CHAPTER - II

POWER SECTOR IN
INDIA
CHAPTER II

POWER SECTOR IN INDIA

Power is considered to be a pioneer of infrastructure and a part and parcel of human life. Power is a heart of all kinds of economic activities. It is impossible to assume the world without electric power and it is inevitable for economic development. The economic development of a country is the result of aggregate work of all economic and non-economic variables. India is now the second fastest growing economy in the world and second highest populous, 7th largest country covering 32, 87,263 sq.km. India has become self sufficient in agriculture production and is now the 10th industrialized country. It is the 4th largest country in the world in installed capacity of the power and is in 5th place in power production and the 6th largest country in power consumption.

Power development in India

Power development in India commenced with the commissioning of electricity supply in Darjeeling during the year 1897 followed by the commissioning of hydro power station at Sivasamudram in Karnataka in 1902. In the pre-independence era, power supply was mainly in the private sector that too restricted to the urban areas. After independence a significant step was taken in bringing about a systematic growth of power supply industry all over the country with the formation of State Electricity Boards (SEBs). A number of multi-purpose projects came into being and with the setting up of thermal, hydro and nuclear power stations power generation started increasing significantly. The power generation increased from 6.6 to 842.5 billion kilo watts during the period 1950-51 to 2008-09. The power generation installed capacity improved from 2302 Mega Watts to 169748.86 Mega Watts during the period from 1950-51 to the end of January 2010. The length of transmission and distribution lines increased from 29721 to 7278946 CKM.
during the period 1950-51 to 2008-09. The number of electrified villages rose from 3061 to 488439 during the same period. So India made spectacular progress in the power sector after independence. This is possible because of four major policies viz the budgetary support and ownership of the power utilities by the Government, development of a centralized supply system, technological self reliance and subsidization. These four major policies enabled the power sector to achieve a commendable growth in terms of capacity addition, generation, per capita consumption and electrification of villages.

Structure of power sector in India

The Ministry of Power Govt. of India provides overall guidance to the sector based on the advises of the Central Electricity Authority. The recently established Central Electricity Regulatory Commission is empowered to regulate the sector at the national level, including central power utilities according to the Electricity Regulatory Commission Act, 1998. At state level, state governments control the power sector through the State Electricity Boards (SEBs) and Electricity Departments (EDs). These SEBs and EDs are responsible for generation, transmission and distribution.

Ministry of Power

The Ministry of power started functioning independently with effect from 2nd July 1992. It was known as the Ministry of Energy Sources. The Ministry of Power prepares the perspective planning for power development and processing of projects, investment decision, monitoring its implementation, man power development, training and the administration. The Ministry of Power is responsible for the administration of the Electricity Act, 2003, and the Energy Conservation Act, 2001, and to under take such amendments to these Acts.
Central Electricity Authority (CEA)

The Ministry of Power is assisted by the Central Electricity Authority in all technical and economical matters. The Government of India constituted a statutory body for CEA under Electricity Act, 1948. Later on this was replaced by the Electricity Act, 2003. The CEA is headed by a chairman and six full time members, they are designated as member (Thermal), as member (Hydro) as member (Economic and Commercial), as member (Power system), as member (Planning), as member (Grid Operation and Distribution). Chairman get the rank of ex-officio secretary and members gets the rank of ex-officio additional secretary in Government of India. CEA shall prepare the National Electricity plans. It gives the advises to Central and State Governments for power development. CEA collects and records the data concerning the generation, transmission, trading, distribution and utilization of electricity and carry out studies relating to cost, efficiency competitiveness and such like matters.

Functions of CEA

❖ To develop national plans and formulate national power policy.

❖ To assess the progress of the electricity supply industry.

❖ To provide technical assistance.

❖ To advice Central Government/State Governments/Boards/ generating companies.

Central Sector Power Corporations

National Thermal Power Corporation (NTPC)

NTPC is the largest power generation company in India. It was set up in 1975 for the purpose of accelerated power development in India. Of 2000 ranks of Forbs Global NTPC got 317th rank in 2009 and also became a ‘Maharatna’ company in May 2010 (only
four companies in India got this status). The main function of NTPC is power generation, power trading, ash utilization and coal mining.

NTPC contributed 28.60 per cent of the total power generation in Central sector (2,18,840 Million Units as on 30.01.2010) and the total installed capacity of the company was 28,8401 Mega Watts (including JVs) with 15 coal based and 7 gas based stations located across the country. In addition to JVs, 5 stations are coal based and other stations use naphtha/LNG as fuel. The company has set a target to have an installed power generating capacity of 1, 28,000 Mega Watts by the year 2032. The PLF has increased from 76.6 per cent in 1998-99 to 90.81 per cent in 2009-10.

**National Hydro Electric Power Corporation Limited (NHPCL)**

The NHPCL is one of the central government enterprises. Since its inception in 1975, NHPCL has grown to become one of the another largest organization in the field of hydro power development in the country. At present, NHPCL is a Mini Ratna category-I enterprise and it is one among the top ten companies in the country in terms of investment. The objectives of NHPCL are to plan, organise development of hydro power in all aspects through the conventional and non-conventional sources in India and abroad. During the financial year 2009-10, NHPCL power stations achieved the highest ever generation of 16960.45(as on 31.01.2010) Million Units.

**North Eastern Electric Power Corporation Limited (NEEPCOL)**

The NEEPCOL is a schedule “A” Government of India enterprise under the Ministry of Power. It was set up on 2nd April 1976 with its headquarters at Shillong, the capital of Meghalaya. The functions of NEEPCOL are to plan, investigate, design, construct, generate, operate and maintain power stations in the North Eastern Region of
the country. Its installed capacity is 1130 Mega Watts which is 49 per cent of the total installed capacity of the North Eastern Region.

**Nuclear Power Corporation of India Limited (NPCIL)**

The NPCIL is a public sector enterprise under the administration of Department of ATOMIC Energy (DAE), Government of India. It was registered as a public limited company under the company Act, 1956 in September 1987. The main objectives of NPCIL are operating the atomic power stations for generation of electricity and implementing the programmes of the Government of India under the ATOMIC Energy Act, 1962. NPCIL gross electric power generation was 18831 Million Units in 2009-10 (as on 31.01.2010) and installed capacity was 4560 Mega Watts.

**Power Grid Corporation of India Limited (PGCIL)**

The PGCIL was established in 1989 for transmission of electric power across the country. Power grid was recognized as the Mini Rathna category-1 by the Government of India in October 1998 and also got the status of Nava Rathna conferred on 1st May 2008. PGCIL is discharging its responsibility efficiently in operation and maintenance of Inter-State transmission system and operation of Regional Power Grids.

Power grid modernized all the Regional Load Dispatch Centers (RLDCs) which are greatly contributing to bring quality in operation of power system besides improving data availability, visibility and transparency for over all co-ordination. PGCIL net work consists of 75,290 circuit kilo meters of Inter-State transmission lines, 124 NOs of EHV&HVDC sub-stations with transformation capacity of about 83,100 Kilo Watts.
Corporations under Ministry of Power

Rural Electrification Corporation Limited (REC)

The REC was started on 25th July 1969 under the Companies Act, 1956. It is a listed Government of India Public Sector Enterprise (Central Public Sector Enterprises under the Ministry of Power). REC got the status of Nava Rathna. The functions of REC are to finance and promote rural electrification projects all over the country. It provides financial assistance to State Electricity Boards, State Electricity Departments and Rural Electric cooperatives of rural electrification projects.

REC's net worth was Rs.1108033.00 crore, and its income was Rs.570760.00 crore in 2009-10. By 2009-10 REC electrified of 4,96,577 villages and energised 93,50,250 pump sets.

Power Finance Corporation (PFC)

The PFC is one of the Public Sector Enterprises. It was set up in July 1986. PFC was registered as a non-banking finance company by RBI and it got the status of Nava Rathna (Public Sector Utilities in GOI) on 22nd Jun 2007. PFC is providing large range of financial products and services like project term, level of financing direct, discounting bill- short term, consultancy services etc.

Joint Venture Companies

Satluj Jal Vidut Nigam Limited (SJVN)

The SJVN was started on 24th May 1988 in the place of Naptha Jhakri Power Corporation Limited as a joint venture of Govt. of India and State Govt. of Himachal Pradesh (Central Public Sector Utilities under Ministry of Power). The Corporation was conferred the status of Mini Rathna category-1 by the Govt. of India. This corporation’s
functions and objectives are to plan, investigate, organise, execute, operate and maintain power projects in the Satluj river basin in Himachal Pradesh and at any other places in India and abroad.

**Tehri Hydro Power Corporation (THDC)**

The THDC is formed as a joint venture corporation of Govt. of India in July 1988 under the Companies Act, 1956, to develop, operate and maintain the Tehri Hydro Power Complex and other hydro power projects.

**Statutory Bodies**

**The Bhakras Beas Management Board (BBMB)**

The BBMB was constituted on 15th May 1976 under Section 79 of the Punjab Re-Organisation Act, 1966 in the place of Beas Construction Board (BCD in 1967) and Bhakra Nangal Management Board (BMB). BBMB is responsible for administration & maintenance of Bhakra Nangal project, Sutluj link projects and Pong Dam including power houses and net work to transmission lines and grid sub-stations. BBMB has an installed capacity of 2804.73 Mega Watts.

**Damodar Vally Corporation (DVC)**

The DVC was established on 7th July 1948 by the Damodar Vally Corporation Act. The Govt. of India set a body for DVC administration a full time chairman and two part-time members. The part-time members represented the states of Bihar and West Bengal. DVC covers an area of 24,235 sq.kms which includes seven districts of Bihar and five districts of West Bengal. DVCs main objectives are flood control, irrigation and water supply for industrial and domestic use, generation, transmission and distribution of electrical energy etc.
Bureau of Energy Efficiency (BEE)

The BEE has been set up by the Govt. of India on 1st March 2002 as a statutory body as per Section 3 of Energy Conservation Act, 2001, at New Delhi. BEE is responsible for improvement of energy through regulatory and promotional instruments. BEE developed policies and strategies with a thrust on self regulation and market principles with in the over all frame work of Energy Conservation Act, 2001.

Central Power Research Institute (CPRI)

The CPRI set up in 1960, is an autonomous society under Ministry of Power, Govt. of India. Its head office is located at Banglore. This institute has infrastructure facilities at Bhopal, Hyderabad, Nagpur, Noida, Kolkata and Guwahati. CPRI functions as a center for applied research in electrical power engineering assisting the electrical industry in product development, consultancy and quality assurance. It is also serving as an independent authority for testing and certification of power equipment.

National Power Training Institute (NPTI)

The NPTI is an apex body for training and human resources development in power sector. It was set up by the Govt. of India in 1974 with its corporate office at Faridabad. It operates on an all India basis through its units which are located in different power zones of the country.

Historical Background of Legislative Initiatives

In the Constitution of India “Electricity is a subject that falls with in the concurrent jurisdiction of the central and the state.

The Indian Electricity Act, 1910
❖ Provided basic framework for electric supply industry in India.

❖ Growth of the sector through licensees. Licence by State Govt.

❖ Provision for licence for supply of electricity in a specified area.

❖ Legal framework for laying down of wires and other works.

❖ Provisions laying down relationship between licensee and consumer.

This Act is to facilitate mobilization of domestic and foreign private funds and to allow incentives such as high returns on investment. As a result of this Act, the electricity installed capacity in the utilities was 63 per cent in private sector and about 37 per cent in public sector in December 1950.

The Electricity (Supply) Act, 1948

This paved the way for the establishment of State Electricity Boards (SEBs), State Electricity Departments (EDs) and Central Sector Utilities (CEA, NTPCL, NHPCL, NEEPCL, etc.) and contributed to the current status of development of the sector serving a population more than 1 billion. Amendments elaborate institutional frame work and financing norms of the performance of the electricity industry in the country. The Industrial Policy Resultations envisaged the generation, transmission and distribution of power almost exclusively in the private sector. As a result of Electricity Supply Act, 1948 the electricity industry was developed rapidly in the state sector.

Main amendments to the Indian Electricity Supply Act, 1998

❖ Amendment in 1975 is to enable generation in Central sector.

❖ Amendment to bring in commercial viability in the functioning of SEBs.
 Amendmen in 1998 is to allow private sector participation in transmission.

**The Electricity Regulatory Commission Act, 1998**

- Provision for setting up of Central / State Electricity Regulatory Commission with powers to determine tariffs.
- Constitution of SERC optional for States.
- Distancing of Government from tariff determination.

**The Electricity Laws (Amendment) Act, 1998**

This Act was passed with a view to make transmission as a separate activity for inviting greater participation in investment public and private sectors. This Act provides for creation of Central and State Transmission Utilities.

**Electricity Bill-2001**

The Electricity Bill 2001 was introduced in Parliament in August 2001. The Bill seeks to replace the three existing Acts, viz., the Indian Electricity Act, 1910, the Electricity (Supply) Act, 1948 and the Electricity Regulatory Commissions Act, 1998. The Ministry of Power initiated the drafting of a comprehensive bill to replace the three above Acts. As such a radical move was contemplated signifying the depth of the institutional changes in the sector. From all accounts, development of this bill was a national initiative. A consultant from the National Council of Applied Economic Research (NCAER) drafted the initial bill, with subsequent control over content resting within the Ministry itself.

- The Central Govt. prepares a National Electricity Policy in consultation with State Governments.
❖ The Central Govt. prepares a National Electricity Policy in consultation with State Governments.

❖ A thrust to complete rural electrification and provide for management of rural distribution by Panchayaths, Cooperative Societies, non-Governmental organization, franchise etc.

❖ Generation to be delicensed and captive generation to be freely permitted. Hydro projects would, however, need approval of the state government and clearance from the Central Electricity Authority.

❖ Transmission Utility at the Central as well as State level, to be a Government company- with responsibility for planned and coordinated development of transmission network. Provision for private transmission licensees.

❖ Open access in transmission from the outset with provision for surcharge for taking care of current level of cross subsidy with the surcharge being gradually phased out.

❖ Distribution licensees would be free to undertake generation and generating companies would be free take up distribution licensees.

❖ The State Electricity Regulatory Commission is a mandatory requirement.

❖ Provision for license free generation and distribution in the rural areas.

❖ The SERCs may permit open access in distribution in phased with surcharge for current level of cross subsidy to be gradually phased out along with cross subsidies and obligation to supply.

❖ Provision for payment of subsidy through budget.
❖ For rural and remote areas stand alone systems for generation and distribution would be permitted.

❖ Trading as a distinct activity being recognized with the safeguard of the Regulatory Commission being authorized to fix ceiling on trading margins, if necessary.

❖ The State Government has flexibility to unbundle the SEBs or continue with them as distribution licensees and State Transmission Utility.

❖ The Bill does not prescribe any model reform, instated provides flexibility to the State Government to choose the model suiting to their conditions.

❖ Metering of all electricity supplied made mandatory.

❖ An Appellate Tribunal to hear appeals against decision of CERC and SERSs.

❖ Provisions relating to theft of electricity made more stringent.

ELECTRICITY ACT, 2003

Electricity Act, 2003 is a witness for major changes of Indian power sector. This Act has replaced above three Acts namely (i) The Indian Electricity Act, 1910 (ii) The Electricity (Supply) Act, 1948 and (iii) The Electricity Regulatory Commission Act, 1998. The provisions of State Reforms Acts (list given at the end) have been saved under section 185 (3) of the Act subject to the condition that the provisions of the enactments are not in consistence with Electricity Act shall apply to the State in which such enactments are applicable.
The salient features of the Electricity Act are as follows:

i. No license is required for Generation and captive generation has been freely permitted. Hydro projects exceeding the capital cost notified by Central Government however, need concurrence of the Central Electricity Authority.

ii. No license is required for generation and distribution in notified rural areas.

iii. Transmission Utility at the Central as well as State level, to be a Government company – with responsibility for planned and coordinated development of transmission network. Provision for private licensees in transmission.

iv. Trading, a distinct activity recognised with the safeguard of the Regulatory commissions being authorised to fix ceilings on trading margins, if necessary.

v. Open access in distribution with provision for surcharge for taking care of current level of cross subsidy with the surcharge being gradually phased out.

vi. Distribution licensees would be free to undertake generation and trading.

vii. The State Governments are required to re-organise the SEBs. However, they may continue the SEB as State Transmission Utilities and licensees for such time the State and Central Government agree.

viii. Setting up of the State Electricity Regulatory Commission made mandatory.

ix. An Appellate Tribunal to hear appeals against the decision of the CERC and SERCs.

x. Metering of all electricity supplied made mandatory.

xi. Provisions relating to theft of electricity made more stringent.

xii. For rural and remote areas stand alone systems for generation and distribution permitted.
xiii. Thrust to complete rural electrification and provide for management of rural
distribution by panchayats, cooperative societies, non-government organizations,
franchises, etc.

Electricity (Amendment) Act, 2007

Electricity (Amendment) Act, 2007 was enacted on 29th May 2007 and brought
into force with effect from 15.06.2007.

The main features of the Act:

❖ Central Govt. jointly with State Govt. to endeavour to provide access to electricity
to all areas including villages and hamlets though the rural electricity
infrastructure and electrification of house holds.

❖ No license is required for sale of electricity from captive units.

❖ Definition of theft expanded to cover use of tempered meters and use for
unauthorized purpose.

❖ Deletion of provisions for elimination of cross subsidies, the provision for
reduction of cross subsidies would continue.

Tariff Policy

The Central Government is to prepare the National Electricity Tariff Policy in
consultation with the State Governments and Central Electricity Authority (CEA). The
Government has finalized the National tariff policy for power sector, which addresses
some important issues like method of calculation of cross-subsidy under the open access
and the competitive bidding route for the private players. However it has left certain
issues like the transmission pricing framework unaddressed. The Central Government
notified the National Tariff Policy (NTP) for the power sector in compliance with Section
3, Electricity Act. It basically deals with various parameters with respect to the fixation of tariffs, like providing adequate return on investment to the power generation and supplier and ensuring responsible user charges for the consumers, historical costs, that is observed post cost, rather than the long-run margin cost, the current and future cost of developing system. It provides uniform guidelines to the State Electricity Regulatory Commission (SERCs) for the fixation of tariffs for their respective entities (as there are independent SERCs for each state) as well as CERC. Historical costs that is observed post cost, rather than the long-run margin cost, the current and future cost of developing system.

**Two parts of tariff order**

1. **Fixed part:** to cover fixed costs including a return on capital.

2. **A Variable part:** mainly to cover fuel costs related to actual generation.

CERC has emphasized that all future projects and new investment in generation, transmission and distribution both Public Sector Utilities as well as IPPs. CERC views the Availability of Based Tariff (ABT) as a transaction towards fully comparative pricing. Ultimately, the CERC thinks, supply and demand will determine the appropriate tariff. Therefore, CERC has endeavored to develop a tariff mechanism, keeping in mind the interests while contributing to the development of a viable power sector in India.

The SEBs confirmed the use of a cost-plus tariff, a plant based tariff in which normative costs are passed through the buyers. Among the norms used one determining load factor for recovering full fixed charges (68.5 per cent for stem cost units).

**National Electricity Policy and Plan**

The Central Government prepares the National Electricity Policy in consultation with the State Governments and Central Electricity Authority (CEA). These policies have to be prepared for development of power systems based on optimal utilization of
resources such as coal, natural gas, nuclear substances, hydro and renewable sources of energy. These policies have to be published and are also subject to review or revision in consultation with the State Governments and CEA. Further, in accordance with National Electricity Policy, the CEA has to prepare National Electricity Plan after inviting suggestions from all stake holders and notify it once in five years. Such Plan can be notified by CEA after obtaining approval from the Central Government and incorporating directions, if any, given by the Central Government while granting such approval.

At the national level, the responsibility of planning rests with CEA and the National Electricity Plan notified by CEA shall form the basis for future capacity addition in generation and transmission networks. The Act mandates that Regulatory Commissions shall be guided by the National Electricity Policy and National Electricity Plans. Further the Regulatory Commissions are to be guided by any direction of the government (Central Government for CERC and State Government for SERC) pertaining to any policy involving public interest.

**Objectives of National Electricity Plan.**

National Electricity Plan covers a programme for development of generation and transmission and distribution system in the country. It includes development aspects such as rural electrification, energy conservation and demand side management, environment protection & improvement, energy security, research & development, human resources development and requirement of likely inputs.
Table 2.1  
Resource wise Electricity Installed Capacity in India  
(In Mega Watts)

<table>
<thead>
<tr>
<th>Year</th>
<th>Hydro</th>
<th>Growth Rate</th>
<th>Thermal (coal)</th>
<th>Growth Rate</th>
<th>Nuclear</th>
<th>Growth Rate</th>
<th>Oil, Gas Wind</th>
<th>Growth Rate</th>
<th>Total Utility</th>
<th>Growth Rate</th>
<th>Growth Rate</th>
<th>Total Non-Utility</th>
<th>Growth Rate</th>
<th>Growth Rate</th>
<th>Total Utility + Non-Utility</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-1951</td>
<td>559.00</td>
<td>(24.8)</td>
<td>1743.00</td>
<td>(75.72)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2302.00</td>
<td>-</td>
<td>588.00</td>
<td>2890.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960-1961</td>
<td>1917.00</td>
<td>242.93</td>
<td>3737.00</td>
<td>114.40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5654.00</td>
<td>145.61</td>
<td>1001.00</td>
<td>6655.00</td>
<td>130.28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970-1971</td>
<td>6383.00</td>
<td>232.97</td>
<td>7508.00</td>
<td>100.91</td>
<td>420.00</td>
<td>-</td>
<td>398.00</td>
<td>-</td>
<td>14709.00</td>
<td>160.15</td>
<td>1562.00</td>
<td>16271.00</td>
<td>144.49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980-1981</td>
<td>11791.00</td>
<td>84.73</td>
<td>17128.00</td>
<td>128.13</td>
<td>860.00</td>
<td>104.76</td>
<td>440.00</td>
<td>10.55</td>
<td>30219.00</td>
<td>105.45</td>
<td>3102.00</td>
<td>33321.00</td>
<td>104.79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990-1991</td>
<td>18752.00</td>
<td>59.03</td>
<td>43004.00</td>
<td>151.07</td>
<td>1565.00</td>
<td>81.98</td>
<td>2764.00</td>
<td>528.18</td>
<td>66086.00</td>
<td>118.69</td>
<td>8613.00</td>
<td>74699.00</td>
<td>124.18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000-2001</td>
<td>25152.91</td>
<td>34.13</td>
<td>61010.88</td>
<td>41.87</td>
<td>2860.00</td>
<td>82.75</td>
<td>12602.42</td>
<td>355.95</td>
<td>101626.20</td>
<td>53.78</td>
<td>16156.36</td>
<td>117782.57</td>
<td>57.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001-2002</td>
<td>26268.78</td>
<td>4.44</td>
<td>62130.88</td>
<td>1.84</td>
<td>2720.00</td>
<td>-</td>
<td>13926.32</td>
<td>10.51</td>
<td>105045.96</td>
<td>3.37</td>
<td>-</td>
<td>122191.16</td>
<td>3.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002-2003</td>
<td>26766.83</td>
<td>1.90</td>
<td>63950.88</td>
<td>2.93</td>
<td>2720.00</td>
<td>0.00</td>
<td>14440.66</td>
<td>3.69</td>
<td>107878.37</td>
<td>2.70</td>
<td>-</td>
<td>18361.62</td>
<td>7.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003-2004</td>
<td>29506.83</td>
<td>10.24</td>
<td>64955.88</td>
<td>1.57</td>
<td>2720.00</td>
<td>0.00</td>
<td>15500.76</td>
<td>7.34</td>
<td>112683.47</td>
<td>4.45</td>
<td>-</td>
<td>18740.31</td>
<td>2.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004-2005</td>
<td>30942.24</td>
<td>4.86</td>
<td>67790.87</td>
<td>4.36</td>
<td>2770.00</td>
<td>1.84</td>
<td>16922.58</td>
<td>9.17</td>
<td>118425.70</td>
<td>5.10</td>
<td>-</td>
<td>19102.57</td>
<td>1.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005-2006</td>
<td>32325.77</td>
<td>4.47</td>
<td>68518.88</td>
<td>1.07</td>
<td>3360.00</td>
<td>21.30</td>
<td>20082.53</td>
<td>18.67</td>
<td>124287.18</td>
<td>4.95</td>
<td>-</td>
<td>21468.21</td>
<td>12.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006-2007</td>
<td>34653.78</td>
<td>7.20</td>
<td>71121.38</td>
<td>3.80</td>
<td>3900.00</td>
<td>16.07</td>
<td>22654.07</td>
<td>12.80</td>
<td>132329.23</td>
<td>6.47</td>
<td>-</td>
<td>22335.04</td>
<td>4.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2008</td>
<td>35908.76</td>
<td>3.62</td>
<td>76018.88</td>
<td>6.89</td>
<td>4120.00</td>
<td>5.64</td>
<td>27013.38</td>
<td>19.24</td>
<td>143061.02</td>
<td>8.11</td>
<td>-</td>
<td>24986.39</td>
<td>11.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-2009</td>
<td>36877.76</td>
<td>2.70</td>
<td>77648.88</td>
<td>2.14</td>
<td>4120.00</td>
<td>0.00</td>
<td>29318.77</td>
<td>8.53</td>
<td>147965.41</td>
<td>3.43</td>
<td>-</td>
<td>26873.68</td>
<td>6.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009-2010*</td>
<td>39000.00</td>
<td>0.06</td>
<td>102552.90</td>
<td>51.97</td>
<td>4500.00</td>
<td>(2.82)</td>
<td>15427.10</td>
<td>(9.68)</td>
<td>159400.00</td>
<td>(47.38)</td>
<td>-</td>
<td>187900.00</td>
<td>7.59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Economic Survey -2010-11, Ministry of Finance, Govt.of India.
Note: 1.* is provisional data.
2. Figures in brackets are percentages to total utility.
Electricity Installed Capacity

Resource wise electricity installed capacity in India is shown in Table 2.1. This data covers a time period from 1950-51 to 2009-10. The important resources of electricity are hydro, thermal, nuclear, oil, gas, wind etc. The total installed capacity of total utility increased from 2302 MW in 1950-51 to 159400 MW in 2009-10. It is observed that the growth of installed capacity of total utility was very high between 1960-61 and 1990-91 as it ranged from 145.61 per cent in 1960-61 to 105.45 per cent in 1980-81. After 2000-01 and up to 2009-10 the growth rate of installed capacity of total utility was very low and it ranged from 2.70 per cent in 2002-03 to 8.11 per cent in 2007-08. It implies that the growth in installed capacity of total utility became stagnant after 2000-01. The installed capacity of non-utility also increased from 588 MW in 1950-51 to 28500 MW in 2009-10. In this case also the growth rate is high between 1960-61 and 2000-01. Afterwards the growth in the installed capacity of non-utility tremendously declined.

Similarly the installed capacity of utility and non-utility rose from 2890 MW in 1950-51 to 187900 MW in 2009-10. In terms of growth rate it was very high at 144.49 per cent in 1970-71. Between 2001-02 and 2009-10 the growth rate in the installed capacity of utility and non-utility was very low and it ranged from 3.1 per cent in 2002-03 to 8.65 per cent in 2007-08. All these facts reveal that the growth rate of the installed capacity was very significant. Table 2.1 also shows that of the total installed capacity of utility in 1950-51 the installed capacity of hydro electricity accounted for 24.28 per cent and that of thermal for 75.72 per cent. In 2009-10 also the installed capacity of thermal power was high throughout the period from 1950-51 to 2009-10. However the installed capacity of thermal power declined by more than 10 per cent in 2009-10. It was due to the introduction of new resources like nuclear, oil, gas, wind etc. The share of nuclear in the
total installed capacity was only 2.82 per cent and that of oil, gas, wind etc was 9.66-
per cent in 2009-10.

**Electricity Generation**

Resource wise electricity generation in India is shown in Table 2.2. The important
sources of electricity generation are thermal, hydro, nuclear, oil, gas and wind etc. The
generation of total utility increased from 5.10 billion units in 1950-51 to 796 billion units
in 2009-10. It is observed that the growth rate of power generation (total utility) was very
high in 1960-60. After 2001-02 growth rate of power generation (total utility) declined to
3.42 per cent in 2008-09. Because, the government encouraged private electricity
generation. While the power generation (total non-utility) increased from 1.50 B.U to
109.70 B.U in 2009-10. But its percentage declined from 22.18 to 12.10 during the same
period. The growth of the total non-utility was high in 1990-91 and after that this growth
rate declined. The total power generation rose from 6.60 B.U in 1950-51 to 906 B.U in
2009-10. The growth of power generation was very high in 1960-61 and 1970-71. It ranged
from 204.55 per cent to 204.53 per cent. After that the growth rate declined. The thermal-
(coal) power generation increased from 2.60 B.U in 1950-51 to 671B.U (including oil,
gas and wind etc) in 2009-10. The highest growth was registered at 250.00 per cent in
1960-61. After this year the growth rate declined. The negative growth rate (-8.60 per-
cent) was recorded in the year 2008-09.

The hydro power generation increased from 2.50 B.U in 1950-51 to 106.70 in
2009-10. But the highest hydro power generation was recorded at 120.39 B.U in 2007-08.
While the highest growth of hydro power generation was at 223.72 per cent in 1970-71.
But the growth rate of hydro power generation was negative in 2001-02, 2002-03, 2008-
09 and 2009-10. This is due to low rainfall and less inflows to reservoirs.
Table 2.2
Resource wise Electricity Generation in India

( IN Billion Units )

<table>
<thead>
<tr>
<th>Year</th>
<th>Hydro</th>
<th>Growth Rate</th>
<th>Thermal (coal)</th>
<th>Growth Rate</th>
<th>Nuclear</th>
<th>Growth Rate</th>
<th>Oil, Gas&amp; Wind etc</th>
<th>Growth Rate</th>
<th>Total Utility</th>
<th>Growth Rate</th>
<th>Total Non-Utility</th>
<th>Growth Rate</th>
<th>Total Utility+ Non-Utility</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-51</td>
<td>2.50</td>
<td>-</td>
<td>2.60</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5.10</td>
<td>-</td>
<td>1.50</td>
<td>-</td>
<td>6.60</td>
<td>-</td>
</tr>
<tr>
<td>1960-61</td>
<td>7.80</td>
<td>212.00</td>
<td>9.10</td>
<td>250.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>16.90</td>
<td>231.37</td>
<td>3.20</td>
<td>113.33</td>
<td>20.10</td>
<td>204.55</td>
<td>-</td>
</tr>
<tr>
<td>1970-71</td>
<td>25.25</td>
<td>223.72</td>
<td>27.80</td>
<td>205.49</td>
<td>2.42</td>
<td>0.36</td>
<td>-</td>
<td>55.83</td>
<td>230.36</td>
<td>5.38</td>
<td>68.13</td>
<td>61.21</td>
<td>204.53</td>
<td>-</td>
</tr>
<tr>
<td>1980-81</td>
<td>46.54</td>
<td>84.32</td>
<td>60.71</td>
<td>118.38</td>
<td>3.00</td>
<td>23.97</td>
<td>0.59</td>
<td>63.89</td>
<td>110.84</td>
<td>8.42</td>
<td>56.51</td>
<td>119.26</td>
<td>94.84</td>
<td>-</td>
</tr>
<tr>
<td>1990-91</td>
<td>71.64</td>
<td>53.93</td>
<td>178.32</td>
<td>193.72</td>
<td>6.14</td>
<td>104.67</td>
<td>8.22</td>
<td>1293.22</td>
<td>264.33</td>
<td>518.48</td>
<td>251.11</td>
<td>198.22</td>
<td>289.43</td>
<td>142.36</td>
</tr>
<tr>
<td>2000-01</td>
<td>74.36</td>
<td>3.80</td>
<td>357.18</td>
<td>100.30</td>
<td>16.90</td>
<td>175.24</td>
<td>52.76</td>
<td>541.85</td>
<td>501.20</td>
<td>89.61</td>
<td>59.64</td>
<td>137.51</td>
<td>560.84</td>
<td>93.77</td>
</tr>
<tr>
<td>2001-02</td>
<td>73.58</td>
<td>-1.05</td>
<td>370.88</td>
<td>3.84</td>
<td>19.47</td>
<td>15.21</td>
<td>53.50</td>
<td>1.40</td>
<td>517.43</td>
<td>3.24</td>
<td>61.68</td>
<td>3.42</td>
<td>579.11</td>
<td>3.26</td>
</tr>
<tr>
<td>2002-03</td>
<td>64.01</td>
<td>-13.01</td>
<td>389.55</td>
<td>5.03</td>
<td>19.39</td>
<td>-0.41</td>
<td>59.74</td>
<td>11.66</td>
<td>532.69</td>
<td>2.95</td>
<td>63.85</td>
<td>3.52</td>
<td>596.54</td>
<td>3.01</td>
</tr>
<tr>
<td>2003-04</td>
<td>75.24</td>
<td>17.54</td>
<td>407.28</td>
<td>4.55</td>
<td>17.78</td>
<td>-8.30</td>
<td>64.79</td>
<td>8.45</td>
<td>565.09</td>
<td>6.08</td>
<td>68.17</td>
<td>6.77</td>
<td>633.26</td>
<td>6.16</td>
</tr>
<tr>
<td>2004-05</td>
<td>84.61</td>
<td>12.45</td>
<td>424.24</td>
<td>4.16</td>
<td>17.01</td>
<td>-4.33</td>
<td>68.59</td>
<td>5.87</td>
<td>594.45</td>
<td>5.20</td>
<td>71.42</td>
<td>4.77</td>
<td>665.87</td>
<td>5.15</td>
</tr>
<tr>
<td>2005-06</td>
<td>101.49</td>
<td>19.95</td>
<td>435.49</td>
<td>2.65</td>
<td>17.32</td>
<td>1.82</td>
<td>69.51</td>
<td>1.34</td>
<td>623.81</td>
<td>4.94</td>
<td>73.64</td>
<td>3.11</td>
<td>697.45</td>
<td>4.74</td>
</tr>
<tr>
<td>2006-07</td>
<td>113.50</td>
<td>11.83</td>
<td>461.79</td>
<td>6.04</td>
<td>18.80</td>
<td>8.55</td>
<td>76.56</td>
<td>10.14</td>
<td>670.65</td>
<td>7.51</td>
<td>81.80</td>
<td>11.08</td>
<td>752.45</td>
<td>7.89</td>
</tr>
<tr>
<td>2007-08</td>
<td>120.39</td>
<td>6.07</td>
<td>560.07</td>
<td>21.28</td>
<td>16.96</td>
<td>-9.79</td>
<td>25.21</td>
<td>-67.07</td>
<td>722.63</td>
<td>7.75</td>
<td>90.48</td>
<td>10.61</td>
<td>813.11</td>
<td>6.06</td>
</tr>
<tr>
<td>2008-09</td>
<td>110.10</td>
<td>-0.10</td>
<td>511.90</td>
<td>-8.60</td>
<td>14.93</td>
<td>-11.97</td>
<td>104.25</td>
<td>313.53</td>
<td>741.17</td>
<td>2.57</td>
<td>99.72</td>
<td>10.21</td>
<td>840.89</td>
<td>3.42</td>
</tr>
<tr>
<td>2009-10</td>
<td>106.70</td>
<td>-0.03</td>
<td>671.00</td>
<td>31.08</td>
<td>18.80</td>
<td>24.58</td>
<td>-</td>
<td>-</td>
<td>796.30</td>
<td>7.44</td>
<td>109.70</td>
<td>10.01</td>
<td>906.00</td>
<td>7.74</td>
</tr>
</tbody>
</table>

2. Economic Survey -2009-10, Ministry of Finance, Govt.of India.
Note: 1. * is Provisional data.
2. 2009-10 Thermal (coal) data including Oil, Gas and Wind etc.
Fig 2.1
Resource wise Percentage of Electricity Generation in India

Years

Percentage

- Hydro
- Thermal
- Nuclear
- Renewable Energy Sources
The nuclear power generation rose from 2.42 B.U in 1970-71 to 18.60 B.U in 2009-10. The nuclear power generation growth rate was negative in 2007-08 (-9.79 per cent) and 2008-09 (-11.97 per cent). The power generation from oil, gas, wind etc. (renewable energy sources) also increased from 0.36 B.U in 1970-71 to 104.25 B.U in 2008-09. The growth rate of power (R.E.S) was very high (313.53 per cent) in 2008-09. But in 2007-08 this growth rate was negative (-67.07 per cent). In 1950-51 the share of hydro power in total generation was 24.3 per cent and that of thermal was 75.2 per cent. But in 2009-10 the share of hydro was only 13.3 per cent and that of thermal was very high at 84.26 per cent. The generation of nuclear power was started in 1970-71. Its share in total generation ranged from 2.55 per cent in 2001-02 to 1.97 per cent in 2008-09. It implies that there is no significant change in the contribution of nuclear power.

State wise Installed Generating Capacity

Region wise and state wise installed generating capacity (Utilities only) as on 31.3.09 is shown in Table 2.3. Region wise statistics reveal that western region with 31.06 percent of the total installed capacity of India (147965.42 MW) stands first followed by northern region with 26.17 per cent, southern region with 25.91 per cent and north-eastern region with 20.89 per cent. Within northern region Punjab with 5111.30 MW (13.2 per cent) stands first followed by Utter Pradesh (5046.48 MW) and Rajasthan (4702.94 MW). Among the states of western region Maharashtra has high installed capacity of 15284.06 MW (33.25 per cent) followed by Gujarath 9273.20 MW (20.17 per cent). In the southern region Tamil Nadu has high installed capacity of 11131.55 MW (29.17 per cent) followed by Andhra Pradesh 9224.28 MW (24.06 per cent). While West Bengal with 6890.13 MW (30.37 per cent) stands first in eastern region. In north eastern region Assam with 471.30 MW (20.89 per cent) ranks first.
## Table 2.3
State wise Installed Generating Capacity (Utilities only) As on 31.3.2009

<table>
<thead>
<tr>
<th>States/ Region</th>
<th>Hydro (%)</th>
<th>Thermal (%)</th>
<th>Nuclear (%)</th>
<th>Res (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NORTHRN REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haryana</td>
<td>884.23</td>
<td>28.53</td>
<td>69.25</td>
<td>-</td>
<td>68.70</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>779.60</td>
<td>80.80</td>
<td>-</td>
<td>0.13</td>
<td>-</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>780.00</td>
<td>72.51</td>
<td>183.94</td>
<td>17.10</td>
<td>-</td>
</tr>
<tr>
<td>Punjab</td>
<td>2319.83</td>
<td>45.39</td>
<td>2630.00</td>
<td>51.45</td>
<td>-</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>987.84</td>
<td>21.00</td>
<td>2988.80</td>
<td>63.55</td>
<td>-</td>
</tr>
<tr>
<td>Utter Pradesh</td>
<td>523.50</td>
<td>10.37</td>
<td>4120.00</td>
<td>81.64</td>
<td>-</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>1652.15</td>
<td>93.76</td>
<td>0.00</td>
<td>0.00</td>
<td>-</td>
</tr>
<tr>
<td>Chandigarh</td>
<td>0.00</td>
<td>0.00</td>
<td>2.00</td>
<td>0.00</td>
<td>-</td>
</tr>
<tr>
<td>Delhi</td>
<td>0.00</td>
<td>0.00</td>
<td>920.40</td>
<td>100.00</td>
<td>-</td>
</tr>
<tr>
<td>Central Sector (NR)</td>
<td>5498.00</td>
<td>34.28</td>
<td>9362.00</td>
<td>58.37</td>
<td>1180.00</td>
</tr>
<tr>
<td><strong>Sub-Total (NR)</strong></td>
<td>13425.15</td>
<td>34.67</td>
<td>22351.69</td>
<td>57.72</td>
<td>1180.00</td>
</tr>
<tr>
<td><strong>WESTERN REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>772.00</td>
<td>8.33</td>
<td>7103.70</td>
<td>76.60</td>
<td>-</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>1703.67</td>
<td>35.69</td>
<td>2807.50</td>
<td>58.81</td>
<td>-</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>120.00</td>
<td>3.90</td>
<td>2780.00</td>
<td>90.43</td>
<td>-</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>3332.83</td>
<td>21.81</td>
<td>9792.00</td>
<td>64.07</td>
<td>-</td>
</tr>
<tr>
<td>Goa</td>
<td>0.00</td>
<td>0.00</td>
<td>48.00</td>
<td>61.50</td>
<td>-</td>
</tr>
<tr>
<td>D&amp;N Haveli</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-</td>
</tr>
<tr>
<td>Central Sector (WR)</td>
<td>1520.00</td>
<td>11.27</td>
<td>10122.00</td>
<td>75.08</td>
<td>1840.00</td>
</tr>
<tr>
<td><strong>Sub-Total (WR)</strong></td>
<td>7448.50</td>
<td>16.20</td>
<td>32653.20</td>
<td>71.04</td>
<td>1840.00</td>
</tr>
<tr>
<td><strong>SOUTHERN REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>3572.93</td>
<td>38.73</td>
<td>4982.70</td>
<td>54.02</td>
<td>-</td>
</tr>
<tr>
<td>Karnataka</td>
<td>3530.80</td>
<td>43.61</td>
<td>2684.42</td>
<td>33.16</td>
<td>-</td>
</tr>
<tr>
<td>Kerala</td>
<td>1756.50</td>
<td>76.17</td>
<td>4304.44</td>
<td>18.67</td>
<td>-</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>2093.95</td>
<td>18.81</td>
<td>4657.96</td>
<td>41.84</td>
<td>-</td>
</tr>
<tr>
<td>Lakshadweep</td>
<td>0.00</td>
<td>0.00</td>
<td>9.97</td>
<td>92.92</td>
<td>-</td>
</tr>
<tr>
<td>Pondicherry</td>
<td>0.00</td>
<td>0.00</td>
<td>32.50</td>
<td>99.94</td>
<td>-</td>
</tr>
<tr>
<td>Central Sector (SR)</td>
<td>0.00</td>
<td>0.00</td>
<td>6440.00</td>
<td>85.41</td>
<td>1100.00</td>
</tr>
<tr>
<td><strong>Sub-Total (SR)</strong></td>
<td>10954.18</td>
<td>28.57</td>
<td>19237.99</td>
<td>50.18</td>
<td>1100.00</td>
</tr>
<tr>
<td><strong>EASTERN REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>0.00</td>
<td>0.00</td>
<td>540.00</td>
<td>91.46</td>
<td>-</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>130.00</td>
<td>7.41</td>
<td>1620.00</td>
<td>92.36</td>
<td>-</td>
</tr>
<tr>
<td>Orissa</td>
<td>2067.93</td>
<td>82.05</td>
<td>420.00</td>
<td>16.67</td>
<td>-</td>
</tr>
<tr>
<td>West Bengal</td>
<td>1022.00</td>
<td>14.83</td>
<td>5768.58</td>
<td>83.72</td>
<td>-</td>
</tr>
<tr>
<td>D.V. Corporation</td>
<td>144.00</td>
<td>4.32</td>
<td>3190.00</td>
<td>95.68</td>
<td>-</td>
</tr>
<tr>
<td>Andhraland</td>
<td>0.00</td>
<td>0.00</td>
<td>60.05</td>
<td>91.82</td>
<td>-</td>
</tr>
<tr>
<td>Sikkim</td>
<td>570.00</td>
<td>7.62</td>
<td>6910.00</td>
<td>92.38</td>
<td>-</td>
</tr>
<tr>
<td>Central Sector (ER)</td>
<td>570.00</td>
<td>7.62</td>
<td>6910.00</td>
<td>92.38</td>
<td>-</td>
</tr>
<tr>
<td><strong>Sub-Total (ER)</strong></td>
<td>3933.93</td>
<td>17.35</td>
<td>18513.63</td>
<td>81.63</td>
<td>-</td>
</tr>
<tr>
<td><strong>NORTH EASTERN REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assam</td>
<td>100.00</td>
<td>21.22</td>
<td>344.19</td>
<td>73.03</td>
<td>-</td>
</tr>
<tr>
<td>Manipur</td>
<td>180.00</td>
<td>0.00</td>
<td>45.41</td>
<td>89.28</td>
<td>-</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>156.00</td>
<td>82.50</td>
<td>2.05</td>
<td>1.08</td>
<td>-</td>
</tr>
<tr>
<td>Nagaland</td>
<td>0.00</td>
<td>0.00</td>
<td>2.00</td>
<td>6.25</td>
<td>-</td>
</tr>
<tr>
<td>Tripura</td>
<td>0.00</td>
<td>0.00</td>
<td>132.35</td>
<td>89.21</td>
<td>-</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>0.00</td>
<td>0.00</td>
<td>15.88</td>
<td>25.97</td>
<td>-</td>
</tr>
<tr>
<td>Mizoram</td>
<td>0.00</td>
<td>0.00</td>
<td>51.86</td>
<td>74.80</td>
<td>-</td>
</tr>
<tr>
<td>Central Sector (NER)</td>
<td>860.00</td>
<td>69.64</td>
<td>375.00</td>
<td>30.36</td>
<td>-</td>
</tr>
<tr>
<td><strong>Sub-Total (NER)</strong></td>
<td>1116.00</td>
<td>49.47</td>
<td>968.74</td>
<td>42.95</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total (All India)</strong></td>
<td>36877.76</td>
<td>24.92</td>
<td>93725.25</td>
<td>63.34</td>
<td>4120.00</td>
</tr>
</tbody>
</table>

Source: All India Electricity Statistics General Review - 2010.
Note: R.E.S is Renewable Energy Sources.
It is observed that in all the states the important power generating sources are thermal and hydro. The percentage of thermal in state's total installed capacity was high in Delhi (100 per cent), Utter Pradesh (81.64 per cent), Chattisgarh (90.43 per cent), Gujarat (76.60 per cent), Pandicherry (99.94 per cent), Laskshadweep (92.92 per cent), Jharkhand (92.36 per cent), West-Bengal (83.72 per cent), A&N Islands (91.82 per cent), Manipur (89.28 per cent), Tripura (89.21 per cent) and Mizoram (74.80 per cent). While the percentage of hydro was very high in Himachal Pradesh (80.80 per cent), Jammu&Khasmir (72.51 per cent), Utteranchal (93.76 per cent), Kerala (76.17 percent), Orrissa (82.05 per cent) and Meghalaya (82.50 per cent). As on 31.33.2009, of the total installed generating capacity of India (147965.42 MW) the share of hydro was 24.92 per cent, of thermal 63.34 per cent and that of nuclear was only 2.78 per cent.

Table 2.4

<table>
<thead>
<tr>
<th>Year</th>
<th>Central</th>
<th>States</th>
<th>Private</th>
<th>Over all</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-01</td>
<td>74.3</td>
<td>65.6</td>
<td>73.1</td>
<td>69.0</td>
</tr>
<tr>
<td>2001-02</td>
<td>74.3</td>
<td>67.0</td>
<td>74.7</td>
<td>69.9</td>
</tr>
<tr>
<td>2002-03</td>
<td>77.1</td>
<td>68.7</td>
<td>78.9</td>
<td>72.1</td>
</tr>
<tr>
<td>2003-04</td>
<td>78.7</td>
<td>68.4</td>
<td>80.5</td>
<td>72.7</td>
</tr>
<tr>
<td>2004-05</td>
<td>81.7</td>
<td>69.6</td>
<td>85.1</td>
<td>74.8</td>
</tr>
<tr>
<td>2005-06</td>
<td>82.1</td>
<td>67.1</td>
<td>85.4</td>
<td>73.6</td>
</tr>
<tr>
<td>2006-07</td>
<td>84.8</td>
<td>70.6</td>
<td>86.3</td>
<td>76.8</td>
</tr>
<tr>
<td>2007-08</td>
<td>86.7</td>
<td>71.9</td>
<td>90.8</td>
<td>78.6</td>
</tr>
<tr>
<td>2008-09</td>
<td>84.3</td>
<td>71.2</td>
<td>91.0</td>
<td>77.2</td>
</tr>
<tr>
<td>2009-10*</td>
<td>84.3</td>
<td>69.7</td>
<td>84.4</td>
<td>76.6</td>
</tr>
</tbody>
</table>

Source: Annual Report 2009-10, Ministry of Power, Govt. of India.
Note: * is provisional data.
Plant Load Factor

Plant load factor is an important indicator of operational efficiency of thermal power plants. Every one per cent improvement in national average PLF makes available an additional 450 MW of installed generating capacity. Table 2.4 shows the plant load factor of central, state and private thermal stations. It is evident that the percentage of PLF is relatively high in private sector as it ranged from 73.1 per cent in 2000-01 to 91.0 per cent in 2008-09. The percentage of PLF is also high in central sector where the PLF percentage ranged from 74.3 per cent in 2000-01 to 86.7 per cent in 2008-09. But the same is comparatively low in the thermal stations of states as it varied from 65.6 per cent in 2000-01 to 71.9 per cent in 2008-09. It is also observed that the percentage of PLF of central, state and private thermal stations is very high especially in 2007-08. The PLF of state thermal plants has been low because of deficiencies in management, operation and non-availability of coal of appropriate quality.
Fig 2.2
Plant Load Factor Percentage of Thermal Power Stations


Percentage

Central States Private Over all
Table 2.5
Plain wise Capacity addition Targets and Achievements in India
(Figures in Mega Watts)

<table>
<thead>
<tr>
<th>Plan</th>
<th>Period</th>
<th>Targets</th>
<th>Achievements</th>
<th>% of achievement</th>
<th>% of short fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Plan</td>
<td>1951-56</td>
<td>1300</td>
<td>1100</td>
<td>84.61</td>
<td>15.39</td>
</tr>
<tr>
<td>2nd Plan</td>
<td>1956-61</td>
<td>3500</td>
<td>2250</td>
<td>64.29</td>
<td>35.71</td>
</tr>
<tr>
<td>3rd Plan</td>
<td>1961-66</td>
<td>7040</td>
<td>4520</td>
<td>64.20</td>
<td>35.80</td>
</tr>
<tr>
<td>Annual Plans</td>
<td>1966-69</td>
<td>5430</td>
<td>4120</td>
<td>75.88</td>
<td>24.12</td>
</tr>
<tr>
<td>4th Plan</td>
<td>1969-74</td>
<td>9264</td>
<td>4579</td>
<td>49.42</td>
<td>50.78</td>
</tr>
<tr>
<td>5th Plan</td>
<td>1974-79</td>
<td>12499</td>
<td>10202</td>
<td>81.62</td>
<td>18.38</td>
</tr>
<tr>
<td>Annual Plan</td>
<td>1979-80</td>
<td>2813</td>
<td>1799</td>
<td>63.95</td>
<td>36.05</td>
</tr>
<tr>
<td>6th Plan</td>
<td>1980-85</td>
<td>19666</td>
<td>14266</td>
<td>72.54</td>
<td>27.46</td>
</tr>
<tr>
<td>7th Plan</td>
<td>1985-90</td>
<td>22245</td>
<td>21401</td>
<td>96.20</td>
<td>3.80</td>
</tr>
<tr>
<td>Annual Plan</td>
<td>1990-91</td>
<td>4212</td>
<td>2776</td>
<td>65.90</td>
<td>34.10</td>
</tr>
<tr>
<td>Annual Plan</td>
<td>1991-92</td>
<td>3811</td>
<td>3027</td>
<td>79.42</td>
<td>20.58</td>
</tr>
<tr>
<td>8th Plan</td>
<td>1992-97</td>
<td>30538</td>
<td>16423</td>
<td>53.78</td>
<td>46.22</td>
</tr>
<tr>
<td>9th Plan</td>
<td>1997-02</td>
<td>40245</td>
<td>19119</td>
<td>47.50</td>
<td>52.50</td>
</tr>
<tr>
<td>10th Plan</td>
<td>2002-07</td>
<td>41110</td>
<td>21180</td>
<td>51.52</td>
<td>48.48</td>
</tr>
<tr>
<td>11th Plan</td>
<td>2007-08</td>
<td>16335</td>
<td>9263</td>
<td>56.70</td>
<td>43.30</td>
</tr>
<tr>
<td>2008-09</td>
<td>7530</td>
<td>3454</td>
<td>45.87</td>
<td>54.13</td>
<td></td>
</tr>
<tr>
<td>2009-10</td>
<td>14507</td>
<td>9585</td>
<td>66.07</td>
<td>33.93</td>
<td></td>
</tr>
</tbody>
</table>


Capacity Addition

Table 2.5 shows the plan wise targets and achievements in capacity addition. In every Five Year Plan there was a shortfall in achievement. The achievement ranged from 96.20 per cent in the Seventh Five Year Plan (1985-90) to 47.50 per cent in the Ninth Five Year Plan (1997-02). While the shortfall varied from 3.80 per cent in the Seventh Five Year Plan to 52.50 per cent in the Ninth Five Year Plan. The actual capacity addition was very high 21401 mega watts in the Seventh Five Year Plan and 21180 mega watts in the Tenth Five Year Plan. The capacity addition actually declined from 21401 MW in Seventh Five Year Plan to 16423 MW in Eighth Five Year Plan. The important reason for
this short fall was the withdrawal of budgetary support by central government for power projects in the mistaken expectation that the Independent Power Producers would come up with necessary investments.

Table 2.6

Category wise Pattern of Electricity Consumption in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic</th>
<th>Commercial</th>
<th>Industrial</th>
<th>Agriculture</th>
<th>Others</th>
<th>Utility (B.U)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-51</td>
<td>12.60</td>
<td>7.50</td>
<td>62.60</td>
<td>3.90</td>
<td>13.40</td>
<td>5.10</td>
</tr>
<tr>
<td>1960-61</td>
<td>10.70</td>
<td>6.10</td>
<td>69.40</td>
<td>6.00</td>
<td>7.80</td>
<td>16.90</td>
</tr>
<tr>
<td>1970-71</td>
<td>8.80</td>
<td>5.90</td>
<td>67.60</td>
<td>10.20</td>
<td>7.50</td>
<td>55.83</td>
</tr>
<tr>
<td>1980-81</td>
<td>11.20</td>
<td>5.70</td>
<td>58.40</td>
<td>17.60</td>
<td>7.10</td>
<td>110.84</td>
</tr>
<tr>
<td>1990-91</td>
<td>16.80</td>
<td>5.90</td>
<td>44.20</td>
<td>26.40</td>
<td>6.70</td>
<td>264.33</td>
</tr>
<tr>
<td>2000-01</td>
<td>21.28</td>
<td>5.17</td>
<td>30.50</td>
<td>29.13</td>
<td>13.92</td>
<td>501.20</td>
</tr>
<tr>
<td>2001-02</td>
<td>22.03</td>
<td>5.25</td>
<td>30.18</td>
<td>29.69</td>
<td>12.85</td>
<td>517.43</td>
</tr>
<tr>
<td>2002-03</td>
<td>24.55</td>
<td>7.49</td>
<td>33.85</td>
<td>24.88</td>
<td>9.23</td>
<td>532.69</td>
</tr>
<tr>
<td>2003-04</td>
<td>24.86</td>
<td>7.81</td>
<td>34.52</td>
<td>24.13</td>
<td>8.68</td>
<td>565.09</td>
</tr>
<tr>
<td>2004-05</td>
<td>24.77</td>
<td>8.13</td>
<td>35.63</td>
<td>22.93</td>
<td>8.54</td>
<td>594.45</td>
</tr>
<tr>
<td>2005-06</td>
<td>24.30</td>
<td>8.73</td>
<td>36.8</td>
<td>21.92</td>
<td>8.25</td>
<td>623.81</td>
</tr>
<tr>
<td>2006-07</td>
<td>24.36</td>
<td>8.80</td>
<td>37.58</td>
<td>21.73</td>
<td>7.53</td>
<td>670.65</td>
</tr>
<tr>
<td>2007-08</td>
<td>24.09</td>
<td>9.30</td>
<td>37.74</td>
<td>20.75</td>
<td>8.12</td>
<td>722.63</td>
</tr>
<tr>
<td>2008-09</td>
<td>24.64</td>
<td>10.15</td>
<td>39.38</td>
<td>20.43</td>
<td>5.40</td>
<td>741.17</td>
</tr>
</tbody>
</table>

Source: Power Development In Andhra Pradesh (Statistics), Transmission Corporation of A.P. Limited 2009-10.

Note: BU: Billion Units

Pattern of Electricity Consumption

As shown in Table 2.6 in India the power consumption rapidly increased from just 5.10 B.U in 1950-50 to 741.17 B.U in 2008-09 registering 145 fold increase. Sector wise statistics reveal that the consumption of domestic sector doubled from 12.60 per cent in 1950-51 to 24.64 per cent in 2008-09. But there is no significant increase in commercial consumption at it ranged between 6.10 per cent in 1960-60 and 10.15 per cent in 2008-09. While the share of industrial sector in total power consumption declined from 62.60-
per cent in 1950-51 to 39.38 per cent in 2008-09. It does not mean that industrialization has slowed down. The industrial units are shifting to other sources of fuel. Many large industrial units have set up their own captive power plants instead of depending on inadequate public utilities. The power consumption by agriculture sector significantly increased from 3.90 per cent in 1950-50 to 29.69 per cent in 2001-02. Afterwards this share declined to 20.43 per cent by 2008-09. The increase in power consumption by agriculture sector is mainly due to energization of pump sets which lift water for irrigating fields and ultimately for increasing agriculture production.

**Per Capita Consumption**

Table 2.7 shows state wise per capita consumption of power in India. The per capita consumption increased from 360 Kilo Watts/Hour in 1998-99 to 733.54 kWh in 2008-09. In 1998-99 Daman & Diu stood first with the highest per capita consumption of 3599 kWh in India. D&N Haveli got first rank in 2004-05 with the per capita consumption of 8479 kWh and 11094 kWh in 2008-09. The lowest per capita consumption (75 kWh) was registered in Manipur state in 1998-99. Bihar state stood last with the consumption of 75 kWh in 2004-05 and 107 kWh in 2008-09. In Andhra Pradesh state the per capita consumption increased from 480 kWh in 1998-99 to 685 kWh in 2004-05 and 928 kWh in 2008-09. It is higher than the India’s per capita consumption. Andhra Pradesh state got 12th rank in 1998-99. About 19 states out of 31 states/UTs reached India’s per capita consumption level in 1998-99, 17 states in 2004-05 and 15 states in 2008-09.
<table>
<thead>
<tr>
<th>State</th>
<th>1998-99</th>
<th>2004-05</th>
<th>2008-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daman&amp;Diu</td>
<td>3599</td>
<td>7546</td>
<td>6508</td>
</tr>
<tr>
<td>D&amp;N Haveli</td>
<td>3566</td>
<td>8479</td>
<td>11094</td>
</tr>
<tr>
<td>Pandicherry</td>
<td>1010</td>
<td>2049</td>
<td>1988</td>
</tr>
<tr>
<td>Goa</td>
<td>740</td>
<td>2189</td>
<td>2260</td>
</tr>
<tr>
<td>Punjab</td>
<td>861</td>
<td>1245</td>
<td>1553</td>
</tr>
<tr>
<td>Gujarat</td>
<td>724</td>
<td>1299</td>
<td>1457</td>
</tr>
<tr>
<td>Delhi</td>
<td>689</td>
<td>1554</td>
<td>1374</td>
</tr>
<tr>
<td>Haryana</td>
<td>504</td>
<td>951</td>
<td>1279</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>594</td>
<td>879</td>
<td>969</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>334</td>
<td>831</td>
<td>1016</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>480</td>
<td>685</td>
<td>928</td>
</tr>
<tr>
<td>Chandigarh</td>
<td>844</td>
<td>887</td>
<td>1247</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>-</td>
<td>685</td>
<td>1418</td>
</tr>
<tr>
<td>Uttaranchal</td>
<td>-</td>
<td>654</td>
<td>921</td>
</tr>
<tr>
<td>Karnataka</td>
<td>349</td>
<td>660</td>
<td>928</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>292</td>
<td>609</td>
<td>894</td>
</tr>
<tr>
<td>Orissa</td>
<td>313</td>
<td>735</td>
<td>775</td>
</tr>
<tr>
<td>Sikkim</td>
<td>185</td>
<td>985</td>
<td>806</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>329</td>
<td>583</td>
<td>747</td>
</tr>
<tr>
<td>Jharkhand</td>
<td></td>
<td>546</td>
<td>696</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>150</td>
<td>521</td>
<td>655</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>398</td>
<td>516</td>
<td>584</td>
</tr>
<tr>
<td>A&amp;N Island</td>
<td>218</td>
<td>346</td>
<td>475</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>87</td>
<td>380</td>
<td>447</td>
</tr>
<tr>
<td>Kerala</td>
<td>305</td>
<td>398</td>
<td>444</td>
</tr>
<tr>
<td>West Bengal</td>
<td>211</td>
<td>414</td>
<td>442</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>498</td>
<td>918</td>
<td>1134</td>
</tr>
<tr>
<td>Lakshadweep</td>
<td>231</td>
<td>377</td>
<td>453</td>
</tr>
<tr>
<td>Mizoram</td>
<td>114</td>
<td>439</td>
<td>378</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>196</td>
<td>309</td>
<td>372</td>
</tr>
<tr>
<td>Manipur</td>
<td>75</td>
<td>258</td>
<td>242</td>
</tr>
<tr>
<td>Tripura</td>
<td>110</td>
<td>351</td>
<td>204</td>
</tr>
<tr>
<td>Nagaland</td>
<td>81</td>
<td>181</td>
<td>226</td>
</tr>
<tr>
<td>Assam</td>
<td>123</td>
<td>163</td>
<td>199</td>
</tr>
<tr>
<td>Bihar</td>
<td>152</td>
<td>75</td>
<td>107</td>
</tr>
<tr>
<td>All India</td>
<td>360</td>
<td>613</td>
<td>733.54</td>
</tr>
</tbody>
</table>

Source: www.cea.nic.in.
Note: kWh: Kilo Watt Hour.
Power Supply Position

Power development during the last 60 years has been significant. The total power generation increased from 499500 billion units to 723800 B.U in 2008-09. Besides enlargement of generation capacity, the last five decades witnessed the growth rate of power system from the rudimentary stage of isolated stations to fairly well integrated system in most of the states and emergence of grids. Construction of inter-state and inter-regional lines has also made headway. Despite this tremendous growth, India has always faced chronic power shortage. This is evident from the table 2.8 which shows the particulars of power requirement, availability and shortage during 2000-01 to 2009-10. In all the years the power requirement is greater than that of availability.

Table 2.8
Power Supply Position in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Power Generation (B.U)</th>
<th>Million Units</th>
<th>% of Shortage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Requirement</td>
<td>Availability</td>
</tr>
<tr>
<td>2000-01</td>
<td>499500</td>
<td>507216</td>
<td>467400</td>
</tr>
<tr>
<td>2001-02</td>
<td>515200</td>
<td>522537</td>
<td>483350</td>
</tr>
<tr>
<td>2002-03</td>
<td>531600</td>
<td>545983</td>
<td>497890</td>
</tr>
<tr>
<td>2003-04</td>
<td>558300</td>
<td>559264</td>
<td>519398</td>
</tr>
<tr>
<td>2004-05</td>
<td>587400</td>
<td>591373</td>
<td>548115</td>
</tr>
<tr>
<td>2005-06</td>
<td>617500</td>
<td>631554</td>
<td>578819</td>
</tr>
<tr>
<td>2006-07</td>
<td>662400</td>
<td>690587</td>
<td>624495</td>
</tr>
<tr>
<td>2007-08</td>
<td>704400</td>
<td>737502</td>
<td>664660</td>
</tr>
<tr>
<td>2008-09</td>
<td>723800</td>
<td>777039</td>
<td>691038</td>
</tr>
<tr>
<td>2009-10*</td>
<td>638100</td>
<td>688171</td>
<td>62003</td>
</tr>
</tbody>
</table>

Source: Annual Report 2009-10, Ministry of Power, Govt. of India.
Note: 1. * is provisional data as on date 31.01.2010.
2. B.U is Billion Units.

The power requirement showed increasing trend from 507216 M.U in 2000-01 to 777039 M.U in 2008-09 while that of availability from 467400 M.U to 691038 M.U during the same period. It means the power availability is increasing at low rate compared to that of requirement. As a result power shortage occurred and in terms of percentage the shortage of power ranged from 7.1 per cent in 2003-04 to 11.1 per cent in 2008-09.
Table 2.9
Region and State wise Power Supply and Shortages in 2009-10

<table>
<thead>
<tr>
<th>Region / State</th>
<th>Requirement (MU)</th>
<th>Availability (MU)</th>
<th>surplus/Deficit (MU)</th>
<th>surplus/Deficit %</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORTHERN REGION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haryana</td>
<td>33520</td>
<td>32006</td>
<td>-1514</td>
<td>-4.5</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>7009</td>
<td>6762</td>
<td>-247</td>
<td>-3.5</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>11467</td>
<td>8698</td>
<td>-2769</td>
<td>-24.1</td>
</tr>
<tr>
<td>Punjab</td>
<td>45770</td>
<td>39451</td>
<td>-6319</td>
<td>-13.8</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>44031</td>
<td>42983</td>
<td>-1048</td>
<td>-2.4</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>75822</td>
<td>59390</td>
<td>-16432</td>
<td>-21.7</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>8904</td>
<td>8321</td>
<td>-583</td>
<td>-6.5</td>
</tr>
<tr>
<td>Chandigarh</td>
<td>1570</td>
<td>1521</td>
<td>-49</td>
<td>-3.1</td>
</tr>
<tr>
<td>Delhi</td>
<td>24271</td>
<td>24088</td>
<td>-183</td>
<td>-0.8</td>
</tr>
<tr>
<td>Total</td>
<td>253804</td>
<td>224451</td>
<td>-29353</td>
<td>-11.6</td>
</tr>
<tr>
<td>WESTERN REGION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>70412</td>
<td>67263</td>
<td>-3149</td>
<td>-4.5</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>43159</td>
<td>34953</td>
<td>-8206</td>
<td>-19</td>
</tr>
<tr>
<td>Chattisgarh</td>
<td>11035</td>
<td>10766</td>
<td>-269</td>
<td>-2.4</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>124961</td>
<td>101537</td>
<td>-23424</td>
<td>-18.7</td>
</tr>
<tr>
<td>Goa</td>
<td>3085</td>
<td>3021</td>
<td>-64</td>
<td>-2.1</td>
</tr>
<tr>
<td>D&amp;N Haveli</td>
<td>3966</td>
<td>3812</td>
<td>-154</td>
<td>-3.9</td>
</tr>
<tr>
<td>Daman &amp; Diu</td>
<td>1931</td>
<td>1799</td>
<td>-132</td>
<td>-6.6</td>
</tr>
<tr>
<td>Total</td>
<td>258549</td>
<td>223151</td>
<td>-35398</td>
<td>-13.7</td>
</tr>
<tr>
<td>SOUTHERN REGION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>79014</td>
<td>73784</td>
<td>-5230</td>
<td>-6.6</td>
</tr>
<tr>
<td>Karnataka</td>
<td>45607</td>
<td>42098</td>
<td>-3509</td>
<td>-7.7</td>
</tr>
<tr>
<td>Kerala</td>
<td>17606</td>
<td>17183</td>
<td>-423</td>
<td>-2.4</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>76213</td>
<td>71488</td>
<td>-4725</td>
<td>-6.2</td>
</tr>
<tr>
<td>Lakshadweep</td>
<td>24</td>
<td>24</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pondicherry</td>
<td>2118</td>
<td>1973</td>
<td>-145</td>
<td>-6.8</td>
</tr>
<tr>
<td>Total</td>
<td>220558</td>
<td>206526</td>
<td>-14032</td>
<td>-6.4</td>
</tr>
<tr>
<td>EASTERN REGION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>11763</td>
<td>9939</td>
<td>-1824</td>
<td>-15.5</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>5866</td>
<td>5409</td>
<td>-457</td>
<td>-7.8</td>
</tr>
<tr>
<td>Orissa</td>
<td>21112</td>
<td>20926</td>
<td>-186</td>
<td>-0.9</td>
</tr>
<tr>
<td>West Bengal</td>
<td>33853</td>
<td>32919</td>
<td>-934</td>
<td>-2.8</td>
</tr>
<tr>
<td>A&amp;N Island</td>
<td>240</td>
<td>180</td>
<td>-60</td>
<td>-2.5</td>
</tr>
<tr>
<td>Sikkim</td>
<td>383</td>
<td>340</td>
<td>-43</td>
<td>-11.2</td>
</tr>
<tr>
<td>D.V CORPORATION</td>
<td>15063</td>
<td>14521</td>
<td>-542</td>
<td>-3.6</td>
</tr>
<tr>
<td>Total</td>
<td>88040</td>
<td>84054</td>
<td>-3986</td>
<td>-4.5</td>
</tr>
<tr>
<td>NORTH EASTERN REGION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assam</td>
<td>5129</td>
<td>4695</td>
<td>-434</td>
<td>-8.5</td>
</tr>
<tr>
<td>Manipur</td>
<td>522</td>
<td>427</td>
<td>-95</td>
<td>-18.2</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>1550</td>
<td>1328</td>
<td>-222</td>
<td>-14.3</td>
</tr>
<tr>
<td>Nagaland</td>
<td>527</td>
<td>464</td>
<td>-63</td>
<td>-12</td>
</tr>
<tr>
<td>Tripura</td>
<td>864</td>
<td>780</td>
<td>-84</td>
<td>-9.7</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>406</td>
<td>332</td>
<td>-74</td>
<td>-18.2</td>
</tr>
<tr>
<td>Mizoram</td>
<td>351</td>
<td>288</td>
<td>-63</td>
<td>-17.9</td>
</tr>
<tr>
<td>Total</td>
<td>9349</td>
<td>8314</td>
<td>-1035</td>
<td>-11.1</td>
</tr>
<tr>
<td>All India</td>
<td>830300</td>
<td>746496</td>
<td>-83804</td>
<td>-10.1</td>
</tr>
</tbody>
</table>

Source: www.cea.nic.in
Note: MU: Million Units.
State wise Power Supply Position

Table 2.9 shows that there is no surplus power in any state or region in India. The shortage of power is high in Jammu & Kashmir (-24.1 per cent) followed by Uttar Pradesh (-21.7 per cent), Mahaatra (-18.7 per cent), Arunachal Pradesh (-18.2 per cent), Manipur (-18.2 per cent), Mizoram (-17.9 per cent) and Bihar (-15.5 per cent). Among the regions Western region has -13.7 per cent power shortage followed by Northern region -11.6 per cent. The power supply position is comparatively better in Southern region and Eastern region. It is impressive to note that power shortage is low in Delhi (-0.8 per cent), Orissa (-2.1 per cent), Rajasthan (-2.4 per cent), Kerala (-2.4 per cent) and Himachal Pradesh (-3.5 per cent). In the country as a whole the shortage of power in 2009-10 was estimated at -10.1 per cent. The availability of power was 746496 MU while the power required was 830360 MU and that deficit was -83804 MU.

Table 2.10
Electricity Peak Demand in India
(In Mega Watts)

<table>
<thead>
<tr>
<th>Year</th>
<th>Peak Demand</th>
<th>Met</th>
<th>Shortage</th>
<th>% of Shortage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-01</td>
<td>78037</td>
<td>67880</td>
<td>10157</td>
<td>13.0</td>
</tr>
<tr>
<td>2001-02</td>
<td>78441</td>
<td>69189</td>
<td>9252</td>
<td>11.8</td>
</tr>
<tr>
<td>2002-03</td>
<td>81492</td>
<td>71547</td>
<td>9945</td>
<td>12.2</td>
</tr>
<tr>
<td>2003-04</td>
<td>84574</td>
<td>75066</td>
<td>10254</td>
<td>11.2</td>
</tr>
<tr>
<td>2004-05</td>
<td>87906</td>
<td>77652</td>
<td>11463</td>
<td>11.7</td>
</tr>
<tr>
<td>2005-06</td>
<td>93255</td>
<td>81792</td>
<td>13897</td>
<td>2.3</td>
</tr>
<tr>
<td>2006-07</td>
<td>100715</td>
<td>86818</td>
<td>18073</td>
<td>13.8</td>
</tr>
<tr>
<td>2007-08</td>
<td>108866</td>
<td>90793</td>
<td>13024</td>
<td>16.6</td>
</tr>
<tr>
<td>2008-09</td>
<td>109809</td>
<td>96785</td>
<td>14672</td>
<td>11.9</td>
</tr>
<tr>
<td>2009-10*</td>
<td>116281</td>
<td>101609</td>
<td>14672</td>
<td>12.6</td>
</tr>
</tbody>
</table>

Source: Annual Report 2009-10, Ministry of Power, Govt. of India.
Note: * is provisional data as on date 31.01.2010.
Fig 2.3
Electricity Peak Demand, Met and Shortages in India
Electricity Peak Demand

Table 2.10 shows the trends in peak demand and shortage. Peak demand means it is the maximum sustained demand during the specified period. The peak demand continuously increased from 78037 MW in 2000-01 to 101609 MW in 2009-10. As a result there is power shortage which varied from 11.2 per cent in 2003-04 to 16.6 per cent in 2007-08. This is due to lack of sufficient increase in power generation.

Table 2.11
Plan wise Out lay and Expenditure on Power Sector in India

<table>
<thead>
<tr>
<th>Plan</th>
<th>Period</th>
<th>Out lay</th>
<th>% of Power Sector</th>
<th>Expenditure on</th>
<th>% of Power Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Power Sector</td>
<td>All Sectors</td>
<td>Power Sector</td>
<td>All Sectors</td>
</tr>
<tr>
<td>1st Plan</td>
<td>1951-56</td>
<td>393.4</td>
<td>20688.8</td>
<td>19.0</td>
<td>260.0</td>
</tr>
<tr>
<td>2nd Plan</td>
<td>1956-61</td>
<td>426.9</td>
<td>4800.0</td>
<td>8.9</td>
<td>455.5</td>
</tr>
<tr>
<td>3rd Plan</td>
<td>1961-66</td>
<td>1019.7</td>
<td>8094.5</td>
<td>12.6</td>
<td>1252.3</td>
</tr>
<tr>
<td>Annual Plans</td>
<td>1966-69</td>
<td>1064.0</td>
<td>6665.0</td>
<td>16.0</td>
<td>1212.5</td>
</tr>
<tr>
<td>4th Plan</td>
<td>1969-74</td>
<td>2447.6</td>
<td>15902.2</td>
<td>15.4</td>
<td>2931.7</td>
</tr>
<tr>
<td>5th Plan</td>
<td>1974-79</td>
<td>7293.9</td>
<td>39287.5</td>
<td>18.6</td>
<td>7399.5</td>
</tr>
<tr>
<td>Annual Plan</td>
<td>1979-80</td>
<td>2396.0</td>
<td>12549.6</td>
<td>19.1</td>
<td>2240.5</td>
</tr>
<tr>
<td>6th Plan</td>
<td>1980-85</td>
<td>19265.4</td>
<td>95700.0</td>
<td>20.1</td>
<td>18298.7</td>
</tr>
<tr>
<td>7th Plan</td>
<td>1985-90</td>
<td>34273.5</td>
<td>180000.0</td>
<td>19.0</td>
<td>37895.3</td>
</tr>
<tr>
<td>Annual Plan</td>
<td>1990-91</td>
<td>12479.6</td>
<td>64716.9</td>
<td>19.3</td>
<td>13147.5</td>
</tr>
<tr>
<td>Annual Plans</td>
<td>1991-92</td>
<td>12479.6</td>
<td>72316.8</td>
<td>18.9</td>
<td>12463.3</td>
</tr>
<tr>
<td>8th Plan</td>
<td>1992-97</td>
<td>79589.3</td>
<td>434100.0</td>
<td>17.2</td>
<td>76667.4</td>
</tr>
<tr>
<td>9th Plan</td>
<td>1997-02</td>
<td>1245026.0</td>
<td>859200.0</td>
<td>14.5</td>
<td>111825.0</td>
</tr>
<tr>
<td>10th Plan</td>
<td>2002-07</td>
<td>113121.0</td>
<td>1525639.0</td>
<td>7.4</td>
<td>187234.6</td>
</tr>
<tr>
<td>11th Plan</td>
<td>2007-08</td>
<td>38489.5</td>
<td>364718.0</td>
<td>10.5</td>
<td>29426.9</td>
</tr>
<tr>
<td></td>
<td>2008-09</td>
<td>45052.2</td>
<td>531594.0</td>
<td>8.4</td>
<td>39817.5</td>
</tr>
<tr>
<td></td>
<td>2009-10</td>
<td>57878.7</td>
<td>-</td>
<td>-</td>
<td>39678.0</td>
</tr>
</tbody>
</table>

2. Economic Survey, 2010-11, Ministry of Finance, Govt. of India.
Expenditure on Power Sector

Funds are being allocated for the development of power sector in India through five year plans. Table 2.11 shows the plan-wise outlay and expenditure on power sector. The power sector outlay increased from 393.4 crore in First Plan (1951-56) to Rs 124502.6 crore in Ninth Plan (1997-02). But the outlay (Rs 113121 crore) in Tenth Plan (2002-07) was less than that of 9th Plan. The outlay of power sector as per cent to outlay of all sectors in India ranged from 20.1 in 6th plan to 7.4 in 10th Plan. It is also observed that the percentage of power sector outlay was high especially in 1st Plan (19.0 %), 5th Plan (18.6 %) and in 8th Plan (17.2 %). On the other hand the expenditure on power sector significantly increased from Rs 260.0 crore in First Plan (1951-56) to Rs 187234.6 crore in 10th Plan (2002-07) registering a 720 fold increase. It is noticed that a huge amount was spent on power sector between 7th Five Year Plan and 10th Five Year Plan (The amount spent ranged from Rs 37895.3 crore to Rs 187234.6 crore). However the expenditure on power sector as per cent to expenditure on all sectors was low at 9.9 per cent in 2nd Plan (1956-61), 11.5 per cent in 10th Plan (2002-07). In the remaining Plans this percentage ranged from 13.3 per cent in the First Plan (1950-56) to 18.8 per cent in the 5th Plan (1974-79). On the whole the percentage of expenditure on power sector declined in 9th Plan and 10th Plan.
Table 2.12
Length of Transmission and Distribution Lines - All India

<table>
<thead>
<tr>
<th>Year</th>
<th>HVDC</th>
<th>800kV</th>
<th>400kV</th>
<th>230/220kV</th>
<th>132/110kV</th>
<th>78/66/44kV</th>
<th>33/22kV</th>
<th>15/11/7.3/6.6/2.2kV (Up to 500 Volts)</th>
<th>Total Length (C.K.M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-51</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9.20</td>
<td>25.40</td>
<td>17.20</td>
<td>48.20</td>
<td>-</td>
<td>29271.0</td>
</tr>
<tr>
<td>1960-61</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.70</td>
<td>8.10</td>
<td>9.30</td>
<td>17.20</td>
<td>64.70</td>
<td>157888.0</td>
</tr>
<tr>
<td>1970-71</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.00</td>
<td>4.10</td>
<td>2.20</td>
<td>8.60</td>
<td>32.50</td>
<td>1117164.0</td>
</tr>
<tr>
<td>1980-81</td>
<td>-</td>
<td>0.10</td>
<td>1.24</td>
<td>2.37</td>
<td>1.06</td>
<td>6.49</td>
<td>31.10</td>
<td>57.63</td>
<td>2522011.0</td>
</tr>
<tr>
<td>1990-91</td>
<td>-</td>
<td>0.50</td>
<td>1.40</td>
<td>2.00</td>
<td>0.80</td>
<td>4.70</td>
<td>29.60</td>
<td>61.30</td>
<td>4483414.0</td>
</tr>
<tr>
<td>2000-01</td>
<td>0.02</td>
<td>-</td>
<td>0.65</td>
<td>1.61</td>
<td>1.88</td>
<td>0.74</td>
<td>4.67</td>
<td>29.33</td>
<td>5850647.0</td>
</tr>
<tr>
<td>2001-02</td>
<td>0.07</td>
<td>-</td>
<td>0.68</td>
<td>0.61</td>
<td>1.96</td>
<td>0.73</td>
<td>4.78</td>
<td>29.15</td>
<td>6030148.0</td>
</tr>
<tr>
<td>2002-03</td>
<td>0.09</td>
<td>-</td>
<td>0.79</td>
<td>1.52</td>
<td>1.85</td>
<td>0.66</td>
<td>4.62</td>
<td>29.63</td>
<td>6551737.0</td>
</tr>
<tr>
<td>2003-04</td>
<td>0.09</td>
<td>0.01</td>
<td>0.85</td>
<td>1.60</td>
<td>1.92</td>
<td>0.69</td>
<td>4.46</td>
<td>29.56</td>
<td>6345421.0</td>
</tr>
<tr>
<td>2004-05</td>
<td>0.10</td>
<td>0.01</td>
<td>0.88</td>
<td>1.59</td>
<td>1.89</td>
<td>0.69</td>
<td>4.56</td>
<td>30.11</td>
<td>6570823.0</td>
</tr>
<tr>
<td>2005-06</td>
<td>0.10</td>
<td>0.01</td>
<td>0.85</td>
<td>1.59</td>
<td>1.91</td>
<td>0.69</td>
<td>4.57</td>
<td>30.31</td>
<td>6778359.0</td>
</tr>
<tr>
<td>2006-07</td>
<td>0.10</td>
<td>0.02</td>
<td>0.84</td>
<td>1.62</td>
<td>1.90</td>
<td>0.71</td>
<td>4.53</td>
<td>30.49</td>
<td>6939894.0</td>
</tr>
<tr>
<td>2007-08</td>
<td>0.09</td>
<td>0.02</td>
<td>0.89</td>
<td>1.59</td>
<td>1.89</td>
<td>0.69</td>
<td>4.61</td>
<td>30.75</td>
<td>7278946.0</td>
</tr>
<tr>
<td>2008-09</td>
<td>0.03</td>
<td>0.08</td>
<td>1.02</td>
<td>1.59</td>
<td>1.85</td>
<td>0.68</td>
<td>4.59</td>
<td>31.22</td>
<td>7472853.0</td>
</tr>
</tbody>
</table>

Note: 1. Figures are percentage to Total Length.
2. C.K.M is Circuit Kilo Meters.
Length of Lines

Total length of lines in India is shown in Table 2.12. The total length increased from 29271 C.KM (Circuit Kilo Meters) in 1950-51 to 7472853 CKM in 2008-09. Of total length, the distribution lines (up to 500 volts) accounted for 51.60 per cent in 1970-71 and 61.30 per cent in 1990-91. The remaining are transmission lines. Of these lines the percentage of transmission lines of 15/11/7.3/6.6/2.2 kV ranged from 67.70 per cent in 1960-61 to 29.15 per cent in 2001-02. It is observed that the length of HVDC, 800 kV, 400 kV and 230/220 kV transmission lines and 132/110 kV declined from 9.20 per cent in 1950-51 to 1.85 per cent in 2008-09. The length of 78/66/44 kV also declined considerably over a period of time.

Transmission and Distribution Losses

Based on Transmission and Distribution Losses one can measure the performance of power sector. T&D losses directly depend on the precise point in the T&D network with reference to which the losses are computed. Reference point can be interconnection point at which generated/purchased power is received or at which the distribution system receives the power at 33 kV. The T&D losses are substantially higher than normal technical standards, with a high component on non-technical losses due to inadequate metering and high incidence of energy theft. T&D losses consist of transmission losses, which take place in the transmission system (33 kV and above), the distribution losses which take place in the distribution system.
### Table 2.13
State wise Transmission and Distribution Losses

<table>
<thead>
<tr>
<th>State</th>
<th>Transmission and Distribution Losses</th>
<th>(In Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assam</td>
<td>21.20 38.60 30.70 38.30 39.31 51.76 40.34 38.69 38.60 37.59</td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>21.25 25.00 24.70 37.96 36.66 38.88 43.96 50.67 48.79 46.37</td>
<td></td>
</tr>
<tr>
<td>Delhi (D.V.B)</td>
<td>22.30 47.00 45.00 45.82 43.66 45.40 42.22 33.00 28.65 22.22</td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>22.70 20.00 19.20 28.52 24.20 30.43 27.91 24.87 26.13 24.07</td>
<td></td>
</tr>
<tr>
<td>Haryana</td>
<td>24.20 35.00 33.00 37.65 32.07 32.11 30.51 33.25 32.83 30.74</td>
<td></td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>18.07 18.30 17.40 21.16 22.76 28.90 23.54 19.77 16.98 15.51</td>
<td></td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>48.75 56.40 46.80 45.55 45.54 41.08 44.93 51.98 55.71 58.02</td>
<td></td>
</tr>
<tr>
<td>Karnataka (K.P.T.C.L)</td>
<td>18.91 36.50 36.00 24.57 23.29 26.08 29.77 25.91 18.87 17.03</td>
<td></td>
</tr>
<tr>
<td>Kerala</td>
<td>21.00 17.20 17.20 27.45 21.63 22.48 23.50 19.11 17.81 13.16</td>
<td></td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>23.20 31.00 30.00 43.41 41.44 41.30 40.07 39.24 35.64 38.46</td>
<td></td>
</tr>
<tr>
<td>Maharashtra</td>
<td>15.77 30.00 30.00 28.00 34.01 34.12 32.40 31.60 31.34 29.79 23.88</td>
<td></td>
</tr>
<tr>
<td>Meghalaya</td>
<td>11.49 20.30 20.30 21.92 16.73 28.35 40.19 35.34 37.62 37.45</td>
<td></td>
</tr>
<tr>
<td>Orissa (GRID CO)</td>
<td>24.00 49.30 NA 45.36 57.09 44.02 45.56 40.86 39.44 42.65</td>
<td></td>
</tr>
<tr>
<td>Punjab</td>
<td>18.70 17.50 17.50 24.42 25.96 25.42 27.56 26.61 22.82 23.08</td>
<td></td>
</tr>
<tr>
<td>Rajasthan</td>
<td>22.54 29.00 27.70 42.61 43.74 44.68 39.92 35.60 34.71 31.47</td>
<td></td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>16.35 16.50 16.30 17.16 17.16 19.28 18.66 19.54 18.71 18.47</td>
<td></td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>25.26 39.90 38.70 34.16 35.17 34.49 32.63 33.49 28.60 30.94</td>
<td></td>
</tr>
<tr>
<td>West Bengal</td>
<td>23.80 30.00 30.00 25.93 31.01 28.54 24.84 23.64 21.29 16.79</td>
<td></td>
</tr>
<tr>
<td>All India</td>
<td>21.71 29.90 27.80 32.54 32.53 31.25 30.42 28.65 27.20 25.47</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.13 shows the state-wise transmission and distribution losses in terms of percentage in India. All India statistics reveal that T&D losses declined from 32.54 per cent in 2002-03 to 25.47 per cent in 2008-09. After reforms the T&D losses were recorded between 25 and 35 per cent. But in 1991-92 (pre reforms period) the percentage of T&D losses was 21.71. Andhra Pradesh state improved its performance by reducing the T&D losses from 33.90 per cent in 2000-01 to 18.63 in 2008-09. Kerala state recorded the lowest T&D losses (13.06 per cent) in 2008-09. But in the developed countries the T&D losses were recorded between 8 & 10 per cent. In 2008-09 Himachal Pradesh stood first in the country with the lowest T&D losses (15.51 per cent), followed by West Bengal (16.79 per cent), Karnataka (17.03 per cent), Tamil Nadu (18.47 per cent) and Andhra Pradesh (18.63 per cent). In 2008-09 the highest percentage of T&D losses was recorded in Jammu & Kashmir (58.02 per cent) followed by Bihar (46.37 per cent), Orissa (42.65 per cent), Madhya Pradesh (38.46 per cent) and Assam (37.59 per cent).

Reasons for T&D losses are

❖ Inadequate capital outlay and technology.

❖ Weakness in T&D lines and high length power carried lines, and cross sections.

❖ Lack of working meters, energy auditing and billing.

❖ Non-metering of agricultural loads.

❖ Faulty metering at consumers’ premises where there is consumption but not metering.

❖ Average billing practices which are not yet fully eradicated.
Rural Electrification

Rural Electrification is a vital programme for socio-economic development of rural areas. The objectives are to trigger economic development by providing electricity as an input for productive uses in agriculture, rural industries and improve the quality of life of the rural people by supplying electricity for lighting of homes, shops, community centers and public places in all villages.

<table>
<thead>
<tr>
<th>Year</th>
<th>No of villages Electrified</th>
<th>% of Electrified Villages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951</td>
<td>3061</td>
<td>0.54</td>
</tr>
<tr>
<td>1960-61</td>
<td>21754</td>
<td>3.89</td>
</tr>
<tr>
<td>1970-71</td>
<td>104942</td>
<td>18.5</td>
</tr>
<tr>
<td>1980-81</td>
<td>272287</td>
<td>47.3</td>
</tr>
<tr>
<td>1990-91</td>
<td>481124</td>
<td>83.1</td>
</tr>
<tr>
<td>2000-01</td>
<td>508071</td>
<td>86.52</td>
</tr>
<tr>
<td>2001-02</td>
<td>508863</td>
<td>86.65</td>
</tr>
<tr>
<td>2002-03</td>
<td>492325</td>
<td>83.83</td>
</tr>
<tr>
<td>2003-04</td>
<td>495031</td>
<td>84.30</td>
</tr>
<tr>
<td>2004-05</td>
<td>439800</td>
<td>74.10</td>
</tr>
<tr>
<td>2005-06</td>
<td>488439</td>
<td>82.27</td>
</tr>
<tr>
<td>2006-07</td>
<td>482564</td>
<td>81.28</td>
</tr>
<tr>
<td>2007-08</td>
<td>488435</td>
<td>81.28</td>
</tr>
<tr>
<td>2008-09</td>
<td>488439</td>
<td>82.27</td>
</tr>
<tr>
<td>2009-10*</td>
<td>500920</td>
<td>84.40</td>
</tr>
</tbody>
</table>

2. www.cea.nic.in

Note: is provisional data as on date 31.01.2010.

Table 2.14 shows the progress of rural electrification in India. In 1949 there were only 1500 electrified villages. Later on electrified villages increased from 3061 in 1951 to
500920 in 2009-10. In other words the percentage of electrified villages to total villages rose from just 0.54 per cent in 1950-51 to 86.65 per cent in 2001-02. Later on this percentage declined to 83.83 per cent in 2002-03 and finally reached to 84.40 per cent in 2009-10. The increase in the number electrified villages is due to following reasons. The Govt. of India set up Rural Electrification Corporation in 1969 with a mandate to finance rural electrification with its major financing activities. The second one is the green revaluation which mainly occurred in Punjab, Haryana and Gujarath. Because of this green revolution many villages were electrified. So the electrified villages increased from 104942 in 1970-71 to 272287 in 1980-81. The percentage of electrified villages also improved from 18.5 per cent to 47.3 per cent during the same period. After that the Govt. of India identified the importance of rural electrification for the development of the country. So the government had taken up and implemented rural electrification programmes like Kuteer Joythi programme (1988-89), Pradhanamantri Gramodaya Yojana (2000-01), Accelerated Rural Electrification programme (2002-03) and Rajiv Gandhi Grameen Vidyutikaran Yojana (2005). These programmes helped to increase the rural electrified villages from 272287 in 1980-81 to 500920 in 2009-10. The percentage of electrified villages also rose from 47.3 per cent to 84.40 per cent during the same period. The highest percentage of electrified villages was recorded at 86.65 per cent in the year 2001-02.
### Table 2.15
State and Region wise Number of Villages Electrified in India

<table>
<thead>
<tr>
<th>Name of the Region/State</th>
<th>2000-01 Total No of Villages</th>
<th>% of Electrified Villages</th>
<th>2005-06 Total No of Villages</th>
<th>% of Electrified Villages</th>
<th>As on 30-11.2010 Total No of Villages</th>
<th>% of Electrified Villages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NORTHERN REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haryana</td>
<td>6759</td>
<td>100</td>
<td>6764</td>
<td>100.0</td>
<td>6764</td>
<td>100.0</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>16807</td>
<td>100.2</td>
<td>17495</td>
<td>68.8</td>
<td>17495</td>
<td>98.2</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>6477</td>
<td>97.5</td>
<td>6417</td>
<td>98.2</td>
<td>6417</td>
<td>98.2</td>
</tr>
<tr>
<td>Punjab</td>
<td>12248</td>
<td>100.0</td>
<td>12278</td>
<td>100.0</td>
<td>12278</td>
<td>100.0</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>34968</td>
<td>101.4</td>
<td>39753</td>
<td>63.9</td>
<td>39753</td>
<td>71.1</td>
</tr>
<tr>
<td>Utter Pradesh</td>
<td>112566</td>
<td>79.2</td>
<td>97942</td>
<td>58.2</td>
<td>97942</td>
<td>88.3</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>-</td>
<td>-</td>
<td>15761</td>
<td>92.2</td>
<td>15761</td>
<td>97.1</td>
</tr>
<tr>
<td>Chandigarh</td>
<td>24</td>
<td>100.0</td>
<td>23</td>
<td>100.0</td>
<td>23</td>
<td>100.0</td>
</tr>
<tr>
<td>Delhi</td>
<td>214</td>
<td>100.0</td>
<td>158</td>
<td>100.0</td>
<td>158</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>190243</td>
<td>87.9</td>
<td>196591</td>
<td>68.4</td>
<td>196591</td>
<td>87.9</td>
</tr>
<tr>
<td><strong>WESTERN REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>18114</td>
<td>99.0</td>
<td>18066</td>
<td>98.7</td>
<td>18066</td>
<td>99.7</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>71352</td>
<td>95.8</td>
<td>52117</td>
<td>96.3</td>
<td>52117</td>
<td>96.4</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>40412</td>
<td>100.0</td>
<td>41095</td>
<td>86.5</td>
<td>41095</td>
<td>89.1</td>
</tr>
<tr>
<td>Maharastra</td>
<td>386</td>
<td>93.3</td>
<td>347</td>
<td>100.0</td>
<td>347</td>
<td>100.0</td>
</tr>
<tr>
<td>Goa</td>
<td>70</td>
<td>95.7</td>
<td>70</td>
<td>100.0</td>
<td>70</td>
<td>100.0</td>
</tr>
<tr>
<td>D &amp; N Haveli</td>
<td>26</td>
<td>100.0</td>
<td>23</td>
<td>100.0</td>
<td>23</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>130360</td>
<td>97.5</td>
<td>131462</td>
<td>90.6</td>
<td>131462</td>
<td>94.6</td>
</tr>
<tr>
<td><strong>SOUTHERN REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>26586</td>
<td>99.9</td>
<td>26613</td>
<td>99.8</td>
<td>26613</td>
<td>100.0</td>
</tr>
<tr>
<td>Karnataka</td>
<td>27028</td>
<td>98.7</td>
<td>27481</td>
<td>98.1</td>
<td>27481</td>
<td>99.9</td>
</tr>
<tr>
<td>Kerala</td>
<td>1384</td>
<td>100.0</td>
<td>1364</td>
<td>100.0</td>
<td>1364</td>
<td>100.0</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>15381</td>
<td>99.9</td>
<td>15400</td>
<td>94.9</td>
<td>15400</td>
<td>100.0</td>
</tr>
<tr>
<td>Lakshadweep</td>
<td>291</td>
<td>100.0</td>
<td>8</td>
<td>100.0</td>
<td>8</td>
<td>100.0</td>
</tr>
<tr>
<td>Pondicherry</td>
<td>7</td>
<td>100.0</td>
<td>92</td>
<td>100.0</td>
<td>92</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>71127</td>
<td>99.5</td>
<td>70958</td>
<td>98.1</td>
<td>70958</td>
<td>99.9</td>
</tr>
<tr>
<td><strong>EASTERN REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>67546</td>
<td>70.9</td>
<td>39015</td>
<td>51.3</td>
<td>39015</td>
<td>61.3</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>-</td>
<td>-</td>
<td>29354</td>
<td>31.5</td>
<td>29354</td>
<td>31.1</td>
</tr>
<tr>
<td>Orissa</td>
<td>46553</td>
<td>75.6</td>
<td>47529</td>
<td>55.2</td>
<td>47529</td>
<td>62.6</td>
</tr>
<tr>
<td>West Bengal</td>
<td>38024</td>
<td>77.6</td>
<td>37945</td>
<td>84.8</td>
<td>37945</td>
<td>99.5</td>
</tr>
<tr>
<td>A &amp; N Island</td>
<td>491</td>
<td>100.0</td>
<td>501</td>
<td>43.7</td>
<td>501</td>
<td>67.1</td>
</tr>
<tr>
<td>Sikkim</td>
<td>440</td>
<td>92.1</td>
<td>450</td>
<td>94.4</td>
<td>450</td>
<td>94.4</td>
</tr>
<tr>
<td>Total</td>
<td>153054</td>
<td>74.2</td>
<td>154794</td>
<td>57.1</td>
<td>154794</td>
<td>65.4</td>
</tr>
<tr>
<td><strong>NORTH EASTERN REGION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assam</td>
<td>21995</td>
<td>86.9</td>
<td>25124</td>
<td>77</td>
<td>25124</td>
<td>87.8</td>
</tr>
<tr>
<td>Manipur</td>
<td>2035</td>
<td>98.3</td>
<td>2315</td>
<td>82.2</td>
<td>2315</td>
<td>86.3</td>
</tr>
<tr>
<td>Meghlaya</td>
<td>4902</td>
<td>51.2</td>
<td>5782</td>
<td>57.6</td>
<td>5782</td>
<td>59.3</td>
</tr>
<tr>
<td>Nagaland</td>
<td>1153</td>
<td>103.7</td>
<td>1278</td>
<td>66.9</td>
<td>1278</td>
<td>64.4</td>
</tr>
<tr>
<td>Tripura</td>
<td>856</td>
<td>94.6</td>
<td>858</td>
<td>57.2</td>
<td>858</td>
<td>57.2</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>3257</td>
<td>66.7</td>
<td>3863</td>
<td>48.3</td>
<td>3863</td>
<td>56.8</td>
</tr>
<tr>
<td>Mizoram</td>
<td>721</td>
<td>95.8</td>
<td>707</td>
<td>80.6</td>
<td>707</td>
<td>80.6</td>
</tr>
<tr>
<td>Total</td>
<td>34878</td>
<td>81.4</td>
<td>39927</td>
<td>71.0</td>
<td>39927</td>
<td>79.1</td>
</tr>
<tr>
<td><strong>ALL INDIA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>579662</td>
<td>87.5</td>
<td>593732</td>
<td>74.1</td>
<td>593732</td>
<td>84.4</td>
</tr>
</tbody>
</table>

2. www.rggvy.gov.com

Note: Total number of villages as per 1991 census and 2001 census.

69
State wise Villages Electrified

State and Region wise number of electrified villages in India is shown in Table 2.15. In the northern region number of electrified villages increased from 190243 in 2000-01 to 196591 in 2010. But the percentage of electrified villages declined from 87.9 per cent in 2000-01 to 68.4 per cent in 2005-06 and again increased to 87.9 per cent in 2010. In Northern region the states namely Haryana, Himachal Pradesh, Punjab, Rajasthan, Chandigarh and Delhi achieved 100 per cent village electrification in 2001-02. In Rajasthan state electrified villages percentage increased from to 63.9 per cent in 2005-06 to 71.1 per cent in 2010.

In Western Region the number of electrified villages increased from 130360 in 2000-01 to 131462 in 2010. While the percentage of electrified villages decreased from 97.5 per cent in 2000-01 to 90.6 per cent in 2005-06 and again increased to 94.6 per cent in 2010. In this region the states namely Goa, Daman& Diu and D& N Haveli achieved 100 per cent electrification. The states like Gujarath, Madhya Pradesh and Chattisgarh achieved more than 90 per cent electrification by the end of March 2010. The Southern Region showed good progress. Because, all the states achieved 100 per cent electrification by 2010. These states include Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Lakshadweep and Pondicherry. The Eastern Region was backward in rural electrification. The percentage of electrified villages declined from 74.2 per cent in 2000-01 to 65.4 per cent in 2010. In this region only two states namely West Bengal and Sikkim achieved 90 per cent of electrification by 2010. Jharkhand state registered the lowest percentage of electrification i.e. 31.1 per cent in the country.

In the North Eastern Region the percentage of electrified villages is better than that of Eastern Region. But the percentage of electrified villages declined from 81.4 per cent in 2000-01 to 71.0 per cent in 2005-06 and again increased to 79.1 per cent in
The number of electrified villages increased from 579662 in 2000-01 to 593732 in 2010. In this region no state achieved 100 per cent electrification by the end of the March 2010. In the country as a whole the number of electrified villages increased from 579662 in 2000-01 to 593732 in 2010. The percentage of electrified villages was recorded at 84.4 per cent by 2010. It is observed that in all regions the percentage of electrified villages declined in the year 2005-06 compared to that of 2000-01. Thus the analysis reveals that there are still many states in the country which have to achieve 100 per cent electrification.

In 1947 only 1500 villages are electrified in India, the per capita consumption was 14 units only. So the Govt. of India identified the importance of rural electrification and introduced the different type of rural electrification programmes.

1. **Kutir Joythi Programme**

   This programme was began in 1988-89. It was a major rural electrification programme which arranged single point connection to BPL house holds in rural areas. 100 per cent grant was provided by Central Govt. and set a target of 71.7 lakh BPL house holds to be connected in 16 years. A total of 50331 connections were completed during the period from 1997-98 to 2004-05. The loan amount to the tune of Rs 23818 crore was sanctioned during 1999-2000 to 2004-05. But this scheme was merged with Accelerated Rural Electrification Progaramme in 2004 and with Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY).

2. **Pradhan Mantri Gramodaya Yojana (PMGY)**

   Govt. of India launched Pradhan Mantri Gramodaya Yojana scheme in 2000-01 for providing services such as health, education, drinking water and electrification etc in rural areas. Funds were provided by central government on 90 per cent loan and
10 per cent grant principle. State has flexibility to decide on inter-allocation amongst basic services.

3. Accelerated Rural Electrification Programme (AREP)

   This scheme was initiated in 2002 in the place of Accelerated Rural Electrification to cover One Lakh Villages and One Crore Households. This programme is being administrated by the Ministry of Power. According to the scheme, electrification of the un-electrified villages as on 31st March 2004 will be taken up.

Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY).

   This programme was launched by the Hon. Prime Minister, Dr. Manmohan Singh on 4th April, 2005 for achieving the National Common Minimum Needs Programme objective of providing access to electricity to all Rural Households over a period of four years. This programme has been brought under the ambit of Bharat Nirman. The Central Government provides funds under this scheme with 90 per cent capital subsidy for rural-electrification infrastructure through:

   i. Creation of Rural Electricity Distribution Backbone (REDB) with one 33/11 kV (or 66/11 kV) substation in every block where it does not exist.

   ii. Creation of Village Electricity Infrastructure (VEI) for electrification of all un-electrified villages/habitations and provision of distribution transformer(s) of appropriate capacity in every village/habitation

   iii. Decentralized Distributed Generation (DDG) and Supply System from conventional sources for Villages/Habitations where grid supply is not cost effective and where Ministry of Non-Conventional Energy Sources would not be providing electricity through their programmer
Balance 10% will be loan assistance on soft terms by REC. The scheme, inter-alia, provides for funding of electrification of all un-electrified Below Poverty Line (BPL) households with 100% capital subsidy.

**Aims**

❖ Electrifying all villages and habitations as per new definition;
❖ Providing access to electricity to all rural households; and
❖ Providing electricity Connection to Below Poverty Line (BPL) families free of charge.

**Implementation of the Programme**

❖ Preparation of District based detailed project reports for execution on turnkey basis.
❖ Involvement of central public sector undertakings of power ministry in implementation of some projects.
❖ Certification of electrified village by the concerned Gram Panchayat.
❖ Deployment of franchisee for the management of rural distribution for better consumer service and reduction in losses.
❖ Undertaking by States for supply of electricity with minimum daily supply of 6-8 hours of electricity in the RGGVY network.
❖ Making provision of requisite revenue subsidy by the state.
❖ Determination of Bulk Supply Tariff (BST) for franchisee in a manner that ensures commercial viability.

Three tier quality monitoring Mechanism for XI Plan Schemes made mandatory.
❖ Web based monitoring of progress.
❖ Release of funds linked to achievement of pre-determined milestones.
❖ Electronic transfer of funds right up to the contractor level.
❖ Notification of Rural Electrification Plans by the state governments

**Decentralized Distributed Generation scheme (DDG)**

DDG projects can be taken up under RGGVY in remote villages where grid connectivity is either not feasible or not cost effective and covered for financing under MNES not included. DDG guidelines were prepared and released by the Ministry on 12th January 2009. It envisages appointment of consultants for preparation of detailed project reports (DPRs). For facilitating states in appointment of suitable consultants, Ministry of Power established various consultants and circulated the panel to the states on 28th August 2009. The cost of consultant will be treated as part of the project cost.

Under DDG scheme of RGGVY, 90% of the project cost is provided as capital subsidy by the Government. Cost of spares for 5 years after commissioning (excluding cost of consumables and labour) is included as project cost. Service charges at the rate of 8 percent of the project cost will be provided to the implementing agencies.

All un-electrified revenue villages and hamlets (above 100 populations) are eligible under DDG scheme of RGGVY. Identification of eligible villages shall be done by SREDAs in consultation with state utility and MNRE.
<table>
<thead>
<tr>
<th>Name of the State</th>
<th>No. of Projects</th>
<th>No. of Districts</th>
<th>No. of Un electrified villages covered</th>
<th>No. of Electrified villages covered</th>
<th>No. of Un electrified households covered (including BPL)</th>
<th>No. of BPL households covered</th>
<th>Total sanctioned project cost (Rs in Crore)</th>
<th>Total amount released</th>
<th>% of released amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>26</td>
<td>22</td>
<td>0</td>
<td>27481</td>
<td>3954128</td>
<td>2592140</td>
<td>840.1</td>
<td>665.01</td>
<td>79.2</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>16</td>
<td>16</td>
<td>2129</td>
<td>1756</td>
<td>76407</td>
<td>40810</td>
<td>537.69</td>
<td>531.34</td>
<td>98.9</td>
</tr>
<tr>
<td>Assam</td>
<td>23</td>
<td>23</td>
<td>8525</td>
<td>13330</td>
<td>1414482</td>
<td>991656</td>
<td>1664.72</td>
<td>1612.35</td>
<td>96.9</td>
</tr>
<tr>
<td>Bihar</td>
<td>43</td>
<td>38</td>
<td>23211</td>
<td>6651</td>
<td>6002036</td>
<td>2362455</td>
<td>2975.9</td>
<td>3371.94</td>
<td>113.7</td>
</tr>
<tr>
<td>Chattisgarh</td>
<td>14</td>
<td>14</td>
<td>1132</td>
<td>16333</td>
<td>1288545</td>
<td>777165</td>
<td>1105.22</td>
<td>609.46</td>
<td>55.1</td>
</tr>
<tr>
<td>Gujrat</td>
<td>25</td>
<td>25</td>
<td>0</td>
<td>17934</td>
<td>1595853</td>
<td>955150</td>
<td>360.44</td>
<td>218.04</td>
<td>60.5</td>
</tr>
<tr>
<td>Haryana</td>
<td>18</td>
<td>18</td>
<td>0</td>
<td>5985</td>
<td>569686</td>
<td>224073</td>
<td>197.4</td>
<td>140.34</td>
<td>71.1</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>12</td>
<td>12</td>
<td>91</td>
<td>10666</td>
<td>36479</td>
<td>12448</td>
<td>205.26</td>
<td>221.59</td>
<td>108</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>14</td>
<td>14</td>
<td>283</td>
<td>6050</td>
<td>295221</td>
<td>136730</td>
<td>635.94</td>
<td>624.97</td>
<td>98.3</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>22</td>
<td>22</td>
<td>19737</td>
<td>7622</td>
<td>2926260</td>
<td>1691797</td>
<td>2662.61</td>
<td>2826.2</td>
<td>106.1</td>
</tr>
<tr>
<td>Karnataka</td>
<td>25</td>
<td>25</td>
<td>132</td>
<td>2819</td>
<td>1932797</td>
<td>891939</td>
<td>600.1</td>
<td>668.69</td>
<td>111.4</td>
</tr>
<tr>
<td>Kerala</td>
<td>7</td>
<td>7</td>
<td>0</td>
<td>630</td>
<td>92736</td>
<td>56351</td>
<td>134.33</td>
<td>52.4</td>
<td>39</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>32</td>
<td>32</td>
<td>806</td>
<td>34094</td>
<td>2655356</td>
<td>1376242</td>
<td>1528.88</td>
<td>1037.34</td>
<td>67.8</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>34</td>
<td>34</td>
<td>6</td>
<td>40292</td>
<td>2633742</td>
<td>1876391</td>
<td>713.44</td>
<td>527.27</td>
<td>73.9</td>
</tr>
<tr>
<td>Manipur</td>
<td>9</td>
<td>9</td>
<td>882</td>
<td>1378</td>
<td>192148</td>
<td>107369</td>
<td>357.8</td>
<td>215.97</td>
<td>60.4</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>7</td>
<td>7</td>
<td>1943</td>
<td>3536</td>
<td>188648</td>
<td>116447</td>
<td>290.42</td>
<td>164.04</td>
<td>56.5</td>
</tr>
<tr>
<td>Mizoram</td>
<td>8</td>
<td>8</td>
<td>137</td>
<td>570</td>
<td>44334</td>
<td>27417</td>
<td>104.25</td>
<td>238.24</td>
<td>228.5</td>
</tr>
<tr>
<td>Nagaland</td>
<td>11</td>
<td>11</td>
<td>105</td>
<td>1152</td>
<td>142992</td>
<td>69900</td>
<td>111017</td>
<td>123.74</td>
<td>111.3</td>
</tr>
<tr>
<td>Orissa</td>
<td>31</td>
<td>30</td>
<td>17995</td>
<td>28992</td>
<td>4858292</td>
<td>3185863</td>
<td>3575.12</td>
<td>2665.11</td>
<td>74.3</td>
</tr>
<tr>
<td>Punjab</td>
<td>17</td>
<td>17</td>
<td>0</td>
<td>11840</td>
<td>405023</td>
<td>148860</td>
<td>154.59</td>
<td>59.9</td>
<td>38.8</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>40</td>
<td>33</td>
<td>4454</td>
<td>34841</td>
<td>2229442</td>
<td>1750118</td>
<td>1254.49</td>
<td>809.16</td>
<td>64.5</td>
</tr>
<tr>
<td>Sikkim</td>
<td>4</td>
<td>4</td>
<td>25</td>
<td>418</td>
<td>28166</td>
<td>11458</td>
<td>57.11</td>
<td>132.88</td>
<td>231.8</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>26</td>
<td>26</td>
<td>0</td>
<td>12461</td>
<td>1692235</td>
<td>545511</td>
<td>447.41</td>
<td>275.92</td>
<td>61.7</td>
</tr>
<tr>
<td>Tripura</td>
<td>4</td>
<td>4</td>
<td>160</td>
<td>642</td>
<td>228759</td>
<td>194730</td>
<td>131.47</td>
<td>91.57</td>
<td>69.6</td>
</tr>
<tr>
<td>Utter Pradesh</td>
<td>64</td>
<td>65</td>
<td>30802</td>
<td>3287</td>
<td>1694075</td>
<td>1120648</td>
<td>2719.51</td>
<td>3235.6</td>
<td>119.6</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>13</td>
<td>13</td>
<td>1469</td>
<td>14105</td>
<td>357309</td>
<td>281615</td>
<td>643.89</td>
<td>664.5</td>
<td>103.2</td>
</tr>
<tr>
<td>West Bengal</td>
<td>28</td>
<td>17</td>
<td>4573</td>
<td>24775</td>
<td>3974005</td>
<td>2699734</td>
<td>2344.64</td>
<td>1980.16</td>
<td>84.5</td>
</tr>
<tr>
<td>Total of all States</td>
<td>573</td>
<td>546</td>
<td>118499</td>
<td>354967</td>
<td>54257682</td>
<td>24645017</td>
<td>13759.73</td>
<td>23763.73</td>
<td>90.2</td>
</tr>
</tbody>
</table>

Source: www.rggv.gov.com
RGGVY

Particulars of Rajiv Gandhi Grameen Vidyutikaran Yojan in India as on 31.3.2010 are shown in Table 2.16. It also shows the state wise details and progress of RGGVY in India. In India 573 RGGVY projects were taken up and these projects covered 546 districts. A total of 118499 unelectrified villages and 354967 electrified villages are covered under this scheme. About 54257682 unelectrified households (including BPL) and 2465017 BPL households are also electrified under this scheme. For all these projects an amount of Rs 137259.73 crore was sanctioned. Of this only Rs 23763.73 crore was released. The state wise statistics reveal that there are large number (64) of projects in Uttar Pradesh and these projects cover 65 districts. Sikkim and Tripura states got 8 projects (each state 4 projects) and these projects cover 4 districts in each state. The highest number of unelectrified villages (30802) are covered in Uttar Pradesh state. In India there are six states namely Andhra Pradesh, Gujarath, Haryana, Kerala, Punjab and Tamil Nadu in which unelectrified villages are not covered under this scheme. Because, these states achieved 100 per cent electrification before the launching of RGGVY. Of all the states, Madhya Pradesh state has electrified the highest villages (40292). While Assam state electrified highest number of (14144828) unelectrified households in the country. Orissa state covered highest number of (3185863) BPL households under this scheme. Nagaland state has registered the highest projects sanctioned (142992) in the country. But Assam state was released the highest amount of Rs 3371.94 crore. Rajasthan state occupied first place in terms of percentage of amount released in the country under this scheme.
Pump Sets Energized

Table 2.17 shows year wise number of pump sets energized in India. The number of energized pump sets rose from 0.2 lakh in 1951 to 161.65 lakh in 2009. But the increase the number of pump sets energized is low between 1961 and 1969 as Govt of India gave topmost priority to industries (communication and transport) in second five year plan and in the third plan due to the wars of Indo-China and Indo-Pakistan. The Govt of India introduced High Yielding Varieties Programme in 1966 (it is popularly known as green revaluation). So the energized pump sets increased rapidly after 1969.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Pump Sets Energised</th>
<th>Year wise Energised Pump Sets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951</td>
<td>0.2</td>
<td>-</td>
</tr>
<tr>
<td>1961</td>
<td>1.99</td>
<td>1.79</td>
</tr>
<tr>
<td>1969</td>
<td>10.89</td>
<td>8.90</td>
</tr>
<tr>
<td>1980</td>
<td>39.66</td>
<td>28.77</td>
</tr>
<tr>
<td>1990</td>
<td>83.51</td>
<td>43.85</td>
</tr>
<tr>
<td>2000</td>
<td>125.28</td>
<td>41.77</td>
</tr>
<tr>
<td>2001</td>
<td>128.38</td>
<td>3.10</td>
</tr>
<tr>
<td>2002</td>
<td>131.28</td>
<td>2.90</td>
</tr>
<tr>
<td>2003</td>
<td>137.92</td>
<td>6.64</td>
</tr>
<tr>
<td>2004</td>
<td>141.15</td>
<td>3.23</td>
</tr>
<tr>
<td>2005</td>
<td>144.45</td>
<td>3.30</td>
</tr>
<tr>
<td>2006</td>
<td>148.34</td>
<td>3.89</td>
</tr>
<tr>
<td>2007</td>
<td>153.5</td>
<td>5.16</td>
</tr>
<tr>
<td>2008</td>
<td>154.71</td>
<td>1.00</td>
</tr>
<tr>
<td>2009</td>
<td>161.65</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Source: Power Development In Andhra Pradesh (Statistics), Transmission Corporation of A.P.Limited, Annual Reports.
The number of energized pump sets stood at 28.77 lakh in 1980, 43.85 lakh in 1990 and 41.77 lakh in 2000. The cumulative figures for the same years are 39.66 lakh, 83.51 lakh and 125.28 lakh. During this period India's irrigation potential also increased significantly. After 2000 the increases in the number of pump sets energized declined. But again in the years 2003 and 2007 the number of pump sets energized increased considerably.