

## CHAPTER - 1

# Introduction

### 1.1 Power sector Scenario in India

Energy has been universally recognized as one of the most important drivers of economic growth and development. There is a strong two-way relationship between economic development and energy consumption. Access to affordable and reliable power is critical to a country's growth and prosperity. India has made significant progress towards the augmentation of its power infrastructure. The total installed capacity of power generation has increased from 1,05,046 MW at the beginning of Tenth Plan to the present capacity of 1,99,877 MW at the end of Eleventh Plan (March 2012). However, the capacity augmentation of power generation was not commensurate with the exponentially increasing demand for power driven by the rising population, expanding economy and a quest for improved quality of life. This has resulted in overall deficit of power in the country.

### 1.2 Hydro power potential

Hydro power is a renewable, economic, non-polluting and environmentally benign source of energy. Hydro power stations have inherent ability for instantaneous starting, stopping, load variations, etc. and help in improving reliability of power system. The generation cost is not only low and inflation free but also reduces with time. Therefore, hydro power is considered to be the best choice for meeting the peak demand. The first systematic and comprehensive study to assess the hydro-electric resources in India was undertaken during the period 1953 to 1959 by the Power Wing of the erstwhile Central Water and Power Commission. On the basis of the then prevailing technology with available topographical and hydrological data, the potential was assessed to 42,100 MW<sup>5</sup> at 60 *per cent* load factor in basins/rivers. The re-assessment study of hydro-electric potential of the country was completed by the Central Electricity Authority in 1987 and hydro power potential was estimated at 84,044 MW<sup>6</sup> at 60 *per cent* load factor. Hydro power is generated by Central and State Public Sector Enterprises as well as Private Sector companies.

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<sup>5</sup> *Indus basin (6,583 MW), Ganga basin (4,817 MW), Central India Rivers (4,300 MW), West Flowing Rivers (4,350 MW), East Flowing Rivers (8,633 MW) and Brahmaputra basin (13,417 MW)*

<sup>6</sup> *Indus basin (19,988 MW), Ganga basin (10,715 MW), Central India Rivers (2,740 MW), West Flowing Rivers (6,149 MW), East Flowing Rivers (9,532 MW) and Brahmaputra basin (34,920 MW)*

### 1.3 Snapshot of Hydro Policies - Role of Ministry of Power, Government of India

Ministry of Power (MOP), Government of India (GOI) is primarily responsible for the development of electrical energy in the country. MOP is concerned with perspective planning, policy formulation, processing of projects for investment decision, monitoring of the implementation of power projects and enactment of legislation in regard to thermal & hydro power generation, transmission and distribution. In order to promote hydro sector, a new Policy on Hydro Power Development was announced (August 1998) with the aim and objective of accelerating pace of hydro development. The Hydro Policy emphasized on the following:

- Basin wise development of hydro potential for optimal use of river basins;
- Execution of mega<sup>7</sup> projects through Central Public Sector Undertakings in case State or Private sector is not in a position to implement these projects;
- Encouragement to private investment through joint ventures or Independent Power Producers;
- Thorough survey and investigation of the potential hydro sites on an advanced scientific basis before preparation of Detailed Project Report (DPR);
- Simplification of procedure for clearances to save time, money and reduce gestation period;
- Development of small and mini hydro projects; and
- Allotment of hydro projects upto 100 MW to the private developers through MOU route.

National Electricity Policy (February 2005) had envisaged power to all and increase of per capita availability of electricity to over 1,000 units by the year 2012. Accordingly, Hydro Power Policy 2008 set the following broad policy objectives for accelerating the pace of hydro power development:

- Inducing private investment in hydro power development;
- Harnessing the balance hydro-electric potential;
- Improving resettlement and rehabilitation;
- Facilitating financial viability of hydro projects; and
- State Governments to follow a transparent procedure for awarding potential sites to the private sector.

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<sup>7</sup> *Projects with installed capacity of 500 MW and above.*

## 1.4 Profile of Hydro Power Sector CPSEs

There are mainly four Central Public Sector Enterprises (CPSEs) in hydro power sector *viz.* NHPC Limited (NHPC) including its JV Company NHDC Limited (NHDC), SJVNL Limited (SJVNL), THDC India Limited (THDC) and North Eastern Electric Power Corporation Limited (NEEPCO). The main objective of all these CPSEs is to develop and maintain hydro power stations. Profiles of these CPSEs as on 31<sup>st</sup> March 2012 are as under:

Particulars/Name of the Company	NHPC (incl. its JV company)	SJVNL	THDC	NEEPCO
Month/Year of incorporation	November 1975 (JV in August 2000)	May 1988	July 1988	April 1976
Area of operation	Himachal Pradesh, Madhya Pradesh, Jammu & Kashmir, Uttrakhand, West Bengal and North-Eastern States	Himachal Pradesh and Uttrakhand	Uttrakhand	North-Eastern States
Installed power generating Capacity as on 31 <sup>st</sup> March 2012	5,295 MW <sup>8</sup> (2.65 per cent <sup>9</sup> )	1,500 MW (0.75 per cent)	1,400 MW (0.70 per cent)	1,130 MW <sup>10</sup> (0.57 per cent)
Percentage of All India hydro power generation capacity <sup>11</sup>	13.58	3.85	3.59	2.90
No. of power generating plants	14 hydro	One hydro	Two hydro	Three hydro and two gas based
Share in total electricity generated <sup>12</sup> during 2011-12	23,347 MUs (2.66 per cent)	7,610 MUs (0.87 per cent)	4,591 MUs (0.52 per cent)	2,394 MUs (0.27 per cent)
Percentage of share of Central/State Government to total equity as on 31 <sup>st</sup> March 2012	Central: 86.36 (Balance Public, FIs, etc.)	Central: 64.46 State: 25.50 (Balance Public, FIs, etc.)	Central: 75 State: 25	Central: 100
			Complied from information received from CPSEs	

<sup>8</sup> Includes 1,520 MW of its Joint Venture Company i.e. NHDC Limited

<sup>9</sup> All India power generating capacity was 1,99,877 MW (thermal, hydel and others) as on March 2012 (Source: CEA website)

<sup>10</sup> Hydro (755 MW) and Gas based (375 MW)

<sup>11</sup> Hydro power generation capacity was 38,990 MW as on March 2012 (Source: CEA website)

<sup>12</sup> Total electricity generation was 8,76,888 MUs (thermal, hydel and others) during the year 2011-12 (Source: CEA website)

## 1.5 About the capacity addition programme (2007-12)

Recognizing the fact that decline in hydro share (from 44 *per cent* in 1970 to 25 *per cent* in 1998) was largely responsible for power system instability, Hydro Policy (1998) of GOI had given renewed thrust on hydro power. Therefore, NHPC, SJVNL, THDC and NEEPCO drew up (2002 to 2003) capacity addition plans in the hydro power sector to be achieved up to 2012. The capacity addition programme of these CPSEs envisaged capacity addition of 10,341 MW (NHPC- 11 projects), 412 MW Rampur project (SJVNL), 400 MW Koteshwar project (THDC) and 660MW (NEEPCO-2 projects) during the period 2007-12. NHPC revised (October 2008) its target to 5,322 MW (12 projects).

Preparedness of the CPSEs for future capacity addition programmes is discussed in detail in Chapter-III.

## 1.6 Progress of Capacity Addition Programme

Four CPSEs envisaged capacity addition target of 11,813 MW during April 2007 to March 2012 but the same were revised to 6,794 MW. As against this reduced target, the CPSEs could add only 1,550 MW<sup>13</sup> through four hydro projects<sup>14</sup> up to March 2012. Incidentally all of these four projects pertained to the previous Plan period (2002-07). Thus, the CPSEs registered shortfall of 10,263 MW (87 *per cent*) and 5,244 MW (77 *per cent*) with respect to the initial and revised targets, respectively. The details of the capacity planned actual achievement thereagainst and shortfall is tabulated below:

Sl. No.	Name of Company	Capacity envisaged (in MW)		Capacity added during 2007-12 (in MW)	Shortfall in percentage achievement of targets	
		Original	Revised		Original	Revised
1.	NHPC	10,341	5,322	1,150	89	78
2.	SJVNL	412	412	0	100	100
3.	THDC	400	400	400	NIL	NIL
4.	NEEPCO	660	660	0	100	100
<b>Total</b>		<b>11,813</b>	<b>6,794</b>	<b>1,550</b>	<b>87</b>	<b>77</b>

<sup>13</sup> Two units of Chutak project each 11 MW have not been included in the capacity addition as these units were synchronised at partial load due to unavailability of desired load and both the units are yet to be put into commercial operation (June 2012)

<sup>14</sup> Teesta-V (510 MW), Sewa-II (120 MW), Omkareshwar JV (520 MW) and Koteshwar (400 MW)

A detail of the approved cost, revised cost, anticipated cost and actual expenditure incurred by the CPSEs upto March 2012 is given below:

Sl. No.	Name of Company	Approved cost of the projects (₹ in crore)	Revised cost of the projects (₹ in crore)	Anticipated cost of the projects as of June 2012 (₹ in crore)	Expenditure incurred as on 31 March 2012 (₹ in crore)
1.	NHPC	23,790.70	34,145.36	34,145.36 <sup>15</sup>	24,396.32
2.	SJVNL	2,047.03	2,047.03 <sup>16</sup>	2,047.03	1,793.40
3.	THDC	1,301.56	2,466.96	2,719.49	2,620.71
4.	NEEPCO	2,865.62	6,052.63	6,052.63	2,091.72
<b>Total</b>		<b>30,004.91</b>	<b>44,711.98</b>	<b>44,964.51</b>	<b>30,902.15</b>

As may be seen from the above, cost of the projects planned by the CPSEs had increased significantly. The increase in the revised cost of the completed/ongoing projects ranged between 12 and 148 *per cent* as compared to original approved cost. The detailed analysis of the reasons of time and cost overruns is discussed in the chapters IV, V and VI.

<sup>15</sup> Based on revised cost estimate (RCE) submitted by NHPC to MOP. RCE of all projects is yet to be approved (June 2012) by the Competent Authority.

<sup>16</sup> RCE is under preparation