NAGAR HAVELI	0.00	0.96	0.00	0.00	0.96
18	DAMAN & DIU	0.00	10.95	0.00	0.00	10.95
19	ANDHRA PRADESH	2769.94	1228.48	135.17	423.90	4557.49
20	TELANGANA	183.69	960.99	45.54	310.36	1500.59
21	KARNATAKA	5411.24	343.47	1491.55	1358.97	8605.23
22	KERALA	66.43	20.92	374.73	44.43	506.51
23	NTPC RAMAGUNDAM+ ANANTAPURAM	0.00	271.12	0.00	0.00	271.12
24	TAMIL NADU	11153.53	1477.88	89.80	1065.36	13786.57
25	LAKSHADWEEP	0.00	1.17	0.00	0.00	1.17
26	ANDAMAN & NICOBAR	0.00	5.26	12.17	0.00	17.43
27	BIHAR	0.00	83.01	20.05	0.00	190.52
28	JHARKHAND	0.00	31.63	0.00	87.46	31.63
29	ODISHA	0.00	166.37	218.15	0.00	442.36
30	SIKKIM	0.00	0.00	34.38	57.85	34.38
31	WEST BENGAL	0.00	11.71	92.84	0.00	1297.49
32	DVC	0.00	0.00	121.46	1192.94	121.46
33	NTPC ANDAMAN+TALCHER	0.00	16.48	0.00	0.00	16.48

34	ARUNACHAL PRADESH	0.00	0.13	13.40	0.00	13.53
35	ASSAM	0.00	79.85	78.73	0.00	158.58
36	MANIPUR	0.00	0.01	0.00	0.00	0.01
37	MEGHALAYA	0.00	0.00	54.75	0.00	54.75
38	MIZORAM	0.00	0.00	42.57	0.00	42.57
39	NAGALAND	0.00	0.00	86.41	0.00	86.41
40	TRIPURA	0.00	0.00	40.03	0.00	40.03
41	NEEPCO	0.00	5.65	0.00	0.00	5.65
	Total	41159.91	10565.90	7202.06	11201.23	70129.11

Source: Central Electricity Authority (CEA)

Note: Data as received from State Load Dispatch Centre (SLDC) of the respective states of the electricity department.

Power Generation

YEAR	GROWTH IN CONVENTIONAL GENERATION (%)	GROWTH IN RENEWABLE GENERATION (%)	GROWTH IN TOTAL GENERATION (%)
2008-09	2.7	-	-
2009-10	6.6	-	-
2010-11	5.56	-	-
2011-12	8.11	-	-
2012-13	4.01	-	-
2013-14	6.04	-	-
2014-15	8.43	-	-
2015-16	5.64	6.47	5.69
2016-17	4.72	24.46*	5.83
2017-18 (Upto April 2017)	3.91	22.00*	4.79