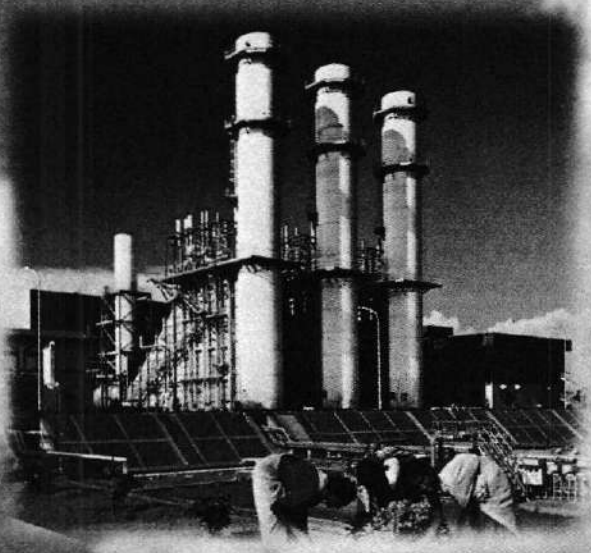
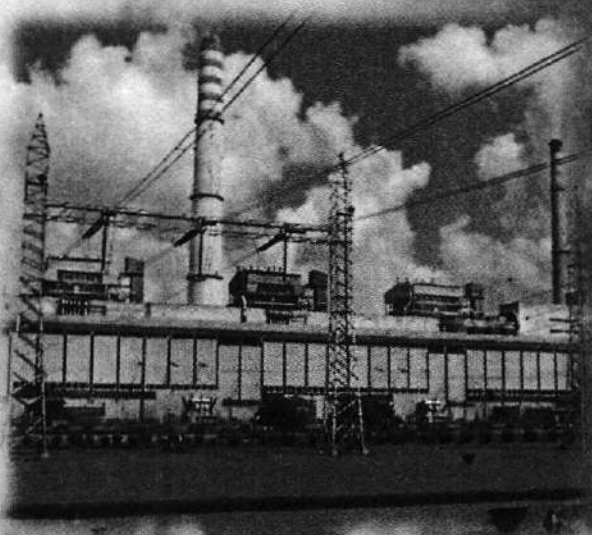
सत्यमेव जयते

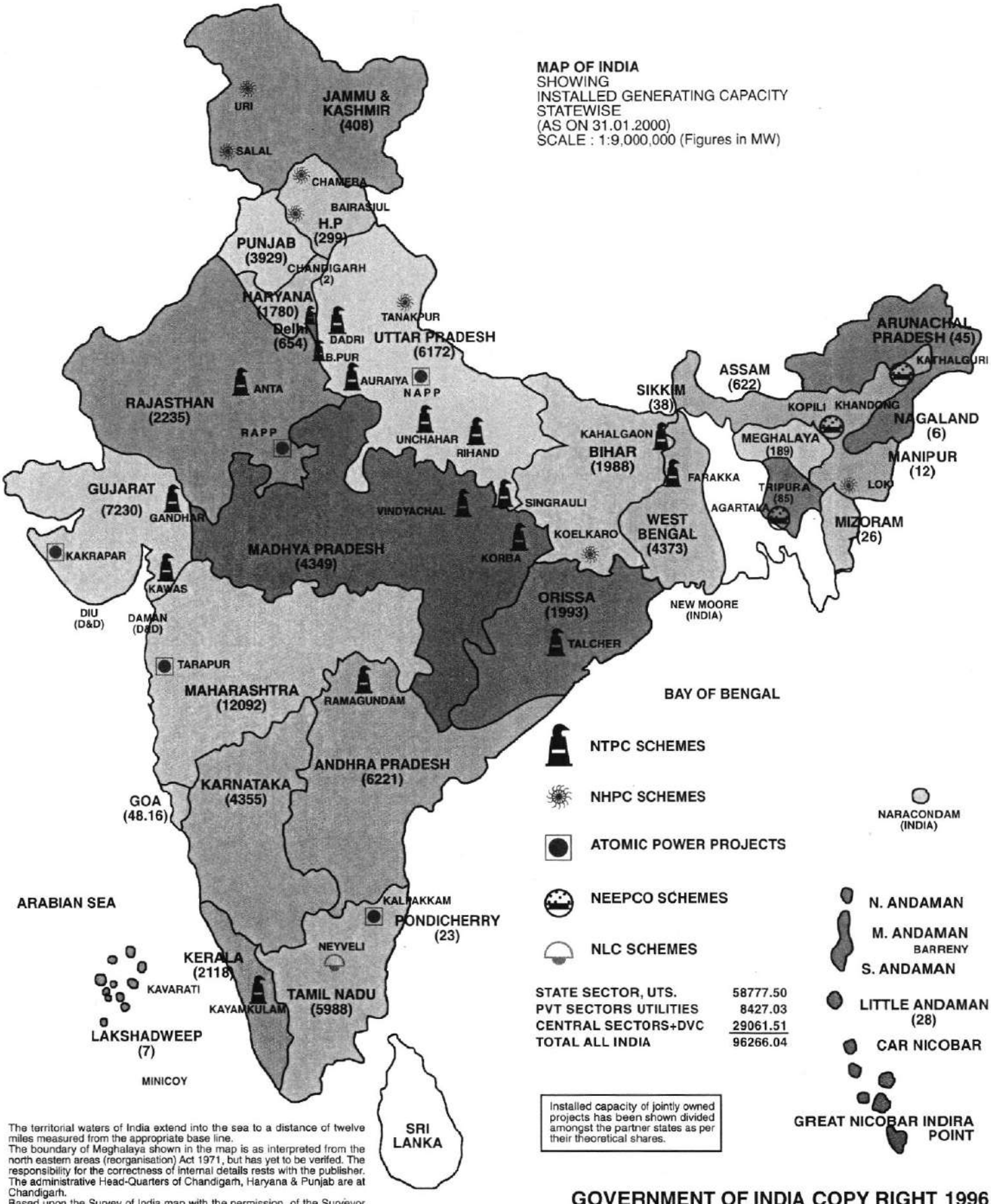
MINISTRY OF POWER

GOVT. OF INDIA





ANNUAL REPORT 1999-2000


MAP OF INDIA
SHOWING
INSTALLED GENERATING CAPACITY
STATEWISE
(AS ON 31.01.2000)
SCALE : 1:9,000,000 (Figures in MW)
JAMMU & KASHMIR (408)
URI
SALAL
CHAMERA
BAIRASIUL
H.P (299)
PUNJAB (3929)
CHANDIGARH (2)
HARYANA (1780)
Delhi (654)
DADRI
TANAKPUR
UTTAR PRADESH (6172)
B.PUR
AURAIYA
NAPP
ANTA
RAJASTHAN (2235)
RAPP
UNCHAHAR
RIHAND
GUJARAT (7230)
GANDHAR
KAKRAPAR
KAWAS
DIU (D&D)
DAMAN (D&D)
VINDYACHAL
SINGRAULI
MADHYA PRADESH (4349)
KORBA
KOELKARO
ORISSA (1993)
TALCHER
NEW MOORE (INDIA)
TARAPUR
MAHARASHTRA (12092)
RAMAGUNDAM
BAY OF BENGAL
ANDHRA PRADESH (6221)
KARNATAKA (4355)
GOA (48.16)
KALPAKKAM
PONDICHERRY (23)
NEYVELI
KERALA (2118)
KAVARATI
KAYAMKULAM
TAMIL NADU (5988)
LAKSHADWEEP (7)
MINICOY
ARABIAN SEA
SRI LANKA
KAHALGAON
BIHAR (1988)
FARAKKA
WEST BENGAL (4373)
SIKKIM (38)
ASSAM (622)
ARUNACHAL PRADESH (45)
KATHALGURI
KOPILI
KHANDONG
NAGALAND (6)
MEGHALAYA (189)
MANIPUR (12)
TRIPURA (85)
LOKTAK
AGARTALA
MIZORAM (26)
NTPC SCHEMES
NHPC SCHEMES
ATOMIC POWER PROJECTS
NEEPCO SCHEMES
NLC SCHEMES
NARACONDAM (INDIA)
N. ANDAMAN
M. ANDAMAN
BARRENY
S. ANDAMAN
LITTLE ANDAMAN (28)
CAR NICOBAR
GREAT NICOBAR INDIRA POINT
STATE SECTOR, UTS. 58777.50
PVT SECTORS UTILITIES 8427.03
CENTRAL SECTORS+DVC 29061.51
TOTAL ALL INDIA 96266.04
Installed capacity of jointly owned projects has been shown divided amongst the partner states as per their theoretical shares.
The territorial waters of India extend into the sea to a distance of twelve miles measured from the appropriate base line.
The boundary of Meghalaya shown in the map is as interpreted from the north eastern areas (reorganisation) Act 1971, but has yet to be verified. The responsibility for the correctness of internal details rests with the publisher. The administrative Head-Quarters of Chandigarh, Haryana & Punjab are at Chandigarh.
Based upon the Survey of India map with the permission of the Surveyor General of India.
GOVERNMENT OF INDIA COPY RIGHT 1996
CHART 'A'

ANNUAL REPORT

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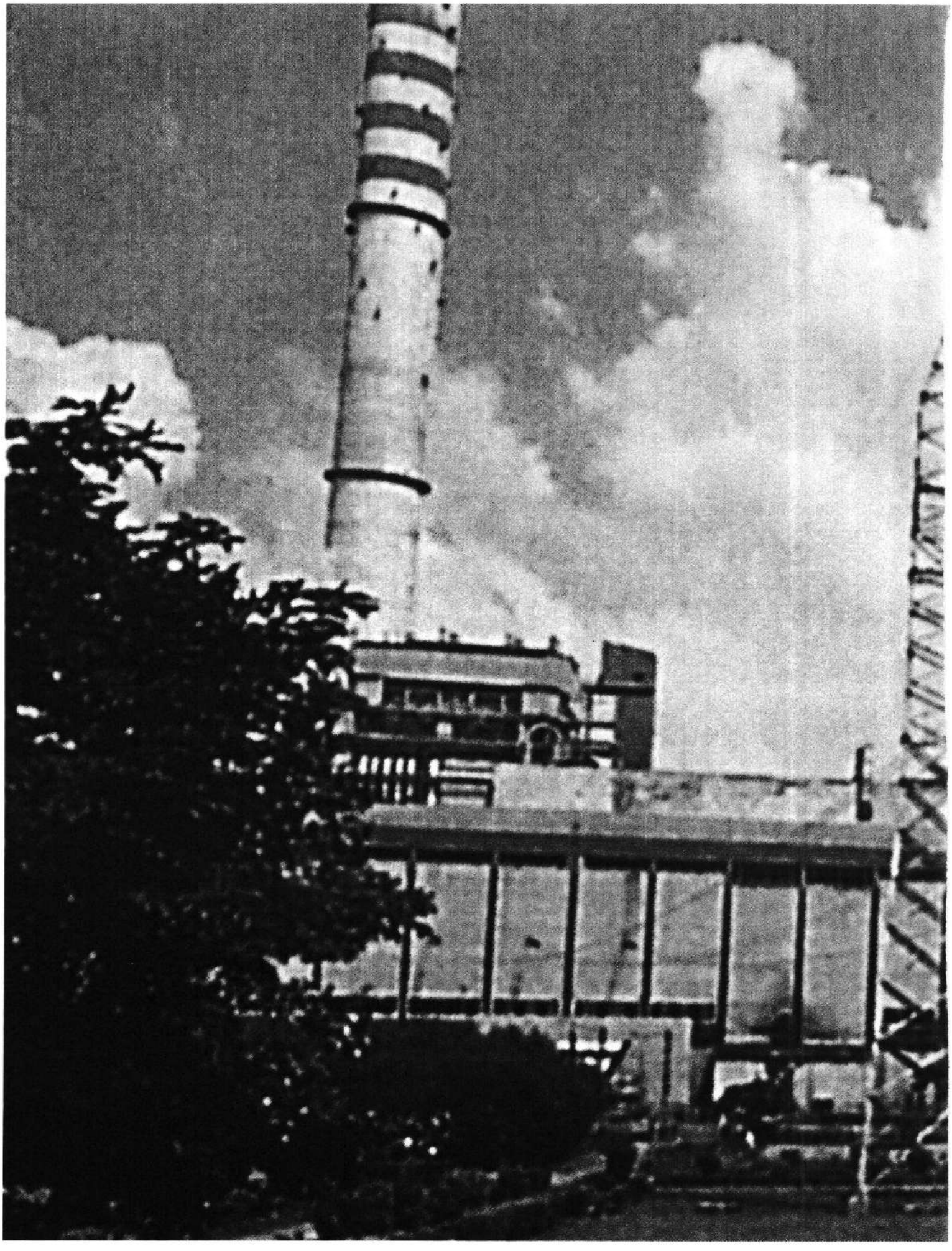
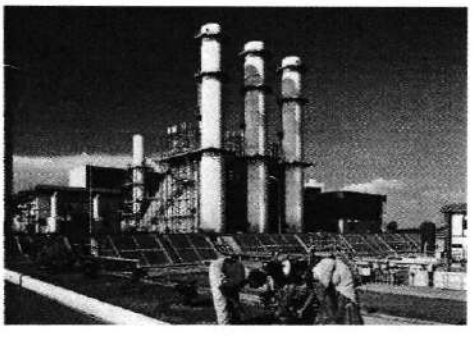
Ministry of Power

Govt. of India



Singrauli Super Thermal Power Station

C O N T E N T S



MINISTRY OF POWER

1.1 MINISTRY OF POWER

The Ministry of Power started functioning independently with effect from 2nd July, 1992. Earlier it was known as the Ministry of Energy comprising the Departments of Power, Coal and Non-Conventional Energy Sources.

Electricity is a concurrent subject at Entry 38 in List III of the Seventh Schedule of the Constitution of India. The Ministry of Power is primarily responsible for the development of electrical energy in the country. The Ministry is concerned with perspective planning, policy formulation, processing of projects for investment decision, monitoring of the implementation of power projects, training and manpower development and the administration and enactment of legislation in regard to thermal, hydel power generation, transmission and distribution.

The Ministry of Power is responsible for the administration of the Indian Electricity Act, 1910 and Electricity (Supply) Act, 1948, Electricity Regulatory Commission Act, 1998 and to undertake such amendments to these Acts, as may be necessary from time to time, in conformity with the Government's policy objectives.

The Ministry of Power is mainly responsible for evolving general policy in the field of energy. The main items of work dealt with by the Ministry of Power are as below:

1. General Policy in the Electric Power Sector and issues relating to energy policy. (Details of short, medium and long-term policies in terms of formulation, acceptance, implementation and review of such policies, cutting across sectors, fuels, regions and cross country flows).
2. All matters relating to hydroelectric power (except small / mini / micro hydel projects of and below 25 MW capacity) and thermal power and transmission system network.
3. Research, development and technical-assistance relating to hydroelectric and thermal power and transmission system network.
4. Administration of the Indian Electricity Act, 1910 (9 of 1910) and the Electricity (Supply) Act, 1948 (54 of 1948), and Electricity Regulatory Commision Act 1998.
5. All matters relating to Central Electricity Authority, Central Electricity Board and Central Electricity Regulatory Commission.
6. Rural Electrification, power schemes in Union Territories and issues relating to power supply in the States and Union Territories.
7. Matters relating to the following Undertakings/Organizations etc. :
   (a) The Damodar Valley Corporation.
   (b) Bhakra Beas Management Board (except matters relating to irrigation).
   (c) National Thermal Power Corporation Limited.
   (d) National Hydro-Electric Power Corporation Limited.
   (e) Rural Electrification Corporation Limited.
   (f) North Eastern Electric Power Corporation Limited.
   (g) Power Grid Corporation of India Limited.
   (h) Power Finance Corporation Limited.
   (i) Tehri-Hydro Development Corporation.
   (j) Nathpa Jhakri Power Corporation.
   (k) Central Power Research Institute.
   (l) National Power Training Institute.
   (m) Energy Management Centre.
8. Other Public Sector Enterprises concerned with the subject included under this Ministry except such projects as are specifically allotted to any other Ministry or Department.
9. All matter concerning Energy Conservation and Energy Efficiency pertaining to the Power Sector.

1.2 ORGANIZATIONS UNDER MINISTRY OF POWER

In all technical and economic matters, Ministry of Power is assisted by the Central Electricity Authority (CEA) constituted under the Electricity (Supply) Act, 1948.

Badarpur Management Contract Cell (BMCC), a subordinate office of this Ministry, is responsible for administering the Badarpur Thermal Power Station (BTPS) Management Contract between the Government of India and NTPC.

The construction and operation of generation and transmission projects in the Central Sector are entrusted to Central Sector Power Corporations, viz. The National Thermal Power Corporation (NTPC), the National Hydro Electric Power Corporation (NHPC), the North Eastern Electric Power Corporation (NEEPCO) and the Power Grid Corporation of India Limited (PGCIL). The Power Grid is responsible for all the existing and future transmission projects in the Central Sector and also for the formation of the National Power Grid. Two Joint Venture Power Corporations namely,

Nathpa Jhakri Power Corporation (NJPC) and Tehri Hydro Development Corporation (THDC) are responsible for the execution of the Nathpa Jhakri Power Project in Himachal Pradesh and projects of the Tehri Hydro Power Complex in Uttar Pradesh respectively. Two statutory bodies i.e., the Damodar Valley Corporation (DVC) and the Bhakra Beas Management Board (BBMB) are also under the administrative control of the Ministry of Power. Programmes of rural electrification are provided financial assistance by the Rural Electrification Corporation (REC) under the Ministry of Power. The Power Finance Corporation (PFC) provides term-finance to projects in the power sector.

Further, the autonomous bodies (societies) i.e. Central Power Research Institute (CPRI), the National Power Training Institute (NPTI) and the Energy Management Centre (EMC) are also under the administrative control of the Ministry of Power. Apart from that Power Trading Corporation (PTC) has also been formed.

1.3 ORGANIZATIONAL SET-UP

Shri P.R. Kumaramangalam is the Minister of Power with effect from 19.03.1998. Smt. Jayawanti Mehta has assumed charge as the Minister of State for Power on 14th October, 1999. Shri V.K. Pandit is the Secretary of the Ministry. He is assisted by a Special Secretary, an Additional Secretary and five Joint Secretaries, including the Financial Advisor.

The Additional Secretary heads the Divisions relating to Hydel, Energy Conservation and Damodar Valley Corporation. The allocation of work among the five Joint Secretaries in the Ministry of Power is as under :

(i) Administration, Coordination, Training & Research, Systems (Transmission & Distribution and Powergrid), Operation Monitoring and Vigilance & Security.
(ii) Hydel
(iii) Policy & Planning, External Assistance, Thermal, Reforms & Restructuring and Rural Electrification Corporation.
(iv) Investment Promotion and Power Finance Corporation.
(v) Internal Finance.

There is a Principal Accounts Office headed by the Controller of Accounts who in turn reports to the Financial Advisor in the Ministry of Power. Matters relating to reservations for SC/ST, Physically Handicapped and OBC are dealt by respective Liaison Officers. The total staff strength of the Ministry is 313.

1.4 CENTRAL ELECTRICITY REGULATORY COMMISSION STATUS

The Central Electricity Regulatory Commission (CERC) has been constituted under the provisions of the Electricity Regulatory Commission Act, 1998 (Act No. 14 of 1998). The CERC consists of a Chairperson and four other Members including Chairman of the Central Electricity Authority as the ex-officio Member. The Govt. of India has notified the rules governing service conditions of chairperson and Members of CERC. The rules regarding annual report of the Commission have also been notified. The Commission has notified the regulations on conduct of Business, on tariff fixation, terms and conditions for appointment of consultants and drafted the regulations for its officers and staff under the provisions of the ERC Act, 1998. The Indian Electricity Grid Code has also been finalised. The Central Government has omitted the provisions of Section 43(A)(2) of the Electricity Supply Act, 1948, thereby transferring the tariff fixation powers to the CERC.

Functions of the Commission

The Commission has the responsibility to discharge the following functions :

(a) to regulate the tariff of generating companies owned or controlled by the Central Government;

(b) to regulate the tariff of generating companies other than those owned or controlled by the Central Government if such generating companies enter into or otherwise have a composite scheme for generation and sale of electricity in more than one State;

(c) to regulate the inter-state transmission of energy including tariff of the transmission utilities;

(d) to promote competition, efficiency and economy in the activities of the electricity industry;

(e) to aid and advise the Central Government in the formulation of tariff policy which shall be

i) fair to the consumers; and

ii) facilitate mobilisation of adequate resources for the power sector;

(f) to associate with the environmental regulatory agencies to develop appropriate policies and procedures for environmental regulation of the power sector;

(g) to frame guidelines in matters relating to electricity tariff;

(h) to arbitrate or adjudicate upon disputes

involving generating companies or transmission utilities in regard to matters connected with (a) to (c) above;

(i) to aid and advise the Central Government on any other matter referred to the Central Commission by that Government.

(j) to license any person for the construction, maintenance and operation of an inter-state transmission system.

Mission of the Commission

Given the range of activities within its mandate, the Commission recognises the need for prioritisation of objectives. The Commission has, therefore, formulated a mission statement which will guide it in formulating its work plan over the coming years. The Commission intends to promote competition, efficiency and economy in bulk power markets, improve the quality of supply, promote investments and advise government on the removal of institutional barriers to bridge the demand supply gap and thus foster the interests of consumers. In pursuit of these objectives the Commission will :

- Improve the operations and management of the regional transmission systems through the Indian Electricity Grid Code and advise on restructuring of the institutional arrangements thereof.
- Formulate an efficient tariff setting mechanism, which ensures speedy and time bound disposal of tariff petitions, promotes competition, economy and efficiency in the pricing of bulk power and transmission services and ensures least cost investments.
- Improve access to information for all stakeholders.
- Institute the mechanisms to ensure that investment decisions for inter-state transmission are taken transparently, in a participative mode and are justifiable on the basis of least cost.
- Facilitate the technological and institutional changes required for the development of competitive markets in bulk power and transmission services.
- Advise on the removal of barriers to entry and exit for capital and management, within the limits of environmental safety and security concerns and the existing legislative requirements, as the first step to the creation of competitive markets.
- Associate with environmental regulatory agencies for the application of economic principles to the formulation of environmental regulations.

POWER SECTOR - HIGHLIGHTS AND MAIN ACHIEVEMENTS

2.1 POWER GENERATION

The overall generation in the country has increased from 301 BUs during 1992-93 to 448 BUs during 1998-99 (Chart B).

The year wise generation is as follows:

Year	Generation (BUs)
1992-93	301
1993-94	324
1994-95	351
1995-96	380
1996-97	396
1997-98	422
1998-99	448
1999-2000 (Apr, 99-Jan, 2000)	371
1999-2000	469*
*(Anticipated)	

2.2 INSTALLED CAPACITY

The all India installed capacity of electric power generating stations under utilities was 93253.04 MW as on 31.3.1999 consisting of 22443.28 MW hydro, 67560.76 MW thermal, 1840 MW nuclear and 1024.00 MW wind which has increased to 96266.04 MW (statement-I) as on 31.01.2000 consisting of 23527.28 MW hydro, 69474.76 MW thermal, 2240 MW nuclear and 1024 MW wind. (Chart C). At present the rerated installed nuclear capacity is 1840 MW.

2.3 CAPACITY ADDITION PROGRAMME 1998-99

A capacity addition programme of 3299.3 MW consisting of 544.5 MW hydro and 2754.8 MW thermal was envisaged for the year 1998-99. Against this, a capacity addition of 4242 MW consisting of 542.5 MW hydro and 3699.5 MW of thermal was added during the year.

The Sector-wise capacity addition during 1999-2000 (Upto January, 2000 is as under):

2.3.1 Capacity Addition Programme During 1999-2000 and Achievements (Apr'99-Jan. 2000)

(Chart -D)

	Programme for 1999-2000				Achievement during 1999-2000 (Apr.'1999-Jan., 2000)			
Type	**CS**	**SS**	**PS**	**TOTAL**	**CS**	**SS**	**PS**	**TOTAL**
Hydro	70.00	1493.00	-	1563.0	20.0	989.0	-	1009.0
Thermal	1115.40	1013.60	553.0	2682.0	615.40	767.6	515.0	1898.0
Nuclear	440.00	-	-	440.0	-	-	-	-
TOTAL	1625.40	2506.60	553.0	4685.0	635.40	1756.6	515.0	2907.0

A programme of commissioning of 2682 MW thermal generating capacity was envisaged at the beginning of the year 1999-2000. However, as per the status some of the thermal units are likely to be pre-poned and get commissioned within the year 1999-2000. The total thermal capacity addition now expected to be achieved during 1999-2000 is 2945.8 MW.

The details of 1898 MW of thermal capacity already commissioned during the year 1999-2000 till 31.01.2000 are given at Statement-II. The remaining thermal capacity of 1047.8 MW is likely to be commissioned during the remaining period of 1999-2000.

A programme of commissioning of 1563 MW hydro capacity was envisaged at the beginning of the year 1999-2000. However, as per the status some of the hydro units are likely to be pre-poned and get commissioned during the year 1999-2000 and some of the units are likely to slip from 1999-2000. The total hydro capacity addition now expected to be achieved during 1999-2000 is 1411.5 MW. Details of 1009.0 MW hydro capacity already rolled/commissioned during 1999-2000 till 31.01.2000 are given at Statement III. The remaining 402.5 MW of hydro capacity is likely to be commissioned during the remaining period of 1999-2000.

2.3.2 Capacity Addition (last five years)

In the last five years including 1999-2000 (Apr. 99-Jan. 2000), the following new capacities have been added:

(Figures in MW)

Year	Centre	State	Total*
1995-96	987.00	1136.55	2123.55
1996-97	823.50	800.00	1624.40
1997-98	333.00	2893.50	3226.50
1998-99	991.60	3250.40	4242.00
1999-2000 (upto Jan., 2000)	635.40	1756.60	2907.00

* This also includes figures in respect of Private Sector.

2.4 NINTH PLAN CAPACITY ADDITION PROGRAMME

The draft of 9th Plan prepared by the Planning Commission envisaged a total capacity of 40245.2 MW comprising 9819.7 MW hydro, 29545.5 MW thermal and 880 MW nuclear power. The sector-wise and regionwise additions proposed are as follows:

Sectorwise Benefits (in MW)

Sector	Hydro	Thermal	Nuclear	Total
Central	3455.0	7574.0	880.0	11909.0
State	5814.7	4933.0	-	10747.7
Private	550.0	17038.5	-	17588.5
Total	**9819.7**	**29545.5**	**880.0**	**40245.2**

The Mid Term appraisal exercise conducted in July, 1999 however, has indicated that about 28097 MW would be feasible. The corresponding break up is as follows:

Central	2955.0	5894.0	880.0	9729.0
State	5128.2	4877.0	-	10005.2
Private	316.0	8047.0	-	8363.0
Total	**8399.2**	**18818.0**	**880.0**	**28097.2**

The capacity addition in the first three years of the Ninth Plan has been as under:

Year	Centre	State	Private	Total
9th Plan	11909.0	10747.7	17588.5	40245.2
1997-98 (act.)	333.0	1676.0	1217.5	3226.5
1998-99 (act.)	991.6	1675.4	1575.0	4242.0
1999-2000 (est.)	1625.4	2506.6	578.0	4710.0
First Three Years	2950.0	5858.0	3370.5	12178.5

2.5 PLANT LOAD FACTOR (PLF)

The actual all India PLF of Thermal Utilities during April, 1999 to January, 2000 was 66.1% which was 3.3% more than the target of 62.8% for this period.

The PLF figures during the last five years and April, 1999 - January, 2000 are as under:

(Figures in %)

Year	Centre	State	Overall
1993-94	69.8	56.6	61.0
1994-95	69.2	55.0	60.0
1995-66	71.0	58.1	63.0
1996-97	71.1	60.3	64.4
1997-98	70.4	60.9	64.7
1998-99	71.1	60.1	64.6
1999-2000 (Apr., 1999 - Jan., 2000)	72.2	62.7	66.1

A target of 63.8% has been fixed for the year 1999-2000.

2.6 TRANSMISSION & DISTRIBUTION LOSSES

The transmission and distribution losses in the country had come down from 21.8% in 1992-93 to 21.13% in 1994-95. However there has been an increase in losses thereafter. The losses in 1997-98 are 24.44% (tentative). The transmission and distribution losses in the country, year-wise, since 1992-93 are given below:

Year	T&D LOSS (%)
1992-93	21.80%
1993-94	21.41%
1994-95	21.13%
1995-96	22.27%
1996-97	24.53%
1997-98	24.44% (Tentative)

2.6.1 Awards For Reduction Of T&D Losses

Proposals received from KEB, GEB, Pondicherry Electricity Department, MSEB and APSEB are being examined for consideration of award under the Incentive Scheme for reduction of T&D losses for the year 1996-97.

CHART 'B'

GROWTH OF ELECTRICITY GENERATION (UTILITIES) (IN MILLION UNITS)

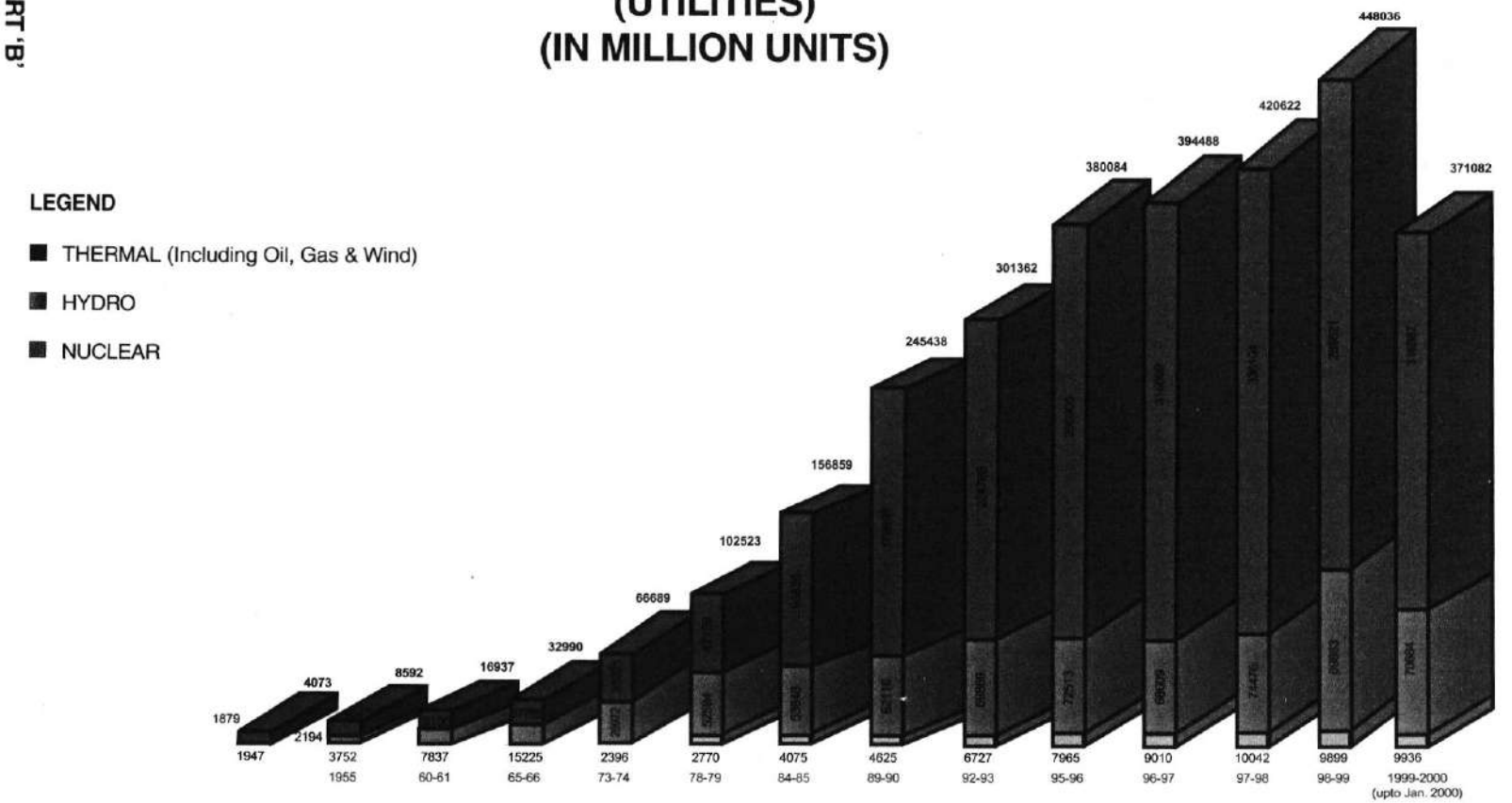
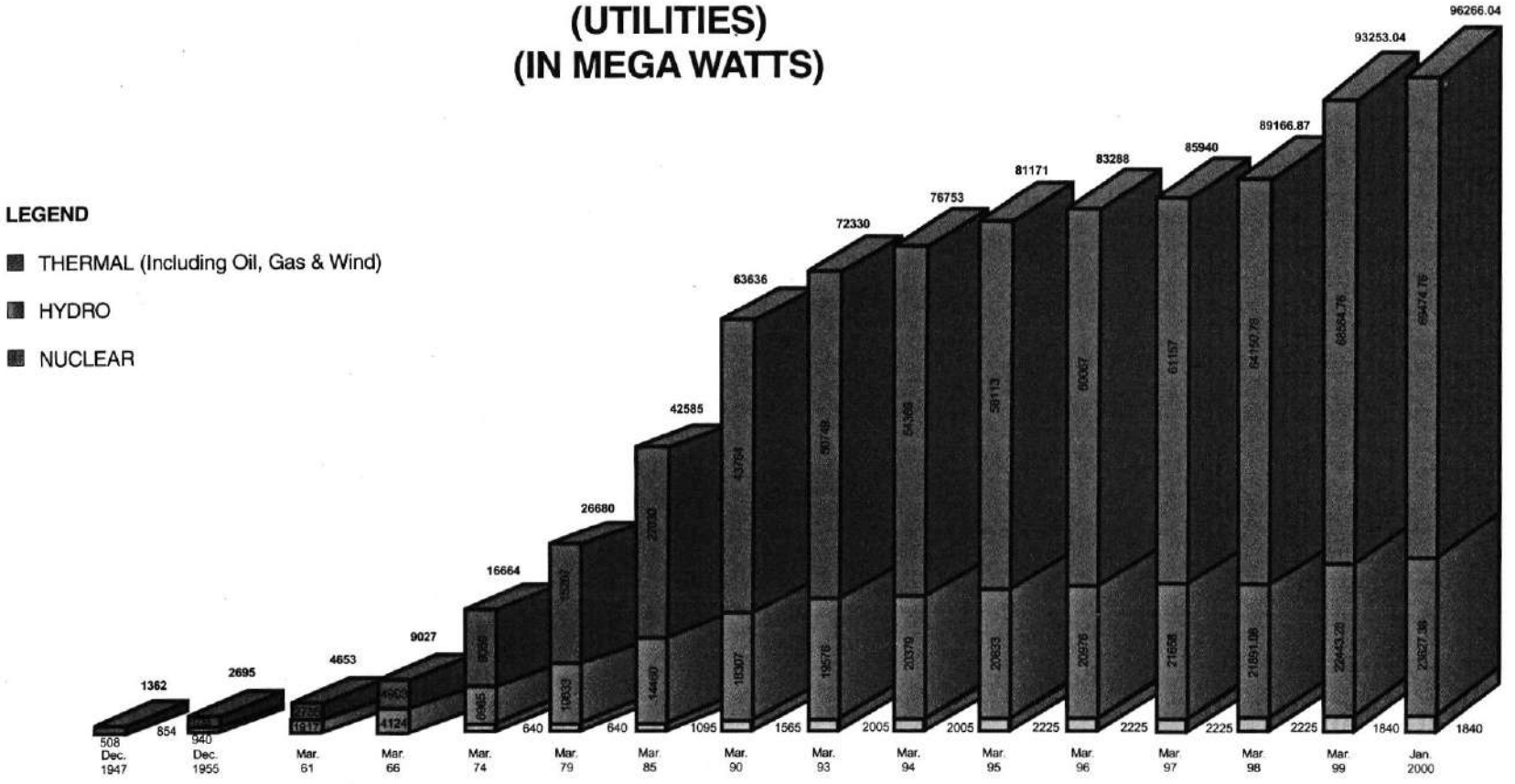


CHART 'C'

GROWTH OF INSTALLED CAPACITY (UTILITIES) (IN MEGA WATTS)



*** At present the installed nuclear capacity has been rerated to 1840 MW.**

Statement I

INSTALLED GENERATING CAPACITY (UTILITIES) (PROVISIONAL) AS ON 31.1.2000 (MW)

Region State/UTs.		Hydro (H)	THERMAL (T) Steam	Gas	Diesel	Sub Total	Nuclear (N)	Total (H+T+N)	Wind	Grand Total
NORTHERN REGION										
Haryana	(Total)	883.90	892.50	0.00	3.92	896.42	0.00	1780.32	0.00	1780.32
State Sector		883.90	892.50	0.00	3.92	896.42	0.00	1780.32	0.00	1780.32
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Himachal Pradesh	(Total)	299.37	0.00	0.00	0.13	0.13	0.00	299.50	0.00	299.50
State Sector		299.37	0.00	0.00	0.13	0.13	0.00	299.50	0.00	299.50
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jammu & Kashmir	(Total)	223.96	0.00	175.00	8.94	183.94	0.00	407.90	0.00	407.90
State Sector		223.96	0.00	175.00	8.94	183.94	0.00	407.90	0.00	407.90
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Punjab	(Total)	1798.94	2130.00	0.00	0.00	2130.00	0.00	3928.94	0.00	3928.94
State Sector		1798.94	2130.00	0.00	0.00	2130.00	0.00	3928.94	0.00	3928.94
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rajasthan	(Total)	971.08	1225.00	38.50	0.00	1263.50	0.00	2234.58	0.00	2234.58
State Sector		971.08	1225.00	38.50	0.00	1263.50	0.00	2234.58	0.00	2234.58
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uttar Pradesh	(Total)	1510.75	4542.00*	0.00	0.00	4542.00	0.00	6052.75	0.00	6052.75
State Sector		1510.75	4542.00	0.00	0.00	4542.00	0.00	6052.75	0.00	6052.75
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chandigarh	(Total)	0.00	0.00	0.00	2.00	2.00	0.00	2.00	0.00	2.00
State Sector		0.00	0.00	0.00	2.00	2.00	0.00	2.00	0.00	2.00
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Delhi	(Total)	0.00	371.60	282.00	0.00	653.60	0.00	653.60	0.00	653.60
State Sector		0.00	371.60	282.00	0.00	653.60	0.00	653.60	0.00	653.60
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central Sector		2010.00	5400.00	2168.00	0.00	7568.00	910.00	10488.00	0.00	10488.00
Total		7698.00	14561.10	2663.50	14.99	17239.59	910.00	25847.59	0.00	25847.59
State Sector		5688.00	9161.10	495.50	14.99	9671.59	0.00	15359.59	0.00	15359.59
Private Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Central Sector	2010.00	5400.00	2168.00	0.00	7568.00	910.00	10488.00	0.00	10488.00	

* Deletion of 32 MW Unit-1 of Panki TPS due to retirement from operation effecting decrease in generating capacity.

Contd...

Statement I

INSTALLED GENERATING CAPACITY (UTILITIES) (PROVISIONAL) AS ON 31.1.2000 (MW)

Region State/UTs.	Hydro (H)	THERMAL (T) Steam	Gas	Diesel	Sub Total	Nuclear (N)	Total (H+T+N)	Wind	Grand Total
Western Region									
Gujarat (Total)	547.00	4864.00	1635.00	17.48	6516.48	0.00	7063.48	166.91	7230.39
State Sector	547.00	4224.00	198.00	17.28	4439.28	0.00	4986.28	17.35	5003.63
Private Sector	0.00	640.00	1437.00	0.20	2077.20	0.00	2077.20	149.56	2226.76
Madhya Pradesh (Total)	892.91	3437.50	0.00	0.00	3437.50	0.00	4330.41	18.44	4348.85
State Sector	892.91	3437.50	0.00	0.00	3437.50	0.00	4330.41	0.59	4331.00
Private Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.85	17.85
Maharashtra (Total)	2575.22	7655.00	1832.00	0.00	9487.00	0.00	12062.22	28.94	12091.16
State Sector	2149.22	6005.00	912.00	0.00	6917.00	0.00	9066.22	6.44	9072.66
Private Sector	426.00	1650.00	920.00	0.00	2570.00	0.00	2996.00	22.50	3018.50
Goa (Total)	0.05	0.00	48.00	0.00	48.00	0.00	48.05	0.11	48.16
State Sector	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.11	0.16
Private Sector	0.00	0.00	48.00	0.00	48.00	0.00	48.00	0.00	48.00
D&N Haveli (Total)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
State Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daman & Diu (Total)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
State Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central Sector	0.00	3860.00	1292.00	0.00	5152.00	860.00	6012.00	0.00	6012.00
Total	4015.18	19816.50	4807.00	17.48	24640.98	860.00	29516.16	214.40	29730.56
State Sector	3589.18	13666.50	1110.00	17.28	14793.78	0.00	18382.96	24.49	18407.45
Private Sector	426.00	2290.00	2405.00	0.20	4695.20	0.00	5121.20	189.91	5311.11
Central Sector	0.00	3860.00	1292.00	0.00	5152.00	860.00	6012.00	0.00	6012.00

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Statement I

INSTALLED GENERATING CAPACITY (UTILITIES) (PROVISIONAL) AS ON 31.1.2000 (MW)

Region State/UTs.	Hydro (H)	THERMAL (T) Steam	Gas	Diesel	Sub Total	Nuclear (N)	Total (H+T+N)	Wind	Grand Total
SOUTHERN REGION									
Andhra Pradesh (Total)	2664.44	2952.50	542.40	0.00	3494.90	0.00	6159.34	61.79	6221.13
State Sector	2664.44	2952.50	99.00	0.00	3051.50	0.00	5715.94	3.05	5718.99
Private Sector	0.00	0.00	443.40	0.00	443.40	0.00	443.40	58.74	502.14
Karnataka (Total)	2685.55	1520.00	0.00	129.92	1649.92	0.00	4335.47	19.64	4355.11
State Sector	2667.55	1260.00	0.00	129.92	1389.92	0.00	4057.47	2.58	4060.05
Private Sector	18.00	260.00	0.00	0.00	260.00	0.00	278.00	17.06	295.06
Kerala (Total)	1752.50	0.00	135.00	228.00	363.00	0.00	2115.50	2.02	2117.52
State Sector	1740.50	0.00	0.00	228.00	228.00	0.00	1968.50	2.02	1970.52
Private Sector	12.00	0.00	135.00	0.00	135.00	0.00	147.00	0.00	147.00
Tamil Nadu (Total)	1963.20	2970.00	130.00	200.00	3300.00	0.00	5263.20	725.05	5988.25
State Sector	1963.20	2970.00	130.00	0.00	3100.00	0.00	5063.20	19.35	5082.55
Private Sector	0.00	0.00	0.00	200.00	200.00	0.00	200.00	705.70	905.70
Pondicherry (Total)	0.00	0.00	32.50	0.00	32.50	0.00	32.50	0.00	32.50
State Sector	0.00	0.00	32.50	0.00	32.50	0.00	32.50	0.00	32.50
Private Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central Sector	0.00	4170.00	350.00	0.00	4520.00	470.00	4990.00	0.00	4990.00
Total	9065.69	16612.50	1189.90	557.92	13360.32	470.00	22896.01	808.50	23704.51
State Sector	9035.69	7182.50	261.50	357.92	7801.92	0.00	16837.61	27.00	16864.61
Private Sector	30.00	260.00	578.40	200.00	1038.40	0.00	1068.40	781.50	1849.90
Central Sector	0.00	4170.00	350.00	0.00	4520.00	470.00	4990.00	0.00	4990.00

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Statement I

INSTALLED GENERATING CAPACITY (UTILITIES) (PROVISIONAL) AS ON 31.1.2000 (MW)

Region State/UTs.		Hydro (H)	THERMAL (T) Steam	Gas	Diesel	Sub Total	Nuclear (N)	Total (H+T+N)	Wind	Grand Total
EASTERN REGION										
Bihar	(Total)	174.90	1813.50	0.00	0.00	1813.50	0.00	1988.40	0.00	1988.40
State Sector		174.90	1813.50	0.00	0.00	1813.50	0.00	1988.40	0.00	1988.40
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Orissa	(Total)	1571.92	420.00	0.00	0.00	420.00	0.00	1991.92	1.10	1993.02
State Sector		1571.92	420.00	0.00	0.00	420.00	0.00	1991.92	1.10	1993.02
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West Bengal	(Total)	164.01	4086.38	100.00	22.50	4208.88	0.00	4372.89	0.00	4372.89
State Sector		164.01	2885.00	60.00	22.36	2967.36	0.00	3131.37	0.00	3131.37
Private Sector		0.00	1201.38	40.00	0.14	1241.52	0.00	1241.52	0.00	1241.52
Central Sector	(D.V.C.)	144.00	2637.50	90.00	0.00	2727.50	0.00	2871.50	0.00	2871.50
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sikkim	(Total)	32.89	0.00	0.00	5.00	5.00	0.00	37.89	0.00	37.89
State Sector		32.89	0.00	0.00	5.00	5.00	0.00	37.89	0.00	37.89
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central Sector (Including D.V.C.)		204.00	6547.50	90.00	0.00	6637.50	0.00	6841.50	0.00	6841.50
Total		2147.72	12867.38	190.00	27.50	13084.88	0.00	15232.60	1.10	15233.70
State Sector		1943.72	5118.50	60.00	27.36	5205	0.00	7149.58	1.10	7150.68
Private Sector		0.00	1201.38	40.00	0.14	1241.52	0.00	1241.52	0.00	1241.52
Central Sector		204.00	6547.50	90.00	0.00	6637.50	0.00	6841.50	0.00	6841.50

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Statement I

INSTALLED GENERATING CAPACITY (UTILITIES) (PROVISIONAL) AS ON 31.1.2000 (MW)

Region State/UTs.		Hydro (H)	THERMAL (T) Steam	Gas	Diesel	Sub Total	Nuclear (N)	Total (H+T+N)	Wind	Grand Total
NORTH EASTERN REGION										
Assam	(Total)	2.00	330.00	269.00	20.69	619.69	0.00	621.69	0.00	621.69
State Sector		2.00	330.00	244.50	20.69	595.19	0.00	597.19	0.00	597.19
Private Sector		0.00	0.00	24.50	0.00	24.50	0.00	24.50	0.00	24.50
Manipur	(Total)	2.60	0.00	0.00	9.41	9.41	0.00	12.01	0.00	12.01
State Sector		2.60	0.00	0.00	9.41	9.41	0.00	12.01	0.00	12.01
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Meghalaya	(Total)	186.71	0.00	0.00	2.05	2.05	0.00	188.76	0.00	188.76
State Sector		186.71	0.00	0.00	2.05	2.05	0.00	188.76	0.00	188.76
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nagaland	(Total)	3.50	0.00	0.00	2.00	2.00	0.00	5.50	0.00	5.50
State Sector		3.50	0.00	0.00	2.00	2.00	0.00	5.50	0.00	5.50
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tripura	(Total)	16.01	0.00	64.50	4.85	69.35	0.00	85.36	0.00	85.36
State Sector		16.01	0.00	64.50	4.85	69.35	0.00	85.36	0.00	85.36
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arunachal Pradesh	(Total)	29.55	0.00	0.00	15.88	15.88	0.00	45.43	0.00	45.43
State Sector		29.55	0.00	0.00	15.88	15.88	0.00	45.43	0.00	45.43
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mizoram	(Total)	5.31	0.00	0.00	20.36	20.36	0.00	25.67	0.00	25.67
State Sector		5.31	0.00	0.00	20.36	20.36	0.00	25.67	0.00	25.67
Private Sector		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central Sector		355.01	0.00	375.00	0.00	375.00	0.00	730.01	0.00	730.01
Total		600.69	330.00	708.50	75.24	1113.74	0.00	1714.43	0.00	1714.43
State Sector		245.68	330.00	309.00	75.24	714.24	0.00	959.92	0.00	959.92
Private Sector		0.00	0.00	24.50	0.00	24.50	0.00	24.50	0.00	24.50
Central Sector		355.01	0.00	375.00	0.00	375.00	0.00	730.01	0.00	730.01

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Statement I

INSTALLED GENERATING CAPACITY (UTILITIES) (PROVISIONAL) AS ON 31.1.2000 (MW)

Region State/UTs.	Hydro (H)	THERMAL (T) Steam	Gas	Diesel	Sub Total	Nuclear (N)	Total (H+T+N)	Wind	Grand Total
ISLANDS									
A & N Islands (Total)	0.00	0.00	0.00	28.33	28.33	0.00	28.33	0.00	28.33
State Sector	0.00	0.00	0.00	28.33	28.33	0.00	28.33	0.00	28.33
Private Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakshadweep (Total)	0.00	0.00	0.00	6.92	6.92	0.00	6.92	0.00	6.92
State Sector	0.00	0.00	0.00	6.92	6.92	0.00	6.92	0.00	6.92
Private Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	35.25	35.25	0.00	35.25	0.00	35.25
State Sector	0.00	0.00	0.00	35.25	35.25	0.00	35.25	0.00	35.25
Private Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G Total (All India)	23527.28	59187.48	9558.90	728.38	69474.76	2240.00	95242.04	1024.00	96266.04
State Sector	20502.27	35458.60	2236.00	528.04	38222.64	0.00	58724.91	52.59	58777.50
Private Sector	456.00	3751.38	3047.90	200.34	6999.62	0.00	7455.62	971.41	8427.03
Central Sector	2569.01	19977.50	4275.00	0.00	24252.50	2240.00	29061.51	0.00	29061.51

*At present the rerated installed nuclear capacity is 1840 MW

Statement-II

GENERATION CAPACITY ADDITION DURING 1999-2000 (PROGRAMME & ACHIEVEMENT OF THERMAL SCHEMES) (APRIL, 99 TO JANUARY, 2000)

SL. NO.	UNIT NAME	U. NO.	S E C	CAPACITY (MW) (1999-2000)		STATE	IMPL. AGENCY	COMM. SCHED. (MON./ YEAR)	DATE OF ROLL-ING	DATE OF COMMISS -IONING
				TAR.	ACH.					
1	Faridabad CCGT	1	C	143	143	Haryana	NTPC	10/99	-	29.06.99
2	Faridabad CCGT	2	C	143	143	Haryana	NTPC	12/99	-	18.10.99
3	Unchahar TPP	4	C	210	210	U.P.	NTPC	10/99	-	22.10.99
4	Vindhyachal TPP	8	C	500	-	M.P.	NTPC	2/2000	-	-
5	Kayamkulam CCGT-ST	-	C	119.4	119.40	Kerala	NTPC	2/2000	-	30.10.99
6	Sanjay Gandhi Ext.TPP	4	S	210	210	M.P.	MPEB	2/2000	-	23.11.99
7	Raichur TPS St.III	6	S	210	210	Karnataka	KPCL	9/99	-	22.07.99
8	Kozhikode DGSets	1-8	S	8X16 =128	128 (1-8)	Kerala	KSEB	9-11/99	-	1/9, 11/9, 18/9, 23/9, 30/9, 11/10, 25/10 & 6/11/99
9	Liemakhong DG Sets	1-6	S	6X6 =36	-	Manipur	PDC	1-2/2000	-	-
10	Bakreshwar TPP	1	S	210	210	W.B.	WBPDCL	9/99	-	18.07.99
11	Bakreshwar TPP	2	S	210	-	W.B.	WBPDCL	3/2000	-	-
12	Karaikal ST	-	S	9.6	9.6	Pondechery	PPCL	6/99	-	02.07.99
13	Surat Lignite	1	P	125	125	Gujarat	GIPCL	5/99	-	16.01.2000
14	Surat Lignite	2	P	125	125	Gujarat	GIPCL	7/99	-	06.11.99
15	Torangallu	2	P	130	130	Karnataka	Jindal	6/99	-	16.05.99
16	CochinCCGT(Eloore)GT	1	P	45	45	Kerala	BSES	5/99	-	06.06.99
17	Cochin CCGT(Eloore)GT	2	P	45	45	Kerala	BSES	7/99	-	02.08.99
18	Cochin CCGT(Eloore)GT	3	P	45	45	Kerala	BSES	9/99	-	04.12.99
19	Cochin CCGT(Eloore)ST	-	P	38	38	Kerala	BSES	2/2000	-	-

Statement-III

GENERATION CAPACITY ADDITION DURING 1999-2000 (PROGRAMME & ACHIEVEMENT OF HYDRO SCHEMES) (APRIL, 99 TO JANUARY, 2000)

SL. NO.	UNIT NAME	U. NO.	S E C	CAPACITY (MW) (1999-2000)		STATE	IMPL. AGENCY	COMM.S CHED. (MON./ YEAR)	DATE OF ROLL-	DATE OF COMMISS IONING
				TAR.	ACH.					
1	Doyang	1	C	25.00	-	Nag.	NEEPCO	9/99	-	-
2	Doyang	3	C	25.00	-	Nag.	NEEPCO	12/99	-	-
3	Rangit III	1	C	20.00	20.00	Sik.	NHPC	12/99	31.12.99	-
4	Sewa-III	1	S	3.00	-	J&K	JKPPC	9/99	-	-
5	-do-	2	S	3.00	-	J&K	JKPDC	9/99	-	-
6	-do-	3	S	3.00	-	J&K	JKPDC	9/99	-	-
7	Chenani-III	1	S	2.50	-	J&K	JKPDC	9/99	-	-
8	-do-	2	S	2.50	-	J&K	JKPDC	9/99	-	-
9	-do-	3	S	2.50	-	J&K	JKPDC	9/99	-	-
10	Ranjit Sagar Dam	4	S	150.00	-	PUNJ	-	7/99	-	-
11	Ranjit Sagar Dam	3	S	150.00	-	PUNJ	-	1/2000	-	-
12	Rajghat	1	S	15.00	15.00	M.P.	-	8/99	22.09.99	15.10.99
13	Rajghat	2	S	15.00	15.00	M.P.	-	9/99	30.07.99	29.09.99
14	Rajghat	3	S	15.00	15.00	M.P.	-	10/99	26.10.99	03.11.99
15	Dudhaganga	1	S	12.00	12.00	MAH	IDMAH	5/99	13.05.99	-
16	Dudhaganga	2	S	12.00	12.00	MAH	IDMAH	6/99	31.07.99	-
17	Koyna St. IV	3	S	250.00	250.00	MAH	Mah.Irg.Dept.	8/99	03.10.99	25.11.99
18	Koyna St. IV	2	S	250.00	250.00	MAH	DO	1/2000	14.1.2000	-
19	Singur	1	S	7.50	7.50	A.P.	APSEB	9/99	29.11.99	06.12.99
20	Singur	2	S	7.50	-	A.P.	APSEB	12/99	-	-
21	Kakkad	1	S	25.00	25.00	Kerala	-	6/99	12.06.99	23.07.99
22	Kakkad	2	S	25.00	25.00	Kerala	-	8/99	15.06.99	22.07.99
23	Kallnadi-II Kdasalli	3	S	40.00	40.00	Ktk.	KPC	9/99	04.08.99	28.08.99
24	Parson's Valley	1	S	30.00	-	T.N.	-	2/2000	-	-
25	Upper Indravati	1	S	150.00	150.00	Ori.	-	4/99	07.06.99	05.09.99
26	Upper Indravati	2	S	150.00	150.00	Ori.	-	7/99	09.12.99	23.12.99
27	Upper Indravati	3	S	150.00	-	Ori.	-	2/2000	-	-
28	Teesta Canal Falls-II	7	S	7.50	7.50	W.B.	WBSEB	5/99	27.06.99	23.07.99
29	Teesta Canal Falls-II	8	S	7.50	7.50	W.B.	WBSEB	6/99	22.08.99	07.09.99
30	Teesta Canal Falls-II	9	S	7.50	7.50	W.B.	WBSEB	7/99	06.10.99	13.10.99

CAPACITY ADDITION DURING 1999-2000
PROGRAMME & ACHIEVEMENT

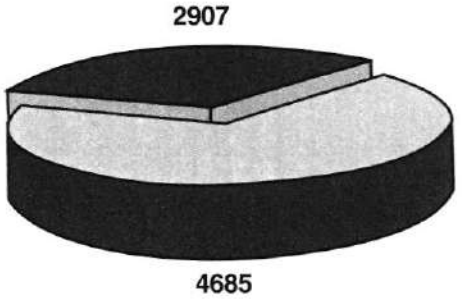


CHART - D

PROGRAMME

ACHIEVEMENT

*Upto January, 2000

2.7 POWER SUPPLY POSITION

The power supply position during the last five years and during the current year (Apr., 1999-Jan., 2000) has been as under:-

Energy (MU)

Year	Requirement	Availability	Shortage	%
1994-95	352260	327281	24979	7.1
1995-96	389721	354045	35676	9.2
1996-97	413490	365900	47590	11.5
1997-98	424505	390330	34175	8.1
1998-99	446584	420235	26349	5.9
1999-2000 (Apr., 1999-Jan., 2000)	396047	372709	23338	5.9

Power (MW)

Year	Peak Demand	Peak Demand Met	Deficit Shortage	(%)
1994-95	57530	48066	9464	16.5
1995-96	60981	49836	11145	18.3
1996-97	63853	52376	11477	18.0
1997-98	65435	58042	7393	11.3
1998-99	67905	58445	9460	13.9
1999-2000 (Apr.-,1999-Jan., 2000)	70321	61712	8609	12.2

It may be seen that the energy shortage has been reducing gradually since 1996-97. The peak shortage during the year 1999-2000 (April, 99 to January, 2000) has decreased to 12.2%

2.8 RESTRUCTURING OF STATE ELECTRICITY BOARDS

The Government of India has enacted the Electricity Regulatory Commission Act, 1998, with the objective of rationalisation of electricity tariff, transparent policies regarding subsidies, promotion of efficient and environmentally benign policies and for matters connected therewith or incidental thereto. The ERC Act paves the way to set up the Central Electricity Regulatory Commission at Centre and State Electricity Regulatory Commissions at State level. The Government of India has set up CERC at Centre by issuing the Notification on 24th July, 1998. The establishment of Regulatory Commissions as provided in the Act passed by the Parliament would lead to rationalisation of tariff and also provide for transparency in the working of SEBs wherever required.

Restructuring and regulatory reforms are under various stages of implementation in different State Electricity Boards. The states of Orissa, Haryana, Andhra Pradesh, Uttar Pradesh and Karnataka have enacted their State Reforms Acts and unbundled/corporatised their SEBs. Rajasthan has also enacted the State Reforms Act. Delhi has drafted its Electricity Reforms Bill. Privatisation of distribution is also emerging as a main focus area. In Orissa, the four subsidiary distribution companies of GRIDCO have been disinvested in favour of the private companies. The Govt. of UP has privatised distribution in Kanpur.

2.9 STATE ELECTRICITY BOARDS- RATE OF RETURN

Restoration of financial health of SEBs and improvement in their operational performance continue to remain critical issues in the power sector. In terms of Section 59 of the Electricity (Supply) Act, 1948, SEBs are required to achieve a rate of return (ROR) of not less that 3 percent on their fixed assets in service at the beginning of the year after providing for interest and depreciation charges less consumer's contribution. This provision has become operative from the accounting year 1985. While in 1994-95, 13 SEBs out of 17 SEBs (including OSEB) had a positive ROR (with subsidy), in 1997-98, 13 SEBs out of 16 SEBs (excluding OSEB & DVB) had a positive ROR (with subsidy). Further only 3 SEBs (MSEB,

HPSEB & BSEB*) had a ROR of more than 3 percent in 1997-98 (with subsidy).

* BSEB A/cs are unaudited.

Managerial and financial inefficiencies in State sector utilities have adversely affected capacity addition and system improvement. While the SEBs do not have enough resources to finance future programmes they are also unable to raise investible funds from alternate sources due to their poor financial and commercial performance.

2.10 SIXTEENTH ELECTRIC POWER SURVEY COMMITTEE

The sixteenth Electric Power Survey Committee was constituted by the Central Electricity Authority in March, 1998 with Member (Planning), Central Electricity Authority as its Chairman. The terms of reference of the Committee are - to review the demand projections for each State and Union Territory in detail upto the year, 2004-05 and project the perspective demand upto the year 2014-15. In the third meeting, the committee extended the period of long terms projects upto the year 2016-17 to make the projections co-terminus with the Twelfth Plan period. The work is in progress.

2.11 MEGA POWER PROJECTS : REVISED POLICY GUIDELINES

The guidelines for setting up of mega power projects of capacity 1000 MW or more, supplying power to more than one State had been issued in November, 1995, is summarised below.

1. Inter-state and Inter-regional mega power projects are proposed to be set up both in the public and private sectors. In the public sector, the National Thermal Power Corporation (NTPC) and Damodar Valley Corporation (DVC) would be setting up the following projects. Kahalgaon Stage II (1500 MW), North Karanpura STPP (2000 MW), Barh STPP (2000 MW), Maithon Project (1000 MW) and Cheyyur (1500 MW). In addition, NTPC would be expanding the four gas based plants, namely, Anta, Auriya, Kawas and Gandhar to an additional capacity of 1300 MW each.

   The National Hydro-Electric Power Corporation (NHPC) would be taking up the following Inter-state projects: Koel-Karo (710 MW), Chamera-II (300 MW), Teesta-V (510 MW), Koldam (800 MW) and Paravati (800 MW).

   In the private sector, in addition to Inter-regional Hirma (6x660 MW) project in Orissa, the following projects are also proposed to be taken up : Cuddalore (1000 MW) based on a blend of domestic and imported coal; Krishnapattanam (1500 MW) - based on a blend of domestic and imported coal; Pipavav (2000 MW) - based on imported coal and Narmada (1000 MW, which could be expanded to 2000 MW), based on LNG. Two or three more projects based on LNG, may be developed on the Western coast later. These fuel options can be revised based on feasibility and cost.

2. The Standing Independent Group (SIG) which had been constituted by the Government of India in November, 1997, to establish parameters for negotiation of large power generation projects would initially be the apex body to oversee the implementation of the mega private power projects. The principles of competitive bidding would be adhered to as far as possible, while obtaining tariff offers.

3. A Power Trading Company (PTC) has been established with majority equity participation by Power Grid Corporation of India Ltd. (PGCIL), along with NTPC, Power Finance Corporation (PFC) and other financial institutions. Concerned State Governments /State Electricity Boards (SEBs) would also be co-opted, if found feasible. The PTC would purchase power from the identified private projects and sell it to the identified State Electricity Boards. As power would be sold to the States, the concurrence of the concerned State Governments would be taken. Security to the PTC would be provided by means of a Letter of Credit and recourse to the State's share of Central Plan Allocations and other devolutions. However, PTC may also, if feasible, supply power directly to a 'cluster', like licensees and industrial establishments. The setting up of PTC would enable mega-projects to negotiate with one buyer only and would eliminate mega-projects risk regarding payments. Such security would substantially bring down the tariff from such projects.

4. A pre-condition would be that the beneficiary States should have constituted their Regulatory Commissions with full powers to fix tariffs as envisaged in the Central Act. They would also have to privatise distribution in the cities having a population of more than one million. Similar comforts would be given to public sector projects; however, they would deal directly with the SEBs and not through the PTC.

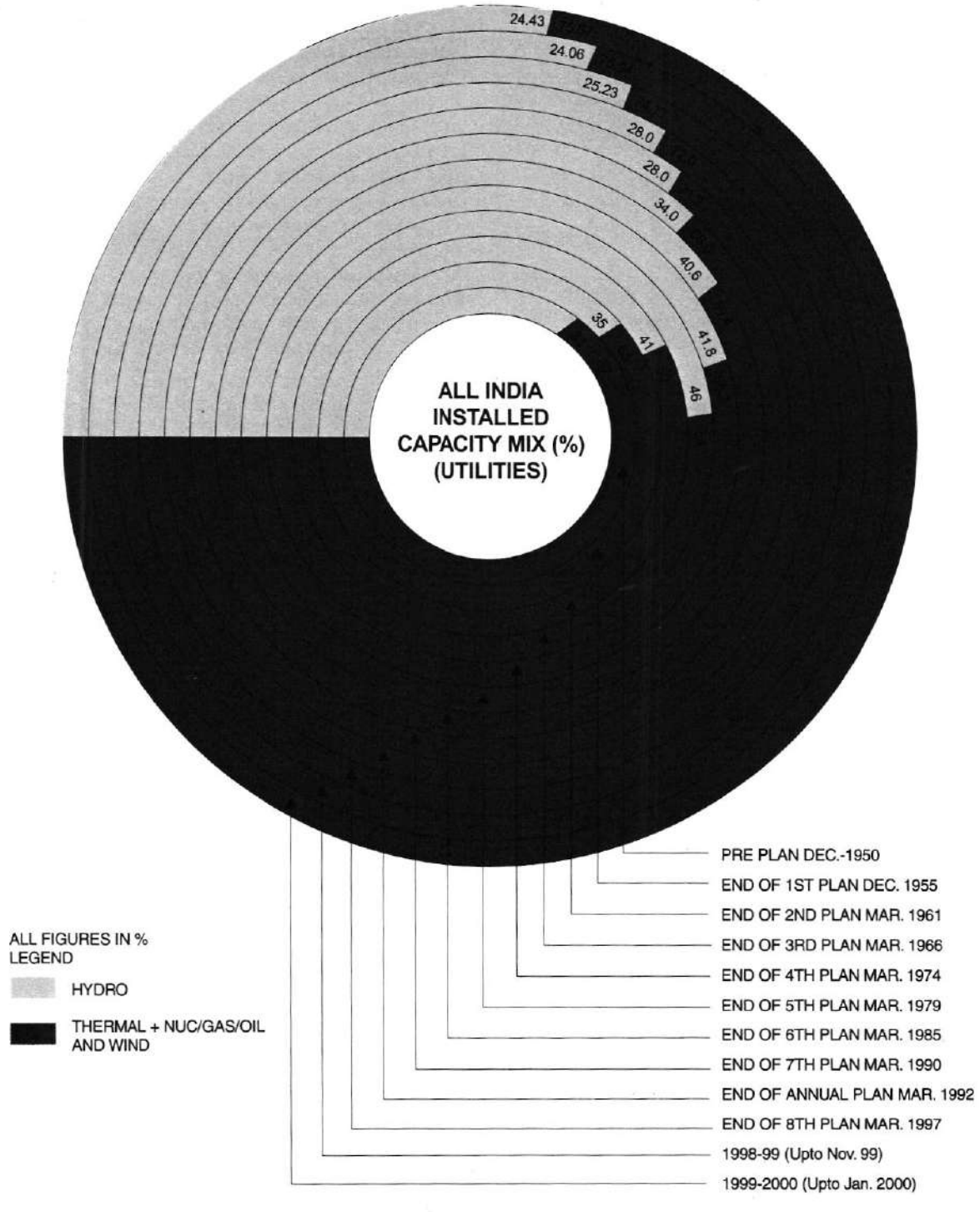
5. The import of capital equipment would be free of customs duty for these projects. In order to ensure that domestic bidders are not adversely affected, price preference of 15% would be given for the projects under public sector, while deemed export benefits as per the EXIM policy would be given to domestic bidders for projects both under public and private sector. The domestic bidders would be allowed to quote in US Dollars or any other foreign currency of their choice. In addition, the income-tax holiday regime would be continued with the provision that the tax holiday period of 10 years can be claimed by a promoter in any block of 10 years, within the first 15 years. The State Governments have been requested to exempt supplies made to mega power plants from sales tax and local levies.

6. All such measures and the economies of scale in mega projects would substantially bring down tariffs from such identified mega projects to provide much needed relief to State Electricity Boards from rising tariffs from generating stations, both in public and private sector. The policy would also enable implementation of a policy where large projects are set up at viable pit head sites, coastal locations and hydel source, thus eliminating the unnecessary movement of fuel by rail and encouraging the setting up of national transmission grid. The tax concessions are necessary as these projects would help in catalysing reforms which are crucial to the restoration of the financial health of the State Electricity Boards and would also help to accelerate the establishment of systems that would transfer power across states and regions.

7. The projects would be offered to the developers only after all the clearances/land have been obtained so that projects can start soon after they are granted to the most competitive bidder. The environmental clearance would be given in two phases by the Ministry of Environment and Forest - the site clearance being given initially. Initial project development expenses would be incurred by designated Central Public Sector Undertaking which would be recouped from the successful developers. PGCIL would be entrusted with developing the required transmission network. Since the transmission network would depend upon the identification of the beneficiary states, PGCIL would identify the schemes and the corresponding costs of these transmission schemes. It would interact with the beneficiary states to identify the requisite investment required in transmission and distribution on the states side to absorb the power generated by the mega project.

8. It is visualised that the country would be adding 15,000-20,000 MW of capacity through this policy at the most competitive tariffs payable by State Electricity Boards and consequently by consumers.

ALL INDIA INSTALLED GENERATING CAPACITY HYDRO-THERMAL MIX (%) (UTILITIES)



TRANSMISSION

Transmission projects continue to be accorded a high priority in the context of the need to evacuate power from the generating stations to the load centres. The transmission construction programme for the year 1999-2000 in the country and the progress achieved during the year 1999-2000 up to Nov '99 in the construction of transmission lines and substations (for 220 KV and above is summarised below:

Works	Programme 1999-2000 (Ckms)	April'99-Nov.99 Programme (Ckm)	April'99-Nov.99 Achievement (Ckm)	% of Achievement
800 kV lines	416	236	121	51.27
400 kV lines	3128	2954	2612	88.42
220 kV lines	3553	2383	2455	103.02
400 kV substations	6990	4470	3510	78.52
220 kV substations	5385	4110	5605	136.37

The programme/achievement during the year 1999-2000 (upto Nov'99) has been shown in charts "F".

3.1 CENTRAL SECTOR TRANSMISSION

Central sector transmission lines and sub-stations completed during the year 1999-2000 upto Nov'99 are listed in the following table:

3.2 FORMATION OF NATIONAL GRID

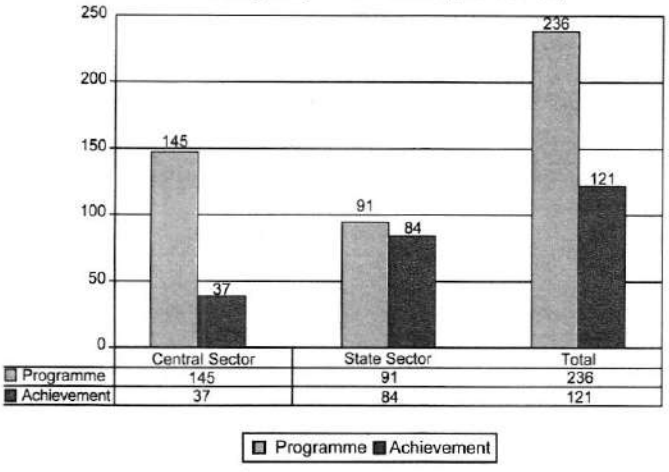
Uneven distribution of exploitable energy resources in the country has necessitated the need of establishment of National Power Grid capable enough to carry bulk power throughout the length and breadth of the country with the aim of optimal development of available energy resources.

The Union Cabinet in 1980 approved in principle establishment of a centrally owned and operated "Power Grid". The National Power Grid would eventually comprise strong regional networks with suitable asynchronous (HVDC) links between the regions. Already 27950 ckm of 400 KV lines and 8113 ckm of 220 KV lines have been constructed in the central sector upto November '99. The inter-regional links Vindhyachal-Singrauli 400 KV double circuit line with 2x250 MW HVDC back-to-back at Vindhyachal connecting NR & WR, Chandrapur-Ramagundam 400 KV double circuit line with 2x500 MW HVDC back-to-back at Chandrapur connecting WR & SR and 500 MW HVDC back-to-back at Gazuwake connecting Eastern and Southern Region is in commercial operation. These as well as other AC links between regions form the important components of the National Power Grid today.

S.No.	Name of th e line/Sub-station	Voltage class	Line length (Ckms)
	Faridabad-Palla line	220 kV	33
	Faridabad-Samayapur line	220 kV	35
	Badarpur-Jiribam	132kV	95
	Kaiga-Sirsi line	400kV	124
	Bidhipadar-Korba line	220 kV	182
	Rowta-Bongaigoan line	400kV	412
	Abdullapur-Bawana	400kV	334
	Badarpur-Bhairabi	132kV	85
	Nallagarh-Hissar line	400kV	499
	Kayamkulam-Pallam	220 kV	94
	Korba-Raipur line	400kV	200
	Unchahar-Kanpur II line	220 kV	290
	Bhairabi-Aizwal	132kV	85
	Badarpur-Kumarghat	132kV	118
	Total		**2586**
	Transformer at Satna	400/220 kV	315 MVA
	Transformer at Kanpur(No.1)	400/220 kV	315 MVA
	Transformer at Abdullapur	400/220 kV	315 MVA
	Transformer at Nallagarh	400/220 kV	315 MVA
	Transformer at Raipur	400/220 kV	315 MVA
	Transformer at Kanpur(No.2)	400/220 kV	315 MVA
	Total		**1890 MVA**
	HVDC B/B at VIZAG		**500 MW**

Transmission Programme VS Achievement

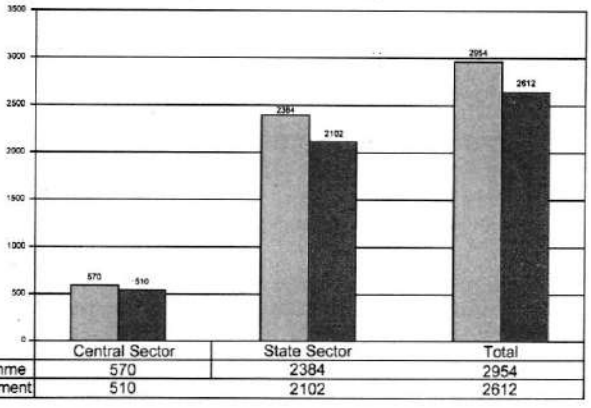
Achievement of 800 KV Transmission Lines during the year 1999-2000 (upto Nov'99)



	Central Sector	State Sector	Total
Programme	145	91	236
Achievement	37	84	121

Programme Achievement

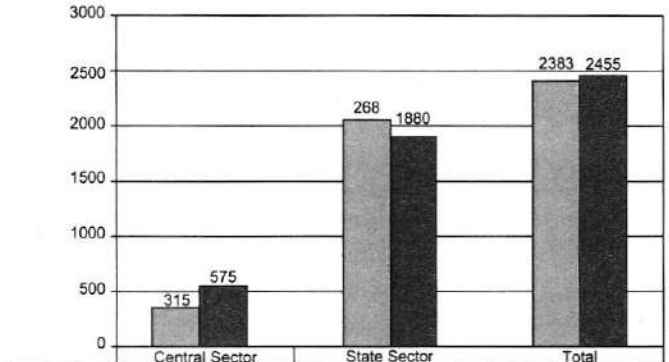
Achievement of 400 KV Transmission Lines during the year 1999-2000 (upto Nov'99)



	Central Sector	State Sector	Total
Programme	570	2384	2954
Achievement	510	2102	2612

Programme Achievement

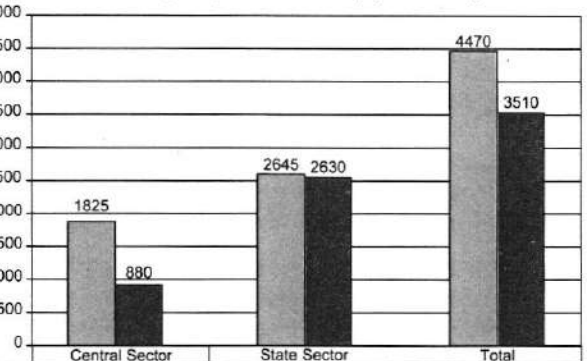
Achievement of 220 KV Transmission Lines during the year 1999-2000 (upto Nov'99)



	Central Sector	State Sector	Total
Programme	315	268	2383
Achievement	575	1880	2455

Programme Achievement

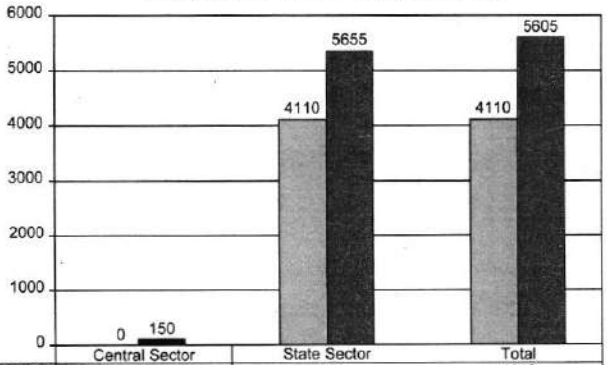
Achievement of 400 KV Sub Station during the year 1999-2000 (upto Nov'99)



	Central Sector	State Sector	Total
Programme	1825	2645	4470
Achievement	880	2630	3510

Programme Achievement

Achievement of 220 KV Sub-Stations during the year 1999-2000 (upto Nov'99)



	Central Sector	State Sector	Total
Programme	0	4110	4110
Achievement	150	5455	5605

Programme Achievement

CHART-F

In Oct'89 Government of India established the Power Grid Corporation of India Limited to further accelerate the development of the National Power Grid. The Power Grid had already taken over most of the existing central sector transmission system. The Power Grid has taken up schemes for further strengthening of the Regional Power Grids and establish HVDC B/B inter-regional links at Sasaram (500 MW) which will connnect Northern and Eastern Region and also HVDC link between Talcher and Koler connecting Eastern and Southern Region. These new projects are under approval/tendering stage.

Although the Regional Grids have already been inter connected, paving way for formation of a National Power Grid, further strengthening of intra-regional and inter-regional tie lines would be needed to enable increased power exchanges and achieve improved economy and reliability. This is a continous process and projects are being taken up during each plan period depending upon the requirement of inter-regional power exchanges and the funds availability.

3.2.1 **Future Transmission Requirements:**

During the coming years, the peak demand of the country is expected to increase rapidly and as per an estimate the demand is expected to reach about 1,76,000 MW in next fifteen years for which capacity addition of 1,53,000 MW has been envisaged.

A fifteen year investment Plan upto year 2012 drawn up, envisages commensurate investment of about Rs. 5,00,000 crores in Transmission and Distribution sector. During 9th Plan, envisaged investment is of about Rs. 60,000 crores in T&D out of which Rs. 11,000 crores will be invested by POWERGRID itself to construct about 20,000 ckt. kms of 400 KV/ 765 KV line, HVDC bipole and back-to-back stations. A national approach has been adopted for development of future power system to achieve optimum utilisation of available energy resources to meet varied load conditions during various times of the day.

The national level approach of the transmission planning gives emphasis to:

- Establishment of a National Grid by interconnecting all the Regional Grids.
- Creation of transmission redundancy and its flexibility for integration with future generation schemes.
- Creation of "Transmission Highways" (Corridors) to be adequately flexible to accommodate uncertainty in the generation plan (in term of location and capacity) to meet power demand requirement.
- Judicious utilisation of right of way by adopting State-of-the-art technologies viz., 765KV transmission voltage level, Flexible AC Transmission system (FACTs) and others to take care of future transmission requirement and to maintain environmental balance.

3.2.2 Evolution Of National Grid Along With Development Of Major Transmission Highways In A Phased Manner

- In the initial phase, (By 2007) HVDC back-to-back interconnection between various Regional Grid have been planned considering the wide variation in frequency in different grids. The HVDC links are comparatively robust and facilitate controlled power flow.
- In second phase, in order to further strengthen the Inter-Regional links, 400 KV AC links have been envisaged viz, Rourkela-Raipur 400 KV line between Eastern and Western Region, Gwalior-Agra 400 KV lines between Western and Northern Region and Purnea-Muzaffarpur-Gorakhpur 400 KV high capacity line between Eastern and Northern Region.
- High capacity HVDC bipole have been planned from Eastern Region to other Regions to evacuate power from Mega projects like Talcher stage-II (2000 MW), Hirma (3960 MW) like –

- Hirma-Jaipur 3000 MW, 1200 km long HVDC bipole connecting Eastern and Northern Region with Hirma (3960 MW)

- Talcher - Kolar (Bangalore) 2000 MW, 1500 km long HVDC bipole connecting Eastern and Southern Region alongwith Talcher II (2000 MW).

- In the long term, (By 2012) a synchronous grid has been envisaged with high capacity transmission system at 765 KV level (6000 ckt km) which would interconnect Eastern, North-Eastern, Northern and Western Regions synchronously. These strong interconnections would enable an exchange of about 10,000 MW of power coming from hydro projects in North-Eastern Region, Sikkim, Bhutan (which is to be pooled in Eastern Region) and large sized thermal projects in Orissa, Bihar in Eastern Region and Madhya Pradesh in Western Region. For Southern Region, it has been envisaged to continue with asynchronous connection for some more time, till synchronous operation in other Regions stabilises.

The blue print of long term Transmission Plan will establish strong interconnections between the Regions through high capacity HVDC bipoles and high capacity EHV/AC 400 KV as well as 765 KV lines. The development of the proposed National Grid will be flexible enough to accommodate any uncertainty in generation planning as well as to facilitate transfer of power from neighbouring countries. Cumulative Inter-Regional transmission capacity of the proposed ultimate National Grid would increase to about 30,000 MW.

3.2.3 Inter-state – Centrally Sponsored Schemes

At the time of fourth five year plan serveral inter-state and inter-regional transmission lines were planned to facilitate the integrated operation of the state systems within the region. Loan assistance equivalent to the full cost of the scheme is extended to the state governments under the centrally sponsored programme for construction of such inter-state lines.

Upto the end to the financial year 1999-2000 (As on 30.11.99), a cumulative sum of Rs. 36540.25 lakhs were released to the states under the programme stringing of over 7000 ckm of 66 KV and above transmission lines have been completed.

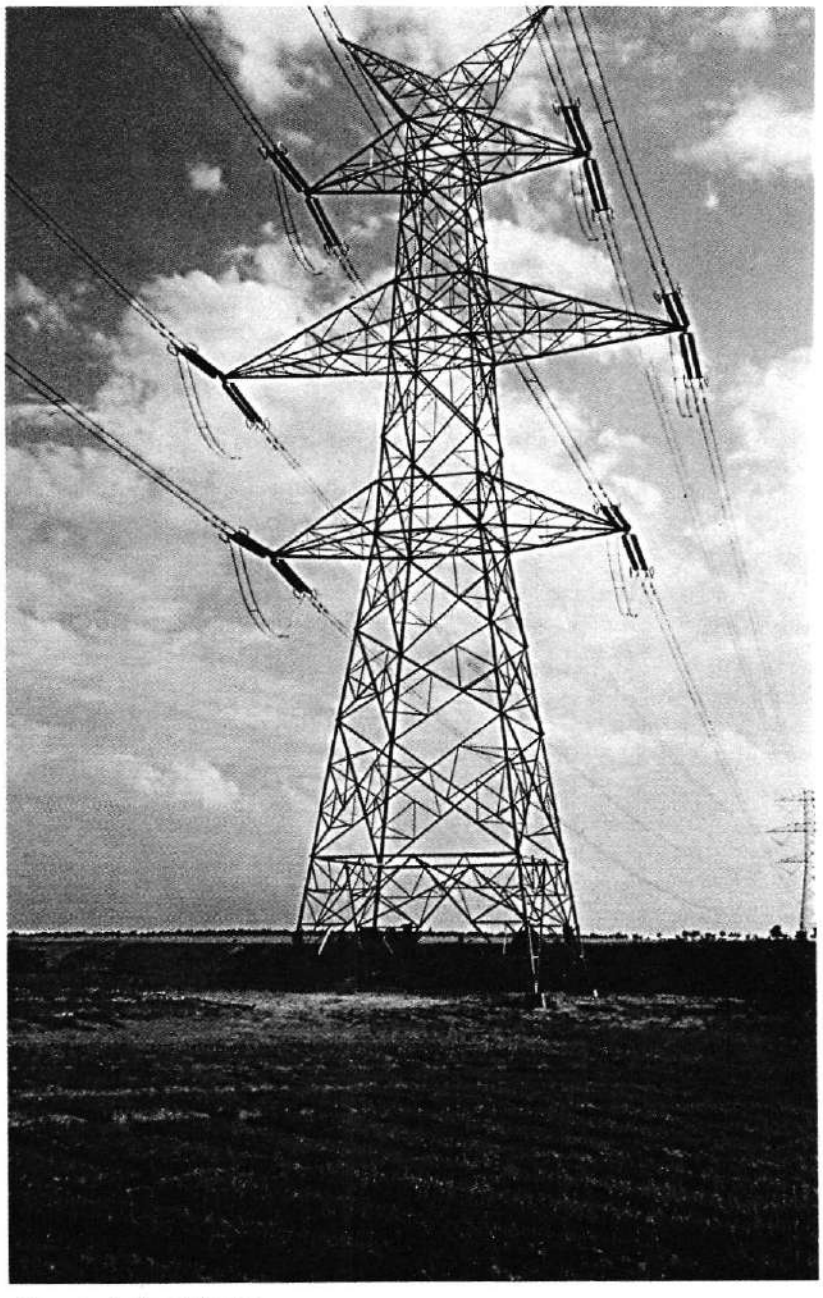
3.3 NATIONAL HIGH VOLTAGE DIRECT CURRENT (NHVDC) PROJECT

The first stage of HVDC project between Lower Sileru (AP) and Barsoor (MP) was commissioned in October, 1989 with total indigenous know-how. The second stage of up-rating the link to 200 MW at 200 KV was approved in September, 1993 at a cost of Rs. 103.98 crores (since revised to Rs. 95.40 crores). Engineering work at Lower Sileru and Barsoor is completed. The erection and commissioning work is envisaged to be completed by February, 2000.

The third stage which envisages addition of another pole to convert the monopole DC system to a bipole operation with a voltage level of + 200 KV DC and power transfer level of 400 MW will be taken after completion of Stage-II.

3.4 UPGRADATION OF TRANSMISSION TECHNOLOGIES

Adoption of new technology and upgradation of existing technologies shall be the mainstay of



Transmission Tower

meeting planning demands of the country. Major objectives for induction of technologies will be conserving right-of-way, increasing power transfer capabilities of existing lines and cost effectiveness in evacuation of power of the future generation projects.

· **Flexible AC Transmission System (FACTS)**

It involves judicious application of thyristor controlled devices to control the active power transfer and reactive power consumption of the transmission lines, thus resulting in enhanced power transfer capability of line, enhanced transient stability, reduced system losses and improved voltage profile.

The Flexible AC Transmission System (FACTS) technology is intended to improve the dynamic performance of the power transmission system and achieve regulated power flow across AC transmission network. In order to consider various aspects of development of flexible AC transmission technology in India, a Committee of Experts under the Chairmanship of Chairman, CEA, had been constituted.

A consensus on the project for implementation of FACTS has been arrived at based on the recommendations of the Technical Committee for installation of Fixed Series Capacitor (FSC) and Thyristor Controlled Series Compensation (TCSC) on the 400 KV Kanpur-Ballabhgarh line of POWERGRID. Based on this decision, BHEL have prepared a detailed feasibility report.

· **400 KV AC Transmission Alternatives :** Presently, 400 KV AC transmission system, the backbone of our Indian system is likely to continue to command the same importance. This voltage option is considered in the area where transmission requirement is of the order of 1,000 MW. To handle bulk quantity of power over short distances, 400 KV AC lines with triple/ quad conductor and/ or application of series compensation is being considered.

· **Next Higher Transmission Voltage:** As a next higher AC voltage, 765 KV AC transmission alternative has been adopted in the country and presently 1,400 ckt. kms of this voltage class line is under construction. 765 KV transmission system is being considered as a viable alternative to achieve efficient utilisation of existing ROW and increased transfer capability. This option has been considered for developing major transmission highways where bulk power is required to be transferred over long distance with tapping of power at in between substations.

· **Multi-Circuit Transmission System:** This system involves the use of more than one voltage level on a single tower. This means that on one tower the power transmission shall be through more than one voltage level. The main objective is the conservation of ROW. It is already tried in limited way on AC lines abroad. Once the effectiveness of the technology is established the same can be considered for use in the Indian system especially in the chicken neck areas.

· **All Aluminium Alloy Conductor** (AAAC) : Use Of All Aluminium Alloy Conductor (AAAC) over conventionally used ACSR (Aluminium Conductor Steel reinforced) conductor for higher temperature endurance and more conductor life. This has been deployed on a few lines of 220 KV and below . Polymer Insulators, which are light weight, low cost and pollution free, have been deployed on Ramagundam-Hyderabad 400 KV lines.

· **Gas Insulated Switchgear :** Metal enclosed SF6 gas insulated high voltage switchgear (GIS) installations came into commercial existence in the late sixties. Today GIS in the voltage range from 66KV to 800KV are in operation. The major advantage of GIS are compactness, more reliability and safety. GIS technology has been adopted for Kayamkulam sub-station which is located in coastal area.

3.5 TUNING OF POWER SYSTEM STABILISERS (PSS)

Power system stabiliser is a micro processor based device which provides modulating action for damping of machine oscillations. Correct tuning of Power System Stabilisers help in damping the oscillations in the power system during disturbed conditions. During the 115th meeting of NREB, it was decided that POWERGRID will co-ordinate the work of tuning of PSS through their consultants PTI, USA. Initially it was decided to tune PSS of generator of one 200 MW and a 500 MW unit of Singrauli and a 180 MW hydro unit at Chamera. Thereafter, the tuning work would be undertaken on all large size machines in the country. For this purpose, a group representing Central Electricity Authority, NTPC, NHPC, BHEL and POWERGRID was constituted. The group underwent preliminary training on this work from 7th to 9th December, 1998. The first on-site test programme for tuning of PSS was held in February/March, 1999 at Singrauli and at Chamera. The final tuning at Chamera and Singrauli was carried out in Oct-Nov., 1999.

3.6 SHUNT CAPACITORS

REBs carried out system studies to assess the requirement of shunt capacitors in the State systems required to improve the voltage profile. 4316 MVAR shunt capacitors were installed in the country during the year 1998-99 against the requirement of 14329 MVAR. The total installed capacity of shunt capacitors at the end of 1998-99 in the country was 33253 MVAR.

The total estimated requirement of shunt capacitors during 1999-2000 is 11751 MVAR out of which 1221 MVAR have have been installed by the end of Oct., 1999. The progress has been rather slow. Capacitor installation programme is being monitored regularly and State advised to expedite the installation programme.

3.7 INTEGRATED GRID OPERATION

The Regional Power Grids in the Northern, Western, Southern, Eastern and North-Eastern Regions of the country were established for optimum utilisation of the unevenly distributed power resources in the country by facilitating intra-regional and inter-regional power exchanges to the extent feasible depending upon day to day power availability and load conditions.

The total inter-regional transfer of energy during the period April'99 to October, 1999 has been about 4595 MU as against 3955 MU during the corresponding period last year registering an increase of about 16%. Further Eastern Region which is perpetually surplus in power, exported 2821 MU energy to neighbouring regions during April to October 1999 as against 2039 MU during the corresponding period last year registering an increase of about 38.3%.

All the constituent systems in the Northern, Western, Southern, Eastern and North-Eastern Regions have been operating in an integrated manner. Major part of North-Eastern Regional Power System operated in synchronism with Eastern Regional Power System. All efforts were made to maximize intra and inter regional power exchanges to the extent possible. Power transfers between Northern Region and Western Region took place asynchronously over Vindhyachal-Singrauli HVDC back-to-back link in both the directions depending on surplus/deficit in the two Regions. Madhya Pradesh in Western Region received assistance in radial mode from Northern Region on 220 KV Auraiya-Malanpur line. Northern Region has also availed surplus power of Western Region over 220 KV Ujjain-Kota line w.e.f. 15.10.99 to 1.11.99 to enhance exports from Western Region from 500 MW to 600 MW as the full capacity of Vindhyachal HVDC back-to-back system (500 MW) was fully utilised. Andhra Pradesh & Tamil Nadu in Southern Region, Madhya Pradesh & Gujarat in Western Region, Uttar Pradesh in Northern Region and Assam in North-Eastern Region received considerable assistance (upto 1000 MW) from NTPC stations in Eastern Region. Besides, Tamil Nadu also availed assistance from Punjab for some period. Southern Region availed off-peak surplus power from Western Region on Chandrapur HVDC back-to-back system. During Aug./Sep.'99, Southern Region has also exported its surplus power to Western Region. Karnataka in Southern Region availed assistance in radial mode from Maharashtra under a bilateral arrangement.

Arrangements were devised to maximize power transfer from Eastern Region to Western Region. In order to achieve this Ib Thermal Power Station along with Hirakund Hydro Power Station were separated from Eastern Regional Grid and synchronized with Western Regional Grid. With this arrangement power export to the tune of 450 MW from Eastern Region to Western Region was possible as against 100-150 MW in radial arrangement.

Gujarat faced acute power shortage due to prolonged dry spell in the State and spurt in agriculture demand. On the request of Gujarat Electricity Board emergent assistance upto 300 MW power was extended to Gujarat from Eastern Region via Southern Region utilising Gazuwaka HVDC system between Southern & Western Regions, during Sept.-Oct'99 in order to help them tide over the crisis and save the crops. Arrangements were also devised to utilise the surplus capacity available in Tata Electric Co. in Western Region during the month of April/May, 1999, when the Western Region was facing acute shortage. Under this arrangement Maharastra utilised the entire surplus of TEC and assistance was rendered to Madhya Pradesh and Gujarat by displacement. MSEB was compensated financially by MPEB and GEB for the difference in tariff of TEC and the Regional pool rate of energy. Thus unutilized surplus of upto 400 MW of TEC was utilised.

Regional Electricity Boards carried out their functions of facilitating integrated operation of the regional power systems. Operational analysis, Operational Planning including drawings coordinated maintenance programmes of generating units & transmission system, coordination of protection system, facilitating inter

utility trading, preparation of regional energy accounts for billing purpose, formulation of policies for smooth operation of the regional grids were some of the important functions carried out by the five Regional Electricity Boards.

3.8 TOWARDS SAARC GRID & BEYOND

SAARC countries, in general, have very low per capita energy consumption, despite most of them are endowed with abundant natural resources. As per an estimate, the hydro potential of Bhutan is 21,000 MW, of Nepal is 83,000 MW and of Pakistan is 36,000 MW. Similarly, Bangladesh has gas potential in tune of 40,000 MW. However, harnessing of these resources, so far, have been done in a limited way.

India, being centrally placed in South Asian region, sharing political boundaries with four SAARC countries, can play a major role in facilitating interconnection between these countries leading to formation of SAARC Grid. The major transmission links are envisaged for interconnecting five countries of the SAARC namely India, Bhutan, Pakistan, Nepal and Bangladesh which would ultimately lead to formation of SAARC grid. Attempts are being made initially to exchange power between neighbouring countries like Bangladesh & Pakistan and strengthening the existing links with Nepal & Bhutan for establishment of SAARC grid.

Two rounds of discussion with Pakistan were held in December, 1998 and February, 1999 to consider a proposal for import of 400-500 MW of power from Pakistan to India. The discussions were aimed at finalising administrative, technical and commercial arrangements. In the long term, exchange of upto 2,000 MW is being envisaged. Interconnection of India & Bangladesh is on the anvil as the proposal is under active consideration for interconnection at 220 KV level for initial exchange of power to the tune of 150 MW.

In a regional workshop held in Dhaka, Bangladesh in August 1998, the resolution for the creation of SAARC Grid was given high priority for assuring quality power supply and to catalyse economic resurgence in the region. The feasibility of extending the boundaries of SAARC grid, to be extended further to connect other neighbouring countries like Mayanmar, Thailand, Malaysia, Kazakistan etc., is also being examined.

3.9 PRIVATE SECTOR PARTICIPATION IN TRANSMISSION

The unfolding of events in the Indian power sector during 1998-99 had made it a watershed year in the history of the country. Several landmark policy initiatives were taken by the Government of India including recognising **"Transmission"** as a distinct entity by enacting the Electricity Laws (Amendment) Act, 1998 (No. 22 of 1998), opening up of transmission to private sector for investment and conferring **Central Transmission Utility (CTU) status on POWERGRID.** This will enable POWERGRID to enter into Joint Ventures with private companies or to take up the projects on its own for which POWERGRID requires a level playing field and enhanced delegated financial, administrative and operational powers for taking quick decision for investment and for entering into Joint Ventures.

RURAL ELECTRIFICATION PROGRAMME

Rural Electrification involves supply of energy for two types of programmes:

(a) Production oriented activities like minor irrigation, rural industries etc., and

(b) Electrification of villages.

While the emphasis is laid on exploitation of ground water potential and energisation of pumpsets/tubewells, which has a bearing on agricultural production, the accent in respect of areas covered under the Revised Minimum Needs Programme (RMNP), is on village electrification.

The existing definition of village electrification was reviewed and changed in 1997. According to the earlier definition "A village is classified as electrified if electricity is being used within its revenue area for any purpose what-so-ever".

This definition of village electrification was reviewed in consultation with the State Governments and State Electricity Boards and it was decided to adopt the following new definition:

"A village will be deemed to be electrified if electricity is used in the inhabited locality within the revenue boundary of the village for any purpose what-so-ever".

Ministry of Power has circulated the new definition of village electrification to all State Governments/State Electricity Boards on 28th October, 1997 and advised them that the statistics of Village Electrification may be compiled on the basis of new definition and reported to Central Electricity Authority.

During the year 1999-2000, 907 inhabited villages were electrified and 88912 irrigation pumpsets/tubewells energised as on 30.09.1999. Cumulatively 505730 villages have been electrified and 12305562 pumpsets have been energised as on 30.09.1999.

As regards the electrification of tribal villages, out of a total of 115088 tribal villages in the country 81344 (provisional) villages constituting 71% have been electrified as on 30.09.1999. Similarly 298748 (provisional) Harijan Bastis have been electrified on the same date.

Village Electrification

ENERGY CONSERVATION AND RENOVATION AND MODERNISATION

5.1 ENERGY CONSERVATION

Conservation and efficient use of energy has been accorded high priority by the Government considering the need to bridge the gap between the demand and availability of various forms of commercial energy. Measures to conserve energy are being devised and implemented both on the supply side and the end use (demand) side. A budgetary provision of regular **Rs. 4.00 crore** (including **Rs. 25 lakh** for the Energy Management Centre) has been provided in 1999-2000 for promoting energy conservation activities.

Supply Side Management:

The measure adopted consists of studies for reduction of secondary fuel/oil consumption in thermal power stations and detailed energy audit studies to identify measures for improving the efficiency of the generating stations.

Under Supply Side Management measures, studies for reduction of fuel/oil consumption at 6 Thermal Power Stations against the target of 6 Energy Audit tests at 6 thermal power stations against the target of 7 and combined Energy Audit Tests and studies for reduction of fuel/oil consumption at 22 thermal power stations against the target of 22 were completed up to March, 1999. With the carrying out of energy audit tested at Santaldih TPS in September, 1999, the scheme of Energy Audit approved by MOP in 1993 has been completed. Reports in respect of studies for reduction of fuel/oil consumption at 6 TPSs and Energy Audit Reports in respect of 23 TPSs have been released upto November, 1999. Reports in respect of the remaining 6 TPSs will be released by the end of 1999-2000.

Energy Audit Studies have revealed that the power stations were heavily losing due to poor condenser vacuum, non-availability of HP Heaters, excessive consumption of DM water, air ingress into the boiler, high flue gas temperature etc. Studies carried out by CEA revealed that most of the power stations were incurring huge financial losses due to sub-optimal operations in terms of increased coal & oil consumption.

Based on the studies earlier carried out at different power stations for reduction of secondary fuel/oil consumption, on All India level there has been a continuous declining trend in specific secondary fuel/oil consumption at Thermal Power Stations. As against 6.77 ml/kwh in 1991-92, it has come down to 3.50 ml/kwh in 1998-99 resulting in a national saving of 9.77 lakh/Kl of fuel/oil.

Benefits have accrued in terms of higher generation, reduction in heat rate, reduction in specific fuel/oil and coal consumption at a number of TPSs where the recommendations given by CEA in the Energy Audit Reports have been implemented. Kolaghat, Ropar, Kota, DPL, Korba (East) and Durgapur DVC power stations have reported marked improvement in heat rate resulting in appreciable savings in their fuel bills.

Encouraged by the results of the completed scheme, a proposal for a new scheme of Energy Audit at another 19 TPSs at an estimated cost of Rs.22 lakhs has been prepared.

Based on guidelines issued for reduction in Transmission and Distribution losses and Energy Audit in power system, utilities have been encouraged to reduce the T&D losses by implementing the schemes in regard to system improvement, energy audit in distribution system, load management and introduction of time of use tariffs (TOU) etc.

Demand Side Management:

On Demand Side Management, Energy Conservation Schemes pertaining to various sectors – Agriculture, Industry, Domestic and Commercial were appraised to facilitate the release of grants/subsidies to the various agencies. Some of the schemes under appraisal/being implemented during 1999-2000 are rectification of agricultural pumpsets in A.P. & Gujarat, DSM activities in RSEB to avail CIDA assistance, use of linear ankyle benzene as a capacitor impregnant, development of thermoplastic elastomer for domestic switch, energy conservation in production of calcium carbide, innovation of power saving technical pumpsets (PSTP), driving vehicle by electric power, design and development of vector controlled induction motors in textile industries, development of integrated energy efficient multifuel externally combusting engine, computerised load management schemes at LT levels in MPEB, energy conservation awarness campaign, design and development of indoor type luminaries,

implementation of the scheme for energy conservation of Shakti Bhawan Complex of UPSEB, pilot scheme of energy conservation and DSM by installation of energy efficient lighting at WBSEB's head quarter etc., standardisation of specific power consumption for various industrial sub sectors viz. Iron and Steel, Aluminium, Pulp and Paper, Chemical, Cement, Textile, Petrochemical, Fertilizer, Sugar, Glass Refineries Ceramic, Edible oil, Vanaspati, Chlor-alkali in connection with energy conservation award has been taken up.

An Environmental Cell under the Conservation & Environment Division has been set up to serve as a focal point in CEA for the consideration of environmental related aspects of the power projects. The functions of the Cell, inter-alia, include collection, collation of environmental related data for power projects, environmental upgradation of thermal projects, appraisal of ETA reports & Co-ordination with Ministry of Environment & Forests for clearance of power projects and related issues. An Expert Committee reconstituted by MOEF in June, 98 for environmental impact assessment of thermal power projects, provides necessary inputs during the appraisal of schemes by the Committee for the clearance of projects from environmental angle.

The reconstituted Expert Committee has considered 18 projects with an installed capacity of 4414 MW during April-November, 1999 of which 12 projects with an installed aggregate capacity of 2304 MW have been recommended for clearance from environmental angle.

A MOU has been signed between Central Electricity Authority (CEA) and Indian Institute of Technology (IIT), Kanpur regarding regional collaborative research on CNG mitigation from the power sector to be executed in collaboration with Asian Institute of Technology (AIT), Bangkok, Thailand. The project is to be funded by Swedish International Development Agency (SIDA). The duration of the project is 3 years. The project involves carrying out studies in few selected countries of Asia. The project would address following three issues:

- Least cost supply options for mitigating Green House Gases (GHG) and other harmful emissions from the power sectors.
- Identification of some clean development mechanism & assessment of their GHG mitigating potential.
- Environment implications of IPPs and decentralised power generation.

5.2 RENOVATION AND MODERNISATION :

I. Thermal Power Stations:

R&M (Phase I) Programme:

In order to improve the performance of existing thermal power stations, a massive Renovation and Modernisation (R&M) Programme (Phase-I) was launched by the Government of India all over the country in September, 1984, for completion during the Seventh Plan period. This programme has since been completed.

R&M (Phase-II) Programme

Phase-II programme for R&M of Thermal Power Stations was taken up in the year 1990-91 for implementation during the 8th Plan. Under this programme 44 nos. of Thermal Power Stations consisting of 198 nos. Thermal Units aggregating to a total capacity of 20,869.435 MW are covered at a sanctioned cost of Rs.2383.03 Crores.

After the completion of the programme the benefits expected are : (i) additional generation of 7,864 MU/Year (ii) increase of 100 MW peaking capacity (iii) life extension of 24 nos.(1402 MW) of Thermal Units by 15-20 years and (iv) environmental upgradation in 93 units (12790 MW).

Progress

PHYSICAL: The programme was originally scheduled to be completed by 1995-96. Out of a total of 1629 activities 914 activities have been completed. Out of the remaining, 170 nos. are under progress. Life Extension works on 10 nos. of units(660 MW) have been completed.

FINANCIAL: By November, 1999 an amount of about Rs.1147 Crores has been incurred till November, 1999. Out of which Rs. **207.67** Crores has been released by Power Finance Corporation, Rs.**222.33** Crores has been released under World Bank/OECF loan and remaining Rs. **717**.00 Crores

under State Plan Own Resources as per details given below:

(Rs. In crores)

Power Finance Corporation	**207.67**
World Bank/OECF	222.33
State Plan Own Resources	717.00
Total (Expenditure till Sept.,99)	1147.00

During the 9th Plan balance projects and activities of R&M Phase II programme with appropriate revisions in the scope of work are to be taken along with activities of some stations, thereby increasing the total capacity covered under R&M Phase II programme to 26910 MW. Additional R&M requirements in thermal capacity identified by SEBs have also been initiated.

There is no central assistance as such for R&M phase II programme. However, Ministry of Power has approved concessional lending rates and provided interest subsidy of 4% to Power Finance Corporation under their lending programme to the SEBs and Utilities for undertaking R&M programme.

A National Perspective Plan for 12 - 15 years for R&M LE of power plants has been initiated for the remaining period of 9th Plan and beyond, to cover all the power plant units above 20 years in age so that R&M work on such units begins in time.

II Hydro Electric Power Stations:

Based on the recommendation of the National Committee and subsequent reviews, a programme for renovation, modernisation and uprating of Hydro Power Stations was formulated by Central Electricity Authority in which 55 schemes were identified with an aggregate capacity of 9653 MW (210 nos. generating units). The total estimated cost of these schemes is Rs. 1493 Crores and expected benefits is 2531 MW/7181 MU. Out of 55 schemes, work on 24 schemes having an aggregate capacity of 5230 MW at an estimated cost of Rs.437 Crores and an expected benefit of 1033 MW/1899 MU have been completed till 31.3.99.

During 1999-2000, it was programmed to complete the following schemes:-

Schemes	Installed Capacity (MW)	Estimated Cost (Rs. Crs.)	Expected Benefits	
			MW	MU
. *Bassi*	4x15	5.35	--	12.50
. *Hirakund II*	3x24	82.05	72	376
. *Pykara*	3x6.65+ 2x11+2x14	26.06	69.95	274.62
. *Koyna I&II*	4x65+ 4x75	76.53	280	1360

Out of 4 above schemes, scheme of Koyna I&II (4x65+4x75 MW) has been completed till 30.11.1999. The RM&U of Pykara (3x6.65+2x11+2x14 MW) & Bassi (4x15 MW) are under advanced stage of implementation.

At present, there are 23 ongoing schemes with aggregate installed capacity of 3335 MW where RM&U works at an estimated cost of Rs.796 Crores. with an expected benefit of 951 MW/2694 MU are under different stages of implementation. It is expected that out of these 23 schemes, 11 schemes would be completed during the Ninth Plan.

R&M Phase-II

Further, Ministry of Power has set up a Standing Committee on 22.1.99 to identify new RM&U schemes (under phase-II) for tying up technology, funding and executing agencies. So far 79 proposals have been received from various states/utilities for consideration under RM&U Phase-II. Out of these, 12 nos. of schemes (R&M Phase-II) have already been tied up for financial assistance.

CENTRAL ELECTRICITY AUTHORITY

6.1 ORGANISATION OF CEA

The Central Electricity Authority (CEA) is a statutory organisation constituted under Section 3 (1) of the Electricity (Supply) Act, 1948. It was established as a part-time body in 1951 and made a full-time body in 1975. It is an attached office of Ministry of Power, Government of India.

In all technical, financial and economic matters, the Ministry of Power is assisted by the CEA. CEA is responsible for technical co-ordination and supervision of programmes and is also entrusted with a number of statutory functions. CEA is headed by a Chairman, who is also Ex-offico Secretary to the Government of India and has full time members, who are of the rank of Ex-officio Additional Secretaries to the Government of India.

6.2 FUNCTIONS OF CEA

The Authority is generally to exercise such functions and perform such duties and act in such a manner as the Central government may prescribe under the Rules framed under section 4B (1) of the Electricity (Supply) Act, 1948 or by issue of written directions in matters of policy involving public interest under Section 4A (1) of the said Act. Under Section 3 (1) of the Act, the CEA is particularly charged with the following functions;

1. To develop a sound, adequate and uniform national power policy, formulate short-term and perspective plans for power development and co-ordinate the activities of planning agencies in relation to the control and utilisation of national power resources.

2. To collect and record the data concerning generation, distribution and utilisation of power and carry out studies relating to cost, efficiency, losses, benefits and such like matters.

3. To make public, from time to time information secured under the Act and to provide for the publication of reports and investigations.

4. To advise any State Govt., SEB, Generating Company or any other agency engaged in generation or supply of electricity on such matters as will enable such Government, SEB, generating company or agency to operate and maintain the power system under the ownership or control in an improved manner and where necessary in co-ordination with any other agency owning or having the control of another power system.

5. To promote and assist in the timely completion of schemes sanctioned under Chapter V of the Act.

6. To make arrangements for advancing the skill of persons in the generation and supply of electricity.

7. To carry out or make arrangement for any investigation for the purpose of generating or transmitting electricity.

8. To promote research in matters affecting the generation, transmission and supply of electricity.

9. To advise the Central Government on any other matter on which its advice is sought or make recommendations to the Government on any matter if, in the opinion of the Authority the recommendations would help in improving the generation, distribution and utilisation of electricity; and

10. To discharge such other functions as may be entrusted to it or under any other law.

Under the provision of Electricity (Supply) Act, 1948, the Central Government has further added a few more functions to the Central Electricity Authority. These are:

: Co-ordination of research and development in the power generation field.

: Evaluation of financial performance of the SEBs constituted under Section 5 and undertaking of studies concerning the economic and commerical aspects of the power industry as well as analysis of the tariff structure in the power indutry.

: Techno-economic appraisal of power projects;

: Promotion of inter-state and joint venture power projects.

Apart from the above functions provided under the Electricity (Supply) Act, CEA also undertakes design and engineering of power projects to assist the State Electricity Boards, Generating Companies and State Authorities requiring such assistance under Section 3 (1) (v) of the Electricity (Supply) Act, 1948.

6.3 SUBORDINATE OFFICES

Following are the subordinate offices of the CEA:

1. Northern Regional Electricity Board, New Delhi.
2. Western Regional Electricity Board, Mumbai.
3. Eastern Regional Electricity Board, Calcutta.
4. Southern Regional Electricity Board, Bangalore.
5. North-Eastern Regional Electricity Board, Shillong.
6. Power System Training Institue, Bangalore.

7. Hot Line Training Centre, Bangalore.
8. Regional Power Survey Organisation, New Delhi.
9. Regional Power Survey Organisation, Bangalore.
10. Regional Power Survey Organisation, Mumbai.
11. Regional Power Survey Organisation, Calcutta.
12. Regional Inspectorate Organisation, Chennai.
13. Regional Inspectorate Organisation, Goa.
14. Regional Inspectorate Organisation, New Delhi.
15. Regional Inspectorate Organisation, Shillong.

6.4 TECHNO-ECONOMIC APPRAISAL OF POWER SCHEMES

The Thermal Civil Design Division of CEA provides necessary back up on Civil Engineering matters on Thermal, Hydro & Transmission schemes to other Divisions of CEA and Ministry of Power.

The detailed project reports and revised cost estimates received in CEA for Techno-Economic Clearance and Approval respectively are perused in respect of civil works. The various inputs required for consideration of the scheme by the Standing Committee for Project Appraisal (SPAC) are first checked and comments offered. The reply from project is further perused and then SPAC meeting is convened. Additional clarifications, if any, required are obtained during SPAC. The scheme is finally granted TEC.

1. During the year 1999-2000 (Upto 15.11.99) CEA accorded Techno-Economic Clearance to 11 Nos. of new power schemes aggregating to 7072.1 MW.

2. During the year 1999-2000 (Upto 15.11.99), CEA has given consultation under Section 44 of E(S) Act, 1948 in respect of 5 Nos. of captive power plants aggregating to 861 MW to the various State Electricity Boards.

6.5 MONITORING OF FLY ASH UTILIZATION

Thermal Civil Design Division also monitors the utilization of the fly ash that is being produced in various coal based thermal power stations existing in the country. The data received from 77 power stations for the year 1997-98 were compiled. The data received for the year 1998-99 from 61 power stations were compiled.

6.6 DESIGN AND CONSULTANCY

Thermal Civil Designs Division provided engineering services for the following ongoing thermal power projects and transmission schemes of various utilities:-

(a) Ash Handling System, LM Plant and Cooling Tower of Faridabad TPS (Haryana) (3x60 MW).

(b) 400 KV Transmission System of Trand Co. Hyderabad, A.P. for evacuating power from Srisailum Left Bank HEP. This consists of 400 kV Transmission S/C & D/C lines and 2 nos. of 400/220 KV substations, one at Hyderabad and the other at Kurnool.

(c) Retrofiting of ESP Units I &II of Panipat TPS (2x110 MW), Haryana.

(d) Augmentation of ash handling system of existing Units I to V of DVB.

(e) Consultancy for the proposed gas based Pragati Power Project 360 MW of DVB (proposed).

(f) Transmission Line Tower foundations from Tala HEP, Bhutan to Indo-Bhutan border (proposed).

(g) External Water Supply System for Mundra TPS (2x250 MW) in Kutch, Gujarat for RT TES, New Delhi.

Anticipated consultancy beyond Nov., 99. Consultancy work shall continue, beyond, 99.

6.7 ASSISTANCE TO UTs

Technical Assistance/Appraisal of schemes.

UT of Dadra and Nagar Haveli

- Tender evaluation for 220/66 KV S/Sat Kharadpada.
- Technical clearance of the scheme for augmentation of Amli S/S from 50 MVA to 60 MVA.

UT of Daman and Diu

- Tender evaluation for 220/66 KV S/S at Magarwada
- Technical clearance of the scheme for augmentation of Diu S/S from 10 MVA to 20 MVA with associated T&D works.

UT of Chandigarh

- Technical clearance of the scheme for Normal Development works for 11 KV and below during IX Plan.

UT of Andaman & Nicobar Islands

- Technical clearance of the scheme for

augmentation of DG capacity at Havelock Island by 3x320 KVA with associated T&D works.

- Technical clearance of the scheme for augmentation of DG capacity at Neil Island by 3x160 KVA with associated T&D works.

6.8 MONITORING OF THERMAL POWER PROJECTS

In order to keep a close watch for timely completion of sanctioned and on-going Thermal power projects in the Central, State and Private Sector, implementation of the projects is closely monitored by the Thermal Monitoring Division by making site visits/correspondence with Suppliers, Contractors and different Executing Agencies. In Thermal Wing, project wise bottlenecks are identified, remedial measures are suggested and concerned project authorities are advised to undertake requisite steps/actions to overcome the constraints. Joint Coordination Meetings are held twice a year and review meetings held periodically which provide useful link between project authorities and main suppliers of equipment to ensure coordinated efforts for timely completion of thermal projects under execution.

PRIVATE SECTOR PARTICIPATION

7.1 THE INDIAN ELECTRICITY SCENARIO

Since independence, development of the electricity sector has primarily been the responsibility of the Government, with a relatively small contribution from private enterprises, in the form of licensees like Bombay Suburban Electricity Supply Company (BSES), Tata Electric Company (TEC), Calcutta Electric Supply Company (CESC) and Ahmedabad Electric Company (AEC), etc. However, considering the large requirement of funds for the sector, it has not been possible to mobilise adequate financial resources by Government alone, given the highly capital intensive nature of the sector and the large incremental capacity addition requirements. At present, the country faces an energy shortage of about 6% and peaking shortage of around 11%. The situation is likely to worsen due to the anticipated slippage in the planned capacity addition.

In the backdrop of an impending power crisis and in order to mobilise additional resources for the sector to help bridge the gap in demand and supply, the Government formulated a policy in 1991 to encourage greater investment by private enterprise in the electricity sector. The Electricity (Supply) Act, 1948 was amended in 1991 to provide a legal framework for facilitating the investments.

The package of incentives in the policy which complements the amended provisions in the legislation comprehensively cover the legal, administrative and financial environment to make private investments in the sector, attractive. A two-part tariff system for power projects to be put up by the Independent Power Producers, covering the fixed costs and variable energy cost in electricity pricing, had been formulated and tariff notification issued in March 1992, which has been amended from time to time keeping in view the changing needs of the sector.

7.2 MAJOR POLICY INITIATIVES TAKEN TO STREAMLINE THE PROCESS OF PROJECT DEVELOPMENT

Model Power Purchase Agreement: Model PPAs for the thermal power projects and hydroelectric power projects prepared by international consultants have been circulated to the State Governments and the SEBs.

Competitive bidding for Awarding Projects: The initial batch of projects were awarded generally on the basis of negotiations between the State Electricity Board (SEB) and a single developer. With effect from 18.2.1995, competitive bidding for award of power projects to private sector has been made mandatory. However, certain categories of projects where the International Competitive Bidding (ICB) route may not be feasible, have been exempted from this route. Detailed guidelines have also been issued to the State Governments for adopting competitive bidding. A notification for competitively bid projects was issued in May 1997 defining the manner in which tariff would be determined for such projects.

7.3 EXEMPTION FROM ICB TO EXPANSION PROJECTS:

Expansion Projects : It has been recognised that in order to have the benefit of the already existing infrastructure facilities, which results in reduced project costs, it would be preferable for the same project developer to be allowed to undertake the expansion project rather than to undergo the bidding process. The states have accordingly been advised in January, 1997 to encourage such expansion plans by independent power producers (IPPs).

Joint venture projects between SEB/PSU and private company : Competitive bidding shall not be necessary for selection of the private company partner in such joint venture projects between a private company and State Electricity Board/Public Sector Undertaking where the SEB/PSU holds majority shares (51%) of the joint venture company.

Generating stations exclusively for captive use: Competitive bidding would not be required for setting up generating stations by IPP's exclusively for the captive use of an industry or a group of industries as long as no sale to State Grid is involved.

Power projects based on heavy bottom residue and set up by existing refineries: Vide a letter sent to the states in June 1997, power projects based on heavy bottom residue being set up by existing refineries have also been exempted.

Bidding for EPC Contracts : The States/SEBs had been advised in June 1996 to impress upon the promoters that for the projects that have not finalized their EPC contracts, it would be necessary to follow the ICB route in the selection of their EPC contractors. In the case of IPPs who inform that their EPC contracts have been finalized, the SEB should satisfy itself that they have actually done so and in cases where it is not finalized, the SEB should ensure that the bidding route adopted is transparent and proper.

7.4 GUIDELINES FOR PRIVATE SECTOR PARTICIPATION IN RENOVATION AND MODERNIZATION :

The Policy spells out various options like lease, rehabilitate, operate and transfer (LROT), sale of plant and Joint venture between SEBs and private companies for promoting R&M programmes. While deciding on the available options, the policy emphasizes on adherence to competitive bidding route. R&M schemes costing up to Rs. 500 crores are not required to be submitted to the CEA for concurrence.

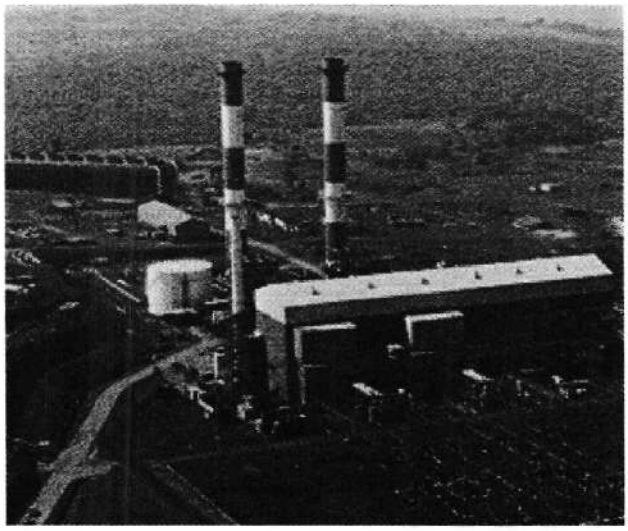
7.5 CAPTIVE/CO-GENERATION PLANTS :

In order to meet the rapidly increasing industrial demand for power, Ministry of Power had suggested encouragement to captive/co-generation plants by industries. The policy suggests, inter-alia, sale of excess power to the grid as per mutually agreed rates, access to transmission grid of the State on payment of wheeling charges, third party access for direct sale of power etc. A resolution for promotion of co-generation had been issued on November 6,1996. The resolution details the definition of co-generation, mode of fixation of tariff and mode of deciding co-generation status for the power plants.

7.6 SETTING UP OF MEGA POWER PROJECTS / POWER TRADING CORPORATION:

To facilitate setting up of large sized thermal plants in the country and in order to derive the economies of scale, a revised mega power policy has been announced. Details of the revised policy guidelines have been given in chapter-2. A Power Trading Corporation (PTC) has been incorporated as a Limited Company as per Company's Act 1956 on 16.4.1999, for the purpose of buying power from mega power projects under long-term Power Purchase Agreements (PPAs) and selling the power to the beneficiary States also under long-term PPAs. Security to the PTC would be provided by means of a Letter of Credit and recourse to the State's share of Central Plan Allocations and other devolutions. A pre-condition for purchase of power from mega power projects would be that the beneficiary States should have constituted their Regulatory Commissions with full powers to fix tariffs as envisaged in the Central Act. They would also have to privatise distribution in the cities having a population of more than one million.

Certain fiscal concessions have been given to mega power projects to make the tariff cheaper. The import of capital equipment would be free of customs duty for these projects. In order to ensure that domestic bidders are not adversely affected, price preference of 15% would be given for the projects under public sector, while deemed export benefits as per the EXIM policy would be given to domestic bidders for projects both under public and private sector. The domestic bidders would be allowed to quote in US Dollars or any other foreign currency of their choice. In addition, the income-tax holiday regime would be continued with the provision that the tax holiday period of 10 years can be claimed by a promoter in any block of 10 years, within the first 15 years. The State Governments are requested to exempt supplies made to mega power plants from sales tax.



Enron Project

7.7 ENHANCING THE CEA LIMIT :

The limit of capital expenditure of the schemes requiring concurrence of Central Electricity Authority has been amended from time to time. The limit in respect of different categories of power generation schemes beyond which the concurrence of CEA would be required, as notified in June 1998 is as follows:

(i) Rupees five thousand crores for thermal projects on the ICB route and conforming to the amendment dated 23rd May, 1997 to the tariff notification.

(ii) Rupees one thousand crores for other thermal generating stations on the ICB route.

(iii) Rupees twenty thousand crores for the identified mega projects in the private sector whose scheme is approved by any agency or body authorized by the Central Government.

(iv) Rupees one thousand crores for hydroelectric generating station on the ICB route.
(v) Rupees five thousand crores for R&M schemes.
(vi) Rupees two hundred and fifty crores for all other schemes.
(vii) All hydroelectric schemes utilizing water of interstate rivers shall be submitted to the Authority for its concurrence (irrespective of the cost).

7.8 POLICY ON AUTOMATIC APPROVAL FOR FOREIGN DIRECT INVESTMENT :

The Government has recently reviewed the existing guidelines for automatic approval for foreign equity for electric generation, transmission and distribution projects, and has decided to enlarge the provisions for automatic approval for such projects. Accordingly, projects for electric generation, transmission and distribution will be permitted foreign equity participation up to 100% on the automatic approval route provided the foreign equity in any such project does not exceed Rs. 1500 crores. The categories which would qualify for such automatic approval are:

(i) Hydroelectric power plants
(ii) Coal/lignite based thermal power plants
(iii) Oil/gas based thermal power plants

7.9 REVISED NORMS FOR ENVIRONMENTAL CLEARANCE :

The following delegations have been made to the state governments in the matter of environment clearance to power projects:-

(i) All co-generation plants and captive power plants upto 250 MW.
(ii) Coal based plants upto 500 MW using fluidized bed technology subject to sensitive areas restrictions.
(iii) Power stations upto 250 MW on conventional technology.
(iv) Gas/Naphtha based station upto 500 MW.
A new procedure for getting environmental clearance for pithead thermal project has also been laid down.

7.10 RELAXATION OF 40% CAP FOR DEBT EXPOSURE BY IFIS :

The policy announced in 1991 envisaged that, an amount not exceeding 40% only of the total outlay for private sector units may come from Indian Financial Institutions (IFIs). The Government has decided that while there would be no bar to the extent of domestic debt raised by a project developer, subject to the need of maximizing financing from external sources and prudential norms exercised by IFIs, allowing a higher domestic debt component for projects which are developed based on indigenously sourced plant and equipment, would be more desirable.
It has also been decided that there would be no objection for Foreign Term Loan being replaced by Rupee Term Loan as long as the hard cost does not change and the new financial arrangements are acceptable to the concerned SEB/State Government, project developers and the lenders. Whenever such a change is desired in the financial package, project developers may approach CEA, for formal approval.

7.11 SETTING UP OF CRISIS RESOLUTION GROUP :

A Crisis Resolution Group (CRG) in the Ministry of Power was set up on January 1,1999 to resolve the 'Last-mile' problems of power projects so that they achieve financial closure and start construction before March 31,1999. The Group has since met on seven occasions.

7.12 RESPONSE FROM THE PRIVATE SECTOR :

The response to Government of India's (GOI's) energy policy has been encouraging. Since 1991, both domestic and foreign developers have evinced keen interest in the Indian power sector. Altogether, 95 private power projects amounting to 54,967 MW of installed generation capacity are presently being monitored by the Central Government. In addition, there are several projects which are being set up by the private sector with the approval of the State Government themselves and do not require the techno-economic clearance of Central Electricity Authority (CEA).

7.13 PROJECTS TECHNO-ECONOMICALLY CLEARED BY CEA :

So far, 56 private sector power projects amounting to around 28,862 MW have been given techno-economic clearance by CEA.

7.14 FOREIGN DIRECT INVESTMENT IN POWER SECTOR :

At present, out of 95 private power projects, as mentioned above, 58 projects for around 36,000 MW capacity are having foreign developers. As per available information, an amount of around Rs. 10,500 crores foreign investment has already been made in the private power sector.

7.15 COUNTER-GUARANTEES :

Counter-guarantee has been extended to seven out of the 8 Fast Track projects, namely, Jegurupadu CCGT, Ib Valley TPP, Dabhol CCGT Phase-I (740 MW), Neyveli TPP-Zero Unit, Bhadravati, Visakhapatnam TPP and Mangalore TPP. The request for counter guarantee was withdrawn by M/s Spectrum Power Generation Limited, who have gone ahead and commissioned their 208 MW Godavari CCGT in Andhra Pradesh.

7.16 PROJECTS COMMISSIONED/UNDER CONSTRUCTION :

As per available information, 24 private sector power generation projects (including those also which do not require TEC of CEA) having a total capacity of about 5058 MW have so far been commissioned. Apart from this, 16 projects (including those also which do not require TEC of CEA) with a total capacity of around 4876 MW are under construction.

7.17 MODIFICATION IN THE LIQUID FUEL POLICY :

The Government reviewed the policy on use of liquid fuels for power generation and came out with following decisions in the Gazette Notification dated 15.10.98.

(i) All non-traditional fuels, such as condensate and ormulsion would be permitted for power generation.

(ii) HSD would be permitted for power generation only as a specialcase in inaccassible and isolated areas where small diesel based capacities are sought to be set up and where use of other fuels is not feasible.

(iii) FO has already been allowed for use as primary fuel. However taking into account the environmental implications, it will be mandatory for new FO based power plants beyond the existing linkages to use Integrated Gasification Combined Cycle (IGCC) technology, or any other technology that would bring sulphur content to within acceptable limits, if the FO contains sulphur beyond permissible limits.

COOPERATION WITH NEIGHBOURING COUNTRIES IN HYDRO POWER

Development of water resources of the common rivers of India, neighboring countries of Nepal, Bhutan and Myanmar for mutual benefits has been under consideration with these countries. There is regular exchange of electric power between India and the neighbouring countries for the supply of surplus power and meeting power requirements in the border areas.

India has been assisting Nepal in the development of its hydro power potential and four HE schemes viz. Pokhra, Trisuli, Western Gandak and Devighat have been implemented with financial and technical assistance from Government of India. Three major water resources projects in Nepal viz. Karnali, Pancheshwar and Saptakoshi are presently under discussions at various levels as mutual benefits projects. Feasibility report of Karnali multipurpose project (10800 MW) was prepared in 1989. Key parameters of this projects to be finalised after mutual discussions. Investigations have been carried out in respect of Pancheshwar MPP by the two countries in their respective territories. Additional investigations and studies are required to be carried out for finalisation of Detailed Project Report (DPR). Both the countries have agreed to establish Joint Project Office at Kathmandu. Preparation of joint DPR is presently under discussions. Development of this project was covered under integrated Mahakali River Treaty signed between HMG, Nepal and India in February, 1996 and subsequently ratified. India had offered financial and technical assistance for investigation of Saptakoshi (3300 MW) Multi-purpose project. Joint technical experts groups have been constituted for each of the above projects for joint guidance for carrying out investigations and preparation of detailed project reports (DPRs).

West Seti Hydro Electric Project (750 MW) in Nepal proposed to be executed by SMEC of Australia is presently under discussions between two countries. The cost of generation/sale rate of energy and impact of the project on existing downstream irrigation in India are yet to be finalised.

In Bhutan, Chukha H.E. project (336 MW) implemented with Indian Financial and technical assistance and operating in an excellent manner is a shining example of cooperation between the two countries for mutual benefits, surplus power from the project is being imported by India. Kurichu H.E. project (45 MW) in Eastern Bhutan is presently under implementation on a turnkey basis with Indian financial and technical assistance. Another project viz. Tala H.E. project (1020 MW) has been taken up for implementation and is being executed by Tala Hydro-electric Project Authority (THPA) comprising of Indian and Bhutanese Officers and Engineers. Consultancy for the project in respect of both electro-mechnical and civil works is being rendered by Central Electricity Authority (CEA), Central Water Commission (CWC) and Water & Power Consultancy Services (WAPCOS). The project is being funded by India through grant and loan and major portion of the power generated will be made available to India. Investigation of Sankosh Multi-purpose Project (4060 MW) have been completed by CWC and DPR prepared by CEA/CWC.

The proposed Manas MPP (2800 MW) was reconnoitered by a Joint Indo-Bhutan team and pre-feasibility report was prepared in August, 1982. The investigation of the scheme could not be taken up due to objections to the scheme from environmental angle.

Investigation of two Hydro-electric projects namely Wangchu (900 MW) and Bunakha (180 MW) have been completed and DPR prepared. India is also providing technical assistance for rehabilitation of 8 nos. Mini/Micro hydel projets in Bhutan for which CEA is rendering Design and Engineering Consultancy Services.

Tamanthi MPP (1200 MW) proposed to be developed on Chindwin River in Myanmar has been identified as a mutual benefit project between India & Myanmar. A fact finding mission led by Member(Hydro), CEA, visited Myanmar in February, 1999 and held discussions relating to setting up of the project and absorption, evacuation of Power to India etc. A technical team comprising Engineers from CEA/NHPC/CWC/GSI visited project site for inspection in November, 1999.

BADARPUR THERMAL POWER STATION

9.1 PERFORMANCE

Badarpur Thermal Power Station consists of 3x100 MW and 2x210 MW coal fired units with an installed capacity of 720 MW. However, the 3 units of 100 MW each have been derated to 95 MW w.e.f. 11.1.1990. The Station is owned by Government of India and is being managed by NTPC since 1st April, 1978. Presently the entire energy generated at this station is supplied to Delhi Vidyut Board only. The generation target for BTPS has been fixed at 4300 MUs at a PLF of 69.43% for the year 1999-2000. Till November, 99, the Station has already generated 3235.65 MUs at a PLF of 78.37%.

9.2 HIGHLIGHTS FOR THE PERIOD APR-NOV' 1999

- Highest ever generation of 3235.65 MUs (at a PLF of 78.37%) during April-November, 99 since inception.
- Station achieved best performance level during April-November, 1999 in respect of Generation, Sp. Oil Consumption, Auxiliary Power Consumption and Partial Loading.

9.3 RENOVATION & MODERNISATION

PHASE-I

BTPS is one of the Thermal Power Stations identified under the centrally sponsored scheme for Renovation and Modernisation of thermal utilities. Under the Renovation & Modernisation Scheme, Phase I, various schemes for 3x100 MW of BTPS for Rs. 36.97 crores were approved. Most of the works under these schemes have already been completed and an expenditure of Rs. 3571 crores has been incurred upto 30.11.99 with the implementation of R&M 1 scheme for BTPS. The actual annual average PLF has improved from 45.30% to 65.00%. Results of successful R&M programme of BTPS have turned out to be exemplary. During the calendar year 1999 the Station generated 4711.91 MUs, the highest since inception.

R&M PHASE-II

Under R&M Phase-II Scheme, certain areas were identified for carrying out further modification. BTPS submitted a proposal for R&M Phase-II for an estimated cost of Rs. 187.77 crores for approval covering all units of BTPS. The scheme mainly emphasizes on reduction in heat rate, increase in PLF from 65.00% to 70.00% and increase in generation by about 320 MUs per year in addition to increase in reliablity of the Units. The proposal has been techno-economically cleared by CEA and approved by PIB in April, 1997. However, the Ministry of Finance did not agree to provide funds under the Scheme. As such, BTPS/NTPC has to explore the possibility for undertaking R&M works from its own sources.

9.4 URGENT WORKS OF CAPITAL NATURE

Pending execution of R&M Phase-II, certain urgent works of capital nature were identified jointly with CEA for immediate implementation in the BTPS units. These schemes have been approved by Ministry of Power for execution during the years 1998-99 and 1999-2000, at an estimated cost of Rs. 14.70 crores. After execution of these works there will be improvement in safety, reliability and availability of the units and also reduction in maintenance cost. During 1998-99, the utilisation has been Rs. 3.38 crores and during 1999-2000, Rs. 7.39 crore has been planned for utilization out of which Rs. 1.79 crores has already been utilized upto Nov., 1999.

9.5 ASH UTILISATION

Ash utilisation for 1999-2000 has been targetted at 30% out of which 15% has already been achieved upto November, 1999.

Production of ash bricks is also gaining momentum. BTPS has already achieved a progress of 10.5 lakh bricks till November, 1999. Bricks are being used for in-house civil constructions in a big way. Ash bricks from the station have also been earlier supplied to IIT, Delhi, US Embassy, CPCB, CPWD and CBRI, Roorkee, for their construction works.

Another area of ash utilization is filling up of low-lying areas. Delhi Metro Railway Corporation is lifting ash from the station for use in their Metro Rail Project. DDA, MCD and other neighbourhood people are also using ash from the station for land filling.

POWER DEVELOPMENT ACTIVITIES IN NORTH EAST

10.1 CREATION OF ELECTRICITY REGULATORY COMMISSION

For the creation of an Electricity Regulatory Commission , it had been indicated by the Union Minister for Power in a meeting held on 25.5.1998, that the Central Government would fund for the initial period, the establishment of a common ERC, in case some of the States preferred this option and for this the required amendments in the Central legislation would be brought about. It has now been decided that four States i.e. Assam, Mizoram, Manipur and Nagaland will set up a common three member ERC to be known as North East ERC (NEERC). It was decided that the three members will be common, however, they will function as independent ERC's in respect of the four States. This arrangement would enable each of the participating 4 States to take an independent decision regarding the functions that it would like to entrust to the NEERC.

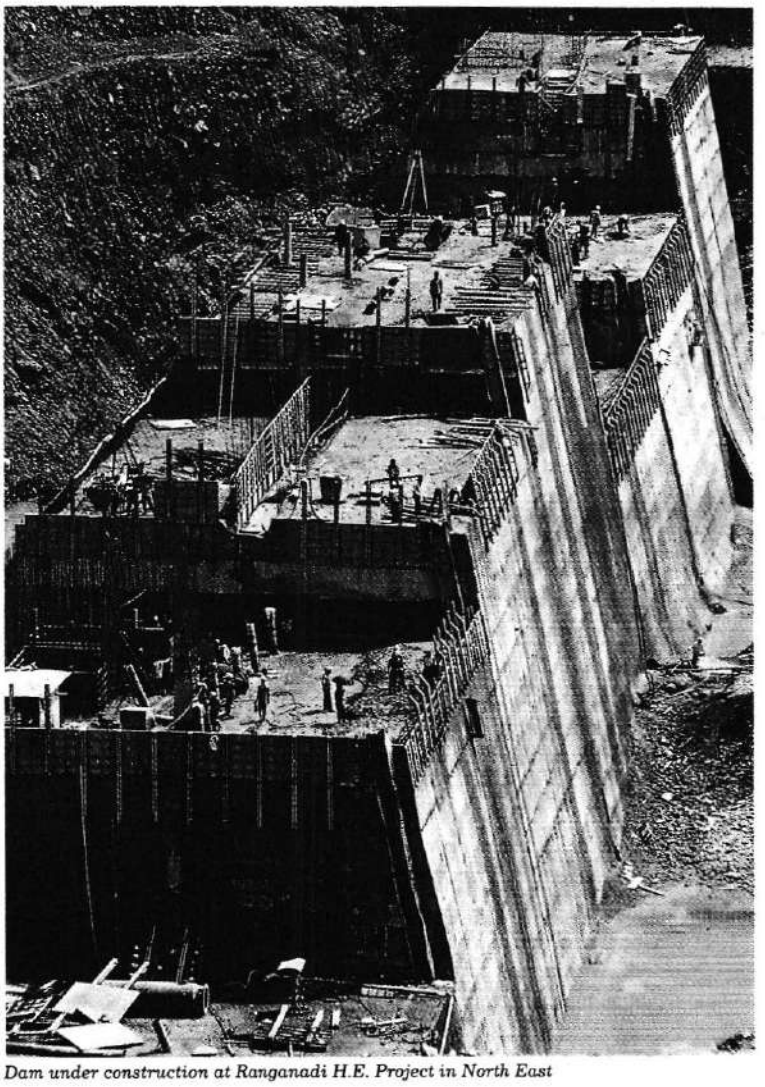
10.2 TRANSMISSION ACTIVITIES:

By 2012 a synchronous grid has been envisaged with high capacity transmission system at 765 kV level (6000 ckt km) which would interconnect Eastern, North-Eastern, Northern and Western Regions synchronously. These strong interconnections would enable an exchange of about 10,000 MW of power coming from hydro projects in North-Eastern Region, Sikkim, Bhutan (which is to be pooled in Eastern Region) and large sized thermal projects in Orissa, Bihar in Eastern Region and Madhya Pradesh in Western Region.

10.3 RURAL ELECTRIFICATION PROGRAMMES IN NORTH EAST:

As on 30th November 99, REC has sanctioned 1,009 projects in the seven North Eastern States, namely, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura for a total loan amount of Rs.991.4 crores covering electrification of 28,110 villages, energisation of 6188 pumpsets & System Improvement programme. The Corporation till now has disbursed an amount of Rs.769.85 crores to these states and these states together have reported electrification of 26,111 villages and energisation of 3,703 pumpsets. Besides this, the Corporation has disbursed a grant of Rs. 9.53 crores for release of Kutir Jyoti connections to these states and 1,49,216 connections have been reported under this programme of single point light connection to the households of rural poor below poverty line.

During the current financial year 1999-2000, an allocation of Rs.76.65 crores has been made to these seven States for electrification of 208 villages and for undertaking System Improvement programme. Besides, Rs.10.20 crores have been allocated as grant for release of 1,02,000 single point connections under Kutir Jyoti Programme.



Dam under construction at Ranganadi H.E. Project in North East

VIGILANCE ACITVITIES

11.1 VIGILANCE ACTIVITIES/DISCIPLINARY CASES IN MINISTRY OF POWER.

Eight disciplinary cases were pending in the ministry at the begining of the year 1999-2000. Four new cases were added during the year. Out of these twelve cases, five have been decided and two are at the final stage of disposal. In the remaining five cases, the inquiry has been completed in two cases and dispensed with in another case. The final decision in these three cases will be taken in consultation with CVC/UPSC. Proposals for initiation of disciplinary proceedings in two more cases were under consideration at the end of Jan., 2000.

11.2 VIGILANCE ACTIVITIES IN REC

Progress Made During Current Year (Upto 30.11.99)

In addition to the statutory functions of the Vigilance Division in REC, i.e. submission of periodical statistical returns to CVC, CBI, MOP, compliance of the instructions issued by the CVC, from time to time, surprise inspections and regular inspections of the Corporate Office and of 7 Project Offices, out of 18, were carried out. In all, 15 complaints were disposed of, out of 25 (i.e. 12 brought forward + 13 received during the year).

Emphasis was laid on the preventive vigilance. REC (CDA) Rules, Guidelines on use of staff car/office vehicles and Purchase Procedure have been updated and are in the process of finalisation. Procedural improvements were suggested, after review of existing procedure, in store management, security arrangement, diary & despatch, use of staff car by the Project Offices, and reducing delay in payment of bills. Officers of Vigilance Division were nominated for five training programmes organised by CBI and NHPC.

Of the 10 disciplinary cases, involving 19 officers, initiated by the Vigilance Division, one case has been finalised, another referred to the CVC and the remaining 8 are pending with the respective Disciplinary Authorities/Inquiry Officers. Out of 8 cases, in one case involving 3 officers, penalty has been imposed on 2 officers and reply of the 3rd officer is under consideration by the Disciplinary Authorities.

Proposed Programme For The Year 1999-2000

In addition to the statutory functions of the Vigilance Division, emphasis would be laid on improvement of existing procedures and systems review, and at least 4 systems of the Corporation would be studied and reviewed. Manuals/ Guidelines under formulation/updation would be finalised, REC (Service) Rules would be updated, all officers of Vigilance Division would be deputed on training at least once during the year and efforts would be made to clear all the pending disciplinary cases.

11.3 VIGILANCE ACTIVITIES OF CPRI

The vigilance activities of the Institute is looked after by the Chief Vigilance Officer who is appointed on approval by the Chief Vigilance Commission. The Chief Vigilance Officer reports to the Director General, CPRI, and is assisted by the Administration. The Chief Vigilance Officer personally ensures that every complaint is given utmost importance, care & urgency as they deserve, and ensures fair disposal. Periodical vigilance inspection is conducted in all sensitive and corruption prone areas both formally & informally with a view to creating necessary awareness about the existence of the vigilance machinery and for promoting conducive atmosphere and efficient functioning of the vigilance mechanism.

11.4 VIGILANCE ACTIVITIES IN BBMB

In BBMB there is no vigilance cases pending.

EMPLOYMENT SITUATION OF WOMEN

12.1 EMPLOYMENT SITUATION OF WOMEN IN REC

Employment situation of Women in various posts as on 17.12.1999 is furnished hereunder:-

Sl. No.	Post(s)	Total No. of Employees	No. of women Employees	Percentage of Women Employees
.	Executive Director/ General Manager	3	Nil	Nil
.	Chief/C.S.	9	Nil	Nil
.	Jt. Chief(s)	11	Nil	Nil
.	Dy. Chief(s)`	63	2	3.17
.	DD/DPE or equivalent	63	7	11.11
.	AD/APE/SO/AO or equivalent	120	27	22.50
.	Sr.PA/Acctt/EA Sr. Asstt./ Librarian./ SCD/ equivalent	183	37	20.22
.	Asstt./Asstt. (Accounts)/ Comp. Analyst/ SCD/DMO	119	16	13.44
.	UDC/Accounts Clerk/Steno Gr.III/ Elecrtrician/ DMO/L.O.	121	20	16.53
.	Staff Car Driver/ LDC	57	3	5.26
.	Class-IV	178	12	6.74
	Total:	927	124	13.38

12.2 WOMEN EMPLOYEES IN CPRI

There are 93 (10.9%) Women Employees working in the Institute at various levels. The Women Employees Cell is also opened to look after the welfare of the women employees, facilitate redressal of their grievances and cater to the issues / grievances concerning women employees. A Creche is currently operating in the Colony for the benefit of working couples in the Institute.

12.3 WOMEN EMPLOYMENT IN BBMS

During the current year, the Central Staff Selection Committee has recommended the filling up of 57 number of vacant posts under group C & D as under

	Male	Female	Total
Group-C	21	11	32
Group-D (Mali & Safai Sewak)	24	1*	25
	45	12	57

* There being no candidates in the category of Mali.

12.4 EMPLOYMENT SITUATION OF WOMEN IN CEA AS ON 17.08.1998

The Employment Situation of Women in CEA is as under :

Group "A"

Sl. No.	Designation & Pay Scale	Total Strength	Women Employed %	Remarks
1.	CE, 18400-500-22400	29	Nil	The recruitment of women is being made to the posts based on the eligibility conditions prescribed for in the Rectt. Rules, as there is no quota fixed for women.
2.	Dir. 14300-400-18300	98	1 (1%)	
3.	Dy. Dir. 10000-325-15200	210	4 (2%)	
4.	Ad. 8000-270-13500	148	2 (1.35%)	No of Posts 14 : one woman candidate who has been issued offer of appointment on the basis of UPSC selection did not join.
			Group "B"	
5.	A.D. (Gr. II) 7500-12000	103	8(7.76%)	
6.	Head D'man (civil) 6500-10500	2	1(50%)	
7.	Technical Officer 6500-10500	90	9(10%)	No recruitment has been made to any of these posts during the year 1998-99.
8.	Junior Engineer 4500-7000	38	1(2.63%)	
9.	Off. Asstt. 4500-7000	2	1(50%)	
10.	D'man Gr.I (E&M) 5500-9000	72	4(5.55%)	
11.	D'man Gr. I (Civil)5500-9000	10	-	
12.	D'man Gr.II (E&M) 5000-8000	98	15(15.30%)	
13.	D'man Gr.II (Civil) 5500-8000	19	3(15.78%)	No recruitment has been made to any these posts during the year 1998-99.
14.	D'man Gr.III 4000-6000	25	5(20%)	
15.	Blue Printer/I/C	3	1(33.3%)	
	Ferro Printer 4000-6000	1	-	
16.	Head D'man (M) 6500-10500	22	1(4.6%)	

Sl. No.	Designation & Pay scale	Sanctioned Strength	Filled	Filled by Women Employees %
1.	Asstt. Director (OL) (Rs. 6500-10500)	1	1	-
2.	Sr. Hindi Translator (Rs. 5500-9000)	1	1	-
3.	Jr. Hindi Translator (Rs. 5000-8000)	3	2	2(66.66%)(
4.	Library Information Asstt. (Rs. 5000-8000)	1	1	1(100%)
5.	Data Entry Operator (Rs. 4500-7000)	19	19	14(73.63%)
6.	Daftary (Rs. 2610-3500)	20	20	1(5%)
7.	Record Sorter (Rs. 2610-3500)	5	5	-
8.	Darwan (Rs. 2610-3500)	2	2	-
9.	Sr. Peon (Rs. 2610-3500)	3	2	-
10.	Peon (Rs. 2550-3200)	126	119	8(6.34)
11.	Safaiwala (Rs. 2550-3200)	15	14	3(20%)
12.	Farash (Rs. 2550-3200)	8	6	-
13.	Chowkidar (Rs. 2500-3200)	12	11	-
14.	Sr. Gest. Operator (Rs. 4500-7000)	1	1	-

Sl. No.	Designation & Pay scale	Sanctioned Strength	Filled	Filled by Women Employees %
15.	Jr. Gest. Operator (Rs. 3050-4590)	2	2	-
16.	Driver Gr.I (Rs. 4500-7000)	6	5	-
17.	Driver Gr.II (Rs. 4000-6000)	8	8	-
18.	Driver Ordinary Grade (Rs. 3050-4590)	18	18	-
19.	Despatch Rider (Rs. 3050-4590)	2	2	-
20.	Store Supervisor (Rs. 4500-7000)	1	1	-
21.	SAS Accountant (Rs. 5500-9000)	3	1	-
22.	Divisional Accountant (Rs. 4500-7000)	1	-	-

No recruitment has been made to any of the vacant posts during the current year.

Sl. No.	Designation & Pay Scale	Total Strength	Women Employed %	Remarks
1.	Steno Gr. III 4000-6000	25	7(28%)	So far as recruitment of Women employees for the year 98-99 is concerned, the information is 'Nil'.
2.	Steno Gr.II 5000-8000	17	5(29.4%)	
3.	Steno Gr.I 5500-9000	4	-	
4.	Senior P.A. 6500-10500	4	-	
5.	LDC 3050-4590	44	19(43.1%)	
6.	UDC 4000-6000	26	6(23.1%)	
7.	Head Clerk 5000-8000	2	-	
8.	Office Supdt. 5500-9000	1	-	
9.	SAS Act. 5500-9000	2	-	
10.	Hindi Translator Gr.II 4500-7000	7	3(42.9%)	
11.	Div. Actt. 5000-8000	2	-	
12.	Daftry/Record Sorter/Gestetner Operator 2610-3540/2650-4000	10	-	
13.	Peon/Messenger/Helper/ Safaiwala/Farash 2550-3200 2610-3540 2610-3540 2550-3200 2550-3200	70	4(5.7%)	
14.	Chowkidar 2550-3200	21	-	

12.5 DETAILS OF WOMEN RECRUITED IN NEEPCO DURING APRIL, 1999- DEC., 1999

Sl. No.	Post	Scale of Pay (IDA)	Grade	Total No. Appointed	Out of these no. of	Percentage	Remarks
1.	Senior Manager (Fin.)	Rs. 7950-10050/-	E-6	1		-	
2.	Manager (Finance)	Rs. 7500-9900/-	E-5	5	-	-	
3.	Medical Officer	Rs. 4000-7475/-	E-2	8	2	25%	
4.	Personnel Officer	Rs. 4000-7475/-	E-2	24	4	16.66%	
5.	Security Officer	Rs. 4000-7475/-	E-2	1	-	-	
6.	System Analyst	Rs. 4000-7475/-	E-2	5	1	20%	
7.	Junior Engineer (C)	Rs. 2900-5330/-	S-1	9	2	22.22%	
8.	Junior Engineer (E/M)	Rs. 2900-5330/-	S-1	15	1	6.66%	
9.	Asstt. Accountant	Rs. 2650-4650/-	W-5	1	-	-	
10.	Electrician, Gr-III	Rs. 2350-3880/-	W-3	2	-	-	
11.	Crane Operator, Gr-III	Rs. 2350-3880/-	W-3	1	-	-	
12.	Fitter, Gr-III	Rs. 2350-3880/-	W-3	2	-	-	
13.	Welder, Gr-III	Rs. 2350-3880/-	W-3	2	-	-	
14.	Fireman, Gr-III	Rs. 2350-3880/-	W-3	6	-	-	
15.	Wireman, Gr-III	Rs. 2350-3880/-	W-3	1	-	-	
16.	Carpenter, Gr-III	Rs. 2230-3295/-	W-2	2	-	-	
17.	Messenger, Gr-III	Rs. 2100-2965/-	W-1	20	12	60%	
18.	Chowkidar, Gr-III	Rs. 2100-2965/-	W-1	5	-	-	
19.	Cook-Helper, Gr-III	Rs. 2100-2965/-	W-1	3	-	-	
20.	Sweeper, Gr-III	Rs. 2100-2965/-	W-1	8	5	62.50%	
		Total		121	28	23.14%	

PUBLIC SECTOR UNDERTAKINGS AND OTHER ORGANISATIONS
NATIONAL THERMAL POWER CORPORATION LTD. (NTPC)

National Thermal Power Corporation (NTPC) was set up in 1975, as a central sector generating company for the development of thermal power. The Corporation is at present engaged in operating/setting up of several thermal power projects and gas based power projects. The total approved investment of the corporation as on 30.11.99 stands at Rs. 43764.94 crores (excluding the investment on Transmission Systems which have since been transferred to Power Grid). Govt. of India has identified NTPC as one of the Navratnas - a potential "Global Giant".

The approved capacity of NTPC Projects is 22515 MW. The capacity commissioned upto 30.11.99 is 18351 MW. This includes acquisition of Unchahar (420 MW) form UPRVUN in Feb.'92 and Talcher (460 MW) from Orissa SEB in June'95. Presently, NTPC has to its credit 12 coal based thermal power projects and 7 gas/liquid fuel based combined cycle projects. Details of NTPC's projects/units are exhibited in the Statement.

Besides its own stations, NTPC also manages the Badarpur Thermal Power Station in Delhi (705 MW) and Balco's Captive Power Station near Korba, Madhya Pradesh (270 MW), which was also constructed by NTPC.

1.0 NTPC PERFORMANCE HIGHLIGHTS : 1999-2000 (UPTO 30.11.99)

- During the year 1999-2000, upto 30.11.99, a record generation of over 75573.3 Million Units was achieved, as against the last year's generation of 69581.6 Million Units during the same period.
- NTPC received Excellent MOU rating for the twelfth consecutive year in a row since the inception of MOU system by Government of India.
- Both Unchahar and Kayamkulam achieved full capacity.
- Construction activities in full swing at Vindhyachal Stage-II, Faridabad and Simhadri. With Main Plant order for Talcher-II placed in November 1999, construction activities already started.
- Techno-economic clearance have been accorded by CEA for Ramagundam Stage-III (500 MW), Rihand Stage-II (1000 MW) expansion projects, while Sipat Stage-I (2000 MW) was considered by Standing Project Appraisal Committee (SPAC) of CEA on 7.9.99.
- For Renovation and Modernization, joint venture company (M/s NTPC - ABB Alstom Power Services Pvt. Ltd.) with ABB has been set up.
- First time in the country, a Thermal Power Station (Dadri) is accredited with ISO-14001 certification in the area of Environment Management Systems, an achievement that means Dadri power plant performance is matching with the international standards towards ensuring environmental protection.
- Western Region Headquarters has been granted ISO-9002 certification for providing Technical and Commercial Services and providing information to Corporate Centre and various sites of NTPC as well as outside NTPC. This certification has been awarded by Bureau of Indian Standards for a period of three years from 1st July, 1999.
- MOU signed with ONGC for setting up power plants under joint ventures based on residual fuel.
- Projects those have been identified for capacity addition by NTPC under Mega Projects policy of Government of India are Kahalgaon-II (1500 MW), North Karanpura (2000 MW), Barh (2000 MW), Cheyyur (1500 MW) and 1300 MW each at Anta, Auraiya, Kawas and Gandhar.
- 15 orders for consultancy have been received during 1999-2000 upto 30.11.99 and the total value of orders received during the period is Rs. 3697.80 lacs, as compared to Rs. 817.875 lacs for orders received during the same period last year. This includes two major orders, one of Rs. 2079 lacs from M/O Health & Family Welfare for "Procurement consultancy services for National AIDS Control Project" and second of Rs. 1345 lacs from DVB for "OES for 300 MW Pragati CCPP".
- Billing during 1999-2000, upto 30.11.99, was Rs. 10509.84 crores with realization of Rs. 8742.85 crores i.e. 83.2%. Outstanding dues rose to Rs. 11884.09 crores, including surcharge of Rs. 4192.61 crores, as on 30.11.99.

2.0 GENERATION (AS ON 30.11.99)

NTPC Station

As on 30.11.1999 a total capacity of 17168 MW (including Talcher TPS - 460 MW) was under commercial operation at various NTPC stations. This comprises 31 units of 200/210 MW at Singrauli, Korba, Ramagundam, Farakka, Vindhyachal, Dadri, Unchahar and Kahalgaon, 14 units of 500 MW at Singrauli,

Korba, Ramagundam, Rihand, Farakka and Talcher and 29 gas/steam turbine units of various capacities operating at gas/naphtha based combined cycle plants at Anta, Auraiya, Kawas, Dadri, Jhanor, Gandhar and Kayamkulam.

The generation performance of NTPC Stations has consistently been at high level. Against the target of 107000 MUs (MOU excellent target for the year 1999-2000), the gross generation from NTPC stations has been 75573.3 MUs, upto 30.11.99.

During the year 1999-2000, upto 30.11.99, the coal based units under commercial operation generated 60801.2 MUs as compared to 56973.6 MUs last year for the same period. The PLF of coal based stations excluding stations of Eastern Region during this period (1999-2000 upto 30.11.99) was 86% against 82.3% last year for the same period. However, including Eastern Region, the PLF is only 76.8% due to low PLF in Eastern Region which results due to poor power demand and highly inadequate inter-regional transmission network.

Stations Managed by NTPC

Badarpur Thermal Power Station (BTPS), Delhi

Badarpur Thermal Power Station (BTPS) (705 MW) owned by Governement of India is being managed by NTPC since 1st April, 1978. 100% power from this station is supplied to DVB. During the year 1999-00, upto 30.11.99, the station has generated 3235.6 MUs at a PLF of 78.4%, as against 3087.6 MUs at a PLF of 74.8% during the same period last year.

Balco Captive Power Plant (4x67.5 MW)

During the year 1999-2000, upto 30.11.99, BCPP has generated 1313.5 MUs at a PLF of 83.1%.

3.0 WORLD BANK LOAN FOR NTPC POWER GENERATION PROJECTS

During the year 1998-99, NTPC has utilized US$ 137.53 million (Rs. 598.03 crs.) out of the first tranche of time slice loan of US$ 400 million extended by World Bank to support NTPC's investment programme for Vindhyachal Stage-II, Kayamkulam and EAP for certain operating stations. The cumulative utilisation till date is US$ 400 million (Rs. 1563.36 crs.) and with this the tranche-I of US$ equivalent 400 million has been completely drawn and utilised.

4.0 ADB LOAN FOR FEROZE GANDHI UNCHAHAR TPS STAGE-II (2X210 MW)

The ADB have approved NTPC as the implementing agency for stage-II of Feroze Gandhi Unchahar Thermal Power Project under loan for US$ 140 million consequent to take over of the project by NTPC. The transfer of the loan has been made effective from 14.11.1995 and an amount of US$ 3.83 million (Rs. 16.44 crores) has been utilised in the financial year 1999-2000, during the period April'99 to November'99. The cumulative utilisation till 30.11.99 is US$ 119.22 million (Rs. 450.38 crores).

5.0 OECF ASSISTANCE FOR FARIDABAD GPP (400 MW)

Faridabad Combined Cycle Gas Based Power Project (400 MW) is being implemented with financial assistance from OECF, Japan. OECF has extended financial assistance of Japanese Yen 22.850 billion for the project. As per the revised allocation made by OECF, J¥ 22.850 billion shall be available to NTPC for implementation of the project and the balance would be available for implementation of ATS by POWERGRID. The implementation of the project has taken off with investment approval having been conveyed by GOI in July'97. During the year 1999-2000, upto 30.11.99, NTPC has utilised J¥ 5126.28 million (Rs. 190.93 crores). The cumulative utilisation till 30.11.99 is J¥ 13998.26 (Rs. 489.34 crores).

6.0 OECF ASSISTANCE FOR SIMHADRI TPP (1000 MW)

Simhadri TPP (1000 MW) was proposed to OECF, Japan for funding, who have pledged a direct OECF loan of J¥ 19817 million to NTPC as first tranche loan for Simhadri TPP. The loan agreement has also been signed and the loan has become effective from 24.6.97. Investment approval for the project was received from the Govt. of India in July 1997. During the year 1999-2000, upto 30.11.99, NTPC has utilised J¥ 3026.95 (Rs. 115.98 crore). The cumulative utilisation till 30.11.99 is J¥ 10079.21 million (Rs. 368.46 crore).

7.0 MEMORANDUM OF UNDERSTANDING

NTPC is the first power sector corporation to have signed a Memorandum of Understanding (MOU) with the Govt. of India and has been rated " Excellent" for the twelfth consecutive year (every year since inception of MOU system of rating).

Based on the Memorandum of Understanding (MOU), signed between NTPC and the Ministry of Power for the year 1999-2000, in respect of major performance parameters, the targets are given below :

Sl. No.	Parameters	Target 1999-2000 V. Good	Excellent
1.	Generation (MUs)	104000	107000
2.	Heat Rate (Kcal/Kwh)	2490	2480
3.	Gross Margin (Rs. Cr.)	4850	5000
4.	Net Profit to Capital employed %	7.0	7.5
5.	Ash Utilisation (Lakh M3)	24	26

8.0 OUTSTANDING DUES OF NTPC

The rising receivables continue to cause concern to NTPC. The billing for the year 1999-2000 (upto 30.11.99) stood at Rs. 10509.84 crores with realisation of Rs. 8742.85 crores, i.e. 83.2%. The total outstandings dues rose to Rs. 11884.09 crores as on 30.11.99. The outstandings in terms of months of average billing works out to 6.5. There has been a significant improvement in the L/C opened as on 30.11.99. being Rs. 1204.60 crores, as against Rs. 1078.23 crores as on 31.3.99. Currently, the L/C covers 94.33% of the last quarter average monthly billing of Rs. 1277.01 crores.

9.0 GROWTH STRATEGY

Power is the prime mover of the economy and NTPC is a key player in the power sector. NTPC is making significant contribution for the growth of the economy by generating nearly one-fourth of India's total power generation with less than one-fifth capacity. NTPC continued its multipronged strategy for capacity addition to maintain/augment its share in the country's installed generating capacity through green field projects, expansion of its existing plants, acquisition of SEB's plants and forming joint ventures and selective diversification in related areas.

10.0 VIII PLAN

During VIII plan period (1992-97) NTPC added 5462 MW including 460 MW of Talcher TPS taken over from Orissa SEB. Capacity addition done by NTPC accounts for more than 30% of country's capacity addition in VIII Plan period.

11.0 IX PLAN

NTPC is planning to add a total of 5300 MW (2700 MW from ongoing projects and 2600 MW from New Projects) in the IX Plan. Out of 2700 MW of ongoing projects, NTPC has already added 1556 MW during the IX Plan. The details of the projects are given below.

12.0 ONGOING PROJECTS

The following projects, for which investment approval has been accorded, have been taken up for implementation and are scheduled to be commissioned in the IX plan period.

Project (Location)	Capacity (MW)	Capacity Addition in IX Plan (MW)	Commissioning Schedule	Already Commissioned (MW)
Vindhyachal-II (Madhya Pradesh)	1000	1000	Feb. 2001	500
Unchahar-II (Uttar Pradesh)	420	420	Jul.'2000	420
Kayamkulam (Kerala)	350*	350	Mar.'2000	350
Faridabad (Haryana)	430**	430	Jan.'2000	286
Simhadri (Andhra Pradesh)	1000	500	Dec.'2002	---
Talcher-II (Orissa)	2000	Nil	Dec.'2005	---
Total	5200	2700		1556

**Approved capacity 400 MW*
*** Approved capacity 400 MW*

13.0 NEW PROJECTS

In addition, the following expansion Projects (TEC cleared by CEA) have been envisaged for commissioning in the IX Plan :

Project	Location (MW)	Total Capacity Addition in IX Plan (MW)	Capacity
Kawas-II	Gujarat	650	650
Anta-II	Rajasthan	650	650
Auraiya-II	Uttar Pradesh	650	650
Gandhar-II	Gujarat	650	650
	Total	2600	2600

Note : Time frame for implementation of these projects is, however, under review due to wide fluctuations in Naphtha price.

14.0 BEYOND IX PLAN

NTPC is planning to become a "30000 MW plus" company by the year 2007. The following projects have been identified for capacity addition beyond IX Plan :

S. No.	Project	State	Capacity (MW)
1.	Talcher-II	Orissa	2000
2.	Simhadri	AP	500
3.	Ramagundam-III	AP	500
4.	Rihand-II	UP	1000
5.	Sipat-I&II	MP	3000
6.	Cheyyur-I&II	Tamilnadu	1500
7.	Kahalgaon-II	Bihar	1500
8.	Kayamkulam-II	Kerala	1950
9.	North Karanpura	Bihar	2000
10.	Barh-I&II	Bihar	2000
11.	Vindhyachal-III	MP	1000
12.	Kawas-III, Gandhar-III,	Gujarat	2600
13.	Anta-III,	Rajasthan	
14.	Auraiya-III	UP	

15.0 JOINT VENTURES

JV with BSES (UPL)

UPL (a Joint Venture Company of NTPC & BSES) was incorporated to take up assignments of Construction, Erection and Supervision in power sector and other sectors in India and abroad. The turnover of the JVC for the year 1998-99 was approximately Rs. 6.0 crores. UPL has already received orders for approximately 5.0 crores in the current financial year.

NTPC-ONGC JV for Power Projects

NTPC has signed an MOU with ONGC for setting up liquid fuel based power plants through Joint Venture route (the equity structure is 25% each by NTPC & ONGC and balance 50% by FIs, public etc.). NTPC-ONGC JV has obtained the permission from Govt. of India for award of the project to the JV Company without going in for competitive bidding by State Govt. The first project to be taken up by this JVC is at Hazira (Gujarat).

Further action for getting clearance from the Gujarat Govt./ Gujarat Electricity Board is under process.

JV for Renovation & Modernisation (R&M)

NTPC has formed a Joint Venture Company with M/s. ABB ALSTOM with equal equity contribution of 50% each for taking up Renovation and Modernisation assignments of Power Plants both in India and abroad. The Company has been registered with Registrar of Companies (ROC) under the name : "NTPC-ABB ALSTOM POWER PLANT SERVICES PRIVATE LIMITED".

JV for LNG

NTPC has signed an MOU with Gujarat Pipavav Ltd., Sea King Infrastructure Ltd. and British Gas for sourcing of LNG for its Gas based Expansion Projects at Kawas and Gandhar on 09.08.99. Promoter's Agreement is being finalised. MOU with Petronet LNG Ltd. for sourcing of LNG for expansion of Gas Based Projects at Anta, Auraiya and Kayamkulam is under progress.

16.0 RELATED DIVERSIFICATION

Hydro Projects

NTPC is discussing with Govt. of Himachal Pradesh for transfer of the Kol Dam (800 MW) and Rampur (500MW) Hydro Power Projects. The Draft Agreement is in advanced stage of finalisation.

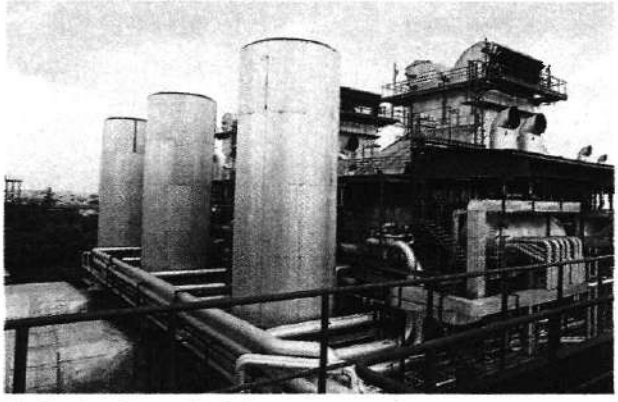
Wind Power

NTPC has finalised the site to set up its first 20 MW Wind Power Project in the state of Tamilnadu. Action for land acquisition and other project development activites have started.

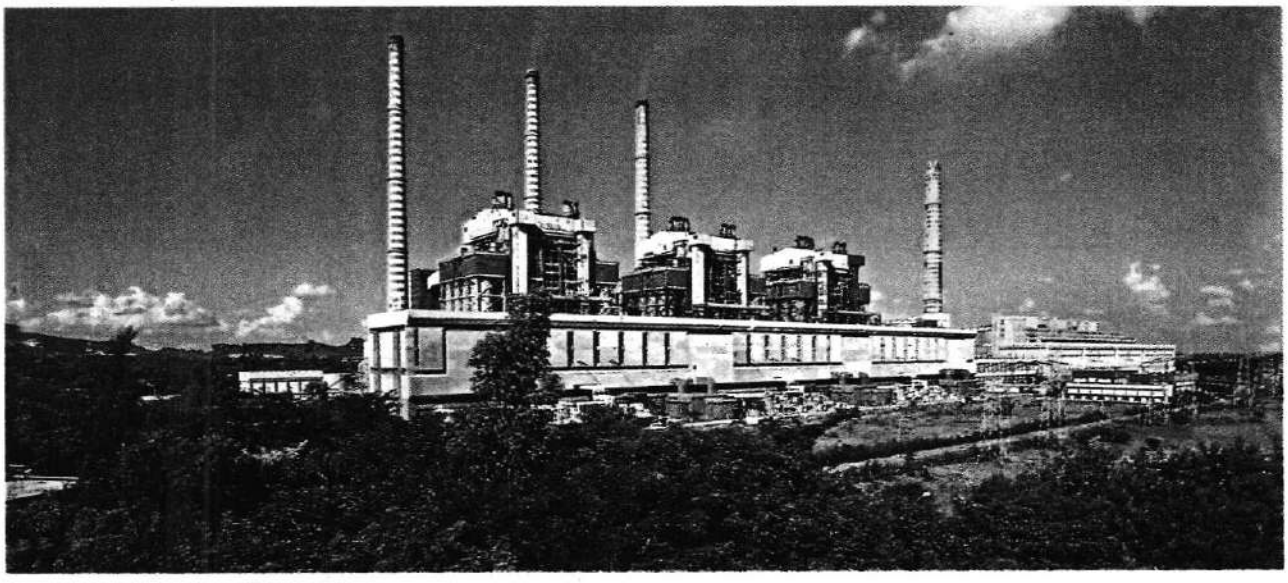
Karnataka Govt. has also allotted a 20 MW Wind Power Project to NTPC for implementation. Actions are being taken up for carrying out the initial Wind Studies at the site and signing of MOU with Karnataka Govt.

Ash based industries

Fly ash brick manufaturing plants to be set-up at Badarpur & Dadri. Feasibility Report & Technical Specifications completed for the same.



Anta Gas based power Project



Ramagundam Super Thermal Power Project

DETAILS OF NTPC PROJECTS SHOWING AGGREGATE APPROVED CAPACITY 22515 MW (AS ON 30.11.99)

S.No.	Name of the Region/ Project/State	Approved Capacity in MW	Commissioned Capacity in MW	Actual/Anticipated Date of Commissioning
(A)	**NORTHERN REGION**			
1.	Singrauli STPP Uttar Pradesh	Stage-I : 600	600	Unit-1 (200) Feb. 82 Unit-2 (200) Nov. 82 Unit-3 (200) Mar. 83
		Stage-II : 1400	1400	Unit-4 (200) Nov. 83 Unit-5 (200) Feb. 84 Unit-6 (500) Dec. 86 Unit-7 (500) Nov. 87
2.	Rihand STPP Uttar Pradesh	Stage-I : 1000	1000	Unit-1 (500) Mar.88 Unit-2 (500) July 89
3.	National Capital Thermal Power Project (Dadri) Uttar Pradesh	Stage-I : 840	840	Unit-1 (210) Oct.91 Unit-2 (210) Dec.92 Unit-3 (210) Mar.93 Unit-4 (210) Mar.94
4.	Dadri GBPP Uttar Pradesh	Stage-I : 817	817	GT-1 (131) Feb. 92 GT-2 (131) Mar. 92 GT-3 (131) June 92 GT-4 (131) Oct. 92 ST-1(146.5) Feb. 94 ST-2(146.5) Mar. 94
5.	Unchahar TPP Uttar Pradesh	Stage-I : 420	420	Unit-1 (210) Nov. 88 Unit-2 (210) Mar.. 89
		Stage-II : 420	420	Unit-3(210) Jan. 1999 Unit-4 (210) Oct. 1999
6.	Auraiya GBPP Uttar Pradesh	Stage-I : 652	652	GT-1 (112) Mar. 89 GT-2 (112) July 89 GT-3 (112) Aug. 89 GT-4 (112) Sep. 89 ST-1 (102) Dec. 89 ST-2 (102) June 90
7.	Anta GBPP Rajasthan	Stage-I : 413	413	GT-1 (88) Jan. 89 GT-2 (88) Mar. 89 GT-3 (88) May 89 ST-1 (149) Mar. 90
8.	Faridabad GPP Haryana	Stage-I : 400	286	GT-1 (143) Jun. 1999 GT-2 (149) Oct.1999 ST-1 (144) OCT. 2000
	Sub-Total	**6962**	**6848**	

DETAILS OF NTPC PROJECTS SHOWING AGGREGATE APPROVED CAPACITY 22515 MW (AS ON 30.11.99)

S.No.	Name of the Region/ Project/State	Approved Capacity in MW	Commissioned Capacity in MW	Actual/Anticipated Date of Commissioning
(B)	**SOUTHERN REGION**			
9.	Ramagundam STPP Andhra Pradesh	Stage-I : 1100	1100	Unit-1 (200) Nov. 83 Unit-2 (200) May 84 Unit-3 (200) Dec. 84 Unit-4 (500) June 88
		Stage-II : 1000	1000	Unit-5 (500) Mar. 89 Unit-6 (500) Oct. 89
10.	Kayamkulam CCPP	Stage-I : 400	350	GT-1 (115) Dec. 98 GT-2 (115) Mar. 99 ST-1 (120) Oct. 99
11.	Simhadri TPP Andhra Pradesh	Stage-I : 1000	600	Unit-1 (500) Mar. 2002 Unit-2 (500) Dec. 2002
	Sub-Total	**3500**	**2450**	
(C)	**EASTERN REGION**			
12.	Farakka STPP West Bengal	Stage-I : 600	600	Unit-1 (200) Jan. 86 Unit-2 (200) Dec. 86 Unit-3 (200) Aug. 87
		Stage-II : 1000	1000	Unit-4 (500) Sept.92 Unit-5 (500) Feb. 94
		Stage-III : 500		Unit-6 (500) Not decided (The project not taken up due to non availability of water.)
13.	Kahalgaon STPP Bihar	Stage-I : 840	840	Unit-1 (210) Mar. 92 Unit-2 (210) Mar. 94 Unit-3 (210) Mar. 95 Unit4 (210) Mar. 96
14.	Talcher STPP Orissa	Stage-I : 1000	1000	Unit-1 (500) Feb. 95 Unit-2 (500) Mar. 96
		Stage-II : 2000		Unit-3 (500) Sept. 2003 Unit-4 (500) Jun. 2004 Unit-5 (500) Mar. 2005 Unit-6 (500) Dec. 2005
15.	Talcher TPP (taken-over from OSEB on 3.6.95)	Stage-I : 240	240	Stage-I (4x60 MW) 1967-1969
		Stage-II : 220	220	Stage-II (2x110 MW) 1982-83
	Sub-Total	**6400**	**3900**	

DETAILS OF NTPC PROJECTS SHOWING AGGREGATE APPROVED CAPACITY 22515 MW (AS ON 30.11.99)

S.No.	Name of the Region/ Project/State	Approved Capacity in MW	Commissioned Capacity in MW	Actual/Anticipated Date of Commissioning
(D)	**WESTERN REGION**			
16.	Korba STPP Madhya Pradesh	Stage-I : 1100	1100	Unit-1 (200) Mar. 83 Unit-2 (200) Oct. 83 Unit-3 (200) Mar. 84 Unit-4 (500) May 87
		Stage-II : 1000	1000	Unit-5 (500) Mar. 88 Unit-6 (500) Mar. 89
17.	Vindhyachal STPP Madhya Pradesh	Stage-I : 1260	1260	Unit-1 (210) Oct. 87 Unit-2 (210) July 88 Unit-3 (210) Feb. 89 Unit-4 (210) Dec. 89 Unit-5 (210) Mar. 90 Unit-6 (210) Feb. 91
		Stage-II : 1000	500	Unit-7 (500) Mar. 99 Unit-8 (500) Mar. 00
18.	Kawas GBPP Gujarat	Stage-I : 645	645	GT-1 (106) Mar 92 GT-2 (106) May 92 GT-3 (106) June 92 GT-4 (106) Aug. 92 ST-1 (110.5) Feb. 93 ST-2 (110.5) Mar. 93
19.	Gandhar GPP Gujarat	Stage-I : 648	648	GT-1 (131) March 94 GT-2 (131) March 94 GT-3 (131) May 94 ST-1 (255) Mar. 95
	Sub-Total	**5653**	**5153**	
	Total (A+B+C+D)	**22515**	**18351**	

NB : 1. Total approved capacity as on 30.11.99 is 22515 MW.
2. Capacity Commissioned upto November 1999 is 18351 MW.
3. In addition, NTPC is also managing Badarpur Thermal Power Station (705 MW) & Balco Captive Project (270 MW)

NATIONAL HYDROELECTRIC POWER CORPORATION LTD. (NHPC)

National Hydroelectric Power Corporation (NHPC) was setup in 1975 under Companies Act, 1956. The mission of NHPC is to harness the vast hydro, tidal and wind potential of the country to produce cheap/pollution free and inexhaustible power. NHPC would play a significant role in the integrated and efficient development of hydro electric, tidal and wind power in the central sector covering all aspects such as investigation, planning, design, construction, operation and maintenance. NHPC is a Schedule "A" Enterprise of the Government of India with an Authorised Share Capital of Rs. 5,000 Crores. With an Investment base of over Rs. 10,000 Crores, NHPC is among the TOP TEN companies in the country in terms of Investment.

1. STATUS OF OPERATING POWER STATIONS

NHPC Power Stations have generated 7051.55 MUs (upto Nov.'99) against the target of 7502 MUs (upto Nov.,'99) in the current year. The generation is less, due to inflow of water being less than 90% dependable design inflows in respect of Uri Project.

2. STATUS OF ONGOING PROJECTS (ENDING NOV.,'99)

Rangit H.E Project (60 MW), Sikkim

Concreting of the Dam and Intake structures, Head Race Tunnel overt lining, Concreting and Erection of roof in the Power House, Boxing up of Turbine guide bearing and Lower guide bearing in respect of all the three Units have been completed. Hydro-Mechanical works are in full swing. Overall, 99% work of Rangit Project has been completed, till Nov.,'99. The Project is scheduled to be commissioned by December, 1999.

Dulhasti H.E. Project (390 MW) , J&K. (Upto Dec.'99)

Out of the total length of 10.6 Kms. of Head Race Tunnel, to be constructed at this Project, so far excavation of the tunnel to the extent of 6.55 Kms. (i.e. 62%) has been achieved. Only 0.280 Kms. HRT has been excavated during October-December, 1999. Owing to adverse geological conditions and seepage, the tunnelling work at upstream face suffered a set back. Out of the total requirement of 2,15,638 cum. Concreting, 1,62,448 Cum. (i.e. 75%) has been achieved in regard to the Switchyard, Transformer cavern, Pressure Shaft Upper and lower expansion gallery. In the Power House, out of the total concreting of 13,960 cum., 13,820 cum. (i.e. 99%) of concrete was poured. In Unit I Generator Barrel concreting completed. Slab was also cast at EL 1034 M. In Unit 2 grouting of Upper and Lower Pit Liners completed. In Unit-3 preparation for assembly and erection of Turbine and Generator commenced. Hydro-mechanical works for Unit-3 are underway. Concreting of floor at EL 1045.50 M in Transformer Cavern has been completed. Preparation and erection of transformers commenced. In Tail Race Tunnel 272 m (i.e. 92%) of excavation and 260 m (i.e. 100%) Overt Concreting was achieved. The supply in respect of Electro-Mechanical Equipment is completed by about 94%. Major components of the equipment already supplied include Turbine, Generating systems, Transformers and 400 KV Gas Insulated Switchgear, including accessories, EOT Crane, and various Liners and Gates. Erection of these equipments is being progressed gradually, as per the completion/availability from civil works front. The expected date of completion of the Project is March, 2001.

Dhauliganga H.E. Project, Stage-I (280 MW), U.P.

The work on this Project could be started only after tie-up of funds with OECF, Japan. A loan assistance of 5665 million Yen (Tranche-I) was effectuated from 23.05.96 and Loan agreement (Tranche-II) amounting to 16316 m Yen has become effective on 09.02.98.

Chamera H.E. Project, Stage-II (300 MW), H.P.

CCEA in its meeting held on 18.05.99 approved the project at an estimated cost of Rs. 1684.02 Crores (August, 98 price level). The Project is being executed on Turnkey mode and agreements with the consortium members were signed on 18.07.99. Mobilisation has been completed by M/s Indo Canadian Hydro Consortium, the turnkey contractor of this Project and major works have been started. Agreement has been signed between the Export Development Corporation (EDC), Canada and NHPC on 04.11.99, for an amount of Canadian $ 175 Million for the construction of this Project. The project is scheduled for commissioning by May, 2004.

Koel Karo H.E. Project (710 MW), Bihar

The works of the project could not be taken up due to paucity of funds and local resistance. The cost of the project was revised and PIB recommended the revised cost of Rs. 2368.41 Crores including IDC of 298.60 Crores for generation portion only at December, '98 price level to CCEA for approval. The CCEA conveyed that Koel Karo HE Project should be placed before the CCEA only after final clearance for the Project is received from MOEF and after the beneficiary States agree to purchase the power.

Govt. of Bihar have informed that survey work for affected families and formulation of R&R Plan will take about an additional two years. MOEF has extended the time for submission of revised R&R Plan till March, 2000. All the beneficiary states

and DVC have been requested to sign the Power Purchase Agreement. The Project is scheduled to be completed in 8 years from the date of Govt. sanction.

Kalpong H.E. Project (5.25 MW), A&N Islands

In terms of the Agreement signed by the NHPC with the Andaman & Nicobar Islands Administration on 16.07.98, the Project is being executed by the NHPC on "Deposit Work" basis. Enabling works and development of Infrastructure facilities have been completed. The Project is scheduled for commissioning by Oct.,'2002. Works relating to Excavation and tunnel concrete lining are in advanced stage.

Kurichu H.E. Project (3x15 MW), Bhutan

This Project is being constructed on "Turnkey basis". The Project is scheduled for commissioning by Sept. '2001. Works relating to construction of dam and power house are in progress.

3. NEW SCHEMES (NOVEMBER'1999)

Teesta H.E. Project Stage-V (510 MW) , Sikkim

All the required clearances for the Project are available. The project has been techno-economically cleared on 26.02.99. PIB in its meeting held on 23.08.99 recommended the project for CCEA approval. Development of Infrastructure facilities has been taken up. Exploratory Drilling & Geological Explorations have also commenced. All the beneficiary states have been requested to sign Power Purchase Agreement to purchase power from the project. Pre-qualification of Contractors and issue of NIT to Pre-qualified Contractors for diversion tunnel work will be completed by January 2000. The project is scheduled to be completed in a period of 7 years after the sanction is issued.

Loktak Downstream H.E. Project (90 MW), Manipur

All the required clearances are available for the Project. Techno-Economic Clearance for the project has been accorded by the CEA on 26.02.99. PIB in its meeting held on 23.08.99 recommended the project for CCEA approval. Section- IV for land acquisition has already been published on 08.10.99. The State Government has been requested to provide security, so that Infrastructure and pre-construction activities at the Dam site could be taken up. All the beneficiary states have been requested to sign Power Purchase Agreement to purchase power from the project. The project is scheduled to be completed in 6 $^{1/2}$ years after sanction. Pre-qualification process for civil works has been started and offers for 3 packages.

Parbati H.E. Project, Stage-II (800 MW), H.P.

The techno-economic clearance for the project has been transferred in favour of NHPC on 12.10.99. The "Site Clearance" has been accorded by MOEF thereby allowing construction of non-tarred roads and temporary labour colonies in the project. "In principle" forest clearance has also been issued by MOEF for the project on 11.08.1999. The site office has been established and all essential resources have been mobilised to take up pre-construction and infrastructural development works. Assets and records have been taken over by NHPC from HPSEB.

4. PROJECTS UNDER SURVEY & INVESTIGATION

Dehang HE Project (11750 MW) & Subansiri H.E. Project (4500 MW)

Brahamputra Board have identified three projects in Dehang basin and three projects in Subansiri basin for development as multipurpose projects. The sites were physically inspected by a joint inspection team consisting of representatives of CWC, GSI, Brahamputra Board and Govt. of Arunachal Pradesh in Feb. '96.

Brahamputra Board has agreed to transfer the upper and middle sites of the three identified sites in each basin to NHPC.

The request of NHPC for sanctioning of funds during 1999-2000 and 2000-2001 to facilitate starting and enabling works such as approach and access roads to work sites, residential and non-residential facilities, procurement of modern exploration equipment and acquisition of remote sensing imageries, aerial photographs, sophisticated softwares, etc., is being examined in consultation with Planning Commission.

For taking up the works, NHPC has mobilised the resources. Offices cum Transit camps have been established at Itanagar, Passighat and Ziro/Hapoli. Reconnaissance Survey has already been taken up at various sites. Creation of site facilities, accommodation, offices, etc. are in progress. The transfer of site from Brahamputra Board to NHPC alongwith relevant records is being done.

Parbati H.E. Project (Stage I & III) (750 MW & 501 MW)

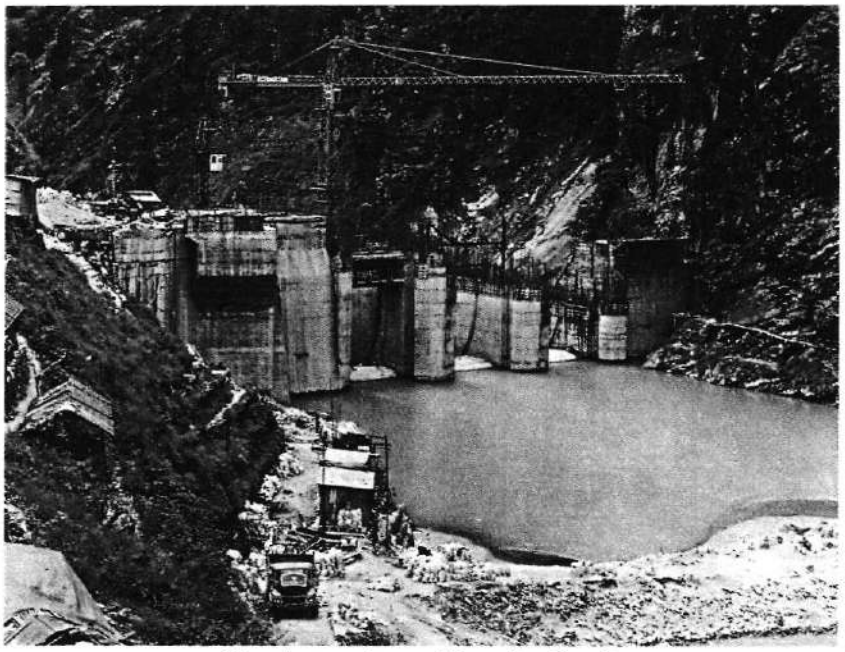
NHPC has started investigation of Parbati HE Project (Stage I & III) located in Himachal Pradesh. The existing infrastructure and manpower at Parbati stage II will be utilised for this purpose initially. The process of posting suitable personnel for the project is already started.

5. WIND POWER FARMS (25 MWS), TAMIL NADU :

NHPC has planned for development of 25 MW capacity wind farm in Coimbatore district of Tamil Nadu. The cost of the scheme is Rs. 99.20 Crs. with debt equity ratio 1:1. The Project will generate 44.44 MU in a year.

6. SMALL/ MINI HYDRO ELECTRIC PROJECTS :

The Corporation has been contemplating to undertake execution of Small/Mini Hydro Electric Projects during the 9th Five Year Plan. DPR in respect of Small Hydro Electric Projects at RD 311.5, RD 79 and RD 43 on Gandak Canal have been prepared and submitted. The Government of Arunachal Pradesh has expressed their intention to hand over 12 Projects to the Corporation, for execution. A team of technical persons of the Corporation visited three Project-sites viz., Kambang (3 MW), Sippa (3 MW) and Jugdin (2 MW). Cost Estimates based on 1999 price indices have been prepared for holding detailed discussions with the Government of Arunachal Pradesh, before taking the final decision regarding execution of these Projects.



View from upstream of dam site - Rangit

7. MEMORANDUM OF UNDERSTANDING :

NHPC has been signing a Memorandum of Understanding (MOU) with the Ministry every year and has been rated "Excellent" since last five years on a five point scale based on the guidelines given by Department of Public Enterprises.

8. CONSULTANCY SERVICES

- NHPC has been awarded the job of Construction Management and monitoring support services for the construction of the Dam and Reservoir of the Bakreshwar Project by the West Bengal Power Development Corporation Limited in West Bengal and the work is going on as per schedule.
- The Industrial Finance Corporation of India Limited (IFCI) has appointed NHPC as Lender's Independent Engineers for the project being set up by Shree Maheshwar Hydro Project Corporation Limited. The tripartite agreement amongst IFCI, SMHPCL & NHPC has been signed and the work is in progress. NHPC has also been appointed by IFCI as Lender's Independent Engineers for Baspa Stage II project being set up by Jai Prakash Hydro Power Limited. An agreement has been executed amongst IFCI, JHPL & NHPC.
- Agreement between Govt. of Nagaland & NHPC for preparation of pre-feasibility report for the Tizu-Zungki H.E. Project has been signed.
- Repair and restoration work of Spituk Monastery, Leh has been entrusted by Ladakh Autonomous Hill Development Council, Leh on 'Deposit Work' basis to NHPC.
- NHPC has also been asked by M/s Sargent & Lundy to conduct study of Hydel Plant Availability and Efficiency for various hydel power stations in Andhra Pradesh. The work is under progress.
- NHPC has got itself registered as consultant with International Financial Institution like : World Bank, Asian Development Bank, African Development Bank and Kuwait Fund for Arab Economic Development. NHPC is also registered as Consulting Engineers with Consultancy Development Council and Central Water Commission.
- NHPC has entered into a Memorandum of Understanding with Bhakra Beas Management Board (BBMB) for providing consultancy in every facet of hydro power development to various organisations jointly. NHPC in association with BBMB has been pre-qualified for hydro-mechanical works of Panchana Dam in Rajasthan.

RURAL ELECTRIFICATION CORPORATION (REC)

Rural Electrification Corporation (REC) was set up in 1969 with the primary objective of providing financial assistance for rural electrification in the country. REC was declared a Public Financial Institution under Section 4-A of the Companies Act 1992. In February, 1998, the Corporation was registered as a Non-Banking Financial Company under Section 45-IA of the RBI Act, 1934. The authorized share capital of the Corporation is Rs.800 Crore and the paid up capital is Rs.680.60 Crore as on 30.11.1999.

Rural Electrification Programmes financed by the Corporation cover electrification of villages, including tribal villages and Dalit Bastis, energisation of Pumpsets, provision of power for small, agro-based and rural industries, lighting of rural households and street lighting. The Corporation has also been providing assistance to the State Electricity Boards for taking up System Improvement Projects for strengthening and improving sub-transmission and distribution system and small generation projects like wind energy and hydel projects. In addition, under Kutir Jyoti Programme launched in 1988-89 by the Govt. of India, one time initial cost of internal wiring and service connection charges upto a maximum limit of Rs.1000 per connection with installation of meter or Rs.800 per connection without meter is provided to rural households below poverty line as grant through the State Govts./SEBs.

1. PERFORMANCE HIGHLIGHTS FOR 1998-99

The year 1998-99 proved to be a Glorious Year in the history of the Corporation as it attained new milestones not only in earning profit and paying Dividend to the Government, but also in recovering outstanding dues. The Corporation registered a profit before tax of Rs.391.00 crore and paid an all time high Dividend of Rs.50 crore to Government of India. The new Loan portfolios introduced by the Corporation and the initiatives taken in recovery of dues have resulted in recovering Rs.2276.10 crore. The Corporation sanctioned 1468 new projects involving a financial outlay of Rs.2878.73 crore and made a total disbursement of Rs.2202.60 crore which is the highest so far in a single year.

2. ANNUAL PLAN FOR THE YEAR 1999-2000

The Annual Plan of REC for the financial year 1999-2000 entails financial outlay of Rs.1553 crore with target for electrification of 2000 villages, energisation of 2,50,000 pumpsets and release of 5.4 lakh Kutir Jyoti connections. Out of this allocation, an amount of Rs.53 crore has been earmarked for electrification of 415 tribal villages and another Rs.105 crore for extending electricity to 2440 Dalit Bastis.

3. MEMORANDUM OF UNDERSTANDING

The Corporation has signed a Memorandum of Understanding with the Ministry of Power for the current financial year 1999-2000. The commitments of REC include achievement of gross margin of Rs.700 crores and realisation of Rs.1050 crore of dues from the State Electricity Boards. For the year 1998-99, the performance of the Corporation has been rated as "excellent".

4. ISSUE OF PRIORITY SECTOR BONDS

Govt. of India have approved raising Rs.650 crore from the market during the financial year 1999-2000 including Tax Free Bonds of Rs.75 crores under Priority Sector Lending Programme. The Corporation has already raised Rs.300 crores by way of taxable Bonds on most competitive terms and the balance amount is being raised shortly as per requirement.

5. DISBURSEMENT OF LOAN

Against the Plan allocation of Rs.1553 crore during the year, the Corporation disbursed a total sum of Rs.1039.73 crore upto 30th November, 1999 including a grant of Rs. 30.93 crore under Kutir Jyoti programme.

6. PHYSICAL PROGRESS UPTO 30th NOVEMBER, 1999

During the year 1999-2000, electrification of 1019 villages, energisation of 1,07,827 pumpsets and release of 1,69,520 single point light connections for the households of rural poor under the Kutir Jyoti Programme have been completed upto November, 1999. Cumulatively, upto November, 1999, over 3 lakh villages have been electrified and 74.3 lakh pumpsets energized under REC schemes besides release of over 35 lakh Kutir Jyoti connections.

7. RURAL ELECTRIC COOPERATIVES

As on 30th November, 1999, REC has sanctioned 41 RE Cooperatives in the country spread over 12 States. Of these, 8 societies - 3 in Rajasthan and one each in Bihar,Gujarat, Orissa, J&K and Uttar Pradesh have been liquidated over the years.

During the current financial year 1999-2000 upto November, 1999, the operating societies have

released a total of 70,683 service connections which include 8,346 pumpsets, 1,179 industries and 61,158 domestic/commercial and other connections. The societies have also electrified 83 hamlets so far during the year 1999-2000. Cumulatively up to the end of November, 1999, the RE cooperatives together have electrified 4,174 villages, 1,964 hamlets and have released 12,07,360 service connections which include 2,36,405 pumpsets, 22,628 industries and 9,48,327 domestic/commercial and other services.

8. JAPAN BANK FOR INTERNATIONAL COOPERATION (JBIC)(EARLIER OECF) ASSISTANCE

Under the assistance of 24.4 billion yen (Rs.760 crore @ exchange rate of 1 Re=3.21 Yen) sanctioned by JBIC (earlier OECF), Japan, for utilization within the extended validity period of Feb.2002, 21 System Improvement Sub-Projects under the first batch involving an outlay of Rs.108 crore in the states of Andhra Pradesh, Haryana, Karnataka, West Bengal are under implementation. Seventeen sub-projects have been completed. Four sub-projects are scheduled for completion by December, 1999.

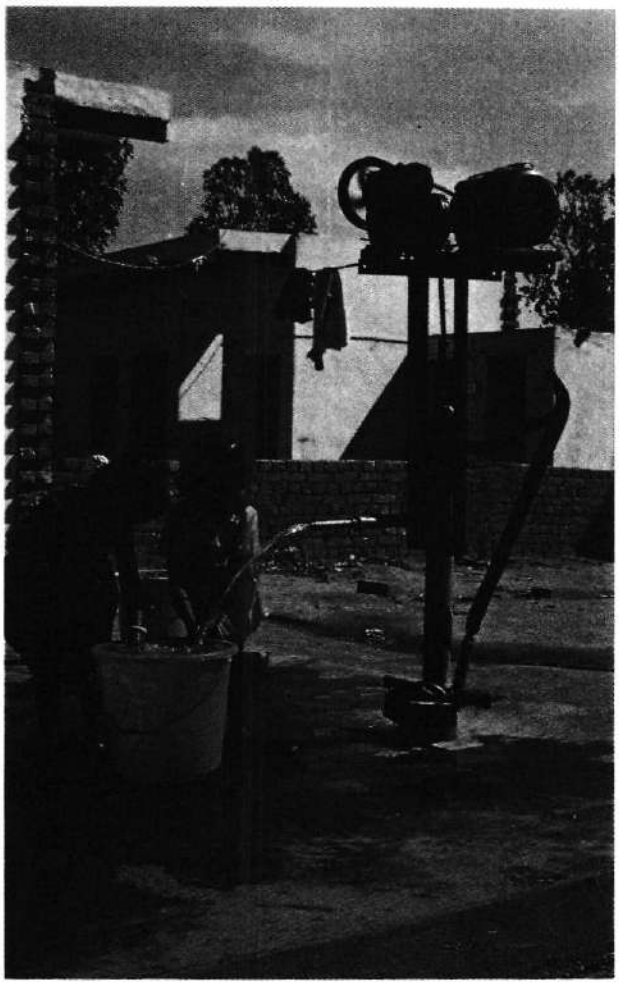
Under the second batch of sub-projects, JBIC has additionally approved 20 system improvement sub-projects for Rs.368 crore in the states of Andhra Pradesh, Kerala and Orissa and one small hydro electric sub-project for Rs.10.89 crore in Tamil Nadu. 16 SI sub-projects are scheduled for completion by December, 1999, 4 SI sub-projects are scheduled for completion by March 2000 and 1 small Hydro electric Sub-project is scheduled for completion by November, 2001.

An amount of Rs.301.22 crore has been disbursed under JBIC assistance so far (as on 30.11.99) including Rs.68.77 crore during the current financial year 1999-2000 covering 6 states of Andhra Pradesh, Haryana, Karnataka, West Bengal, Kerala and Orissa.

Under the third batch of sub-projects, JBIC has sanctioned four sub-projects in the state of Maharashtra involving an outlay of Rs.158.28 crore. Tenders have already been invited and contracts are likely to be awarded by early Feb.2000. The sub-projects are scheduled for completion by May 2001.

9. CENTRAL INSTITUTE FOR RURAL ELECTRIFICATION (CIRE), HYDERABAD

CIRE has conducted several training programmes during the year 1999-2000 (upto Nov. 1999) in technical, finance and managerial aspects useful to the personnel engaged in power utilities, RE Cooperatives and other allied oranisations. The Institute is headed by an Additional Director with core faculty of 5 officers - 3 (Economics), 1 (Technical) and 1 (Information Technology) - and supported by administration and accounts divisions. A total number of 11 programmes were conducted between July and November, 1999. Another equal number of programmes are contemplated to be organised during the remaining part of the year.



Pumpset energisation in rural areas.

The programmes conducted so far are on technical aspects like Energy Audit and DSM, Power Pilferage, Renewable and Energy Efficient Distribution Transformers; Privatisation of Electric Power Distribution Systems, MIS, Application of Commercial Accounting, Lease Finance on Finance and Managerial aspects and another progamme on Software Automated Mapping and Facilities Management in Power systems with a focus on use of Information Technology. A programme on Customer Information Systems is slated during Dec. 1999.

In addition to the above, Ministry of Power has sponsored a training programme on Conservation of Energy in Agricultural Pumping Systems for 400 officers with about 20-25 participants in each programme. Already 3 programmes have been conducted upto Nov. 1999, one each at Hyderabad, Bangalore and Chennai.

10. STANDARDISATION OF EQUIPMENT, CONSTRUCTION PRACTICES AND RESEARCH AND DEVELOPMENT

The Corporation continued its efforts in the area of standardisation of equipments and construction practices with emphasis on innovative technologies and conservation of energy. Two draft specifications viz. Three phase and Single Phase AC Static Watt Hour Meters were finalised by the Working Group during March, 1999. Besides updating of one Construction Standard (K-5) relating to Capitalisation of Losses in distribution transformers during 1999-2000, work has also been initiated on formulation of Standards pertaining to 132 KV lines during the year.

11. NEW THRUST AREAS

Special thrust has been laid during the current year 1999-2000, for providing financial assistance to State Electricity Boards for procurement and installation of high precision electronic & electro-dynamic meters which will improve the revenue collection of SEBs. Under this new category of scheme, known as `Special Loan (Meters)', the Corporation has sanctioned loan assistance of Rs.196 crore for the States of Andhra Pradesh, Haryana, Karnataka, Kerala and Tamil Nadu till the end of November, 1999.

The Corporation has also sanctioned another Rs.47 crore for one small hydro project of 14.4 MW (2x7.2 mw) capacity, namely, Western Yamuna Canal Stage-II of Haryana.

NORTH EASTERN ELECTRIC POWER CORPORATION (NEEPCO)

The North Eastern Electric Power Corporation Ltd. was incorporated on April 2nd, 1976, as a wholly owned Government of India enterprise with the objectives of planning, promotion, organisation, investigation, design, construction, generation, operation and maintenance of power stations and associated structures. The Memorandum and Articles of Association of NEEPCO specify that its area of operations will be the North Eastern Area wherein its activities will be in accordance with the National economic policy and objectives laid down by the Central Government from time to time. From its inception, NEEPCO has been carrying out the stipulated aims and objectives of national policy for power development in the Region. Beginning with a maiden project in Kopili of 150 MW, today the installed capacity of the Corporation is 250 MW of hydel power and 375 MW of gas-based generation. The growth of the corporation can be gauged by the substantial increase in its authorised share capital which was a modest Rs. 75 crores in 1976 and stands today at Rs.2500 crores. It is Schedule 'B' organisation.

The North Eastern Region of the country is blessed with highest hydro-power potential of the country which is estimated at 48000 MW constituting about 33% of the total reserves of the country. The region has abundant natural gas reserves. There is ample scope of development in this under-developed region where the main infrastructure has been identified as power.

The corporation is contributing significantly towards meeting the national policy agenda for the NER through its efforts in power development directed at achieving the goals of socio-economic prosperity and a balanced regional growth.

1. PERFORMANCE HIGHLIGHTS :

Out of total installed capacity of 1714 MW (Grid) in the North Eastern Region, NEEPCO is contributing 625 MW through its Kopili H.E. projects, (250 MW) N.C. Hills, Assam, Assam gas based power project (291 MW), Kathalguri & Agartala Gas Turbine Power Project (84 MW) Tripura, under O&M. The corporation achieved a capacity addition of 251 MW within the 8th Five Year Plan and another 173 MW in the year 1997-98, 51 MW in the year 1998-1999. In 1999-2000 a capacity addition of 75 MW has been targetted to be achieved. The corporation proposes a capacity addition of 405 MW of Ranganadi H.E. Project (on-going) and 25 MW of Kopili Stage-II project, during remaining period of 9th Plan. The corporation has also taken up Tuirial H.E. Project of 60 MW in the State of Mizoram with OECF funding, which is scheduled to be completed in 2006. In addition to the above the Corporation is to take up the following projects, after obtaining necessary clearances.

1. Kameng H.E. Project, Arunachal Pradesh-600 MW
2. Tuivai H.E. Project, Mizoram -210 MW
3. Tipaimukh H.E. Project, Manipur-1500 MW.

Several other projects as mentioned below are also being proposed to be taken up:

1. Ranganadi H.E. Project - Stage-II, Arunachal Pradesh-180 MW.
2. Lower Kopili H.E. Project, Assam-150 MW
3. Dikrong H.E. Project, Arunachal Pradesh-100 MW.

2. POWER PROJECTS UNDER OPERATION & MAINTENANCE (COMPLETED):

Kopili H.E. Project (150 MW) - Assam :

Kopili H.E. Project (150 MW) is located in N.C. Hills in the district of Assam and was completed in March '88 at a cost of Rs. 243.83 cr. It is a twin project consisting of two Dams, two Water Conductor System leading from the Kopili reservoir to the Khandong Power House (2x25 MW)and from Umrong reservoir to the Kopili Power House (2x50 MW). This project started commercial generation from June/July 1988.

Kopili H.E. Project-1st Stage Extension (100 MW), Assam :

This is an Extension of the Kopili Project by addition of one more Penstock and extension of existing Power House Building for installation of 2x50 MW generation capacity costing Rs. 134.48 Crs. (including IDC). This extension has added another 502 MU of energy annually at 90% dependable year. The 1st unit (called Unit-III) was synchronised on 5.3.1997 and the 2nd unit (called Unit-IV) was synchronised on 17.6.1997.

Assam Gas Based Combined Cycle Power Project (291 MW) - Assam :

This project is located in Dibrugarh district of Upper Assam. It was administratively approved during November, 1984 at a cost Rs. 203.17 Crs for installing 6 Units of 33.5 MW each Gas Turbine and 3 units of 30 MW each steam turbine. The project cost has been subsequently revised and the latest revised cost after completion during 1998-99 comes to Rs. 1532.32 Crores, including IDC at 1998 price level.

Agartala Gas Turbine Power Project (84 MW) - Tripura :

This project is located in West Tripura District of Tripura. The project envisages installation of four Gas Turbine units of 21 MW each at a cost of Rs. 294.05 Crs. (including IDC). The completed cost of the projet has gone upto Rs. 322.50 crores as against the approved cost estimate of Rs.294.05 crores. The project has been fully commissioned in June, 1998.

3. POWER GENERATION HIGHLIGHTS :

During 1999-2000, generation of power up to 31.12.99 was 619.00 MUs against a target of 1214 MUs by Hydro Power Stations and 977.00 MUs against a target of 1470 MUs by Thermal Power Stations.

The cumulative generation since inception till December, 1999 is as below :

i) Kopili H.E. Project	8627.00 MU
ii) Kopili H.E. Project 1st Stage Extension	1123.00 MU
iii) Assam Gas Based Combined Cycle Power Project	3017.00 MU
iv) Agartala Gas Turbine Project	487.00 MU

Power wise anticipated target to be achieved during the remaining period of the year 1999-2000 i.e. from January, 2000 to March, 2000 are given below :

i) Kopili H.E. Project	93.00 MU
ii) Kopili HE Project-1st Stage Extension	54.00 MU
iii) Assam Gas Based Combined Cycle Power Project	360.00 MU
iv) Agartala Gas Turbine Power Project	104.00 MU

4. ON-GOING PROJECTS (GENERATION) :

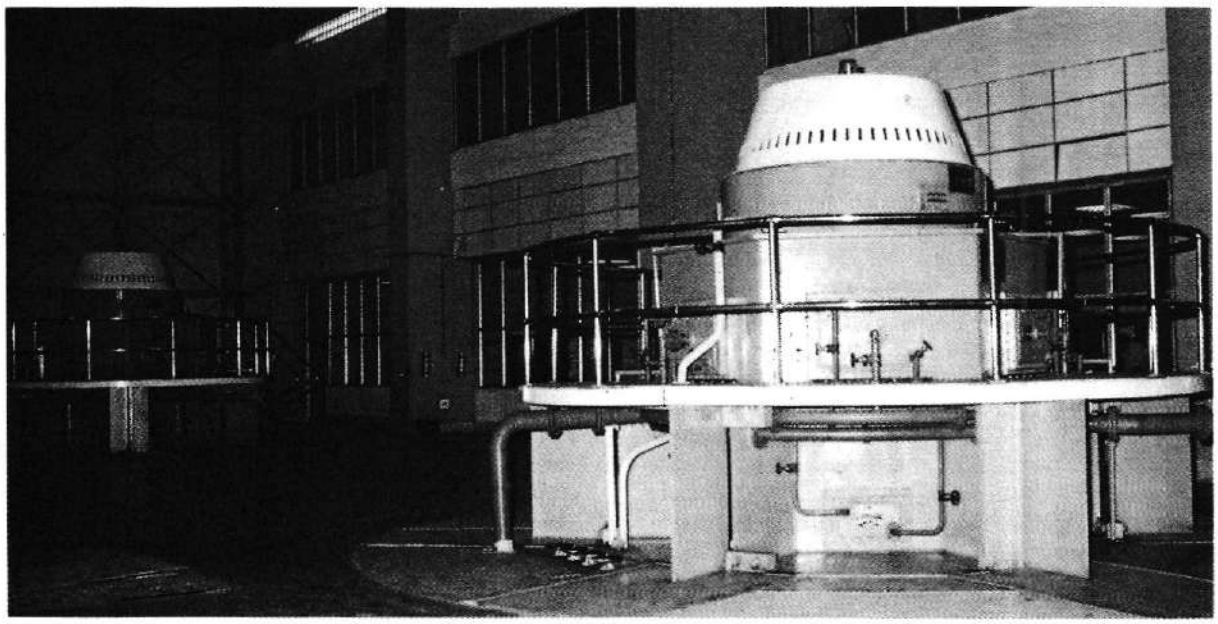
Doyang H.E. Project (75 MW) -Nagaland :

This project is located in the Wokha district of Nagaland. The project was administratively approved in July, 1989 for installing 3 units of 25 MW each. The latest anticipated cost of the project of Rs.758.70 crores (including IDC) at July, 1999 price level has been submited for approval. The project is scheduled for commissioning by March, 2000.

Ranganadi HE Project (405 MW) - Arunachal Pradesh :

The project is located in the Lower Subansiri District of Arunachal Pradesh and has a provision of installing 3 units each of 135 MW. The cost of the project as approved was Rs. 774.12 Crores (including IDC) in August, 1995. The project envisages to generate 1874 MU annually at rated capacity. The project is expected to be commissioned by September, 2001.

The anticipated revised cost of the project of Rs. 1479.62 crores (including IDC) at July, 1999 price level has been submitted for approval.



Unit-III & IV of Kopila H.E.P. (1st Stage exten.)

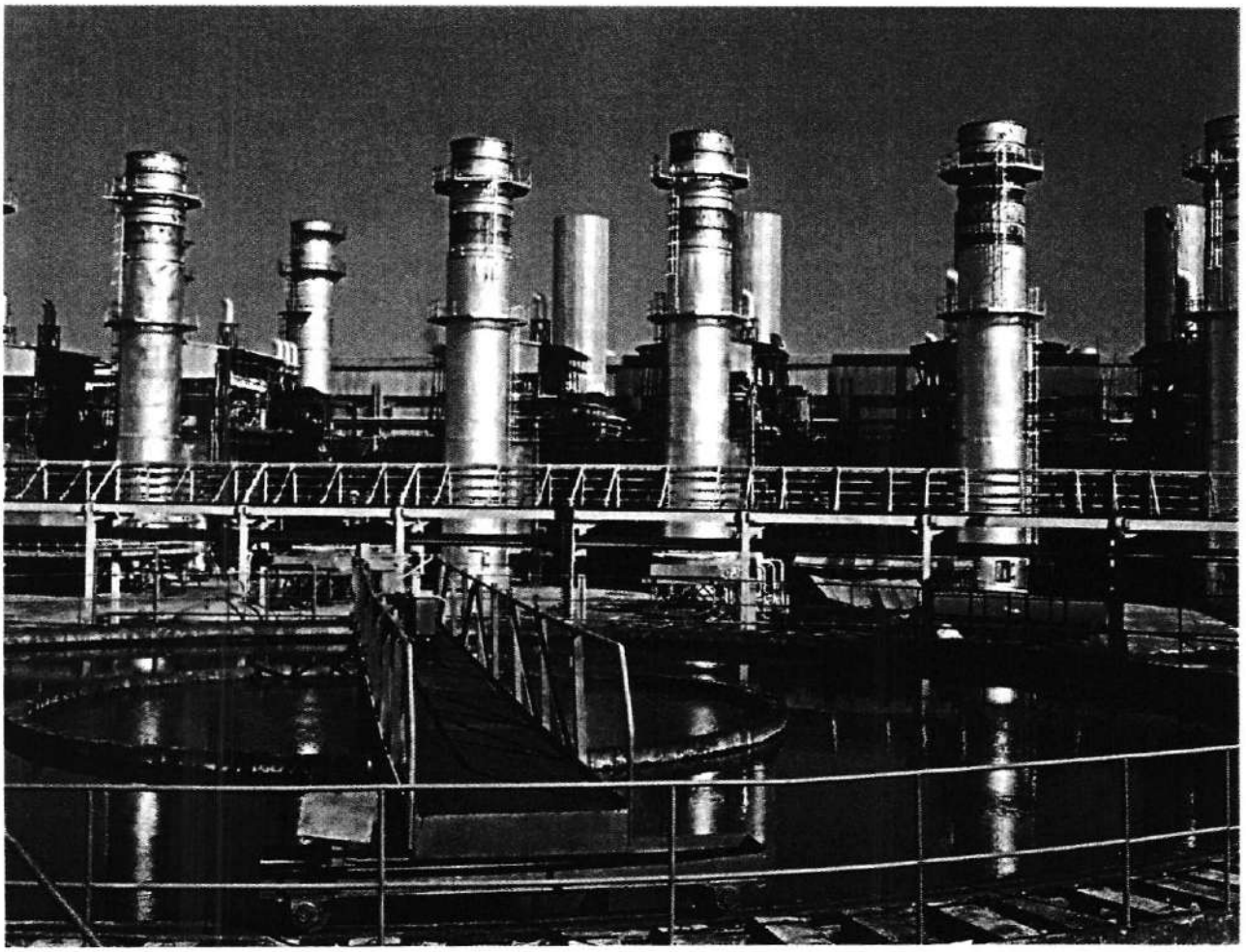
Tuirial H.E. Project (60 MW) - Mizoram :
The Tuirial HE Project in Mizoram is located on the border of Cachar District of Assam and Aizwal District of Mizoram and comprises construction of a 77 M high homogenous earth fill dam across the Tuirial river with an installed capacity of 2 x 30 MW, surface power House on the left bank of the river. The cost of the project at December, 1996 price level is Rs. 368.72 crores (including IDC). This project has been taken up under loan assistance of JBIC, Japan (formerly OECF).

Kopili H.E. Project - Stage-II (25 MW) - Assam:
During the construction of the 1st Stage of the Kopili HE Project, it was found feasible to set up a second Power House at Khandong with an installed capacity of 1x25 MW named as 2nd Stage. The proposed location of the Power House is near the existing Khandong Power House. The scheme consists of a by-pass tunnel of length 325 M, from Khandong, one 2.75m.dia. penstock, a surface Power House & a tail race tunnel to release the water into Umrong Reservoir.

The estimated cost is Rs. 98.23 crores at 1998 price level. Construction activities on the project are progressing as per schedule and the project is expected to be completed during the year 2002-2003 and is envisaged to produce additional 301 MU per year.

5. PROJECTS UNDER SURVEY & INVESTIGATION :

- Papumpam Hydro Electric Project, Arunachal Pradesh - 100 MW
- Pakke Hydro Electric Project, Arunachal Pradesh -105 MW



Assam Gas based Combined cycle Power Project Kathalguri

POWER FINANCE CORPORATION LIMITED (PFC)

The Power Finance Corporation Limited (PFC) was incorporated on 10th July, 1986 under the Companies Act, 1956. The mission of PFC is to function as the prime Development Financial Institution dedicated to the growth and overall development of the Power Sector. The borrower-portfolio of PFC comprises the State Electricity Boards (SEBs), State Generation Corporations (SGCs), Municipality-run power utilities besides central and private power utilities. The funds provided by the Corporation are in the nature of additionality to Central Plan Allocation (in respect of SEBs, etc.) and based on the merits of the invidual projects.

1. PERFORMANCE HIGHLIGHTS

As on 30.11.99, PFC sanctioned loans of the order of Rs. 5086 crores (during 1999-2000) for a wide range of power projects in various parts of the country and disbursements are to the tune of Rs. 1058 crores. As on the 30th November, 1999 the Authorised Capital and the Paid-up (equity) capital of the Corporation stood at Rs.2000 crores and Rs.1030 crores, respectively. The Profit After Tax (provisional), as on 30-9-99 was about Rs. 277 crores. In addition to the above, PFC had paid a dividend of Rs. 108 crores for the year 1998-99 to the Govt. of India which owns all its equity. Besides being a consistently profit-making Corporation, PFC was placed in the highest category of 'Excellent' for the sixth consecutive year, by Govt. of India on the basis of its overall performance during the year 1998-99.

2. RESOURCE MOBILISATION - DOMESTIC

During the year (upto 22.12.99), the Corporation has raised Rs.327 crores out of which Rs.324 crores were raised by way of unsecured bonds and Rs.3 crores by way of a term loan from bank.

Bonds

Out of the total funds raised by way of unsecured bonds of Rs.324 crores, Rs.75 crores has been raised by issue of Tax Free Bonds at the finest rate of 8.70% p.a. payable annually for a tenure of 10 years and Rs.149 crores has been raised by issue of Taxable Unsecured Bonds at the rate of 11.90% p.a. payable annually for a tenure of 7 years with put and call option after 5 years. Further, the raising of taxable unsecured bonds at the coupon rate of 11.90% payable annually is currently on and the Corporation expects to raise the funds to the tune of Rs.300-400 crores, and out of which Rs.149 crores has already been received by the Corporation as mentioned above.

Term Loan

The Corporation has drawn Rs.3 crores from BOB at the Bank's PLR rate against the last year sanction.

During the year, PFC has raised Tax-Free, Unsecured Bonds (through private placement basis) of Rs.75 crores. The bonds have been raised unsecured and in the nature of debentures for 10 years tenure without put and call option. The bonds have been raised at 8.70% coupon rate which is the most competitive rate at this point of time in the Capital Market.

Currently, certain banks namely Canara Bank, Oriental Bank of Commerce, State Bank of Patiala have sanctioned unsecured term loan amounting to Rs. 250 crores for which agreements are yet to be signed.

3. RESOURCE MOBILISATION - INTERNATIONAL

In order to meet its increasing fund requirements, PFC continued to tap the External Commercial Borrowings markets also. The details of the Loan raised as on date in the current FY are as under:

Floating Rate Notes Issue Of US $ 100 Million

PFC has recently raised US $ 100million through a Floating Rate Notes Issue at a very competitive price of 145 bp over the US Dollar 6 months LIBOR having a maturity of period of 7 years with a put option at the end of 5 years. The loan agreement was signed on 22nd July,1999.

EXTERNAL CREDIT UTILISATION

World Bank

The loan of US $ 265 Million (revised to US $ 215 Million) from World Bank for Power Utility Efficiency Improvement Project routed through Government of India become effective from 18th March, 1997. The Corporation has utilised the loan successfully to the tune of US $ 208 Million. Further, PFC is exploring the possibility of tying up for a line of credit of US $ 500 Million with the World Bank.

Asian Development Bank
The loan of US $ 250 Million (revised to US $ 210 Million) from ADB under Power Efficiency (Sector) Project routed through the Government of India became effective from 22nd July, 1992. The Corporation has utilised the loan to the tune of US $ 190 Million and closed the loan. Recently, ADB has sanctioned a T.A. Grant of US $ 1 Million on 24th November, 1999. PFC is also negotiating with ADB for another loan of US $ 250 Million for various power utilities.

DFID (UK) Assistance
The ODA (predecessor of DFID) of UK signed an Agreement with Government of India on 17th September, 1993 for Energy Efficiency Programme, under which a Project of Renovation and Uprating of Hirakud Hydro Power Station of Stage-I Unit 1 & 2 has been approved. The funds are to be channelised through PFC. PFC has sanctioned a sum of US $ 23.52 Million and claims submitted to Government of India equivalent to Rs.65.20 Crores as on 23rd December, 1999.

Kreditanstalt fur Wiederaufbau (KfW)
PFC signed loan agreement with KfW of Germany in June, 1995 for mixed credit of DEM 46.5 Million under Energy Investment Programme, for financing rehabilitation of existing Power Plants and distribution system. Rehabilitation of Koyna HEP Stage I & II in Maharashtra and Hirakud HEP Stage I,III & IV are to be covered from the loan. PFC has disbursed Rs.52.25 Crores as on 30th November, 1999 for Koyna HEP of MSEB.

The disbursement to Hirakud HEP Stage I,III & IV is expected to start during 2000-2001. Accordingly, KfW has been requested to extend the loan utilisation claiming date from 30th December, 1999 to 30th December, 2002.

Credit Rating:
Standard & Poor's, Moody's
During the year Standard & Poor's (S&P) and Moody's have reaffirmed the rating assigned to PFC at 'BB' and 'Ba2' respectively reflecting sovereign rating for India. Moody's has recently upgraded the 'Outlook' from 'Stable' to "Positive" for PFC as well as for India.

CRISIL
Carried out the rating review exercise and has reaffirmed "FAAA" rating to PFC's Fixed Deposit Programme. CRISIL has also assigned "AAA" rating indicating highest safety to PFC's proposed long-term debt programme.

ICRA
ICRA has also reaffirmed the rating of "MAAA" to PFC's Fixed Deposit Programme and assigned the highest rating of "LAAA" to PFC's proposed long-term debt programme.

4. INSTITUTIONAL DEVELOPMENT

Operational & Financial Action Plan (OFAP)
As part of its developmental role, PFC has been endeavouring to improve operational & financial health of the state power utilities through formulation and implementation of operational and financial action plan (OFAP). Based on a diagnostic review of different areas of operation of utility, an action plan is drawn up in order to bring about improvement in its performance level within the existing structure.

Formulation/implementation of OFAP have helped in bringing about quantitative as well as qualitative improvements in the performance of SEB/SGCs over the years. The major achievements of this mechanism are (i) SEBs have started booking subsidy to achieve 3% ROR (ii) release of subsidy by State Govts. to achieve 3% ROR (iii) revision of tariff on regular intervals (iv) improvement in liquidity through control over receivables (v) capital restructuring etc. Besides improving financial health of SEBs/SGCs, OFAP has helped in improving their operational parameters such as (a) improvement in billing & revenue collection by implementing computerisation schemes (b) improvement in voltage & frequency by installing capacitors (c) improvement in PLF and capacity utilisation through R&M of power stations (d) augmentation of transmission system etc.
During 1999-2000, OFAPs of J&K PDCL was formulated and put in place. Further, OFAP of MSEB has also been revised and accepted by the utility during the year. As of now, 29 OFAPs are in place, for 12 SEBs, 9 SGCs, 5 State Electricity Deptts., 1 autonomous body, 1 transmission and distribution utility incorporated under the Company's Act and 1 Municipal Corporation.

PFC is providing financial package to the reforming states. Salient features of PFC's assistance to reforming states is given below:

(i) 1% interest subsidy on all the disbursements made during 1998-99 where State Govt. had established SERCs before 30th April, 1999.

(ii) Providing technical assistance support in getting the reform related studies conducted.

(iii) Relaxation in exposure/lending norms for a larger financial assistance.

(iv) Relaxation in OFAP conditions for schemes relating to studies, computerisation etc.

(v) Providing Grant/ interest free loans/ loans at concessional rate of interest for studies related to reform/ restructuring, implementation of Computerisation schemes, metering system to improve their billing/ revenue collection etc..

Studies:
The following two studies are being conducted for the benefits of SEBs;

(i) Tariff rationalisation studies for Assam, West Bengal and Punjab.

Detailed study on tariff rationalisation is being carried out separately for Assam, West Bengal and Punjab. Based on the data collected for the above states, a dynamic software model is being developed for fixing the tariff by the utilities, SERCs, keeping provision for requirement of each class of consumers.

(ii)Study on creation of profit centres and organisational improvements for Punjab State Electricity Boards(PSEB):

The study on creation of profit centres and organisational improvements has been taken up to place the operations of PSEB on a commercial basis, with transparent and effective accounting of costs and revenues, in an organisational structure which provides improved efficiency of operations. The study will help to recognize and promote better efficiency of operations with all of its attendant benefits.

5. ACCLERATED GENERATION & SUPPLY PROGRAMME (AG & SP)

The Accelerated Generation & Supply Programme (AG&SP) was launched by Govt. of India in 1997-98 to accelerate the power supply to consumers through implementation of R&M and Life Extension schemes, completion of on-going generation projects and construction of missing transmission links in addition to the system improvement. There is also a provision of grants under the Programme for all such studies like RLA/LE, reform & restructuring and DMS that are considered desirable and necessary by PFC to meet the policy objectives of the Government of India and PFC under the programme. The programme has made considerable progress since the time it was conceived in 1997-98 and all round gradual improvements have been realised during the implementation of the programme.

During 1997-98, PFC disbursed about Rs.1272 crores, against a target of Rs.1050 crores and during 1998-99, disbursement is Rs.1879 crores against a target of Rs.1205 crores, out of which Rs.21 crores is for NE States. During, 1999-2000, upto Nov.'99, PFC has disbursed about Rs. 812 crores.

The programme has helped in commissioning of generation plants having installed capacity of 1846 MW during 1997-98 and 1998-99. In addition the following important generation projects covered under AG&SP have been commissioned during the current financial year (upto Nov.'99) :

- Tsutha Mini HEP (2x350 KW) of Nagaland
- Teiri Small HEP (3x1 MW) of Mizoram

Sl. No.	Discipline	Disbursement 1997-98	1998-99	1999-2000 (upto 11/99)
1.	On-going generation projects.	960	1315	525
2.	R&M/LE, Refurbishment schemes.	78	209	176
3.	Augmentation of supply.	234	355	111
	TOTAL AG&SP	**1272** (1050*)	**1879** (1205*)	**812** (1450*)

* Target disbursements.

- Kodasalli Dam PH HEP (Stage-II) Unit 3 of KPCL 40 MW
- Raichur TPS Unit 6 of KPCL 210 MW
- Upper Indravati HEP unit 1 of OHPC 150 MW
- Rajghat HEP units 1,2 & 3 of MPEB 45 MW
- Sanjay Gandhi TPS Unit 4 of MPEB 210 MW

Total : 658.7 MW

6. RENOVATION, MODERNISATION AND LIFE EXTENSION OF OLD THERMAL AND HYDRO POWER PLANTS

To speed up implementation of R&M works in thermal and hydro plants, Two committees have been constituted 'Standing Committee for Renovation, Modernisation and Uprating for Hydro schemes under Phase-II' and 'Steering Committee on Review and formulation of R&M Prospective Plan for Thermal Power Stations'. On its part, PFC is providing financial assistance for R&M projects under relaxed conditionalities. The Corporation has so far sanctioned Rs.2375 crores and disbursed Rs.1097 crores for various R&M schemes in the country.

In order to bring older generation units to an acceptable level of efficiency, availability and reliability, it is important that scope of studies/ works be well defined to include all necessary activities before inviting competitive bids from vendors for works. To facilitate this, PFC has registered qualified vendors through global PQ Bids to undertake R&M and LE Studies/ works for old coal fired thermal plants in August, 1998. Model Bid Documents for inviting competitive bids have also been prepared and are being used by SEBs. Similarly, for RM&U and LE Studies/works of hydro power plants, evaluation of global PQ Bids of vendors is also completed and registration is under finalisation. This pro-active role of PFC is expected to streamline renovation/modernisation activities and speed up its implementation.

7. CONCESSIONAL FINANCIAL ASSISTANCE FOR TAKING UP POWER SECTOR STUDIES

In line with its developmental role in the Power Sector by providing technical and financial assistance, PFC is strategically providing grants, interest free and/or concessional loans to motivate State Power Utilities for taking up studies to supplement their efforts to improve upon their performance by undertaking useful studies in Power Sector. PFC has earmarked 0.4% and 0.6% of its net profit of the previous year for utilising towards grants and interest free loans towards following:

- Model DMS Study phase-I
- R&M and LE studies - Thermal
- R&M and LE studies - Hydro
- Power System studies for development
- Investigation and DPR for HE projects

Further, 1% of its net profit of the previous year is earmarked for concessional loans towards development/ efficiency improvement, project preparation, supervision, implementation, procurement of computer hardware/ software, communication equipment including VSAT, equipment for training institute and laboratories in any other study that a power utility would like to undertake for improvement in its operations.

8. CONTRIBUTION TO PHYSICAL ACHIEVEMENT THROUGH PFC FINANCING

PFC's financial assistance have cumulatively helped in installation of 9325 MVAR Shunt Capacitors; additional generation of 4380 millions units per annum through Renovation & Modernisation of Thermal Power Plants; addition of 209 MW by way of restoration of capacity and additional generation of 478 millions units per annum through Renovation and Uprating of Hydro Power Plants; addition of 11215 MW of Thermal Generation and 1041 MW of Hydel Generation capacity by way of completion of on going generation projects; addition of 19786 Ckt. Kms. of transmission lines and 27420 MVA transformation capacity through Transmission schemes; 5392 Ckt. Kms. of transmission lines, 5494 MVA transformation capacity and 1100 MVAR capacitors through Urban Distribution schemes, till March, 1999.

9. PARTICIPATION IN PRIVATE POWER PROJECTS

PFC has so far sanctioned 19 loans worth about Rs.3400 crores including Rs.398 crores to Jai Prakash Power Ventures Ltd., Rs.318 crores to Ispat Energy Ltd., Rs.400 crores to BPL Power Projects Ltd., Rs. 300 crores to Vamigiri Power Generation Ltd. Mostly, PFC works in consortium with other Financial Institutions like IDBI, ICICI, IFCI for financing private power projects.

10. FINANCING WORKING CAPITAL REQUIREMENTS

PFC has decided to provide finance against Working Capital requirements of State utilities. This decision greatly helped the state utilities, especially when they have to resort to cash credit from banks and short term loans from other FIs for Working Capital requirements which are very expensive. Further, for want of timely infusion of funds, the power generation sometimes gets affected.

The scheme covers all existing borrowers in the State Sector who are not declared as defaulters by PFC at any point of time in the 12 months preceding the month in which the application for Working Capital Loan (WCL) is received by PFC. The actual quantum of WCL to be granted will be determined based on the utility's need for such loans, security available etc. Loans for the Working Capital bear interest rates of 13.5% + interest tax for periods upto 60 days, 14% + interest tax for periods between 60 to 120 days, respectively. The Corporation has so far sanctioned an amount of Rs.700 crores and disbursed the same. The borrower can also roll over the WCL for not exceeding 120 days at a time. Rebate for timely payment at 0.5% is available for this scheme also as in the case of term loan.

Leasing Scheme for Power Equipment

PFC had during the last year, introduced financial leasing of power equipment to the entities in power sector. Any equipment/ machinery essential for power projects and associated works, such as generators, turbines, transformers, capacitors and any defined portion of a power projects. All entities in State Sector, municipal bodies, private sector, joint sector engaged in power generation transmission & distribution, energy conservation, R&M etc. and associated sector are eligible for funds under this scheme.

PFC had so far sanctioned an amount of Rs.285 crores under this scheme and disbursed an amount of Rs.280 crores.

Direct Discounting of Bills Scheme

This is another scheme recently launched by PFC. The credit under this scheme is available to all equipment manufacturers to enable them to sell their equipment on deferred payment terms to the purchasers in power sector. Under the scheme, the delivery of equipment machinery/ plant is made by the seller to the purchaser against usance bills duly accepted guaranteed by purchaser's banker. Duly executed usance bills are discounted by the seller with PFC so that the seller gets immediate payment while the purchaser gets the facility of deferred payment terms. The scheme covers sale of machinery, capital goods and turnkey projects. Extent of assistance under this scheme is available upto 100% of the invoice value including insurance, freight and taxes.

The Corporation has so far sanctioned an amount of Rs.50 crores and disbursed Rs.50 crores under this scheme

11. NEW BUSINESS ACTIVITIES

With a view to offering diversified products under one roof, PFC has recently launched two new services namely, Lenders Engineers' Services and Consultancy Services. While the objective of the former is to protect the lenders from Project Investment & Implementation risks, the aim of the latter is to offer turnkey solutions for investors keen on setting up power facilities in the country. Future expansion in business is envisaged by setting up of an Equity Fund, Take-out financing, Venture Capital, new financial services, etc. so that all facilities are available under one roof for the benefit of power utilities.

12. CUSTOMER ORIENTATION

PFC has been, from time to time, organising meetings with the Chairman of the state power utilities , Energy Secretaries and other senior officials from State Governments. The main objective of these meetings is to understand better the expectations which the state utilities and State Governments may have from PFC and to evolve a common strategy to reorient the operations of PFC vis-à-vis state utilities for a mutually beneficial relationship and faster growth.

13. TARGETS, ACHIEVEMENTS AND ANTICIPATED TARGETS TO BE ACHIEVED DURING THE REMAINING PERIOD (IN THE FY 1999-2000)

Parameters	Targets (i) for 1999-2000	Achievements (ii) as on 30.11.99	Difference between (i) & (ii) Anticipated 1.12.99 to 31.3.2000
Sanctions	2800	5086	-
Disbursements	2250	1058	1192
Realisation	500	547	-
Resource Mobilisation	2200	774	1426
Accelerated Generation & Supply Programme	1400	812	588
Gross Margin	500	363 (for the period ending 30.9.99)	137
Net Profit to closing Capital Employed (%)	3.23	2.72 (for the period ending 30.9.99)	0.51
Operating Ratio % (Operating Cost to Operating Revenue)	64.64	52.28 (for the period ending 30.9.99)	-

14. FUTURE PERSPECTIVE:

Plan During 2000-2002 (Balance Period of Ninth Plan)

During the Ninth Plan, PFC has projected to make disbursement of Rs.17,000 crores. Of this, the disbursement in the first 2 years have been Rs.4493 crores. The higher scale of disbursements during the remaining period of 9th Plan is in line with the Government's plan to provide substantial part of the proposed capacity addition during this period.

Plan During 2002-04

During the years 2002-03 and 2003-04, the Corporation has targetted disbursement of Rs.7000 crores and Rs.8500 crores, respectively.

POWER GRID CORPORATION OF INDIA LTD (POWERGRID)

Power Grid Corporation of India Limited was incorporated on October 23, 1989 with an authorised capital of Rs. 5,000 crores as a public limited company wholly owned by the Government of India. It was an attempt to address the need for creating a national power grid so that inadequacies in power transmission system caused by the existence of a number of players could be rectified. The various Central Generating organizations like NTPC, NHPC, NEEPCO, NLC, NPC and Joint Ventures like THDC, apart from their main business of setting up power stations were also planning, constructing, operating and maintaining transmission lines and Sub-stations for transmission of power upto main grid points of SEBs. This created multiplicity of ownership along with SEBs in the power transmission sector which were posing numerous operational and commercial problems in grid operations.
The Corporation was formed with the following objectives :

- To plan, promote and build an integrated and efficient power transmission system network in all its aspects including investigation, planning, engineering and design.
- To construct, own, operate and maintain transmission lines, sub-station facilities and appurtenant works.
- Wheeling of power generated at various power stations in accordance with the policies and objectives laid down by the central government from time to time.
- Keeping abreast of technology development in transmission, load despatching and communication system.

POWERGRID incorporated in October, 1989, started functioning on management basis with effect from August, 1991. It took over transmission assets from NTPC, NHPC, NEEPCO and other Central/Joint sector organisations.

In addition, it took over the operation of existing Regional Load Despatch Centres from CEA in a phased manner which are now being upgraded with state-of-the-art unified load Despatch and communication schemes. According to its mandate, the Corporation apart from providing transmission system for evacuation of central sector power is responsible for establishment and operation of Regional and National Power Grids to facilitate transfer of power within and across the Regions with reliability, security and economy on sound commercial principles.

The unfolding of events in the Indian power sector during 1998-99 had made it a watershed year in the history of the country. Several landmark policy initiatives were taken by the Government of India including recognising "Transmission" as a distinct entity; opening up of transmission to private sector for investment and conferring Central Transmission Utility (CTU) status to POWERGRID.

1. ACHIEVEMENTS OF POWERGRID

POWERGRID has been continuously achieving "Excellent" rating for the MOUs with Ministry of Power, since signing its first MOU in the year 1993-94. POWERGRID was ranked at 2nd position for the year 1997-98 in MOU rating amongst the PSEs in the country and was the only PSE in the Indian power sector to receive the "The Prime Minister's MOU Award" for the year. POWERGRID has been excelling consistently, surpassing the targets in all the performance parameters relating to operational, constructional, financial and commercial aspects. Based on its impeccable performance, POWERGRID has been recognized as "Miniratna" PSU by the Government of India and marches ahead towards future excellence.

It has made significant achievements in executing transmission lines in all regions, despite varying geographical and climatic conditions over the country. More than 17,000 circuit kms were constructed since its inception. A high level in-house engineering and project management team enables POWERGRID to execute its projects on time even in extremely difficult terrains and many a time in the face of insurgency and law and order problems.

During a short span of 7 years, asset base of the company has grown from Rs. 3,521 crores in 1992-93 to Rs. 8,850 crores in 1998-99, thereby registering an average annual growth rate of 18%. The turnover went up from a modest Rs. 634 crores in 1992-93 to Rs. 1,770 crores in 1998-99, registering an average annual growth rate of 21%. The Net Profit was Rs. 444 crores in 1998-99 and has an average annual growth of 15% compared to 1992-93. POWERGRID is a consistently dividend yielding company and has paid dividend of Rs. 20 crores to Government of India during 1998-99. Presently, POWERGRID is operating and maintaining **over 37,000 circuit kms**. of transmission lines criss-crossing the entire length and breadth of the country, comprising of 400 KV, 220 KV, 132 KV AC transmission lines and HVDC

transmission systems. Its network possesses transformation capacity of 30,395 MVA distributed over 62 Sub-stations. About 30,000 MW power is transmitted through POWERGRID system which constitutes about one third of total generating capacity in the country.

In order to utilise the existing facilities fully, POWERGRID has accorded top priority for maintaining high degree of transmission system availability. In North-East Region, where several types of problems like law and order, tough terrain etc. are being faced, the system availability increased from 88% in 1991 to over 98% at present and number of trippings per line brought down to 6.5% per annum. As a result, its consistent performance in maintaining transmission system availability of over 98% since its inception has earned the unique distinction of being ranked amongst top six transmission utilities in the world. All this has been possible through excellence in best O&M practices at par with International Utilities which include :

- Extensive Hot-line Maintenance
- Emergency Restoration System
- Thermo-vision scanning of lines
- On line DGA monitoring of transformers
- Condition monitoring of Sub-station equipment

2. BUSINESS DEVELOPMENT AND CONSULTANCY

POWERGRID has already provided consultancy to various organisations both in public and private sector. Few major clients of POWERGRID worth mentioning include Merz & McCellan, U.K.,Price Waterhouse, U.K., State Electricity Boards of Orissa, Bihar, Pondicherry, Andhra Pradesh, Karnataka and West Bengal, Delhi Vidyut Board and West Bengal Power Development Board. Today POWERGRID is earning turnover of over Rs. 50 crores from these assignments. POWERGRID has identified focus on neighbourig SAARC countries, Latin American and Middle East (Saudi Arabia, UAE etc.) countries etc. In the next 5-7 years, POWERGRID aims to garner about Rs. 100-200 crores of business from global markets and would like to increase the same to Rs. 500 crores in the next 15 years.

3. UNIFIED LOAD DESPATCH AND COMMUNICATION FACILITIES

Apart from the scientific streamlining of operations for existing load despatch facilities after their take-over, POWERGRID plans to invest around Rs. 2,000 crores to establish Unified Load Despatch and in design, implementation, maintenance compatibility in its equipment and systems, thus leading to a fully dedicated and integrated grid control and communication network amongst the regions. The state-of-the-art EMS/SCADA technologies and dedicated communication facilities would ensure effective and optimal grid operation, minimal grid collapses and monitoring and control of inter-regional power exchanges to facilitate proper delivery of allocated shares from the central sector stations to the beneficiary states. All these Load Despatch and Communication projects are expected to be completed progressively by 2002.

4. IN-HOUSE ENGINEERING EXPERTISE

POWERGRID has achieved in-house standardisation of tower designs which would contribute substantial saving not only in implementation period of upto one year but also optimise cost of the projects. Modern O&M techniques adopted have contributed in liquidation of inventories, yielding a benefit of about Rs. 150 crores. Further, efforts towards import substitution saved about Rs. 100 crores through development of indigenous vendors. POWERGRID has developed first time in the country its Environmental & Social Policy and Procedure (ESPP) through public hearing and discussions.

To cater to diverse geographical and climatic conditions of the Indian nation, POWERGRID has designed transmission towers for different geographical conditions like wind and ice, marshy, water logged and mid-stream locations besides special towers for rivers and power line crossings.

POWERGRID already employs Hot-line maintenance technique to ensure line availability without interruptions, use of conventional earthing devices in double circuit transmission line for maintenance of one circuit when the other is charged, Thermo-vision scanning of line for locating hot spots, Emergency Restoration Systems in times of natural disasters.

To increase power transfer capability and conserving Right of Way, POWERGRID is contemplating to induct state-of-the-art power transmission technologies like use of all aluminium alloy conductor, polymer insulators, flexible AC transmission systems, upgrading the existing transmission systems, Time Synchronisation at sub-stations upto an accuracy of a few micro-seconds and much more.

POWERGRID has embarked upon a conscious policy to invest in Research and Development (R&D) to establish benchmark and remain at par with international utilities to enable Company to sustain growth in the next 15-20 years and beyond. The Organisation plans to undertake the specific Research activities/projects in collaboration with institutions like CPRI, IITs, etc. in the country and if need be with International Research & Technical Institutions.

5. EMBARKING INTO TELECOM BUSINESS

To make effective utilisation of its transmission infrastructure, POWERGRID will be heralding into telecommunication business. Its existing transmission network provides an excellent opportunity to establish national information infrastructure for Long Distance Telecommunication Services. The existing network facilitates a readymade right-of-way for installation of Overhead Optical Fibre Ground Wires (OPGW) for carrying high speed audio-video and data signals and would provide extremely robust support in a remarkably cost effective manner.

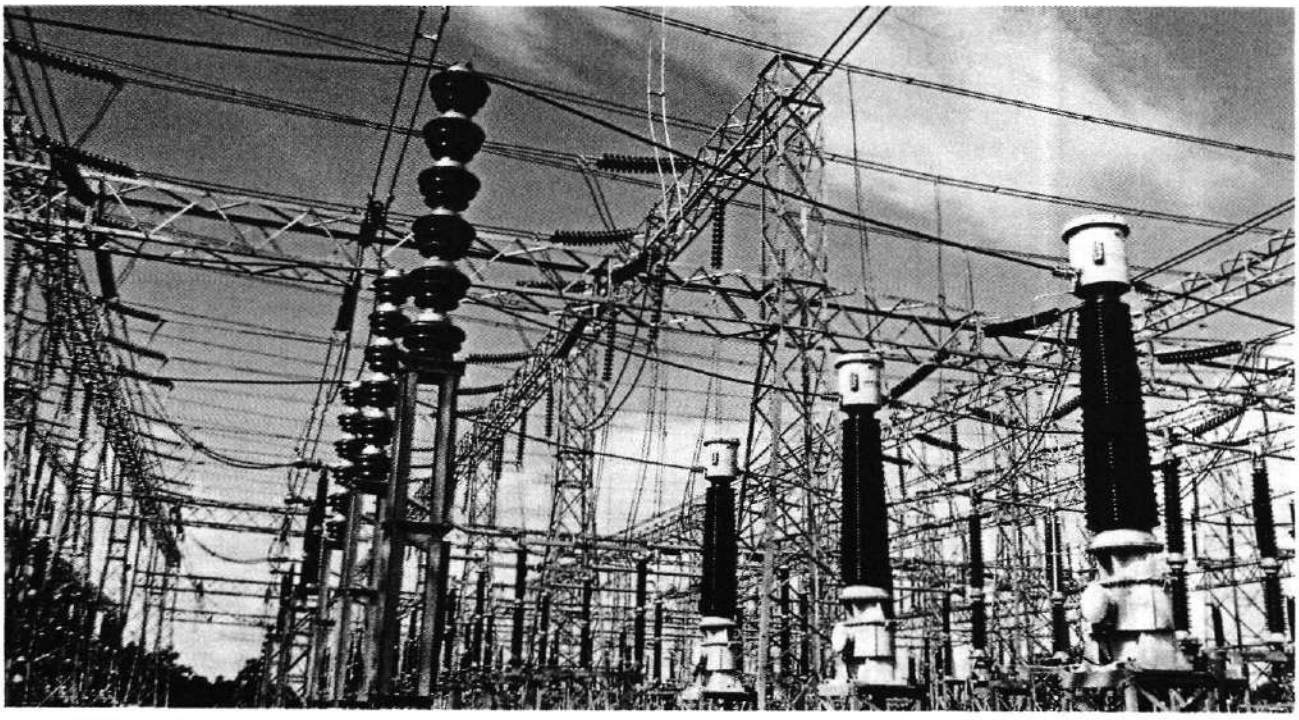
6. GREEN BOUNDARIES- CONCERN FOR THE ENVIRONMENT

POWERGRID has evolved an Environmental and Social Policy and Procedures (ESPP). This unique policy document has been prepared by interaction with the public, NGOs, Project Affected Persons, International Financial Institutions, various Government agencies at State and Central level. The three key principles of POWERGRID's ESPP are Avoiding, Minimisation and Mitigation. Implementation of an Environmental and Social Management Plan has been made an integral part of the project execution process.

7. DISASTER MANAGEMENT

POWERGRID has equipped itself to restore the transmission systems in quickest possible time through deployment of Emergency Restoration Systems (ERS). The collapsed towers are easily bypassed using ERS structures resulting in restoration of the damaged system within shortest possible time. The damaged towers can then be attended to, without effecting the regular power flow. POWERGRID has successfully deployed ERS on number of occasions to restore it's own and State Electricity Boards damaged transmission system.

The devastation caused by cyclone of Gujarat in June 1999 and Orissa in Oct. 1999 was attended by Powergrid on war footing and normalcy was restored within few days which otherwise would have taken months of time.



Power Grid Sub-station

JOINT VENTURE CORPORATION
TEHRI HYDRO DEVEPOPMENT CORPORATION (THDC)

The Tehri Hydro Complex comprises the 1000 MW Tehri Dam & HPP (Stage-1) the 1000 MW Pump Storage Plant, and the 400 MW Koteshwar Dam & HPP. Tehri Hydro Development Corporation (THDC) was incorporated on July 12th, 1988 to plan, promote, organize, execute, operate and maintain Hydro Power Projects in Bhagirathi-Bhilangna valley in U.P. as a joint Venture of Govt. of India and Govt. of U.P. both sharing the cost of power component (20% of Stage-I cost) of the project in the ratio of 75:25 respectively. The irrigation component is to be funded entirely by the Govt. of U.P.

Tehri Hydro Complex (2400 MW) was transferred to THDC by Govt. of U.P. in June 1989. Government of India on 15.03.1994 accorded approval for execution of Tehri Dam & HPP (Stage-I) alongwith the essential and committed works of Tehri Pump Storage Plant & Koteshwar Dam Project at a cost of Rs. 2963.66 Crs. (at March'93 price level). The Revised Cost Estimate amounting to Rs. 4967.77 Cr. at Dec'97 price level (excluding IDC) for Tehri Stage-I including Essential & Committed Works of PSP and Koteshwar has been approved by CEA. Investment approval to the revised cost estimates by the Govt. remained under process.

The Tehri Power Complex comprises of four components viz., i) the 260.5 M high rock fill Tehri Dam and 1000 MW Hydro Power Plant (HPP) (Stage-I of the Complex); ii) 103.5 m. high concrete Dam with 400 MW Hydro Power Plant at Koteshwar 22 Km downstream of Tehri; and iii) 1000 MW Pump Storage Plant (PSP) situated just downstream of the confluence of Bhagirathi and Bhilangana river at Tehri, alongwith 800 KV Associated Transmission System for evacuation of power from the Tehri Hydro Power Complex to be executed by Power Grid Corporation of India.

With the Tehri Stage-I progressing well, THDC now proposes to take up execution of the 400 MW Koteshwar Dam & HPP. Proposal for investment sanction for Koteshwar Project is presently under consideration of the Govt.

1. BENEFITS

Tehri Dam & HPP Stage-I is a Multipurpose Project catering to the needs of Power Generation, Irrigation and Drinking Water. The main benefits from the Stage-I when completed would be :

- Addition to the installed capacity in Northern Region : 1000 MW (2400 MW on completion of Stage-II).

- Annual energy availability (peaking) : 3568 Million Units (6500 MU on completion of Stage-II).

- Additional irrigation in 2.7 Lacs Ha. Area besides stabilisation in existing 6.04 Lacs Ha. area.

- 162 Million Gallons of water per day for drinking water supply to Delhi to cater to a population of 40 Lacs.

- 108 Million Gallons of water per day (200 Cusecs) for drinking water supply to the towns and villages of Uttar Pradesh.

- Integrated development of Garhwal Region, including construction of a new hill station viz. New Tehri Town (NTT) with provision of all possible facilities, improved communication, education, health, tourist traffic, setting-up of non-polluting industries, development of horticulture, fisheries, afforestation of the region etc. much to the advantage of the people of that region.

2. STATUS OF THE PROJECT WORKS (TEHRI STAGE-I)

The present status of the Project is;

- Almost all infrastructural works have been completed at the project site.

- All the four diversion tunnels have been completed and the river diverted through the two right bank tunnels.

- Excavation of four numbers head race tunnels (two each for Tehri HPP Stage-I & Tehri PSP) of 8.5 m diameter each with a total length of 3667 m. have been completed and lining work is complete in Stage-I tunnels while it is partly done in tunnels for PSP. The balance works are in progress.

- The foundation of the Main Dam over the entire length of 1.1 Km. has been laid and the Main Dam raised upto 15 M above the river bed level.

Main Dam, Spillways and the Civil Works of Power House Complex are presently under execution, and the status is as under :

i) Dam

Work of Main Dam (260.5 m high Earth and Rock Fill Dam) was awarded in Jan. '97. After completion of work of abutment striping, work on further raising of the Main Dam has since been progressing. The Main dam has been raised to an average height of EL 690 m. i.e., around 103 m. from the deepest foundation level.

ii) Spillways

The work of Spillways was awarded in Dec.'98. The open excavation work for Spillways on various fronts like Chute Spillway, Right Bank Shaft Spillways and Left Bank Shaft Spillways is in progress. The excavation of Right Bank Shaft Spillway has been completed. Around 41% of open excavation has been completed till Oct.'99.

iii) Power House Civil Works

The works of Power House Complex awarded in three packages are in an advanced stage. Excavation of various underground structures like Approach Adits, Drainage galleries, Vertical Penstocks, Transformer Hall etc. have been completed. Excavation of Machine Hall is under progress. Assembly of Draft Tube pieces for Unit-IV has been started.

iv) E&M Equipment

Contracts for Turbine, Generator, Valves and Control Systems with financing have been awarded to a consortium of manufacturers from Russia, Ukraine, and ABB-Germany. Loan Agreements have been signed with KEW, Germany for financing of the ABB portion of supply. Model studies for the Turbine have been successfully conducted at Russia, and witnessed by THDC/CEA representatives.

3. REHABILITATION

Rehabilitation is being implemented in two phases. The Phase-I covers those families which are affected by construction of Coffer Dam, including the Old Tehri Town. In Phase-II, all remaining families affected by construction of Main Dam would be rehabilitated.

The Phase-I Rural Rehabilitation is nearly completed, with 98.5% of the families having been paid compensation and rehabilitated. In Phase-II, 435 out of 2845 rural families have been rehabilitated and land for the balance families in Hardwar/Dehradun areas is being acquired. The entire Phase-II affected population would be rehabilitated well before the impoundment of the reservoir.

The Urban affected population is being rehabilitated in New Tehri Town and at Rishikesh/Dehradun as per their option. The NTT has been developed at a height of 1350-1850 M. and has all modern facilities including a University Campus, Hospital, Educational and Financial Institutions, Markets, Places of worship and public utility buildings.

4. ENVIRONMENT

Ministry of Environment and Forests had laid down certain conditions. Studies were to be carried out and based on their findings, action plans had to be drawn up for execution pari-passu with construction of the project. All the required studies have been completed and reports submitted to the MOEF. It has been established that there would be no adverse effect on the environment and bio-diversity of the area due to Tehri Project. THDC is carrying out Catchment Area Treatment in the high and very high erodibility classification. Around 34596 Ha. area has been treated so far. MOEF granted forest clearance in June, 1997 with stipulation that the project authorities will carry out compensatory afforestation in an area of 3815 ha. of non forest land. An area of 4540 ha. has already been planted in districts of Jhansi and Lalitpur in U.P. The plantation done on non-forest land is now being converted into reserve forest.

5. COMMISSIONING SCHEDULE

The First unit of 250 MW is scheduled to be commissioned by March'2002, and balance three units of 250 MW each at an interval of 3 months each.

6. EXPENDITURE ON THE PROJECT

Expenditure incurred on Tehri St-I upto Oct.'99 is Rs. 2217.46 Cr.

7. KOTESHWAR PROJECT (400 MW)

The Koteshwar Project consists of a 97.5 m. high concrete dam with a surface power house at the toe of the dam, housing four units of 100 MW each with Francis type turbines. Necessary access and major infrastructure required to start the Koteshwar project is already established. Before construction of the dam, a diversion tunnel of 8 m. Diameter and of 582.0 m. length would be constructed to divert the flow of river. Work on this diversion tunnel has been taken up.

8. PUMP STORAGE PLANT (PSP) (1000 MW)

Tehri PSP Scheme has been envisaged to generate 1000 MW of peaking power for enhancing system reliability and also to provide balancing load to the thermal base generation during off peak hours. Reservoir created by the Tehri Dam would function as the upstream reservoir for this Project.

Koteshwar Dam, will create a balancing reservoir to regulate the releases from Tehri Reservoir and serve as the downstream reservoir for the PSP. Certain essential works of PSP were taken up alongwith the execution of Stage-I works. Excavation of Headrace Tunnels for both Stage-I and PSP has been completed; lining work is also completed in Stage-I tunnels, and partly done in PSP tunnels. The Intakes for Headrace Tunnels for PSP are being constructed alongwith the Stage-I works. The Transformer Hall constructed in Stage-I would also serve the PSP. Thus, major Civil Works to be taken up in PSP would involve only the Machine Hall and Tail Race Tunnels. The Pump Storage Plant envisages 4 reversible units of 250 MW each. The main feature of the Project is the variation of about 90 m between the maximum and minimum head, under which the reversible units shall operate.

Construction of the PSP would be taken up, after obtaining Government approvals, once the DPR is updated for which action is already initiated.

9. NEW PROJECTS

Two green field Hydro-Electric Project namely Pala Maneri (4x104 MW) and Lohari Nag Pala (4x130 MW) located on Bhagirathi River have been handed over by Govt. of U.P. to THDC for implementation.

Preliminary investigation works for above projects have been identified and are being taken up.

NATHPA JHAKRI POWER CORPORATION LIMITED (NJPC)

The Nathpa Jhakri Power Corporation Limited (NJPC) was incorporated on May 24, 1988 as a joint venture of the Government of India and the Government of Himachal Pradesh with the Corporate Mission to plan, promote, organise and execute Hydro - Electric Power Projects in the Satluj river basin in Himachal Pradesh. The authorised share capital of NJPC is Rs. 4,500 crores.

1. NATHPA JHAKRI HYDROELECTRIC POWER PROJECT (6 x 250 MW)

The Naptha Jhakri Hydro-electric Project (6x250 =1500 MW) in the Distt. Kinnaur at Shimla in Himachal Pradesh is under execution by NJPC.

The World Bank has sanctioned a loan of US $ 437 million for part financing of the project. The Project is to be financed in 1:1 debt equity ratio. The equity portion is to be shared between Government of India (GOI) and Government of Himachal Pradesh (GOHP) in the ratio of 3:1 respectively.

In the implementation of its first project, NJPC is supported by CWC and CEA as the Principal Consultants, along with the consortium of Nippon Koei, Japan; Electrowatt, Switzerland; and WAPCOS, India, as the Retainer Consultants. Besides these, NJPC is also backed by the services of a Panel of Experts, comprising both nationally / internationally renowned professionals and a Consultant on Commercial matters.

The Nathpa Jhakri Hydroelectric Power Project envisages the construction of :

- A 60.50 m. high concrete Dam on Satluj river at Nathpa to divert 405 cusecs of water through four Intakes.
- An underground Desilting Complex, comprising four chambers, each 525 m. long, 16.31 m. wide and 27.5 m. deep (one of the largest underground desilting complex for hydro - power in the World).
- A 10.15 m dia and 27.39 km. long Head Race Tunnel (one of the longest hydro- power tunnel in the World), terminating in a 21 m. dia and 301 m. deep Surge Shaft.
- Three circular steel - lined Pressure Shafts, each of 4.9 m. dia and 633 m. long bifurcating near the Power House to feed six generating units.
- An underground Power House with a cavern size of 222 m. x 20 m. x 49 m. having six Francis Turbines of 250 MW each to utilise a design discharge of 405 cusecs and design head of 425 m.
- A 10.15 m dia and 982 m. long Tail Race Tunnel to discharge the water back into the river Satluj.

2. PROJECT COST

The approved revised cost estimates of the Project is Rs. 7,666.31 crores at June 1998 price level,

3. PROJECT COMMISSIONING SCHEDULE

All the six generating units are estimated to be commissioned by March, 2002.

4. PROJECT BENEFITS

Besides the social and economical upliftment of the persons in its vicinity, on commissioning, NJHPP will generate 6700 million units of electrical energy in a 90% dependable year and would also provide 1500 MW of valuable peaking power to the Northern Grid.

12% of power generated at bus bar is to be supplied free of cost to the state of Himachal Pradesh. Out of the remaining 88 % energy generation, 25 % shall be supplied to Himachal Pradesh at bus bar rates and the balance to the other states of the Northern Region.

5. PROJECT PROGRESS

Infrastructure Work

The excavation of all HRT Adits has been completed. Construction of the residential buildings as well as the non - residential buildings such as the Administrative Office, Transit Camps, Field Hostels, Auditorium etc., have been completed.

Main Civil Works

The implementation of the civil works for the four major civil contracts is in progress with the three joint ventures of Indian and foreign construction companies.

Dam Complex

The slope stabilization of the right and left banks of the Dam area has been completed by installing 40/100 T cable anchors and 200 T cable anchors respectively. The slope stabilisation in the Intake area has also been completed by installing 274 cable anchors of 200 T capacity. So far, 40250 cum. concreting has been placed

in the Dam foundation. The re-diversion of river Satluj for facilitating the commencement of concreting of the Dam foundation in the working season 1999 - 2000, has been achieved on October 12, 1999. After clearing up of the dam pit area of the accumulated debris during the last monsoon, concreting recommenced on November 12, 1999. The excavation of the crown portion of all the four Desilting Chambers has been completed and benching down of these chambers is in progress with Steel Fibre Reinforced Shotcrete (SFRS).

Head Race Tunnel

Heading excavation of a length of 27.138 km (99.06 %) has been completed out of a total length of 27.394 km of HRT. Benching excavation in a stretch of 16.194 km has been achieved. Concreting of HRT from three faces and erection of ferrules at the Manglad reach in HRT are also under progress. The 301 m deep surge shaft has been fully excavated and subsequently 70 % of its concreting has been achieved and consolidation grouting is presently in progress.

Power House Complex

The Power House Cavern has been completely excavated and concreting of its columns, beams and draft tube liners are over. The excavation of the Transformer Hall has also been completed and concreting of its columns and beams are over. The erection of steel liners in the three Pressure Shafts is under progress, with 89 % installation having been achieved after the completion of the excavation of these Pressure Shafts. The concreting of the Tail Race Tunnel (TRT) has also been completed. In TRT outfall area, open excavation is in progress. Presently 110 T cable anchoring is in progress for the stabilisation of slopes adjoining the TRT outfall area.

Installed Ferrules in Horizontal Portion of Pressure Shafts -NJPC

Electro - Mechanical Works

The Generating Units and Associated Equipment contract was awarded to the European consortium of ABB, Kvaerner Energy, Siemens, Sulzer and BHEL and became effective on November 01, 1994. Around 88.9 % of the consignment of Turbine and Generator components from the consortium agencies have been received at the project site. Two nos 250/50/10 Ton EOT cranes in Power House have been commissioned. The erection of Draft Tubes for Units I to VI has been completed. The erection of spiral casings of Units I, II, III & IV has been completed. The critical hydraulic pressure testing activity for Units I to IV has also been successfully achieved. The erection of turbine runner alongwith shaft for Units I to III have been put in position. The Stator Assembly of Unit I has also been lowered into its pit. The pressure testing of MIV for Unit I & II has been completed.

Contracts have been awarded in respect of other major packages, such as (a) Butterfly Valves (b) Generator Transformers (c) GIS and Bus Ducts, (d) Gates and Hoists packages. Presently various activities of design, manufacturing and supply are under progress for these packages. Around 83 % material of the Generator Transformer package has been received. Some shipments pertaining to the GIS and Bus Ducts Packages have also been received and are under installation.

6. FUTURE PROJECT

NJPC could take up the execution of the proposed Rampur Hydro - Electric Power Project (500 - 600 MW), utilising the tail race waters of NJHPP as a run of the river scheme, during the IX and X Five Year Plans.

DAMODAR VALLEY CORPORATION (DVC)

The Damodar Valley Corporation (DVC) established on 7th July, 1948 by the Damodar Valley Corporation Act, has completed its 51st year of existence. The Corporation has a full time Chairman and two part time Members. The part time Members represent the States of Bihar and West Bengal.

The objectives of the Corporation include:

- Flood Control.
- Irrigation and water supply for industrial and domestic use.
- Generation, transmission and distribution of electrical energy.
- Promotion of afforestation and control of soil erosion in the Damodar Valley; and
- Promotion of industrial, economic and general well-being of the people in the Damodar Vally and its areas of operation.

DVC's command area extends over an area of 24,235 sq. kms. Comprising seven districts of Bihar and five districts of West Bengal.

The Corporation has so far constructed four multipurpose dams at Tilaiya, Konar, Maithon and Panchet and an irrigation system comprising a barrage on river Damodar at Durgapur and a canal system of 2459 kms. The management of Barrage and irrigation system have, however, been transferred to Government of West Bengal in 1964.

1. DVC POWER SYSTEM:

DVC has also constructed five thermal power stations, three hydel power stations and one gas turbine station. The existing power plants of DVC are:

Thermal :		
Bokaro A		175 MW (3x45 MW) & (1x40 MW)
Bokaro B		630 MW (3x210 MW)
Chandrapura		750 MW (3x130 MW) & (3x120 MW)
Durgapur		350 MW (1x140 MW) & (1x120 MW)
Mejia TPS	Unit I	210 MW (1x210 MW)
	Unit II	210 MW (1x210 MW) (Placed under commercial operation w.e.f.15.3.99)
	Unit III	210 MW (1x210 MW) (Placed under commercial operation w.e.f. 28.9.99)
Gas Turbine:		
GTP, Maithon		82.5 MW (3x27.5 MW)
Hydel:		
Tilaiya		4 MW (2x2 MW)
Maithon		60 MW (3x20 MW)
Panchet		80 MW (2x40 MW)

DVC's transmission system runs to a total length of 5455 ckt.Kms. comprising 1152 ckt. Kms. 220 KV lines, 3146 ckt. Kms. 132 kv lines and 1157 ckt. Kms. 33 KV lines. The sytem is supported by 56 sub-stations. The system is also interconnected with NTPC and Chukha and operates as a constituent of interconnected grid system of EREB.

DVC has already covered around 4.76 lakh hect. Of land under its soil conservation activities involving works relating to afforestation, treatment of agricultural upland and improvement of waste land and gullied area. Around 10,260 check dams have also been constructed for controlling run-off soil and providing minor irrigation facilities.

2. OVERALL PERFORMANCE AND ACHIEVEMENT

During the year (April'99-Nov.'99) DVC's system generation was 5179.39 MUs of which 480.06 MUs was contributed by thermal stations, 355.92 MUs by hydel power stations and 17.41 MUs by gas turbines. During the period, DVC's turnover was around Rs.1252 crore (provisional) leading to profit of Rs.105.09 crores (provisional) from the power objects.

Performance Highlight
(April'99- November,1999)

System Generation (MU)	5179.39
PLF (Thermal) on installed capacity(%)	32.73%
Turnover (Rs. Crore)	1252.00
Profit (Rs. Crore)	105.09

During the year (April-November, 1999) DVC achieved a record on 7.9.1999, by meeting the peak demand of 1464 MW.

DVC's Bermo Mines produced 186426 MT of coal during April-November, 1999.

3. MEJIA THERMAL POWER STATION (3X210 MW)

Government of India sanctioned the project in 1986, estimated cost of which stands at Rs.1989.14 crores (third quarter 1995 price level) including IDC of Rs. 427.58 crore and WCM of Rs.9.56 crore. This has been approved. Expenditure on the project till 3/99 was Rs.1518.78 crore excluding IDC and from 4/99 to 11/99 was Rs.27.89 crore (provisional).

Unit I &II of the project were declared under commercial operation w.e.f. 1.12.1997 & 15.3.1999 respectively, while Unit III was declared under commercial operation w.e.f. 28.9.1999.

Work of 220 KV Maithon-Mejia Line has re-started. Construction of Effluent Treatment Plant is on progress.

Residual work of the project is expected to be completed by March, 2000.

4. RENOVATION AND MODERNISATION:

DVC has undertaken R&M programmes in three phases with the objective of extension of plant life of its old and ageing thermal units at Bokaro 'A', Chandrapura and Durgapur and for improvement in PLF.

Comprehensive programme for BTPS 'A', CTPS & DTPS have been formulated. The activities under Phase-II R&M work have almost been completed barring two items which are expected to be completed by March, 2000. The major activities under Phase-III R&M scheme remain, the rehabilitation of one of the GE units (i.e.1,2 &3) of CTPS, one of the GE units (i.e.1,2&3) of BTPS 'A', ESP of BTPS 'A' etc and the estimated expenditure of the identified activities is assessed to be Rs.299.46 crore.

5. FUTURE PROJECTS:

Maithon Right Bank TPS (4x250 MW): According to the current estimate the project cost of this (4x250 MW) Thermal Power Station will be around Rs.4620.00 crore (bases on 1st quarter of 1999-2000 price level) including IDC. Techno-economic clearance is yet to be obtained.

Approval in-principle has been accorded for implementation of the project as export-oriented one, through a Joint Venture Company in which DVC and BSES will have equal shareholding (45% each, the balance 10% with Financial Institutions). Meanwhile, the 1000 MW Inter-state project has qualified for the Mega-projects status under the new power policy guidelines.

Powergrid have been requested to plan for evacuation of power to Northern Region via Sasaram and to Western Region via Rourkela and Power Trading Corporation will take up the responsibility for selling power to these regions.

6. COMBINED CYCLE GAS TURBINE:

The existing 82.5 MW (3x27.5 MW) Single Cycle Gas Turbine Station at Maithon has been planned to be converted to combined cycle which would add 45 MW (3x15 MW) extra to the station. Estimated cost is likely to be around Rs. 150 crore and funding arrangement is yet to be identified.

Mezia Thermal Power Station (DVC)

BHAKRA BEAS MANAGEMENT BOARD (BBMB)

Bhakra Management Board (BMB) was constituted under Section 79 of the Punjab Re-organization Act, 1966 for the administration, maintenance and operation of Bhakra Nangal Project w.e.f Ist October,1967. The Beas Project works, on completion, were transferred by the Government of India from Beas Construction Board (BCB) to BMB as per Section 80 of the Act, 1966 and the Bhakra Management Board was renamed as Bhakra Beas Management Board (BBMB) w.e.f 15.5.1976.

1. FUNCTIONS

The Bhakra Beas Management Board manages the facilities created for harnessing the waters impounded at Bhakra and Pong in addition to those diverted at Pandoh through the BSL Water Conductor System. It has also been assigned the responsibility of delivering water and power to the beneficiary States in accordance with their due/entitled shares. The Board is responsible for the administration, maintenance and operation works at Bhakra Nangal project, Beas Project Unit I and Unit II including Power Houses and a network of transmission lines and grid sub-stations. The functions of Bhakra Beas Management Board are:

To regulate the supply of Sutlej and Ravi-Beas waters to the States of the Punjab, Haryana and Rajasthan through a wide network of canals.

To distribute power from Bhakra Nangal and Beas Projects to the States of Punjab, Haryana Rajasthan, Himachal Pradesh and U.T. of Chandigarh.

The works being managed by the BBMB are broadly grouped as three large multipurpose projects viz. Bhakra Nangal Project, Beas Project Unit-I (BSL Project) & Beas Project Unit-II (Pong Dam).

The Bhakra Nangal Project comprises the Bhakra Dam, Bhakra Left Bank and Bhakra Right Bank Power Houses, Nangal Dam, Nangal Hydel Channel and Ganguwal and Kotla Power Houses. Bhakra Dam is a majestic monument across the river Sutlej. It is a high straight gravity concrete Dam rising 225.55 m (740 ft) above the deepest foundation and spanning the gorge with 518.16 m (1700 ft) length at the top. The Gobind Sagar Lake created by the Dam has 168.35 Sq.Km. area and a gross storage capacity of 9621 million cubic-metre (7.80 MAF). The two power houses, one on the Left Bank (5x108=540 MW) and the other on the Right Bank (2x132+3x157=735 MW), have a combined installed capacity of 1275 MW. The Ganguwal and Kotla Power Houses fed from Nangal Hydel Channel have an installed capacity of 162.65 MW.

The Beas Project Unit-I (BSL Project) diverts Beas Water into the Sutlej Basin, falling from a height of 320 metre (1050 ft) and generating power at Dehar Power House having an installed capacity of 6x165 MW = 990 MW. This project comprises a diversion dam at Pandoh, 13.1 Km long Pandoh Baggi Tunnel having capacity of 9000 cusec, 11.8 Km. Long Sundernagar Hydel Channel, Balancing Reservoir at Sundernagar, 12.35 Km. Long Sundernagar Sutlej Tunnel, 125 Metre high Surge Shaft and Dehar Power Plant.

The Beas Dam at Pong is the highest earth fill (earth core, gravel shell) Dam in India, being 132.6 metre (435 ft) high with a gross storage capacity of 8570 million cubic metre (6.95 MAF). The Pong Power Plant (5x60+1x66=366 MW) is located in the stilling basin d/s of penstock tunnels.

The total installed generating capacity of the BBMB Power Houses is 2793.65 MW detailed as under:-

Power House	Installed capacity (MW)	
Bhakra (Right Bank)	2x132+3x157	735
Bhakra (Left Bank)	5x108	540
Ganguwal	1x27.63+1x24.2+1x29.25	81.08
Kotla	1x28.12+1x24.2+1x29.25	81.57
Dehar	6x165	990
Pong	5x60+1x66	366
Total		**2793.65**

2. GENERATION & TRANSMISSION SYSTEM

The BBMB Power Plants have the highest Plant availability factor (90 to 95%). The generation during 1998-99 was 14110 MU against the target of 10650 MU which is the maximum recorded generation since the inception of Bhakra Beas Projects.

The power generation at BBMB Power stations is being evacuated through BBMB Power evacuation

system running into 3735 Circuit Km length of 400 KV, 220 KV, 132 KV and 66 KV transmission lines and 24 EHV Sub-stations. The BBMB Power evacuation system operates in an integrated manner in the Northern grid with its transmission network spreading over the States of Himachal Pradesh, Punjab, Haryana and Delhi. The system is interconnected with transmission system of Power Grid and the States of Uttar Pradesh, Rajasthan and Delhi.

3. RENOVATION AND MODERNIZATION

All the 5 units of Bhakra Right Bank Power Houses are being uprated from original capacity of 120 MW to 157 MW each. This will result in gain of installed capacity by 185 MW and an additional annual energy generation of 310 MUs. Uprating of Unit No.9, Unit No.6 and Unit No.8 has been completed in February 1996, June 1997 and April,1998 respectively. The Renovation, Modernization and Uprating of Unit No.10 has been undertaken on 9.7.1999 and is likely to be completed by March,2000.

The Renovation, Modernization and Uprating of Ganguwal and Kotla Power Houses had been planned in two phases. Under Phase-I, the RMU has already been carried out resulting in the enhancement in the installed capacity of these two units by 7.35 MW and an additional annual generation of 63 MUs. In phase-II, the RM & U of one more unit each at Ganguwal and Kotla power Houses is under process. This will result in capacity enhancement of 5.94 MW and an increased annual generation of 49 MUs.

Renovation, Uprating and Modernization of one unit of Pong Power Plant from 60 MW to 66 MW was completed on 23.2.1998. The RMU of another unit has been undertaken in November,1999 and is likely to be completed by March,2000. The RMU of other remaining four units will be taken thereafter one by one. The benefits include additional peaking capacity of 36 MW, additional annual generation of 173 LUs in good monsoons when spillage becomes inevitable, apart from the additional 90 MVAR reactive power and life extension of the units.

During the current year the generation from the BBMB Power Houses has been 9032 MUs upto November,1999 and is likely to generate 2970 MUs from December,1999 to March,2000. Thus it would be possible to achieve annual generation of around 12000 MUs during the year 1999-2000 against the target of 10760 MUs laid down by CEA, Government of India.

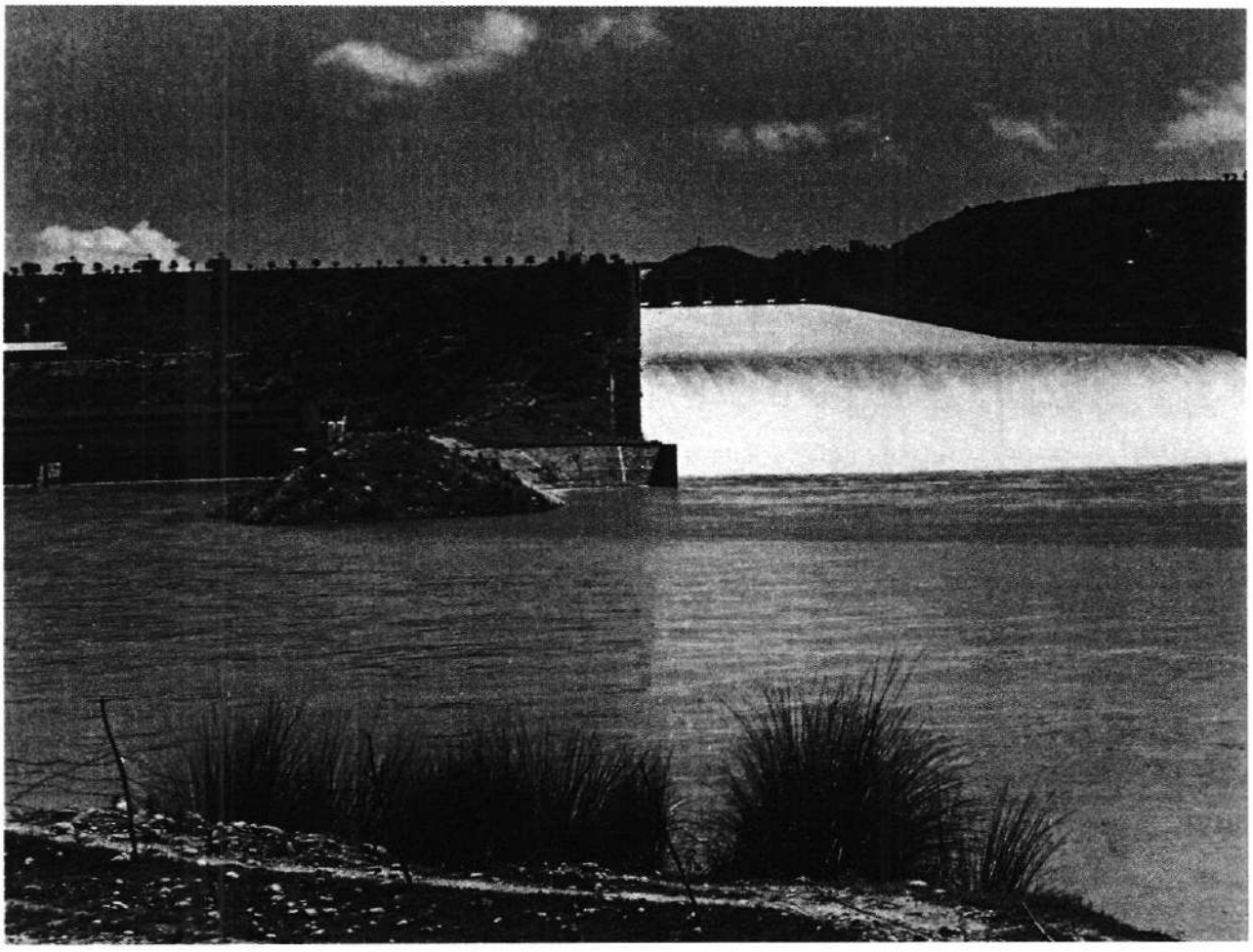
Dehar Power House

4. CONSULTANCY SERVICES

BBMB has acquired long experience and apt expertise in dealing with the problems encountered with the operation and maintenance of Hydro Power Plants and their associated civil works and hydro mechanical structures such as Dams, Hydel Channels, Tunnels, Gates etc. This is accomplished by teams of highly qualified, experienced and dedicated professionals in various disciplines.

BBMB has introduced Consultancy Services for extending its expertise to other organisations globally. Govt. of India has also authorised BBMB to undertake Consultancy Services either independently or as a joint venture with any Central/State/Public Sector Undertakings. BBMB has entered into an Joint Venture with NHPC and signed an MOU on 22nd June,1999 for executing Consultancy jobs jointly at National and International levels and scope of work is as under:-
Renovation, Modernization & Uprating - studies and supervision.

- Reservoir maintenance and flood control.
- Technical problems related to Civil, Electrical and Mechanical fields.
- Post Construction operation and maintenance of multipurpose HEPs.
- Dam safety: inspection and analysis of observed data.
- Design, Fabrication, Testing and Inspection of various Hydraulic and general steel structures, such as Gates, Hoists, Penstocks, Transmission Line Towers etc.
- Testing facilities for materials such as concrete, soil aggregate etc.
- Problems relating to O&M of Hydel Channels/Tunnels.
- Controls, instrumentation and protection.



Pong Dam

CENTRAL POWER RESEARCH INSTITUTE (CPRI)

The Central Power Research Institute (CPRI) was established in Bangalore by the Government of India in 1960. It was organized into an autonomous society in the year 1978. The main objective of setting up the Institute was to serve as a National Laboratory for undertaking applied research in electric power engineering besides functioning as an independent National Testing and Certification Authority for electrical equipment and components to ensure reliability and improve, innovate and develop new products. More specifically the objectives cover the following:

1. OBJECTIVES

To serve as a national centre for applied research in electric power engineering.

To function as an independent and impartial authority for certification and testing of electrical equipments manufactured in the country for quality assurance.

Performing tests for product development

To offer consultancy on problems referred to by utilities and industries.

Undertake sponsored research programmes on subjects of interest in the power systems field.

The Institute has several research laboratories and testing facilities. The Head Office of the Institute is at Bangalore and its other units are located at Bhopal, Hyderabad, Nagpur, Ghaziabad, Thiruvananthapuram and Raichur.

2. PERFORMANCE AND ACHIEVEMENTS - AT A GLANCE

The CPRI continued to play a vital role in quality assurance to ensure reliability of power equipment through testing and certification in accordance with national and international standards.

The Institute has been meeting its non-plan expenditure through revenue generated by testing and consultancy for the last eleven years and the revenue has been increasing over the years.

The Institute is expected to reach the target of Rs.27.00 crores by the year end. Marketing and Publicity has been given a boost by participating in International Exhibitions. This has resulted in an increase in the testing orders by foreign clients. The total foreign exchange earnings estimated for the year 1999-2000 is US $ 1,00,000.

With a goal of achieving full automation in all the activities through computerization and also mechanization of testing activity for speedy preparation of test reports, several servers have been added for fast communication. Test report generation has been automated in Short Circuit laboratory, High Voltage Laboratory & High Power Laboratories of Bangalore and at Switchgear Testing & Development Station, Bhopal and similar work will be completed in Insulation, Planning and Purchase etc. To keep abreast of the latest information technology and global communication, a Web Server for INTERNET communication over leased line was established and is available for the Clients of the Institute for accessing the various test facilities available at the Institute.

To carry out testing on electrical equipments in the earthquake prone areas, a Laboratory to undertake seismic qualification tests is being set up. The Laboratory is likely to commence full-scale tests by April 2001

3. NEW TEST FACILITIES

Some of the new test facilities added during the year are :

i) Steep front impulse measurement system
ii) Test facility for DC insulators
iii) Vibration test system and Mini shaker system for vibration analysis
iv) New test cell for testing medium voltage circuit breakers

4. UNIQUE TESTS / CONSULTANCY CARRIED OUT IN CPRI

Some of the unique tests / consultancy carried out in CPRI during the year are :

i) Renovation & Modernisation and Life extension studies for Bhatinda Thermal Power Station, PSEB. The cost of the contract is Rs.32.45 lakhs.
ii) Tests on Cable terminations as per CENELEC HD 628 standards has been carried out for M/s IKEBANA Engg. Ltd. Bangkok, THAILAND.
iii) Analysis of defects in image intensifier tubes has been carried out for M/s BE-DELFT ELECTRONICS Ltd-Pune using SEM & EDXA
iv) Studies on Flicker mitigation in Industrial Power systems has been carried out for M/s USHA ALLOY & STEEL DIVISION, Jamshedpur.

5. RESEARCH ACTIVITIES

The Institute continued its strides in the area of research by successfully completing five projects upto November end out of a total of 55 ongoing and new projects. During this year, 15 new projects

amounting to Rs.156.55 lakhs were commenced from April 1999. A new thrust was given to orient the research towards the benefit of the power utilities and the manufacturing Industry.

6. PATENTS OBTAINED

The following Patents have been awarded during the period ending November 1999. These were sealed earlier.

i) Spherical Electrode digital field meter

ii) Hand-held Capacitance detector

iii) Zirconium based Ceramic powder for Plasma spray

iv) Development of Metal Chelates for faster curing of Epoxy resin systems.

The patent application relating to "Synthesis of Capacitor liquid dielectrics of Rapeseed Oil" has been sealed.

Technology Transfer

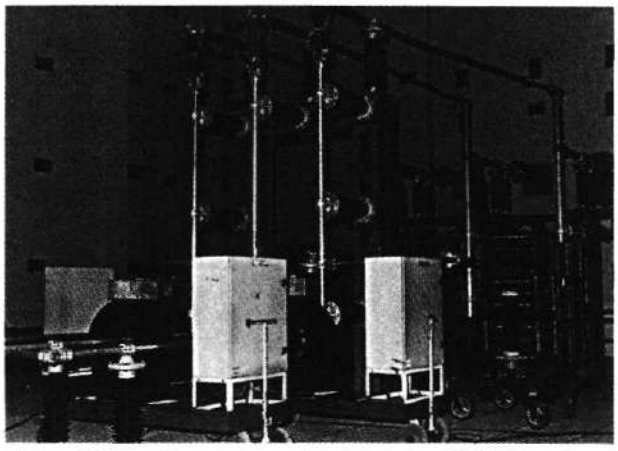
The technologies transferred during the period include "Single & Three Phase Digital Energy Meter" to M/s. Accurate Meters, New Delhi. An MOU was entered into with M/s. Accurate Meters, New Delhi on 21st April 1999 in this regard. During the period April - September 1999, 11 technical reports were brought out covering the outcome of research in various areas and a large number of technical papers were presented in both National and International seminars/workshops.

IX plan schemes

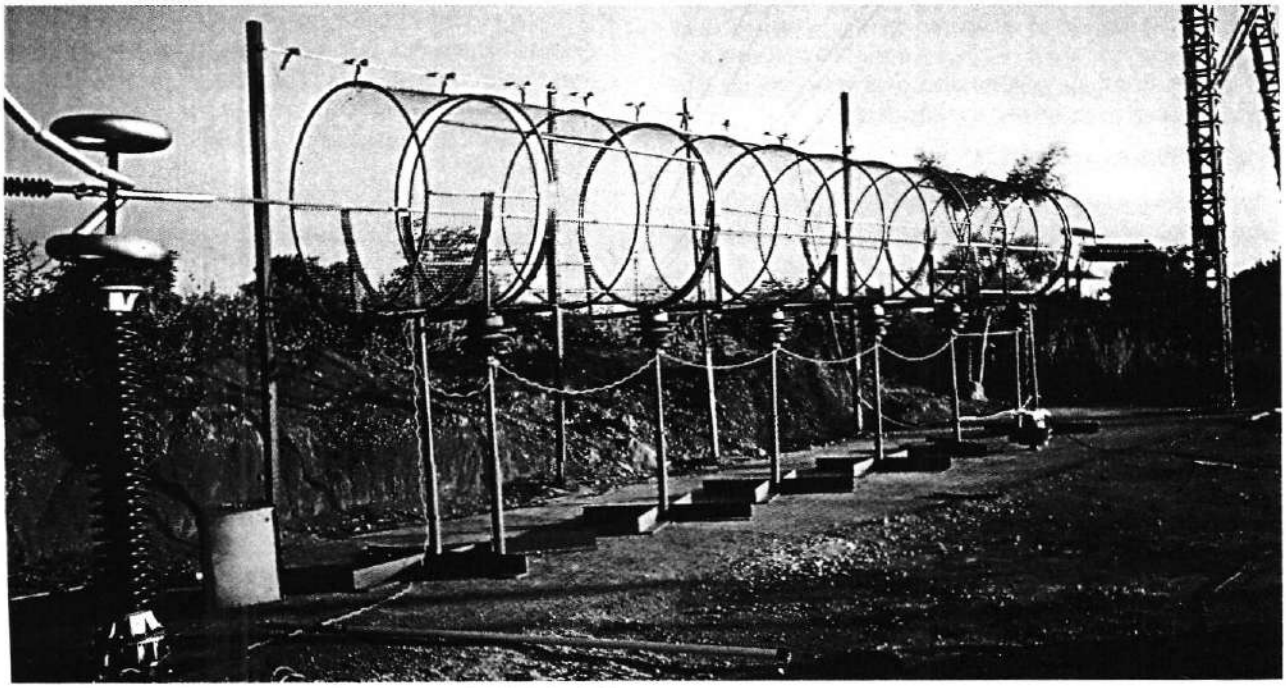
Under the IX Plan schemes, the following two capital projects at a total cost of Rs.3,239.00 lakhs, are progressing as per schedule.

(i) Establishment of Centre for Software Engineering and Training - Rs.374.00 lakhs

(ii) Setting up of Equipment Vibration Centre - Rs.2865.00 lakhs



Test cell for medium voltage circuit breaker CPRI Bangalore



Corona Cage - Ultra high voltage research laboratory, CPRI, Hyderabad

NATIONAL POWER TRAINING INSTITUTE (NPTI)

National Power Training Institute (NPTI) has been set up by the Ministry of Power, Govt. of India to function as national apex body for the Human Resources Development of Power sector personnel in India.

Besides its Head quarters located at NPTI Complex, Sector-33, Faridabad (Haryana), it operates on all India basis through its four regional training institutes located at Neyveli (Tamil Nadu), Durgapur (West Bengal), Badarpur (New Delhi) and Nagpur (Maharashtra). The NPTI including its four Regional Training Institutes, is fully equipped with the latest state-of-the-art training infrastructure and having expert faculty with long years of professional and teaching background. The Institutes are conducting a number of training programmes for the Power Engineers, Operators and Technicians in the areas of Thermal/Hydro Power Generation, Power System and other related areas. The Training Institutes at Badarpur and Nagpur are equipped with the computer based full scope replica Simulators of 210 MW Fossil Fuel Thermal Power Plant to provide off the jobs/hands on training. One more simulator of 500 MW Fossil Fuel Thermal Power Plant is under commissioning at NPTI Hq., Faridabad. In addition, a Centre for Advanced Management and Power Studies (CAMPS) is being established at NPTI Hqs. which will have departments in specialised areas of Hydro, Thermal Power System and Management Studies. It will function as a nodal Institute for training the higher echelons of Power Sector; designing, implementing and supervising the training activities of whole power sector and to create the right type of organisational culture.

1. TRAINING OUTPUT

Upto November, 1999, NPTI and its Regional Institutes, since their inception, have imparted training to 48911 Engineers, Operators and Technicians engaged in the Power Sector organisations of India and abroad. Regional Institutes at Badarpur and Nagpur are equipped with replica Simulators of 210 MW fossil fuel fired thermal power stations, where 4583 Engineers/ Operators have been trained since their installation. During the year 1999-2000, NPTI has trained 658 trainees upto November, 1999 at its four Regional Training Institutes and 11191 trainees weeks have been achieved against the annual target of 19409.

One year Post Graduate Diploma Course in Thermal Power Plant Engineering, duly recognised by AICTE, was launched by NPTI at its four Regional Institutes since August, 1996, for the Graduate Engineers. So far 388 candidates, in three batches, have successfully completed the course. A large number of candidates have been selected for appointment through campus recruitment by the various Power Sector Organisations. 167 candidates have joined IVth batch of PGDC which commenced from August, 1999.

2. SPECIALISED TRAINING PROGRAMMES

- NPTI (NR) Badarpur conducted an 11 weeks On-site Training Programme for PSEB Hydro engineers at Shahpur Kandi (Ranjit Sagar Dam) from 5.4.99. Fifteen engineers participated in the programme.
- One week training programme on "HVDC" was conducted at NPTI (WR), Nagpur, for the Engineers of Power Grid from 19 to 23 April, 99.
- 8 weeks Specialised Training Programme for the engineers of HVPNL, Panipat on "Thermal Power Station O&M" was conducted at Regional Institute, Badarpur and its on-job part at Panipat Thermal Power Station from 17.5.99.
- 5 days training programme on 'Computer Familiarisation" was conducted for 11 Officers and staff of Ministry of Power, GOI at NPTI HQs Faridabad on 17-21.5.99.
- 5 weeks training programme on "Small Hydro Project" was conducted by NPTI (NR), Badarpur at Chandigarh for the 10 engineers of Punjab Energy Development Agency (PEDA) from 7.6.99.
- 8 weeks tailor-made programme on Power Plant Familiarisation for L&T Engineers concluded on 1.4.99 at NPTI (WR), Nagpur, which was followed by another programme of 8 weeks duration for 9 engineers of L&T from 03.05.99 to 26.06.99.
- 26 week "Technician Training Programme" for 51 Power Grid Corporation personnel is being conducted from 12.7.99, at NPTI (ER) Durgapur.
- NPTI (SR) conducted 2 weeks training programme on 'Boiler Maintenance' for 10 technicians of Tamil Nadu Newsprint and Papers Ltd., Kakithapuram, Karur, T.N. from 5.7.99 to 16.7.99 followed by another programme of 2 weeks duration on "Boiler Operation" from 23.8.99.
- NPTI (SR) conducted an on-site training programme on 'Thermal Power Station Operation' at Tuticorin Thermal Power Station, TNEB, Tamil Nadu from 24.8.99 to 28.8.99.
- 8 weeks Induction-cum-Orientation training programme on 'Hydro Power Generation" was conducted for the Junior Engineers of NHPC at

NPTI (NR), Badarpur, from 14.9.99.

- 6 weeks tailor-made training programme on "Power System Management" was conducted at NPTI (WR), Nagpur, for the 48 MSEB engineers from 20.9.99 to 29.10.99.
- NPTI (SR) conducted an on-site training programme on 'Fans & Air Heaters' at Tuticorin Thermal Power Station, TNEB, Tamil Nadu from 7.9.99 to 9.9.99.
- 2 day workshop on 'Ash Handling & Utilisation' was conducted at NPTI Headquarters on 10-11.8.99. 32 senior executives from various SEBs/ Power Utilities, Regulatory authorities etc. attended the programme.
- 3 day workshop on 'Fuel Options & Trends in Thermal Power Technologies' was conducted at NPTI HQs, Faridabad from 31.8.99 to 2.9.99. 50 Senior Executives from various Power Sector organisations attended the workshop.

3. COMPUTER BASED TRAINING

Facilities for developing Computer Based Training (CBT) packages have been fully established at NPTI Hqrs. Faridabad with the assistance of ODA, U.K. The CBT cell has developed 11 CBT (self learning) multimedia packages on different technical topics covering O&M procedures of power generating stations. These packages are widely used by the trainees of NPTI as well as by the other power utilities like NTPC, OHPC, MSEB and Nuclear Power Corporation at their training centres. During the year 1999-2000 NPTI has sold 35 copies of these packages to NTPC, OHPC, MSEB, WBSEB at the total cost Rs. 12.5 lakhs. Five more packages are under development which are expected to be released by March-2000. This cell also provides assistance to SEBs and utilities in establishing Self Learning Centres aided by CBT packages. NPTI has established four Open Learning Centres at its four Regional Institutes.

4. CONSULTANCY SERVICES

NPTI provides consultancy services to power sector organizations in the different areas such as setting of training institutes, assessment of training needs and recruitment of technical personnel.

5. IMPLEMENTATION OF ON-GOING SCHEMES

The following schemes are under implementation:

Setting up of NPTI :

The scheme was sanctioned on 26.2.91 at an estimated cost of Rs. 1273 lakhs which involves construction of an institute, office, residential quarters, executive hostel, guest house, sports complex and recreational facilities. All works have been completed except the transit accommodation, which is expected to be completed by December 1999.

Installation of 210 MW Simulator At NPTI (WR) Nagpur :

A 210 MW Simulator replica of 210 MW Unit of Khaperkheda Thermal Power Station, MSEB has been successfully commissioned at NPTI (WR), Nagpur. Since its commissioning in March '98, 323 trainees have been imparted training on this simulator and NPTI (WR) has earned the revenue of Rs. 42.0 lakhs till October, 99.

Installation of 500 MW Simulator AT NPTI HQ. (Faridabad) :

A state-of-the-art 500 MW Simulator replica of 500 MW Unit of Chandrapur Thermal Power Station of MSEB is near completion. Site Acceptance Test has already been completed and the fine tuning work is in progress. The scheme will be completed in all respects by March, 2000 and the regular training on Simulator will be imparted from 01.04.2000.

Renovation & Modernisation Of Existing 210 MW Simulator At NPTI (NR), Badarpur :

The scheme for renovation and life extension of 210 MW simulator at NPTI (NR) Badarpur was sanctioned at an estimated cost of Rs. 234 lakhs. The computers have been supplied, tested and ready for porting. The scheme is likely to close by Jan., 2000 and the simulator will be ready for training from 31.1.2000.

6. NEW SCHEMES UNDER NINTH PLAN

The following new schemes have been proposed during IXth Plan :

1) Augmentation of Regional Training Institutes.
2) Setting up of Training Institute for Hydro Power.
3) Setting up of Training Institute in North Eastern Region.
4) Setting up Environmental cell / Augmentation of NPTI.
5) Augmentation of CBT scheme.
6) Expenditure on Training at NPTI/RPTI to be treated as plan.

These schemes have been accepted in principle by the MOP for a total outlay of Rs. 117.05 crores.

ENERGY MANAGEMENT CENTRE

Energy Management Centre was set up in April, 1989 as an autonomous organisation under Ministry of Power to strengthen the energy management capabilities in the country. It implements programmes and policies of Ministry of Power as well as provides technical support to the Ministry of Power on matters relating to end use energy efficiency and conservation. The primary role of EMC is to promote and coordinate initiative for all end uses of all sources of energy with a view to provide thrust in energy conservation activities in the country. In past it has been focussing attention on research and training of senior technical personnel, dissemination of information to the main energy consuming sectors through Awareness Campaign, Seminars, Workshops etc. The activity of EMC is purely promotional with a view to increasing the awareness on energy conservation in the country.

The ongoing activities are :-

1. Indo German Efficiency Project for the State of Karnataka is being implemented. A Rational Use of Energy Advisory Centre is established. Demonstration projects on retrofit energy savings are being implemented including operating of energy service on a commercial basis.

2. Preparatory activities for setting up on Bureau of Energy Efficiency,
   (a) Certification of energy managers, and
   (b) Accredition of energy auditors.

3. Energy Management Policy-Guidelines for energy intensive industries of India.
4. Sectoral analysis of Energy Conservation Award Questionnaires.

The following projects were completed during the year 1999-2000.

Energy Saving in Aluminium Electrolysis by bringing down the operating temperature of Electrolyte.

The research has demonstrated about 10% savings in electrical energy by operating the experimental pilot electrolyte cells at 670 degree C instead of conventional bath temperature of 960 degree C. The findings of the research project has been disseminated among the major aluminium plants and research organisations in the country for further investigation.

Projects on Energy Efficient Motors, Variable Speed Drives and Air Compression Systems.

The manuals and computer programmes prepared under the project would provide end users the user friendly technical information on improvement in the motor drive system performance. The tools developed under the project would also assist industry in taking the timely corrective actions in achieving the energy saving potential upto 20% in the motor drive system. The dissemination of Manuals and Computer programmes would commence in the next financial year.

Energy Conservation Award, 1999.

The Ministry of Power has an on-going scheme to give national recognition through Awards to industrial units that have taken special efforts to reduce energy consumption while maintaining their production. The Energy Management Centre provides the technical support to Ministry in the finalisation of the Awards.

For the Awards scheme'99, 123 industrial units from the various sub-sectors of industry participated. The data compiled from 88 industrial units, which supplied complete data, indicates that these units have saved 205 Million Kwh of electricity per year and have thus avoided the installation of a 45 MW thermal power station. Besides,, these units have saved 1.62 lakh KL of furnace oil, 2440 lakh cubic mtrs. of gas and 2.15 lakh tonnes of MT of coal. Average payback was observed to be 1.9 years. These energy conservation efforts have helpec in mitigating green house gas of 1.24 Millior Tonnes of Carbon Dioxide.

OTHER IMPORTANT ACTIVITIES

14.1 IMPLEMENTATION OF OFFICIAL LANGUAGE POLICY

1. The Ministry of Power, its attached and subordinate offices and Public Sector Undertakings/Autonomous Bodies/ Boards/ Societies/Institutions under the administrative control of Ministry of Power have continued their efforts to ensure effective implementation of the Official Language Policy of the Government and encourage progressively the use of Hindi in day to day official work.
2. In compliance with the Constitutional and statutory requirements of Section 3(3) of Official Language Act as amended from time to time all documents required to be issued bilingually, are being issued bilingually by the Ministry. Similarly, all communications received in Hindi are replied to in Hindi compulsorily.
3. In compliance with Official Language Policy, a Golden Jubilee is being celebrated in the Ministry of Power from 14th September, 1999 to September, 2000. During the period of this August occasion, various activities such as Hindi Essay Writing, Hindi Stenography and Typing, Hindi Debate Competitions and special workshops on official language for the high ranking officers in the Ministry of Power as well as other officers under the Ministry's control were organized. Officers and the employees of this Ministry took part in these competitions with zeal and successful participants were awarded prizes by Hon'ble Secretary (Power).
4. With a view to assessing the progressive use of Hindi in various Undertakings/Autonomous Bodies/Boards/Institutions/under the administrative control of Ministry, periodic inspections were made . During the period under review 10 offices of M/o Power were visited inspected and guidance was given on the spot. Inspection reports of the above mentioned offices were prepared and necessary directions issued on the basis of inspection reports. This has been very helpful and beneficial in promoting the use of Hindi in official work.
5. To encourage the progressive use of Hindi through positive competitiveness among the attached offices and Public Sector Undertakings/ Autonomous Bodies/ Boards/ Societies/ Institutions under the administrative control of Ministry of Power, a scheme for awarding Vidyut Rajbhasha Running Shield, Rajbhasha Trophy and Rajbhasha Cup have been introduced.
6. Meetings of Hindi Salahkar Samiti and official language implementation Committee of Ministry of Power were convened regularly in which progress made by Ministry as well as its attached offices and Public Sector Undertakings/ Autonomous Bodies/Boards/ Institutions under the administrative control of Ministry of Power was discussed. Comprehensive measures have been taken to implement the decisions taken in the above meetings.
7. Under the aegis of Ministry of Power, an Award Scheme, namely NTPC Rajbhasha Shield was also introduced. CPRI, Bangalore, Nathpa Jhakri Power Corporation, Shimla and National Hydroelectric Power Corporation were awarded first, second and third prizes respectively for their outstanding and praiseworthy performance in the field of Official Language Policy and implementation thereof in their offices.
8 In addition to this a 'Sarvottam Griha Patrika award' was also unrolled by the Ministry. Urza Dipti, house journal of Power Finance Corporation was selected and awarded for its attractive design, artistic way of presentation and various valuable articles.

14.2 WELFARE OF MINORITIES

The Prime Minister's 15 point programme on Welfare of Minorities is being implemented in the Ministry of Power. It has been ensured that in case of direct recruitment to Group'C and 'D' posts, a member of minority community is included in the selection committee.

14.3 WELFARE OF SC/ST/OBC

SC/ST cell is functioning under the direct control of the Liaison Officer, who is of the rank of Deputy Secretary. The function of the SC/ST Cell is to assist the Liaison Officer in monitoring implementation of reservation policies of the Government of India in all the organisations including the Public Sector Enterprises under the administrative control of Ministry of Power. SC/ST Cell also sends periodical reports viz., consolidated annual statements to Department of Personnel and Training, Department of Public Enterprises, Ministry of Welfare and National Commision for SC/ST. It also helps the Liaison Officer in his annual inspection of the rosters maintained by various organisations of the Ministry. It also deals with the grievances cases of SC/ST officials of various organisation under the Ministry. During the year 1999 the Cell received only two grievance cases plus six old cases of 1998. All these have been redressed. The close follow-up of the complaints and settlement of grievances at personal level with the initiative of LO in consultation with the management of PSUs etc., at the time of annual inspection and free accessibility of LO to the SC/ST officials helped to bring down the no. of complaints drastically. SC/ST Cell also renders assistance to the Liaison Officer (OBC) in monitoring implementation of OBC reservation in

all the organisations under the administrative control of Ministry of Power.

14.4 GRIEVANCE CELL

The inspection of the Grievance Redressal Machinery of the various Public Sector Undertakings, Joint venture Corporations, Autonomous Bodies, Statutory Bodies and Attached offices under the control of the Ministry of Power, with a view to improving their functioning, has been completed. A report in this matter has also been sent to the Department of Administrative Reforms and Public Grievances. Stray cases of public grievances referred to the Ministry have been disposed off.

14.5 CONTROLLER OF ACCOUNTS (COA)

The Office of the Controller of Accounts has four Pay & Accounts Offices, working under his control, viz, PAO (CEA), New Delhi, PAO (CEA), Bangalore, PAO(Sectt.), New Delhi and PAO (BMCC), New Delhi. The monthly accounts of these offices are submitted regularly to the Principal Accounts Office. Thereafter these are consolidated and sent to the Office of the Controller General of Accounts, Ministry of Finance in a detailed classified form.

The Principal Accounts Office is also responsible for the preparation of Appropriation Account. Statement of Central Transactions (SCT) and Finance Account on annual basis for submission to the Controller General of Accounts (CGA). The Principal Accounts Office also brings out the document 'Accounts at a Glance' which contains total transactions of the Ministry and its various organizations in a most scientific way. The office of the COA is responsible for preparing the Receipt Budget of the Ministry.

14.6 COMPUTERISATION OF ACCOUNTS

The Office of the Controller of Accounts utilised the software packages INTEGRATED MODULAR FOR PROCESSING VOUCHER (IMPROVE) and CONTROLLER'S ACCOUNTING (CONTRACT) provided by the CGA. The voucher level computerisation has been carried out in all the four PAOs. The consolidation of monthly accounts of all the PAOs in Ministry of Power is done by using the CONTACT software package. Various other packages like SCT are also used for report generation. Reports are also generated from the options provided in Report Generation Menu in CONTACT. The accounts consolidated through the CONTACT programme are then sent by the Controller of Accounts to the Controller General of Accounts (CGA) for inclusion in the Accounts of the Government of India.

14.7 INTERNAL AUDIT WING

The Internal Audit Wing ensures adoption of sound procedure, regularities and financial propriety of transactions of accounts. This Wing advises the DDOs and their staff for correct implementation of rules and maintenance of proper records. IAW also pursues the settlement of objections raised by the Statutory Audit.

Performance of the Internal Audit Wing during the year 1998-99 is as under:

Year (Accounts due for audit during 1998-99)	No.of Units due/ inspected	No. of Paras raised	No. of Paras settled	No. of Paras outstanding upto 30.11.99
1997-98	19/19	183	75	108

14.8 AUDIT OBSERVATIONS

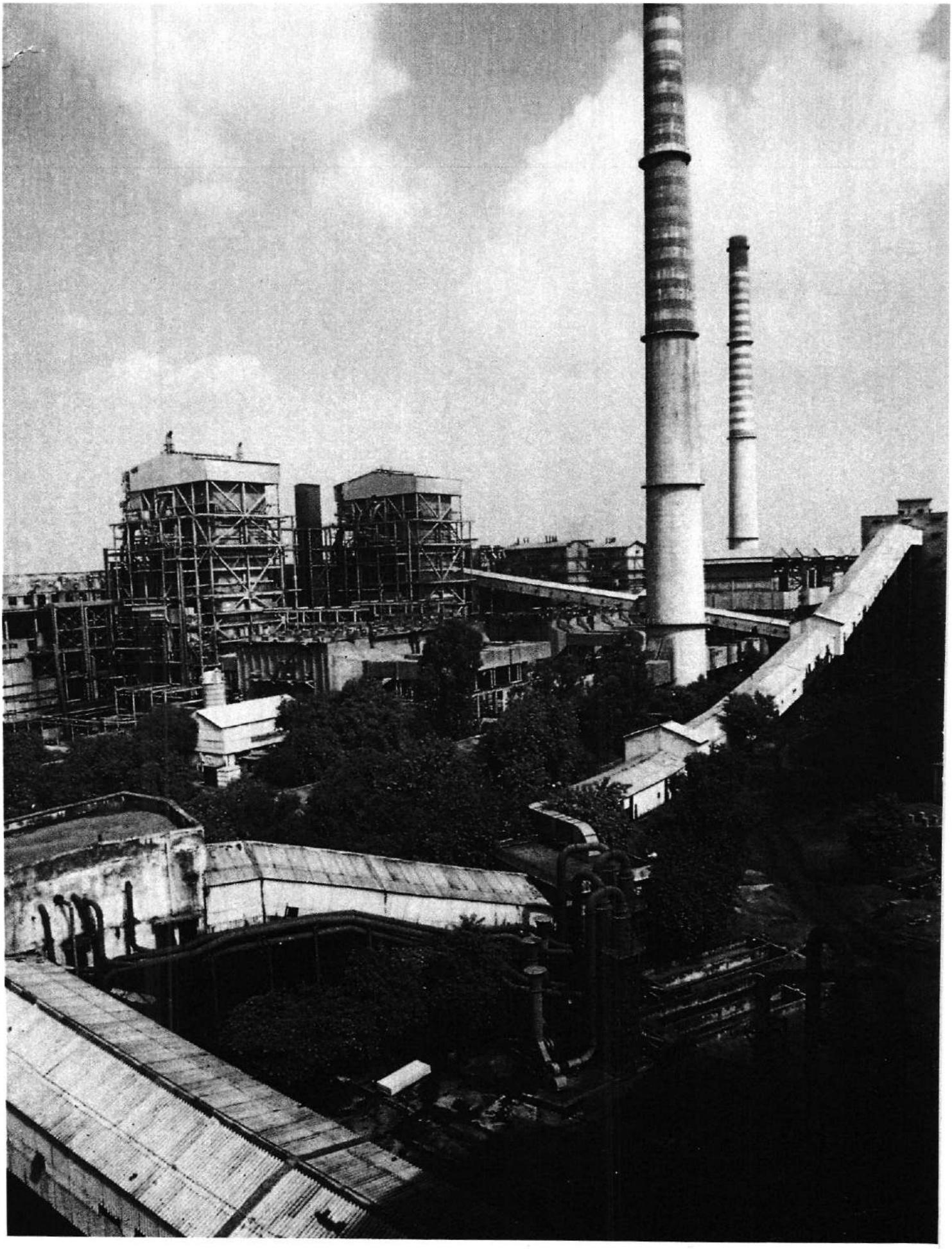
The organisation-wise break up of Outstanding Audit Observations and Inspection Reports as on 31.3.1999 is as under:

Sl. No.	Organisation	No. of Inspection Reports	No. of Paras
1.	Ministry of Power	3	20
2.	Central Electricity Authority	2	53
3.	Controller of Accounts:		
	(i) PAO (CEA), New Delhi	8	21
	(ii) PAO (BMCC), New Delhi	3	4
	(iii) PAO (Sectt), New Delhi	3	10
	(iv) PAO (CEA), Bangalore	4	6
	Total	**23**	**114**

14.9 RECREATION ACTIVITES :

The Ministry is promoting sports and cultural activities. Power Sports Control Board (PSCB), with the Minister in-charge of the Ministry of Power as Chairman, constituted as a nodal agency with the participation of Central Power Organisation i.e. Central Electricity Authority and all the Public Sector Undertakings/Autonomous bodies etc. under the administrative control of the Ministry of Power, is arranging various tournaments in various disciplines every year, all over the country with the help of member organisations.

The Ministry has a Recreation Club for its staff for looking after the cultural and sports activities. The Hon'ble Minister of Power and the Secretary(P) are its Chief patron and patron, respectively. The teams from Ministry of Power have been taking part in different disciplines in various tournaments and cultural meets organised by PSCB and inter-ministerial tournaments organised by Central Civi Services Cultural and Sports Board of the Deptt of Personnel & Training, Government of India. Ir the 1998-99 inter CPSU carrom tournamen held at Rishikesh the team from MOP stoo runners -up.



A view of Badarpur T.P.S.