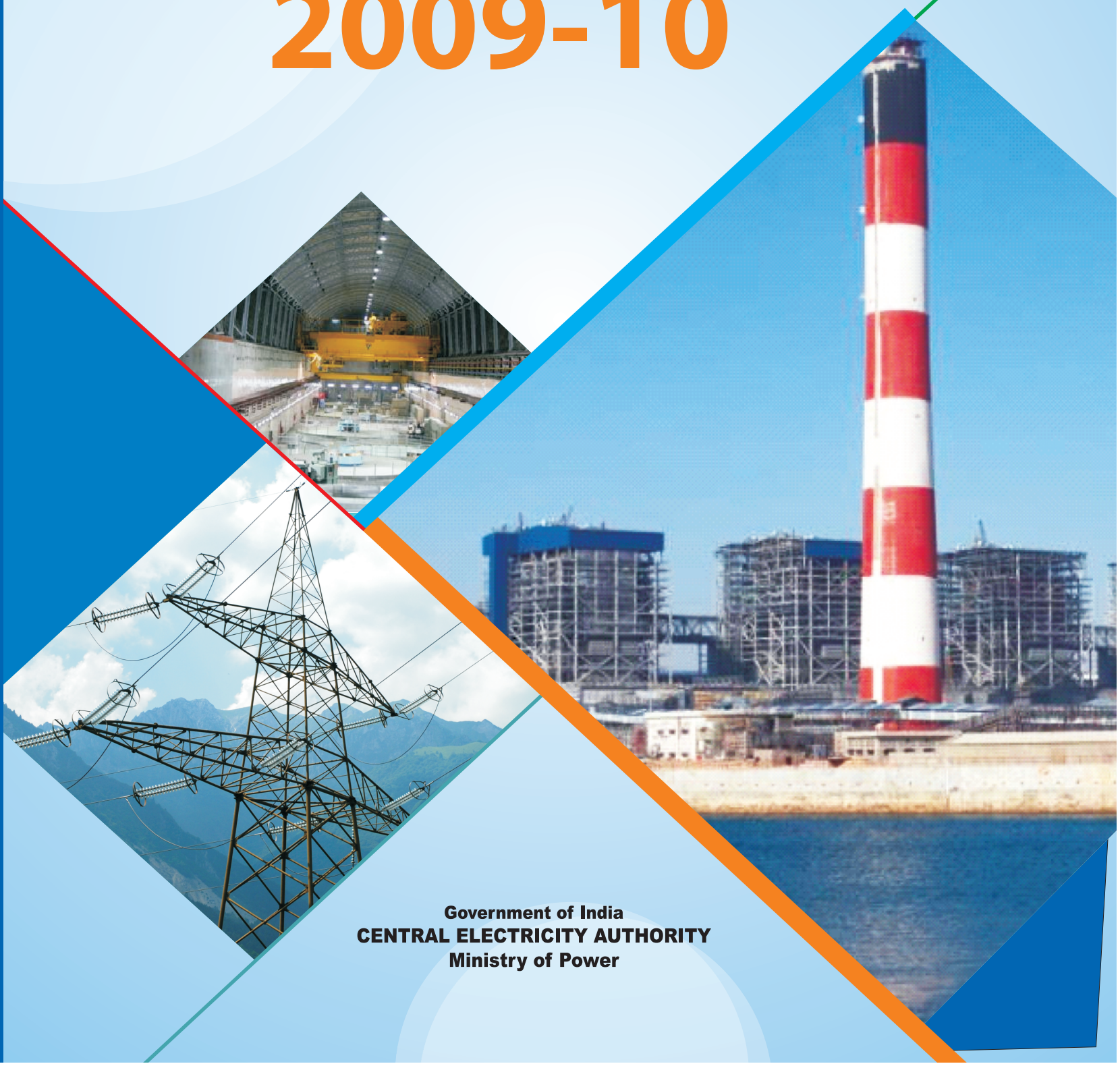
सत्यमेव जयते

Annual Report
2009-10



Government of India
CENTRAL ELECTRICITY AUTHORITY
Ministry of Power

ANNUAL REPORT

2009-10

सत्यमेव जयते

GOVERNMENT OF INDIA

MINISTRY OF POWER

CENTRAL ELECTRICITY AUTHORITY

September 2010

CENTRAL ELECTRICITY AUTHORITY

Sewa Bhawan, R.K. Puram
New Delhi – 110 066
CEA website: www.cea.nic.in

Sub ordinate Offices :

Regional Power Committees:

1. Member Secretary, Northern Regional Power Committee, 18-A, Shaheed Jit Singh Marg, Katwaria Sarai, New Delhi-110016.
2. Member Secretary, Eastern Regional Power Committee, 14 Golf Club Road, Tollygunge, Kolkata-700033.
3. Member Secretary, Western Regional Power Committee, Plot No. F-3, Opposite SEEPZ Complex, MIDC Area Marol, Andheri (East), Mumbai-400093.
4. Member Secretary, Southern Regional Power Committee, 29 Race Course Cross Road, Near Anand Rao Circle, Bangalore-560009.
5. Member Secretary, North-Eastern Regional Power Committee, Nongrimbah Road, Laitumkhrah, Shillong-793003.

Regional Power Survey Offices:

1. Dy. Director, Regional Power Survey Office (North), 3rd Floor, 18-A, Shaheed Jit Singh Marg, Katwaria Sarai, New Delhi-110016.
2. Dy. Director, Regional Power Survey Office (East), Room No.201, C.G.O. Complex, 'DF'-Block, Salt Lake City, Kolkata-700064.
3. Dy. Director, Regional Power Survey Office (West), 5th Floor, Plot No. F-3, Opposite SEEPZ Complex, MIDC Area Marol, Andheri (East), Mumbai-400093.
4. Dy. Director, Regional Power Survey Office (South), Letter Box No. 38, 6th Floor, 'F' Wing, Kendriya Sadan, Koramangala, Bangalore – 560034.

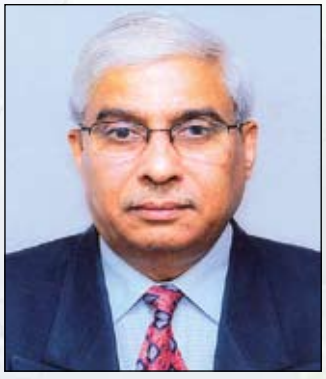
Regional Inspectorial Organisations:

1. Superintending Engineer, Regional Inspectorial Organisation (North), 18-A, Shaheed Jit Singh Marg, Katwaria Sarai, New Delhi-110016.
2. Superintending Engineer, Regional Inspectorial Organisation (East), 14 Golf Club Road, Tollygunge, Kolkata-700033.
3. Superintending Engineer, Regional Inspectorial Organisation (West), Ground Floor, WRPC Building, F-3, MIDC Area Marol, Andheri (East), Mumbai-400093.
4. Superintending Engineer, Regional Inspectorial Organisation (South), Shastri Bhawan, Chennai-600006.
5. Superintending Engineer, Regional Inspectorial Organisation (North-East), "Aprem" near Miza Modern High School, Nongrim Hills, Shillong-793003.

The Authority

Shri Gurdial Singh
Chairperson &
Member (Hydro)

Shri V. Ramakrishna
Member (Power System)

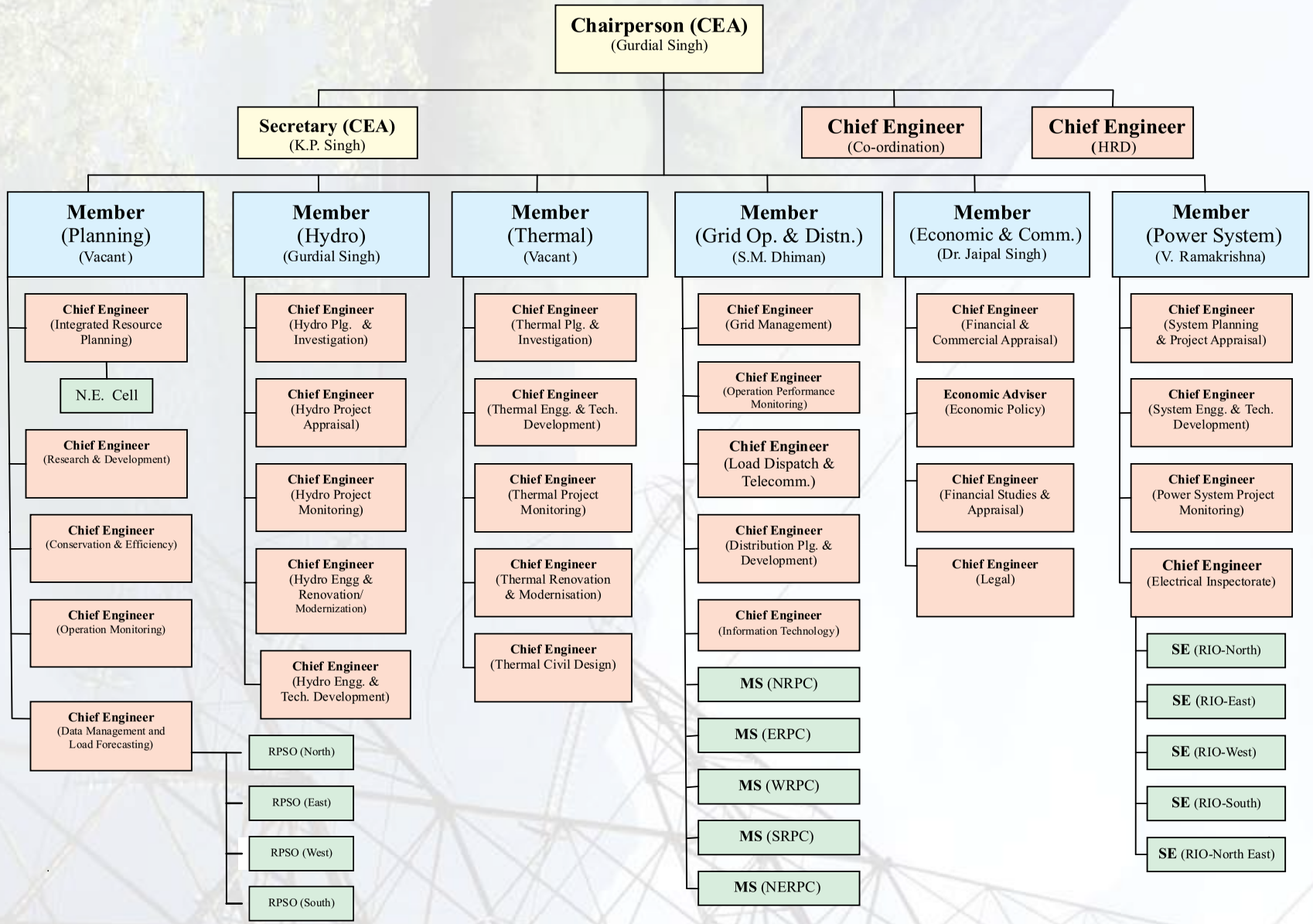


Shri S.M. Dhiman
Member (G.O.&D)

Dr. Jai Pal Singh
Member (E&C)

Organisation Chart of CEA

(As on 31-03-2010)



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FROM THE CHAIRPERSON

The Power Sector in India registered a growth of 6.6% in 2009-10 against the previous year growth of 2.74% with gross power generation by various utilities being 771 Billion kWh as against the previous year power generation of 724 Billion kWh. The growth would have been higher but for less power generation by hydro power stations.

The definition of commissioning of generating units has been revised by CEA and now a unit is declared commissioned only after it has attained full load on the designated fuel. During the year, a total of 9,585 MW generation capacity was added which comprised 9,546 MW Thermal (including 440 MW of Nuclear) and 39 MW Hydro, thus raising the Installed Capacity of the country to 1,59,398 MW.

CEA closely monitors the progress of various constructional activities of thermal power projects under execution in the country. Project monitoring related activities emerge from Section 73 (f) functions and duties of authority of Electricity Act, 2003 which inter-alia envisages "To Promote and Assist in Timely Completion of Various Schemes and Project." Visits are made by CEA officers to the project sites for assessing the progress of various construction activities and rendering necessary advice/assistance in resolving the problems being faced by the project authorities to meet the schedule of commissioning. The Construction Monitoring groups of CEA are constrained by non-availability of IT based monitoring system at the project level which is essential for effective monitoring.

During the year 2009-10, a total thermal capacity of 9,106 MW was added against the programme of 13,002 MW, which is the highest addition in any previous year. The private sector has responded enthusiastically to the opening up of the power market and a substantial amount of generating capacity is coming up through IPPs in coal, lignite, gas and hydro power projects. The private sector contributed 1,970 MW to thermal generation capacity during period 2002-07. Since then thermal generation capacity of 5,920 MW has been commissioned in 11th Plan and another about 16,266 MW thermal generation capacity is under construction in private sector. The private sector is likely to contribute substantial generating capacity in the 12th Plan period (2012-17).

Ultra Mega Power Projects (UMPPs) are being promoted by Ministry of Power with a view to provide power to all at a reasonable rate and ensuring fast capacity addition as an initiative facilitating the development of UMPPs of 4,000 MW capacity each. Out of nine (9) UMPPs proposed to be set up in different states initially, four UMPPs one each in M.P., Gujarat, Andhra Pradesh and Jharkhand have been awarded and transferred to the developers selected through tariff based international competitive bidding and are at different stages of implementation. As per the present status of projects intimated by the developers, one unit of 660 MW of Sasan UMPP and two units of 800 MW each of Mundra UMPP are expected to be commissioned in 11th Plan.

CEA has been facilitating adoption of higher size units with supercritical technology. About 40 supercritical units of 660/800 MW are under construction and some of them would be commissioned in 11th Plan itself. Initially supercritical units were designed with parameters of 247 kg/cm^2, 537/565^{0}C but now higher parameters of 247 kg/ cm^2, 565/593^{0}C are being adopted for new supercritical units. In 12th Plan, supercritical units are likely to constitute a majority of coal based capacity addition. Efforts have been made to encourage International manufacturers to set up manufacturing facilities for Supercritical units in India so as to create indigenous manufacturing capability. As a result, four joint venture companies have been set up between international manufacturers and Indian companies for manufacturing supercritical boilers/turbo-generator in the country. To kick start the new joint ventures, bulk tendering of 11 Nos. 660 MW supercritical units of NTPC & DVC has been undertaken by NTPC through International Competitive Bidding (ICB) with the mandatory condition that the successful bidders would have to set up manufacturing facilities in India as per Phased Manufacturing Program (PMP) being specified in the bid document. CEA has been actively associated in the whole process and the progress of PMP would be monitored by a Committee under CEA.

CEA/Ministry of Power had instituted a Comprehensive Award Scheme for efficient and economic operation of thermal, hydro and nuclear power stations, transmission system and power distribution companies as also for

generation and transmission projects executed in time. During the year, an additional Award for Environment Friendly Thermal Power Station has been introduced. Budge Budge TPS of M/s. CESC Ltd. was adjudged as the best performing power station from the point of view of environment management. During a function held on 29th January, 2010, 9 Gold, 9 Silver and 6 Bronze Shields were presented by Hon'ble Minister of Power to different power stations for their meritorious performance during 2008-09.

One of the functions of CEA is to give concurrence to hydro projects. During the year 2009-10, CEA had appraised and accorded concurrence to 3 hydro generation schemes aggregating to 4,570 MW capacity with an estimated financial cost of Rs.21,650 Crores. As per the studies carried out by CEA, a capacity addition of more than 1,00,000 MW in the 5 years period of 2012-17 would be required, out of which 20,000 MW is proposed to be added through hydro Projects. An exercise has been carried out in CEA to identify candidate Hydro Projects for inclusion in the 12th Plan and beyond. A shelf of 109 candidate projects aggregating to 30,920 MW for realising benefits during 12th Plan based on their status of preparedness has been finalised.

Besides the statutory obligations, CEA rendered engineering and consultancy to the utilities in India and in neighbouring countries.

To deal with the cases under Right to Information Act, the Public Information Officers, Assistant Public Information Officers and the Appellate Authority have been notified for all the offices at Headquarter and Sub-ordinate offices. During the year 2009-10, 110 requests/ applications were received and 114 have been replied including 4 cases received prior to this period. 13 applicants made Appeal to the First Appellate Authority/ Central Information Commission, out of which 12 cases have been disposed of at the level of First Appellate Authority and one case has gone to the Central Information Commission.

All out efforts are being made to enhance the usage of Hindi in official work in all the offices of CEA. The percentage of Hindi correspondence of CEA to the Central and State Government is 78 to 85%. In CEA, the Official Language Implementation Committee (OLIC) meetings are held at regular intervals under the chairmanship of Chairperson, CEA. In addition, a Roving Shield is awarded to the Division/Section/Unit who does maximum work in Hindi throughout the year. CEA has also introduced a Cash Award Scheme namely Kendriya Vidyut Pustak Lekhan Puraskar Yojna on All India basis to promote original book writing in Hindi from the calendar year 2003. Under this scheme, prize money is – (A) First Prize - Rs. 60,000/-, (B) Second Prize - Rs.40,000/- (C) Third Prize - Rs. 25,000/- and one consolation prize of Rs.10,000/- only.

The officers/officials were deputed for various in-service refresher training programmes, technical courses, workshops, seminars and conferences. The programmes organized for enhancing the managerial and interpersonal skills and for awareness about good health included the topics such as effective communication for managers and leaders, Right to Information Act, communication and listening skills, Yoga, Physical and Mental Exercise, Motivation, leadership and team building, Stress Management, etc. The Training was imparted to CEA officers on DM/SCADA System, Protection System, Protection Philosophy & HV equipment, 'Development of Leadership & Administrative Financial Acumen' and also on 'Finance for Non Finance Executives Programme'. 22 training institutes/centers were visited and accorded recognition/ renewal of recognition during the year 2009-10.

In the end, I take this opportunity to express my deep appreciation for the committed efforts put in by one and all in the Power Sector specially the officers/staff of CEA in accomplishment of the above tasks. I hope that CEA officials will continue to work with the same zeal, devotion and co-operation for development of the Power Sector in the country.

September, 2010

(Gurdial Singh)
Chairperson, CEA

CHAPTER – 1
ORGANISATION

1.1 Organisation of CEA

1.1.1 The Central Electricity Authority (CEA) is a statutory organisation originally constituted under section 3(1) of the repealed Electricity (Supply) Act, 1948 since substituted by section 70 of the Electricity Act, 2003. It was established as a part- time body in the year 1951 and made a full- time body in the year 1975.

1.1.2 As per Section 70(3) of the Electricity Act, 2003, Authority shall consist of not more than 14 members (including its Chairperson) of whom not more than eight shall be full-time Members to be appointed by the Central Government.

1.1.3 CEA is headed by a Chairperson who as the Chief Executive of the Authority largely oversees the development of Power Sector in the country. A Secretary, appointed by the Authority with the approval of the Central Government under section 72 of Electricity Act 2003, assists the Chairperson in discharging of CEA's statutory functions.The Secretary also assists the Chairperson in all matters pertaining to administration and technical matters including human resource development and concurrence of hydro power projects etc. There are six (6) Wings in CEA namely Planning, Hydro, Thermal, Grid Operation & Distribution, Economic & Commercial and Power System each headed by a Member of the Authority. Under each Member, there are technical Divisions, headed by an officer of the rank of Chief Engineer. At present, there are twenty-nine Divisions in CEA headquarter at New Delhi.

1.1.4 Sub-ordinate offices of CEA

There are 14 subordinate offices of CEA viz. five (5) Regional Inspectorial Organizations, four (4) Regional Power Survey Organizations and five (5) Regional Power Committees located in various parts of the country.

A) Regional Inspectorial Organisation (RIO)

Under Chief Engineer (EI) in Power System Wing, five (5) Regional Inspectorial Organisation (RIO) offices, each headed by an officer of the rank of Superintending Engineer function at New Delhi, Mumbai, Chennai, Kolkata and Shillong to inspect the HV/MV installations of the Central Government.

B) Regional Power Survey Organisation (RPSO)

Four (4) Regional Power Survey Organisation (RPSO) offices, each headed by an officer of the rank of Deputy Director function at New Delhi, Mumbai, Bangalore and Kolkata under Chief Engineer (DMLF) in the Planning Wing to carry out surveys to forecast the demand of power in their respective regions.

C) Regional Power Committees (RPCs)

Five (5) Regional Power Committees (RPCs) each headed by a Member Secretary, an officer of the rank of the Chief Engineer, are functioning at New Delhi, Mumbai, Bangalore, Kolkata and Shillong to facilitate the integrated operation of the Regional Electricity Grids.

1.2 Functions of CEA

The functions and duties of the Authority are delineated under section 73 of the Electricity Act, 2003. Besides, CEA has to discharge various other functions as well under sections 3, 8, 34, 53, 55 and 177 of the Act.

Section 73 - Functions and Duties of the Authority

a) advise the Central Government on the matters relating to the national electricity policy, formulate short-term and perspective plans for development of the electricity system and coordinate the activities of the planning agencies for the optimal utilization of resources to subserve the interests of the national economy and to provide reliable and affordable electricity to all consumers;

b) specify the technical standards for construction of electrical plants, electric lines and connectivity to the grid;

c) specify the safety requirements for construction, operation and maintenance of electrical plants and electric lines;

d) specify the Grid Standards for operation and maintenance of transmission lines;

e) specify the conditions for installation of meters for transmission and supply of electricity;

f) promote and assist in the timely completion of schemes and projects for improving and augmenting the electricity system;

g) promote measures for advancing the skills of persons engaged in electricity industry;

h) advise Central Government on any matter on which its advice is sought or make recommendation to that Government on any matter if, in the opinion of the Authority, the recommendation would help in improving the generation, transmission, trading, distribution and utilization of electricity;

i) collect and record the data concerning the generation, transmission, trading, distribution and utilization of electricity and carry out studies relating to cost, efficiency, competitiveness and such like matters;

j) make public from time to time the information secured under this Act, and provide for the publication of reports and investigations;

k) promote research in matters affecting the generation, transmission, distribution and trading of electricity;

l) carry out, or cause to be carried out, any investigation for the purpose of generating or transmitting or distributing electricity;

m) advise any State Government, licensees or the generating companies on such matters which shall enable them to operate and maintain the electricity system under their ownership or control in an improved manner and where necessary, in coordination with any other Government, licensee or the generating company owning or having the control of another electricity system;

n) advise the Appropriate Government and the Appropriate Commission on all technical matters relating to generation, transmission and distribution of electricity; and

o) discharge such other functions as may be provided under this Act.

In addition to above functions and duties, CEA has to perform the following functions in terms of the under mentioned sections of the Electricity Act, 2003:-

Section 3 - National Electricity Policy and Plan

1) The Central Government shall, from time to time, prepare the National Electricity Policy and Tariff Policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilization of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy.

2) The Central Government shall publish the National Electricity Policy and Tariff Policy from time to time.

3) The Central Government may, from, time to time, in consultation with the State Governments and the Authority, review or revise the National Electricity Policy referred to in sub-section (1).

4) The Authority shall prepare a National Electricity Plan in accordance with the National Electricity Policy and notify such plan once in five years.

PROVIDED that the Authority while preparing the National Electricity Plan shall publish the draft National Electricity Plan and invite suggestions and objections thereon from licensees, generating companies and the public within such time as may be prescribed;

PROVIDED FURTHER that the Authority shall –

a) notify the plan after obtaining the approval of the Central Government;

b) revise the plan incorporating therein directions, if any, given by the Govt. while granting approval under clause (a).

5) The Authority may review or revise the National Electricity Plan in accordance with the National Electricity Policy.

Section 8 - Hydro-Electric Generation

1) Any generating company intending to set up a hydro-generating station shall prepare and submit to the Authority for its concurrence, a scheme estimated to involve a capital expenditure exceeding such sum, as may be fixed by the Central Government, from time- to time, by notification.

2) The Authority shall, before concurring in any scheme submitted to it under sub-section (1) have particular regard to, whether or not in its opinion:

a) The proposed river-works will prejudice the prospects for the best ultimate development of the river or its tributaries for power generation, consistent with the requirements of drinking water, irrigation, navigation, flood-control, or other public purposes, and for this purpose the Authority shall satisfy itself, after consultation with the State Government, the Central Government, or such other agencies as it may deem appropriate, that an adequate study has been made of the optimum location of dams and other river-works;

b) The proposed scheme meets, the norms regarding dam design and safety.

3) Where a multi-purpose scheme for the development of any river in any region is in operation, the State Government and the generating company shall co-ordinate their activities with the activities of the person responsible for such scheme in so far as they are inter-related.

Section 34 – Grid Standards

Every transmission licensee shall comply with such technical standards, of operation and maintenance of transmission lines, in accordance with the Grid Standards, as may be specified by the Authority.

Section 53 - Provision Relating to Safety and Electricity Supply

The Authority may in consultation with the State Governments, specify suitable measures for-

a) protecting the public (including the person engaged in the generation, transmission or distribution or trading) from dangers arising from the generation, transmission

or distribution or trading of electricity, or use of electricity supplied or installation, maintenance or use of any electric line or electrical plant ;

b) eliminating or reducing the risks of personal injury to any person, or damage to property of any person or interference with use of such property;

c) prohibiting the supply or transmission of electricity except by means of a system which conforms to the specification as may be specified;

d) giving a notice in the specified form to the Appropriate Commission and the Electrical Inspector, of accidents and failures of supplies or transmission of electricity;

e) keeping by a generating company or licensee the maps, plans and sections relating to supply or transmission of electricity;

f) inspection of maps, plans and sections by any person authorized by it or by Electrical Inspector or by any person on payment of specified fee;

g) specifying action to be taken in relation to any electric line or electrical plant, or any electrical appliance under the control of a consumer for the purpose of eliminating or reducing the risk of personal injury or damage to property or interference with its use.

Section 55 - Use, etc. of Meters

(2) For proper accounting and audit in the generation, transmission and distribution or trading of electricity, the Authority may direct the installation of meters, by a generating company or licensee at such stages of generation, transmission or distribution or trading of electricity and at such locations of generation, transmission or distribution or trading, as it may deem necessary.

Section 177- Powers of Authority to Make Regulations

1) The Authority may, by notification, make regulations consistent with this Act and the rules generally to carry out the provisions of this Act.

2) In particular and without prejudice to the generality of the power conferred in sub-section (1), such regulations may provide for all or any of the following matters, mainly :-

a) the Grid Standards under section 34;

b) suitable measures relating to safety and electricity supply under section 53;

c) the installation and operation of meters under section55;

d) the rules of procedure for transaction of business under sub-section (9) of section 70;

e) the technical standards for construction of electrical plants and electric lines and connectivity to the grid under clause (b) of section 73;

f) the form and manner in which and the time at which the State Government and licensees shall furnish statistics, returns or other information under section 74;

g) any other matter which is to be, or may be, specified;

3) All regulations made by the Authority under this Act shall be subject to the conditions of previous publication.

1.3 Broad Functional Areas of work of Chairperson and the Members of the Authority

Chairperson

Chairperson is the Chief Executive of the Authority.

Member (Planning)

Formulation of National Electricity Plan; integrated resource planning; coordinating the activities of Planning agencies for optimization of resource utilization; formulation of short, medium and long term power plans; long and short term demand forecast and sensitivity studies; material and manpower planning; coal, oil and gas linkages to power projects; surveys for power demand growth; identification and testing of co-lateral parameters for economic model for demand forecasting; collection, compilation and publication of statistics of Power Sector; securitization of resources/ fuel availability and fuel efficiency with the support of emerging technologies; modernization of project management; concepts of skill development; pro-active technology forecasting approaches; research and development in Power Sector, co-ordination with multiple agencies involved in research and development activities, energy conservation; energy auditing; environmental aspects of thermal projects; coordination of fuel oil/ liquid fuel supplies; coal quantity and quality control; etc.

Member (Thermal)

Overall thermal power development in the country; updating, development and evaluation of thermal technologies; design and engineering of thermal projects; quality assurance standards and plans; preparation of model documents and standards; thermal projects investigation and ash utilization; monitoring of construction and stabilization of thermal projects and suggesting remedial measures to problems involved; renovation, modernisation and life extension programmes of thermal generating stations; making operating norms for thermal generating stations etc.

Member (Hydro)

Overall hydro power development in the country; technical appraisal of hydro-electric projects; integrated planning for utilization of water resources; assessment of hydro potential; assistance to States on investigation and project report preparation; construction & investigation, monitoring of hydro projects and suggesting remedial measures to problems involved; updating, development and evaluation of hydro technologies; environmental aspects of hydro projects; quality assurance plans and standardization, design and engineering of hydro projects; renovation, modernization and up rating of hydro stations; co-operation with neighbouring countries of Nepal, Bhutan and Myanmar for development of water resources for mutual benefits; etc.

Member (Power System)

Planning and development of Transmission system consistent with national power plans; studies for the purpose of appraisal of transmission projects; transmission technology development; design and engineering; standardization and preparation of model document; renovation and modernization of transmission schemes; construction monitoring of transmission projects; inspection of existing electrical installations in Union Territories and Central Government Departments; investigation of accidents on electrical installations and suggesting remedial measures for their minimization and prevention etc.

Member (Grid Operation & Distribution)

Formulation of policies for safe, secure and economic operation of regional grids; integrated operation, co-ordination of five regional grids through Regional Power Committees (RPCs); monitoring of delivery of shares from Central Sector projects; intra and inter-regional exchange of power; regional energy accounting; load generation balance; investigation of grid disturbances; matters relating Accelerated Power Development and Reforms Programme (APDRP) in J&K; monitoring of rural electrification programme; all matters relating to power development in union

territories; telecommunication in Power Sector; telecommunication data acquisition and software support; operation monitoring and performance review of thermal power stations; updating of maintenance procedures; generation data collection; performance analysis; maintenance monitoring etc.

Member (Economic & Commercial)

Economic evaluation of power policies and projects; appraisal of tariff for Nuclear Power Stations; financial packages; financial parameters; interest during construction and completed cost; examination of bulk power tariff structure; performance of SEBs; scrutiny for import duty exemption; certification of deemed export benefit; co-ordination for externally aided schemes; examination of Power Purchase Agreements, advice on legal matters, etc.

Secretary

The Secretary (CEA) appointed by the Authority with the approval of the Government of India, assists the Authority in discharge of CEA's statutory functions. The Secretary also assists the Chairperson (CEA) in all matters pertaining to administration and technical matters including human resource development and techno-economic appraisal and concurrence of hydro power projects, planning of budget and expenditure control etc.

1.4 Personnel and Administration

The staff strength of CEA as on 31.03.2010 was 1053 against sanctioned strength of 1616 leaving 563 posts vacant. Summarized position of staff strength is shown in the table below:

Category	Sanctioned Strength			Filled Strength		
	Head-Quarters	Sub-Office	Total	Head-Quarters	Sub-Office	Total Strength
CPES GROUP-A	368	113	481	243	81	324
CPES GROUP-B	92	17	109	36	5	41
Non CPES Group						
Group-A	47	0	47	25	0	25
Group-B	309	17	326	276	10	286
Group-C	338	107	445	126	70	196
Group-D	145	63	208	130	51	181
Total	**1299**	**317**	**1616**	**836**	**217**	**1053**

1.4.1 Representation of women in CEA

CEA had a total of 224 women employees as on 31.03.2010. The group- wise number of women employees is shown in the table below:

Category	No. of Govt. Employees		No. of Women employees In position	% age
	Sanctioned	Filled		
CPES GROUP-A	481	324	8	2.47
CPES GROUP-B	109	41	8	19.51
Non CPES Group				
Group-A	47	25	5	20.00
Group-B	326	286	119	41.61
Group-C	445	196	70	35.71
Group-D	208	181	14	7.73
Total	**1616**	**1053**	**224**	**21.27**

1.4.2 Representation of Scheduled Caste (SC), Scheduled Tribes (ST), OBC & Physically Handicapped employees

The group-wise number of Scheduled Caste (SC), Scheduled Tribes (ST), OBC & Physically Handicapped employees as on 31.3.2010 is shown in the table below:

Category	No. of Govt. Employees		No. Of SC Govt. employees in position	No. Of ST Govt. employees in position	No. Of OBC Govt. employees in position	No. of Physically Handicapped Govt. employees in position
	Sanctioned	Filled				
CPES GROUP-A	481	324	51	10	7	1
CPES GROUP-B	109	41	3	0	0	0
Non CPES Group						
Group-A	47	25	2	1	0	0
Group-B	326	286	40	11	2	3
Group-C	445	196	28	8	6	3
Group-D	208	181	67	5	5	0
Total	**1616**	**1053**	**191**	**36**	**20**	**7**

1.5 Representation of CEA Officers on Boards of PSUs

The Chairperson, Members and other officers of CEA, who have been nominated to Board of Directors of various Public Sector Undertakings (PSUs) and other Government Organisations as technical experts, are shown in the table below:

Sl.No.	Name & Designation of Officer	Organisation	Nominated as
1.	Sh. Rakesh Nath, **Chairperson**, CEA (w.e.f. 6.10.2005 upto 04.03.2010)	Nuclear Power Corp. Ltd.	Director
2.	Sh. Gurdial Singh, Member (Hydro) (w.e.f. 22.12.2004 upto 06.07.2009)	NEEPCO	Director
3.	Sh. Gurdial Singh, Member (Hydro) (w.e.f. 22.12.2004)	THDC	Director
4.	Sh. Gurdial Singh, Member (Hydro) (w.e.f. 12.01.2005 upto 24.12.2009)	SJVNL	Director
5.	Sh. Gurdial Singh, Member (Hydro) (w.e.f. 22.12.2004 upto 22.06.2009)	NHPC	Director
6.	Sh. Gurdial Singh, Member (Hydro) (w.e.f. 19.03.2008)	J&K State Power Development Corp. Ltd.	Director
7.	Sh. A.K.Gupta, CE (TRM) (w.e.f. 17.12.2007)	Haryana Power Generation Corpn. Ltd. (HPGCL)	Director
8.	Sh. A.K.Gupta, CE (TRM) (w.e.f. 12.12.2008)	West Bengal Power Development Corpn. Ltd. (WBPDCL)	Director

1.6 Annual Budget

During the year 2009-10, against an allocation of Rs.15.00 Crores (reduced to Rs.11.37 Crores in the RE 2009-10) under Plan head, an expenditure of Rs.8.97 Crores has been booked upto 31.03.2010, whereas an expenditure of Rs.9.05 Crores was booked under Plan head during 2008-09.

During the year 2009-10, on the Non-Plan side, an expenditure of Rs. 71.26 Crores was incurred against an allocation of Rs. 86.14 Crores whereas under Non-Plan an expenditure of Rs. 58.80 Crores was incurred during the year 2008-09.

1.6.1 Revenue Recovered for Consultancy Services by CEA and Recovery of expenses by RPCs from constituents

CEA renders Consultancy Services for design and engineering of thermal and hydro projects to various SEBs and power utilities. During 2009-10, CEA rendered consultancy services worth Rs. 6.19 Crores and an amount of Rs. 6.04 Crores was recovered during the year (upto 31.03.10). Regional Power Committees received revenue of Rs. 12.04 Crores from their constituents during the year 2009-10. Inspection fees collected by RIOs amounted to Rs. 3.31 Crores during the year 2009-10.

1.7 Progressive use of Hindi in Official Work of CEA

The percentage of Hindi correspondence of CEA to the Central and State Governments is 78% to 85%.

In CEA, the Official Language Implementation Committee (OLIC) meetings are held at regular intervals under the chairmanship of Chairperson, CEA. Prompt action has been taken on the decisions taken in these meetings.

Once in a year, a meeting of all Chief Engineers of CEA is held under the chairmanship of Chairperson, CEA in which progress of Hindi in their respective fields is discussed and corrective actions are taken, wherever required.

All efforts are being made to enhance the usage of Hindi in official work in CEA. All incentive schemes sponsored by the Deptt. of Official Language are in operation in CEA. In addition, a Roving Shield is awarded to the Division/Section/Unit who does maximum work in Hindi throughout the year. During the year, Rajbhasha Shields were awarded to 10 Divisions/ Sections where maximum correspondence is made in Hindi with Regions "A" & "B". Apart from above, CEA has introduced a Cash Award Scheme namely Kendriya Vidyut Pustak Lekhan Puraskar Yojna on All India basis to promote original book writing in Hindi from the calendar year 2003. Under this scheme prize money is – (A) First Prize- Rs. 60,000/-, (B) Second Prize- Rs.40,000/- (C) Third Prize- Rs. 25,000/- and one consolation prize of Rs.10,000/- only. This year, evaluation of the books will be finalized after scrutiny the books by the evaluation committee.

To create interest in Hindi, the Hindi Books were regularly purchased for library of CEA as per the target prescribed by the Official Language department.

During the year, Four Hindi Computer Training Programmes (each of five days) were organized in coordination with NPTI, Faridabad in which altogether 72 employees have been given training on computer and one Hindi workshop was also organized in which about 50 employees have participated.

Now in CEA, all Officers and employees are trained in Hindi Language and all typists are trained in Hind Typing. Newly recruited officers/ employees are being trained in Hindi Training Courses organized by the Training Institutes from time to time.

In CEA, Hindi fortnight has been organized during 15.09.2009 to 30.09.2009 and prize distribution ceremony has been held on 06.10.2009 in which Chairperson, CEA presided over at the occasion. During the fortnight, six competitions were held namely General Essay, Technical Essay, Noting Drafting, Poetry Recital, Extempore Speech and Quiz in which most of the officers and employees participated. The winners of these competitions have been given cash award of Rs. 1000/- Ist prize, Rs 750/- IInd prize and Rs. 500/- IIIrd prize respectively. Chairperson, CEA distributed the prizes and appreciation letters to the winners.

1.8 Welfare Activities in CEA

1.8.1 Activities undertaken for the benefit of the Persons with Disabilities

Reservation is being provided in CEA to the Persons with Disabilities as per Rules. The representation of physically challenged employees in all categories of posts of CEA is given below:-

Group	Total Employees as on 1.1.2010	Physically Challenged Employees				Percentage of Physically Challenged Employees
		VH	HH	OH	Total	
Group A	349	-	1	-	1	0.29%
Group B	327	-	-	2	2	0.61%
Group C	196	-	-	1	1	0.51%
Group D	181	-	-	-	-	-
Total	**1053**	**-**	**1**	**3**	**4**	**0.38%**

In addition, due care is taken to post Persons with Disabilities to disabled friendly offices of CEA for providing the barrier free environment.

Also, the guidelines issued by Ministry of Social Justice & Empowerment and other Ministries/ Departments from time to time in the related matter are regularly forwarded for implementation. The feedback of the implementation of related Programme is sent to the Ministry of Power on regular basis.

1.8.2.1 Welfare of SC/ST/OBC

Director (A-II) and Dy. Secretary (Accounts) have been designated as Liaison Officers in CEA to look after the welfare of SC/ ST and OBC employees respectively.

1.8.2.2 Activities related to Women employees

Women employees of CEA have been participating in various activities viz. sports, recreation & cultural activities. They have also been co-opted as members of CEA Departmental Canteen Management Committee.

1.8.2.3 Sadbhawana Fortnight

As in the past, this year too Sadbhawana Fortnight was observed from 20th August to 3rd September, 2009. Chairperson, CEA administered "Sadbhawana Pledge" on 20th August, 2009. The fortnight concluded with a cultural programme on 3rd September, 2009.

1.8.2.4 Quami Ekta Week

As per directions of "National Foundation for Communal Harmony", CEA observed the Quami Ekta Week from 19th to 25th November, 2009. The employees of CEA donated generously towards the fund for the physical and psychological rehabilitation of child victims of communal/ caste/ ethnic/ terrorist violence.

1.8.3 Associations/ Unions in CEA

The following Associations/ Unions of employees in CEA were active during 2009-10.

i) Power Engineers Association- Under process for recognition under CCS (RSA) Rules, 1993.

ii) Drawing Staff Association – Recognized for three year under CCS (RSA) Rules, 1993.

1.8.4 Pension Cases

1.8.4.1 Pension Cases (Superannuation/ VRS including sanction of CGEGIS amount)

93 regular superannuation cases, 3 VRS cases, 5 death cases and 5 provisional pension cases have been settled during the year 2009-2010 and necessary payment of retirement benefits has been released. In addition, 80 (approx.) more revised pension cases were also settled subsequent to revision of Pay/ Pay Scale due to 6th Pay Commission.

1.8.4.2 Transfer of Capitalized Value of Pensionary Benefits

6 cases of transfer of capitalized value in respect of ex-employees of CEA who have been permanently absorbed in Government Undertakings/ Autonomous Bodies were processed and finalized where CEA has discharged its pensionary liabilities to the concerned organizations. 31 more such cases are under various stages of process.

1.8.4.3 Restoration of one-third commuted portion of Pension/ grant of Family Pension

Subsequent to issue of revised instructions/ guidelines by the Deptt. of Pension & Pensioner's Welfare for calculation of 1/3rd restored amount of commuted portion of pension and subsequent to 6th CPC, 45 cases relating to revision of the restored amount of 1/3rd portion of pension and grant of family pension to the beneficiaries have been settled.

1.8.4.4 Pro-rata pension (CAT/ Court Cases)

17 cases of grant of pro-rata and other pensionary benefits to ex-employees of CEA permanently absorbed in PSUs who had approached the CAT/Court for relief were processed. Out of these, 2 cases where judgments were passed, have been settled and requisite payments released as directed by the Hon'ble CAT/Court. One (1) more such case for releasing pro-rata pensionary benefits is under process. In one (1) case, the judgment of the Hon'ble CAT required the Department to consider the claim of the applicant for pro-rata pensionary benefits and issue suitable orders. In this case, the Department considered the claim of the applicant and finding him ineligible for pro-rata pensionary benefits, issued requisite speaking order to him. In 3 cases where judgments were received, the Department/ Government has filed "Appeal" in the Hon'ble Supreme Court and Delhi High Court and the cases are still sub-judice. Three (3) cases have been dismissed by the Hon'ble CAT. Seven (7) cases are still sub-judice in the Hon'ble CAT. In one (1) case, where representation claiming pro-rata pensionary benefits was received in this office, the matter was considered in consultation with the Ministry of Power and the requisite speaking order refusing the claim of the applicant has been issued.

1.9 Vigilance Activities / Disciplinary Cases in CEA

The Vigilance Division, CEA deals with various facets of Vigilance mechanism and functions for carrying out investigations into complaints, suggesting corrective measures for improving the control system, compliance of laid down procedures and also for carrying out preventive vigilance exercises.

Complaints other than anonymous/ pseudonymous were taken up for investigation promptly and after completion of investigations, reports submitted to the prescribed authority. As on 1.1.2010 there was no case of disciplinary action pending under CEA's disciplinary jurisdiction. Three cases were added during the period. Out of them, two have since been finalized. Thus at present (as on 31.3.2010), there is only one case pending finalization. Prescribed periodical Returns were sent to the Ministry of Power in time.

As part of preventive vigilance, the Vigilance Division is ensuring job rotation in sensitive posts. The Vigilance Division has also taken steps to ensure that website of CEA plays an important role in increasing transparency in its functions. Vigilance Awareness Week was observed from 3rd November to 7th November, 2009 and used as an occasion to highlight awareness about effective preventive measures through system improvements and use of information technology to fight corruption.

1.10 Electric Power Information Society (EPIS)

The Electric Power Information Society (EPIS) was established in June 1996 under the aegis of Central Electricity Authority on no-loss-no profit basis for bringing out various CEA publications. These publications including a quarterly technical journal "Vidyut Bharati" are being distributed by CEA among various Government agencies on complimentary basis. These are also available on sale for general public.

During the year 2009-10, the following publications have been brought out:

1) Vidyut Bharati, Quarterly Journal issues
   - i) April – 2009
   - ii) July – 2009
   - iii) Oct. – 2009
2) CEA Annual Report 2007-08 (Hindi Version) – July, 2008
3) Performance Review of Thermal Power Stations, 2007-08 (English & Hindi Version)
4) Review of Performance of Hydro Power Stations, 2007-08
5) Electricity Tariff & Duty and Average Rates of Electricity Supply in India - March 2009
6) All India Electricity Statistics (2007-08), General Review, 2009 - May 2009

1.11 Grievance Cell

To redress the grievances of officers at CEA Head Quarters, in accordance with the instructions of Deptt. of Administrative Reforms and Public Grievances, Shri S. K. Thakral, Chief Engineer (Electrical Inspectorate) is functioning as Director (Grievances). 11 grievance cases were received from April-2009 to February-2010, out of which one case has been settled.

1.12 Right to Information Act, 2005

Under Right to Information Act 2005, Shri S. K. Thakral, Chief Engineer has been entrusted the work of Central Public Information Officer of CEA. During the period from April-2009 to December-2009, 110 requests / applications were received and 114 have been decided including 4 cases received prior to

this period. 13 applicants had made Appeal to the First Appellate Authority/Central Information Commission, out of which 12 cases have been disposed of at the level of First Appellate Authority and one case has gone to the Central Information Commission.

1.13 Public Relations Group

The Public Relations Group (PR Group) was constituted in CEA in March, 1999 with a view to consolidate and project the achievements of CEA as also to interact with the media. The PR Group is headed by Secretary, CEA. Shri R.K. Verma, Director (DP&D), appointed as Director (PR), assists the Secretary, CEA in coordinating and implementing public relation activities with the help of officers from various wings. The Public Relation (PR) Group also organises CEA stall in IITF Exhibition at Pragati Maidan, New Delhi every year.

1.14 Parliament Questions, Parliament Assurances, VIP references

Work relating to answering of Parliament Questions, Parliamentary Assurances, VIP References and compilation & updating material for Consultative Committee and Standing Committee on Energy, compilation and processing of material for presentations regarding power sector reform and private sector participation including action taken reports, notes for Estimates Committee and Power Minister's meeting on power scenario etc. was dealt with. This involved data sourcing and collection, preparation and forwarding of replies to MoP and participation in briefings. Subsequent need based queries and updating was also accomplished promptly.

Materials for 'Calling Attention Motion' and 'No day Yet named Motions' on various matters under Rule 196, 377 etc. of Parliament Procedure were also dealt with.

Generation, compilation and updating of material in respect of various Consultative Committee meetings were accomplished. The action taken reports on these were prepared with the help of data / replies received from various units.

VIP/MoP references including references from PMO covering areas of Power Sector were processed and as a result of active communication with respective divisions/authorities, data so generated was finalized and forwarded to MoP. Material was also compiled and processed for President's Address to both the Houses of Parliament and Finance Minister's Budget Speech.

(A) During the year 2009-10, there were 4 Parliament Sessions and the No. of Questions dealt with is as follows:

S. No.	Particulars	Starred Question	Unstarred Question
1.	Interim Budget 2009-10	11	18
2.	Budget + Monsoon 2009-10	31	242
3.	Winter Session 2009-10	41	269
4.	*Budget 2010-11	15	102

* upto 31.3.2010

(B) During the year, following references were dealt with:

i) No. of Consultative Committees 4

ii) No. of Standing Committees 25

iii) VIP/PMO references 40

iv) Calling Attention Motion, No day yet named Motion, etc. 11

v) Assurances 11

1.15 Monthly Reports

CEA receives regular data on almost all the areas of Power Sector, such as generation, transmission and distribution of power. The information received is incorporated in the following regular monthly reports:

- Report on important developments during the month for Prime Minister's Office
- Summary report for Council of Ministers on important developments in Power Sector during the month.
- Executive Summary
- Thrust area report for P.M.O.
- Fortnightly Report for P.M.O.

The first two reports are issued by 1st and 5th of every month briefly highlighting the major achievements/milestones/critical issues in Power Sector.

The Executive Summary is issued by 10th of every month and is an important reference document reflecting targets vis-à-vis achievements in almost all the important areas of Power Sector in the month of review. Executive Summary of the important activities in the Power Sector and the energy generation parameters for the review and information is sent to Hon'ble Minister of Power and other concerned officials. The report contains the details of the thermal and hydro generating units commissioned during the month and the progress of major transmission lines & sub-stations commissioned. The status of generation vis-à-vis the programme and also the performance with reference to the corresponding period of previous years and the status of the coal position of various thermal power stations is highlighted.

The up-to-date details of the generating capacity, energy demand and the demand met in various States and the Regions are brought out for overall review of the power situation in the country. Also, information regarding capacity addition, generation targets/achievements etc. are sent to MoP every month for Press Release by the end of 2nd week.

1.15.1 Information on various issues provided to the Ministry of Power

1. Material for Economic Survey 2009-10
2. Material for IITF 2009
3. ADB Energy Policy 2009-10
4. Annual Report 2009-10 of MoP
5. Major Achievements in Power Sector
6. National Electricity Policy
7. Estimates Committee
8. Performance review of Power Sector
9. Power Ministers' Conference
10. Material for various speeches for use by MoS (Power).

1.16 Computerization in CEA

The use of computers for power sector development was started in CEA in mid sixties. In the initial years, the usage was mainly for power system planning studies. However, over the years computerization has pervaded all activities of CEA. A number of software packages have been procured (refer Software facilities) and in-house expertise developed. The hardware facilities have also been enhanced.

All the technical Divisions and the administrative sections have been provided with computers to facilitate computerization of all the works in CEA. All the desktop computers of CEA office at Sewa Bhawan and West Block-II have been interconnected through wired as well as wireless LAN. The important statistics / data / information of CEA is uplinked on the website of Central Electricity Authority (www.cea.nic.in) for global access. The bilingual

(English & Hindi) website has been designed, developed and maintained in-house by IT Division, CEA. The internet facility is provided to about 600 officials through 34Mbps RF link provided by NIC. A Data Centre has been set up in CEA's office building (Sewa Bhawan) for collecting and scrutinizing online data from various power utilities / organizations. The same has been ISO 27001:2005 certified during the year 2009-10.

1.16.1 Hardware Facilities

The hardware facilities presently available include:

- IBM X3800 Server (4 Nos.)
- IBM X3500 Server (8 Nos.)
- IBM P550 RISC Server (2 Nos.)
- IBM DS4700 SAN storage, IBM make SAN switch, IBM TS3310 Tape library
- Cisco Catalyst 4500 series core switch, Cisco Catalyst 3750 series L3 switch, Cisco 2821 router, Cisco ASA5540 firewall.
- About 600 Nos. of Pentium-III/Pentium-IV/ Core 2 Duo based PC systems.
- Advanced peripheral like A0 size plotters/ digitizers, colour laser printers, high speed digital printer-cum-copiers, A3 size inkjet printers, heavy duty line printers, CD writer, scanners, KVM Switch, etc.

1.16.2 Software facilities

The following system and application softwares are available:

System software

- Redhat Enterprise Linux operating system
- Windows Server 2003 enterprise edition
- AIX operating system
- Microsoft Windows XP/Vista operating system
- Oracle Database 10g Enterprise edition, RAC, advanced security, Diagnostics pack, Tuning pack
- IBM DB2 Content Manager Enterprise edition, performance expert
- IBM Websphere application server, portal server, process server
- Symantec antivirus enterprise edition
- Lotus Domino enterprise mail server
- Microsoft Windows CALS proxy software
- Cisco LMS network management tool
- IBM Tivoli storage manager
- Cisco AAA software

Application software

- Information Management Software for CEA
- MS Office bilingual software.
- Data Base-(Foxpro, Visual Dbase, MS Access) for desktop PCs
- Report Generation (Adobe Acrobat 5/6)
- Graphic Packages – (AutoCAD)
- Microsoft Visual studio
- Bilingual Software (LEAP, Akshar, APS 2000++)
- Payroll package for CEA (developed in-house)
- Office automation package for GPF/ Consultancy/ Billing/ Newspaper billing.

Some of the important and scientific application packages available include:

- Power System Analysis Package (PSAP)
- Electric Generation Expansion Analysis System Model (EGEAS)
- Integrated System Planning Model (ISPLAN)
- MULTISYM.
- River Basis Planning Module – SIMHYDE.
- River Basis Planning Module – MINERVA.

- Thermoflow software (GT Pro, GT Master and Peace, Steam Pro, Steam Master and
- Peace).
- Caeser II Ver.4.5 standalone PC version-Pipe stress Analysis Software.
- Cadworx-Plant design and Automation Software Version 2005 standalone PC Version
- AutoCad based specification driven Plant Design.
- Primavera for enterprise for construction (P3ec) version 4.1.
- AutoCAD 2010 Civil 3D and AutoCAD 2005-standalone.
- STAAD Pro Structural Suite Software.
- Cyme software for power flow study.
- Software for Distribution Planning (SynerGEE).
- PLS-CADD software package for transmission line terrain modeling.
- i-tower software package for designing steel lattice structures.
- Current Distribution Electromagnetic Interference, Grounding and Soil Analysis (CDEGS) software package.
- PSCAD / EMTDC software package.
- ASPEN one line for relay co-ordination.
- ASPEN line constant programme.
- CYMCAP package for ampacity calculation.
- iSWITCHYARD software for design of switchyard and sub-station structures.
- SIMPOW and NEPLAN – load flow, short circuit, optional power flow and stability studies.
- PSS/E – for load flow, short circuit and stability studies.

1.16.3 Usage of Facilities

All the formations of CEA continue to make use of the existing computer facilities for carrying out studies and day-to-day work. The computer systems are extensively utilized by technical wings of CEA for bringing out various reports through complex engineering studies and analysis. These facilities are also used for internet communications, data transfer between CEA and MoP, budgetary allocation and monitoring and sanction/grant of loans/advances to CEA personnel.

1.16.4 Upgradation of I.T. facilities in CEA

Govt. of India, Ministry of Power has approved a scheme "Upgradation of I.T. facilities in CEA" at an estimated cost of Rs. 9.52 Crores (revised cost estimate Rs. 10.47 Crores). The scheme provides for computers at each working desk inter-connected through LAN and having the facility of Internet. The scheme envisages receiving data electronically from the utilities online through CEA website by direct entry into the database. To achieve the above, 14 No. of servers of various types along with firewall and intrusion detection system have been installed at Data Centre in Sewa Bhawan. This setup facilitates (a) a centralized and online database for analyzing the data of Indian power sector (b) project monitoring (c) interlinking various databases of each division on relational basis for sharing data among them (d) automatic uplinking of information to CEA website, etc.

The work related to Data Centre and installation of servers and system software including establishment of LAN has already been completed. The application software has been developed and is under testing. Entry of daily generation data into the IMS through Internet / CEA website is being carried out by a number of generating stations / companies of the country, for whom short training sessions for the purpose were arranged at CEA headquarters. Similar training sessions were arranged for RPCs, RIOs, TRANSCOs and DISCOMs to enable them furnish monthly / quarterly / half-yearly / annual information / data online through Internet.

Hydro generating companies were also trained to furnish data regarding project investigation, project appraisal, construction monitoring, R&M, etc. However, the process of collection of data (other than daily data) from the aforesaid utilities in online mode is under testing and yet to stabilise.

The study by the consultant to recommend further upgradation of IT facilities in CEA in Phase-II has also been initiated with the approval of MoP with the following broad objectives:

- To provide adequate redundancy in the existing data centre to enhance reliability of the system and to build a separate disaster recovery data centre.
- More intensive and comprehensive IT based monitoring of execution of power projects.

1.17 ISO 9001:2000 Quality System certification for CEA

In order to improve the quality of output and competency of the personnel of CEA, the Quality Management System (QMS) as per ISO 9001:2000 was adopted by CEA. Though ISO certification for all the wings of CEA was obtained from BIS during February-March 2004, a single Composite Licence was obtained from BIS in 2007.

On renewal audit by BIS, CEA obtained ISO 9001:2008 certification in February 2010. As per the provisions of ISO 9001:2008 prescribed in the Quality Manual, Monthly, Quarterly and Half Yearly Review Meetings are held in various divisions/wings at the level of Chief Engineers, Members and Chairperson (CEA). The BIS conducts Surveillance Audit once in a year for all the wings for continuance of ISO certification.

1.18 Various Committees constituted by CEA

The following committees/ working groups, comprising of CEA officers & others, were constituted by CEA:

Sl. No.	Date of constitution of Committee	Name of the Committee
1	06.05.2009	Committee to inquire into the Grid Disturbance in the CESC system on 19th April, 2009.
2	08.01.2010	Committee to inquire into the partial Grid Disturbance that occurred in Northern Region on 2nd January, 2010.
3	11.01.2010	Committee of Experts for the preparation of a document entitled "Standard Design Criteria / Guidelines-765/220 kV Switchyard for Thermal Power Stations (2x500 MW or above)."
4	19.02.2010	Committee for 18th Electric Power Survey

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CHAPTER – 2

PLANNING FOR POWER DEVELOPMENT

2. Power Planning

2.1.1 Generation Planning Studies

i) Generation Planning Studies have been carried out for the terminal year of 12th Plan and 13th Plan for preparation of Draft National Electricity Plan.

ii) Power absorption studies for accord of concurrence to the following projects have been carried out:

1. Indira Sagar (Polavaram) HEP (12x80=960 MW) in Andhra Pradesh by M/s APGENCO.
2. Dibbin HEP (2x60 MW) in Arunachal Pradesh by KSK Dibbin Hydro Power Pvt. Ltd.
3. Nafra Hydro Electric Project (2x48 MW) in Arunachal Pradesh by Sew Nafra Power Corporation Private Limited.
4. Demwe Lower HEP (1750 MW) in Arunachal Pradesh by Athena Demwe Power Pvt. Ltd.
5. Bajoli Holi HEP (160 MW) in Arunachal Pradesh by M/s GMR.
6. Lower Siang HEP (9x300=2700 MW) in Arunachal Pradesh by M/s Jaypee Arunachal Power Ltd.
7. Sainj HEP (2x50=100 MW) in Himachal Pradesh by Himachal Power Corporation Ltd.
8. Kutehr HEP (3x80=240 MW) in Himachal Pradesh by JSW Energy Ltd.
9. Tato-II HEP (4x175 MW) in Arunachal Pradesh by Tato Hydro Power Pvt Ltd.
10. Nyamjang Chhu HEP (6x150 MW) in Arunachal Pradesh by Bhilwara Energy Ltd.
11. Teesta-IV HEP (4x130 MW) in Sikkim by M/s NHPC Ltd.

2.1.2 Reports brought out

1) Guidelines for 'Qualifying Requirements of the Bidders for Balance of Plants (BoP) of Coal/Lignite based thermal power projects' were revised and circulated to all PSUs and State Utilities in November, 2009. Later on, some comments/ observations were received from the EPC contractors, engineering and manufacturing firms, State utilities and joint venture companies. Based on these feedbacks, some amendments were proposed in the Qualifying Requirements of bidders and same were discussed in the meeting held in CEA by CEA Committee [comprising of CE(IRP) and CE(TE&TD) as members] on 11/01/2010 and decisions were taken regarding the amendments. These modifications would shortly be carried out in the Guidelines.

2) Draft National Electricity Plan covering review of 11th Plan & 12th Plan in detail and perspective 13th Plan is under preparation. The draft Plan will be circulated to all stakeholders for suggestions / comments and the same would be incorporated suitably in the final Plan. The Plan will be thereafter notified in the Gazette of India after approval by Government, as per the Electricity Act, 2003.

2.2 Participation of CEA as Committee Member / Interaction Meets etc.

1) Officers from CEA participated in the Interactive Session on 'Issues in Tapping of Surplus Power from the Captive/ Cogeneration Power Plants' held at Pune on 11/09/2009 in which representatives from

SERC, State utilities and industries were also present.

2) One officer from CEA participated and gave presentation on 'Power Policy & Future Planning' on 23.10.2009 for the interactive meeting on issues pertaining to Thermal Power Plants in Bhubneshwar on 23rd October, 2009.

3) Two officers from CEA participated and gave presentations during regional level meeting on 'Interactive Session on Tapping of Surplus Power from Captive Power Plants' held at Bhubneshwar on 22nd December, 2009.

4) Expert Group on 'Low Carbon Growth Strategy' has been constituted by Planning Commission and Chairperson, CEA is a Member of the Group. One meeting of the Expert Group has been held.

5) A Task Force on 'Standardization of Contractual Terms and Conditions for T&D Projects and CEA Specifications for Distribution Transformers' is proposed to be constituted by IEEMA with the help of CEA to discuss the potential areas to enhance the co-operation between IEEMA and CEA.

6) CEA participated in the workshops on "Mitigation of Carbon Tetrachloride (CTC) from Indian Power Sector", which were conducted at Mumbai, Kolkata, Raipur, Hyderabad and Delhi by association of CEA and GTZ, Germany.

2.3 Electricity Demand

a) Under existing system, electricity demand of the country is projected periodically, normally once in five years, for short and long timeframes. The demand forecasting is done by a National level 'Committee of Experts' constituted by CEA with consent of the Ministry of Power, by conducting an exhaustive Electric Power Survey (EPS) of India. EPS is undertaken by CEA by obtaining inputs from four Regional Power Survey Offices which coordinate with various organizations/utilities. The demand forecast is the basic input for formulation of National Electricity Policy, Developmental Plans and Programmes & Schemes concerning generation, transmission, trading, distribution and utilization of electricity. The demand forecast qualifies the need for development of various areas of electricity consumption to orient the growth of the specified sectors of development and leads to planned growth in various categories of electricity consumption. Electric load forecast also drives the development of transmission highways and optimum transmission network for carrying electricity from generation centres to load centres. Inter-regional transmission links for electricity transmission from surplus region to deficit region is an important input for planning and development of such links. The load projections also facilitate planning of electricity transfer MoU and trading of electricity for the mutual benefits of surplus/ deficit regions/States.

The latest forecast of electricity demand had been made by the 17th Electric Power Survey Committee(EPSC) and published in March, 2007. The 18th EPSC has been constituted by CEA in February, 2010.

The terms of reference of 18th EPS are:

i) To forecast year-wise electricity demand for each State, Union Territory, Region and All India in detail upto the end of 12th Plan i.e. for the years 2012-13 to 2016-17.

ii) To project the perspective electricity demand for the terminal years of 13th and 14th Five Year Plans i.e. year 2021-22 and 2026-27.

(b) Analysis of Load Growth

The 17th EPS Report was prepared in consultation with utilities by considering various assumptions, in order to keep a watch on the load growth vis-à-vis demand forecast of various States. Analysis of energy demand and the peak demand is being carried out regularly. The All India energy demand during the year 2009-10 is very much in line with the 17th EPS forecast i.e. demand being 830.31 BU against the projected forecast of 848.39 BU. The energy demand of most of the Regions except North-eastern Region (NER) deviated from projections in the band of 0-5%. The deviation in peak demand of all Regions except NER remained upto 5% with respect to 17th EPS projections during a particular month only. The peak demand projections on All India basis were about 10% more than the actual demand. The analysis of the demand shows that there are spurts in the peak demand by 15-30% whereas the corresponding energy demand during the same year had grown by 8-10% only. The irregular increase in peak demand without corresponding energy growth needs to be addressed through Load Management, Demand Side Management and T&D Loss Reduction Programme. Accordingly, these States have been advised to develop the load growth and infrastructure to provide power for all.

2.4 Publications on All India Electricity Statistics – General Review & Growth of Electricity Sector in India

In fulfillment of its duties and functions stated under Section 73 (i) & (j) and exercising powers vested under Section 74 of the Electricity Act, 2003, CEA publishes following documents carrying annual electricity statistics of national and international importance and growth indicators of the Indian Electricity Sector viz. All India Electricity Statistics 'General Review' & 'Growth of Electricity Sector in India from 1947 onwards'.

2.4.1 All India Electricity Statistics – General Review

General Review-2009 containing annual electrical energy statistics of utilities concerning growth of the Indian Electricity Sector, important information like organizational structure of Electricity Supply Industry in India and reforms carried out by Utilities are incorporated. The General Review incorporates many important statistics/data on installed capacity, energy generation and utilization of energy along with the transmission and distribution losses. This publication contains energy utilization by various categories of electricity consumers like domestic, commercial, irrigation, industries (LV/MV, HV/EHV), public lighting, public water works, etc. In addition, the information on captive generation by 3000(approx) HV/EHV industries is also compiled along with the installed generating capacity by captive generators. General Review–2009 containing data for the year 2007-08 has been published in May, 2009.

2.4.2 Growth of Electricity Sector in India

A Publication titled "Growth of Electricity Sector in India from 1947-2009" was brought out in May, 2009 containing data for 2007-08 and provisional/estimated data for 2008-09 in respect of Indian Electricity Sector is also indicated in this publication. The data for this publication has been sourced from various Utilities & Non-utilities and various National & International Journals.

This annual publication of CEA illustrates the growth of vital development indicators like generating capacity, electrical energy production, transmission and distribution network, captive power plants and pattern of consumption of electricity etc. The important statistics have

been compared with the International data with respect to some of the developed and developing nations.

The booklet contains maps and charts presenting a panoramic view of the growth of Indian Electricity Sector.

2.5 Standing Committee on Derating, Uprating and Retirement of Installed Capacity of Stations

A Standing Committee is constituted under the chairmanship of Member (Planning) for considerating the proposals of derating, uprating & retirement of electricity generating capacity of power stations.

The Committee considers the performance of the units, analyzes the performance data vis-a-vis the overall generation throughout the life of the plant and carries out detailed scrutiny of technical parameters of the proposed units. Keeping in view the merits of the proposals from case to case, the committee makes recommendations for the approval of the Chairperson/Authority. During the year 2009-10, the proposal of extension of temporary deration of Loktak HE Station (3x35MW) to (3x30MW) was approved. The proposals of following power generating units are under consideration of Standing Committee for Upration / Deration:

Sl. No.	Name of the Station & unit nos.	Installed capacity (MW)	Derated / Uprated capacity (MW)	Net upration / deration (MW)	Utility Agency
1.	Papanasam HE Project	4x7	4x8	Net Upration 4MW	TNEB
2.	Mettur Dam Power House	4x10	4x12.5	Net Upration 10 MW	TNEB
3.	Khandong HE Station	2x25	2x22	Net Deration 6 MW	NEEPCO
4.	Kopili Stage-II	1x25	1x21	Net Deration 4 MW	NEEPCO
5.	Kopili Power Station	4x50	4x49	Net Deration 4 MW	NEEPCO
6.	Bhusawal TPS Unit No.1	1x55	1x50	Net Deration 5 MW	MAHAGENCO
7.	Bhusawal TPS Unit No.2	1x210	1x190	Net Deration 20 MW	MAHAGENCO
8.	Chandrapur TPS Unit No.1 &2	2x210	2x185	Net Deration 50 MW	MAHAGENCO
9.	Nasik TPS Unit No.1&2	2x125	2x100	Net Deration 50 MW	MAHAGENCO
10.	Koradi TPS Unit No.1 to 4	4x105	4x85	Net Deration 80 MW	MAHAGENCO

2.6 Implementation of initiative of Working Group-III on 'National Mission on Enhanced Energy Efficiency' for retirement of TPS in 11th Plan.

Ministry of Power, under National Action Plan on Climate Change (NAPCC) has initiated 'National Mission on Enhanced Energy Efficiency' (NMEEE) considering retirement of old small sized inefficient thermal units. As a follow-up to the recommendation of NMEEE regarding retirement of old and inefficient thermal generating units, CEA has undertaken an exercise by identification of thermal units for phased retirement during 11th & 12th Plan periods.

The installed capacity so identified is 5000 MW (approx.) out of which an aggregate capacity of 3076 MW has been identified for retirement during 11th Plan. The following thermal units have been retired under this Plan upto 2009-10 (i.e. the 3rd year of the 11th Plan):

Thermal units Retired under NMEEE during 2009-10

Sl. No.	Name of Station/Plant	Unit No.	Installed Capacity Retired (MW)
1	Faridabad T P S of 60 MW	1	60.00
2	I.P.Station of 62.50 MW	2	62.50
3	I.P.Station of 62.50 MW	3	62.50
4	I.P.Station of 62.50 MW	4	62.50
5	I.P.Station of 60 MW	5	60.00
	Total (Retired)(MW)		**307.50**

2.7 Crisis & Disaster Management of Power Sector

A document titled "Crisis & Disaster Management Plan for Power Sector" was brought out in July, 2004 to serve as a guide to all utilities involved in generation, transmission, distribution of electricity for formulating the Crisis and Disaster Management Plan for their infrastructure. In the intervening period, considerable changes have taken place, such as enactment of Disaster Management Act (December, 2005), creation of National Disaster Management Authority and National Institute of Disaster Management (NIDM). Various Ministries/Departments have been entrusted with specific responsibilities with regard to formulation of Crisis Management Plan/Disaster Management Plan and implementation of various steps/measures in respect of the role assigned to various respective organizations/sectors. With a view to review the document and incorporating various aspects of Disaster Management Act, 2005 and related issues, an Inter-disciplinary Committee headed by Member (Planning), CEA with representatives from CEA, NLDC, NTPC, NHPC, OHPC, APGENCO has been constituted with the following terms of reference:

- Review of Disaster Management Plan/ Crisis Management Plan of Power Sector incorporating provisions of Disaster Management Act, 2005 and guidelines of NDMA and other related aspects.
- To formulate mechanism for annual updating/ review of Disaster Management Plan/Crisis Management Plan and implementation of the observations of Disaster Management audit and other provisions as per amendments in Disaster Management Act and guidelines of NDMA issued from time to time.

The details of Mock Drills in Power Sector conducted by various State/Central Utilities are analysed and reports submitted to MoP in accordance with the directions given during the meeting taken by Secretary (Security), Cabinet Secretariat in October, 2009.

Director (DMLF), CEA visited Andhra Pradesh as a Member of the Central Team to assess the damages of flood affected area and its management along with estimates of damages caused by flood. The report of the assessment was submitted and got approved in the meeting of the Inter-Ministerial Group.

2.8 Research & Development in Power Sector

2.8.1 Perspective Plan for Research & Development

A Standing Committee on R&D in Power Sector was constituted by the Ministry of Power under the chairmanship of Chairperson, CEA to prepare a Perspective Research and Development Plan for next 15 years and to make recommendations from time to time for optimum utilization of infrastructure, raising of funds and to ensure that the outcome of research results in benefits to the customers and the operational efficiency of the sector.

4 (Four) R&D projects recommended by the Standing Committee have been taken up by the various organisations during 10th Plan. The Conveners of the Task Forces, constituted by the Standing Committee are enthused with monitoring the progress of ongoing R&D Projects. The status of ongoing R&D projects is detailed in (a) of **Annexure No. 2A**.

The 12th meeting of Standing Committee on R&D was convened by the Chairperson, CEA, on 18th February, 2009 to consider the R&D projects recommended by the Task Forces. The Standing Committee recommended 12 projects for taking up R&D in the 11th Plan period. An SFC memo for 8 of the R&D projects recommended by the Standing Committee was formulated and forwarded to Ministry of Power. Subsequently, Ministry of Power has accorded financial approval to 6 of these projects. The details of the projects are at (b) of **Annexure-2A.** An SFC memo for the 4 remaining R&D projects, which were recommended by the Standing Committee with certain conditions to be fulfilled by the project proponents before these projects could be posed to Ministry of Power for funds, is under preparation. The details of these projects are:

Sl.No	R&D Project	Lead Agency
1	Power Quality Harmonic Analysis on Grid Substation Feeders in NDPL Network'	NDPL, New Delhi
2	RLA studies for Substations	NDPL, New Delhi
3	Developing of Metering Protocol Test Suite	CPRI, Bangalore
4	Integrated sustainable power generation from short rotation forestry 'enhanced bio-mass' in rural and semi urban areas within CDM (Co_2 mitigation)	IIT Delhi

2.8.2 Innovative R&D Proposals

Work regarding promotion of innovative methods of electricity generation continued and 13 Nos. of proposals received, from individuals through MoP, PMO and President Secretariat were examined and commented upon.

2.8.3 R&D works relating to Hydro Power Generation

The various R&D Schemes/Projects to be taken up in the Hydro Sector during 12th Plan were examined and projects found feasible were identified in consultation with the Members of the Task Force representing various agencies i.e. BHEL, NHPC, NML, IIT Roorkee, CPRI etc. This also includes scrutiny of various R&D proposals received from different organizations and obtaining the views of the Task Force members on these proposals and the clarifications from the project proposers. This also involved organising from time to time meetings of Task Force constituted for Hydro Projects.

A list of various R&D schemes which were under scrutiny are indicated as under:

A. Proposals Approved by MoP for Implementation under 11th Plan

i) Development of Silt Erosion Resistant Materials for Hydro Turbine Generators- NML, Jamshedpur

ii) Tunneling in water charged zones under high hydrostatic pressure – Shri A.K. Gupta, NHPC

iii) Development of Silt Erosion Resistant Nanocomposite Coatings by Physical Vapour Deposition for Hydro Turbine Components- Dr.Ramesh Chandra, IIT Roorkee.

B. Proposals Recommended by the Task Force for presenting to Standing Committee on R&D (SCRD)

i) Evaluation of efficacy of rock reinforcement measures on long-term stabilization of hydel caverns – Sri M.R. Saharan, CIMFR, Nagpur

ii Predicting geology and classifying rock mass for support design ahead of tunnel face – Sri Anil Swarup, CIMFR, Roorkee

iii) Tunneling in rock burst prone areas – Shri Anil Swarup, CIMFR, Roorkee

iv) Assessment of correlation between Rock types and Tunneling rate in Himalayas – Shri Anil Swarup, CIMFR, Roorkee.

v) Compilation of data and correlation between categories of rocks in Himalayan geology and excavation rates of tunnels in various hydro projects - Shri A.K. Gupta, NHPC.

C. Proposals under Scrutiny by Task Force

i) Development of models for design of road header specifications and performance prediction in different geological conditions using laboratory and in situ dynamic rock mass properties for rapid tunneling,- Dr.A.K. Raina, CIMFR, Nagpur.

ii) Design and development of a DSP based controller for small hydro and wind power generation – Dr. S.P. Singh, IIT Roorkee.

iii) Erosion Resistant Nitronic steels for Turbine application in Hydro Power Generation – Dr. Ujjwal Prakash, IIT Roorkee.

2.9 Preparation of Database

The data/information regarding R&D work in power sector being carried out by various agencies/organizations in Private as well as Government Sectors in India was obtained and compiled in the form of a Directory and is available on CEA Website in form of a directory.

2.10 CEA Chairs at Indian Institute of Technology, Delhi

An MoU exists between CEA and the Indian Institute of Technology, Delhi under which two CEA Chair Professorships, one in the Center for Energy Studies alternatively Department of Mechanical Engineering and the other in Electrical Engineering Department, has been established, to fulfill following objectives:

- To take part in the academic programs of IIT, Delhi, as full time professors/faculty in the Center for Energy Studies alternatively Department of Mechanical Engineering and Electrical Engineering Department and coordinate HRD programs in the frontier areas of Power Management;
- To develop R&D programs relevant to the needs of CEA and in areas defined in the appendix to the MoU; and
- To initiate and develop HRD programs relevant to the needs of CEA and to coordinate courses for any batch of students from the CEA.

Under the programme, a number of topics for research have been forwarded to IIT, Delhi.

A total number of 7 officers of CEA, Ministry of Power and NPTI are pursuing M.Tech. and PhD courses at IIT, Delhi under the provisions of the MoU. Till date, 8 officers have already completed M. Tech and one of the officers has completed Ph.D. from IIT, Delhi.

2.11 Energy Conservation

2.11.1 Indo-German Energy Efficiency Programme

A project "Power Plant Optimization Component: Improvement in the availability and efficiency of Power Plants" under Indo –German Efficiency programme (IGEN) is being implemented jointly by M/s GTZ and CEA with the objective to promote energy efficiency and its conservation through improvement in the availability and efficiency of Power Plants. Implementation agreement between Ministry of Power and M/s GTZ was signed in November 2006. The following are the outcome expected of the scheme:

1. Improved availability and efficiency of thermal power plants
2. Establishment of mapped power plants data bank in CEA.
3. Report of Energy conservation impact in power plants
4. Establishment of Energy Efficiency cell at Power Plants
5. Training to the power plant professional on power plant optimization
6. Guidelines of Energy Auditing of Pulverised Coal/Lignite Fired Thermal Power Stations
7. Standard Prescribed format for submitting Energy Audit Reports
8. Organization of Dissemination Seminars.

Under the programme, the work of mapping of 85 units at 47, Thermal Power Stations all over the country has been completed in association with GTZ.Units of 100/200/210/250/500 MW at different stations of various state utilities/ Power Producing companies have been covered. All TPSs in the country have been advised to set up Energy Efficiency Cell and appoint Energy Manager in compliance to the EC Act – 2001 and about 71 stations have so far reported the establishment of cell & its structure.

The mapping reports prepared for various thermal power stations were discussed with management and senior officers from the concerned stations for implementation of the recommendations and modalities for adoption of advance efficiency improvement technologies. Feedback forms were circulated to mapped stations and feedback received from them is being compiled. 51 power plant operational engineers/officials from various thermal power plants/ MoP/CEA were deputed in Germany for Study –cum- familiarization programme and interchange of best practices with power plant operators. Formats for total energy consumed and specific energy consumption for power station for development of electronic version were finalized. Guidelines on Energy Auditing of pulverized coal/lignite fired Thermal Power Plants were finalized and circulated to various Central/ State power generating companies and Bureau of Energy Efficiency.

Proposed activities for thermal power plant optimization component under Phase II of Indo-German Energy Programme (IGEN Prgramme) (October, 2009 – September, 2013) were finalized. The implementation agreement between the Ministry of Power and GTZ is yet to be signed.

2.11.2 Clean Development Mechanism

The Clean Development Mechanism (CDM) under Kyoto protocol of the United Nations Framework Convention on Climate Change (UNFCCC) provides an opportunity for

the Indian Power Sector to earn revenue through the reduction of Greenhouse Gases emissions particularly Carbon Dioxide (CO_2).

Central Electricity Authority (CEA), accordingly took up in cooperation with GTZ-CDM India, to compile a CO_2 database for all Grid connected power stations in the country. The objective of the database is to facilitate the consistent and accurate quantification of CO_2 emissions baseline by CDM project developers in the Indian Power Sector. India is first CDM country in the world to have published such an official baseline for the power sector in the country as a whole. The database along with a User's Guide is available on CEA website www.cea.nic.in. The latest version 5.0 contains the data upto 2008-09. CEA has also worked out CO_2 base line emission factor as per CDM approved methodology ACM 0013 for the new upcoming super critical coal based power plants for availing CDM benefits.

2.11.3 Asia Pacific Partnership (APP) - Introducing Best Practices for Efficiency Improvement in Power Plants

Asia Pacific Partnership (APP) on Clean Development and Climate is an innovative new effort to accelerate the development and deployment of clean energy technologies with founding members from Australia, China, India, Japan, Korea and USA.

The United States Department of Energy's (USDOE) Office of Fossil Energy and NETL is taking the lead in implementing activities targeted at improving the efficiency of coal fired power plants in India under Asia Pacific Partnership (APP) Program on Clean Development and Climate. Under APP program, a Task Force on Power Generation and Transmission has been formed with an objective to facilitate demonstration and deployment of practices, technologies and processes to improve efficiency of the power generation.

Ropar Thermal Power Station of Punjab State Electricity Board and Kolaghat Thermal Power Station of WBPDCL were shortlisted for carrying out studies.

Final report on studies carried out at Ropar TPS and Kolaghat TPS has been submitted by consultant. Respective stations are taking action to implement the recommendations given in the report.

Further, Tuticorin TPS has also been taken up for boiler optimization studies. The work on the same is expected to start soon.

2.11.4 Environment aspects of Electricity Generation

CEA collected and compiled the monthly environmental related data for the year 2009-10 for thermal power stations that are in operation. Those power stations where stack emissions exceeded the norms were addressed to take remedial measures and draw up action plan so that such emissions are brought down within the prescribed norms.

2.12 Performance Awards in Power Sector

2.12.1 Comprehensive Award Scheme for Power Sector

The Comprehensive Award Scheme for Power Sector has been introduced w.e.f the year 2004-05. The objective of the Comprehensive Award Scheme is to develop the spirit of competitiveness in O&M of various generating stations in thermal, hydro and nuclear generation, timely completion of thermal, hydro and transmission projects and performance in distribution companies and rural distribution franchisees in the Power Sector. To encourage environmental friendly measures, a new category of award namely, 'Environment Management Award' for thermal power stations has been introduced from the year 2008-09.

The Comprehensive Award scheme includes the following:

- Thermal Power Station Performance
- Early Completion of Thermal Power Projects
- Hydro Power Station Performance
- Early Completion of Hydro Power Projects
- Transmission System Availability
- Early Completion of Transmission Projects
- Nuclear Power Station Performance
- Performance of distribution companies.
- Performance of Rural Distribution Franchisees
- Environment Management for coal based Thermal Power Station.

2.12.2 Awards for the Year 2008-09

Based upon the data/inputs furnished by various power utilities, the National Awards for power utilities for meritorious performance during 2008-09 were presented by Hon'ble Minister of Power during a function held on 29th January, 2010. The lists of Awardees is given at **Annexure-2B.**

2.12.3 National Energy Conservation Awards, 2009

Ministry of Power had undertaken a scheme to encourage, motivate as well as give recognition through 'National Energy Conservation Awards' to industrial units and other establishments, who have taken extra efforts to reduce energy intensities while maintaining the production levels. The scheme is aimed to create an environment that would spur industries and other establishments in achieving excellence in efficient use of energy and its conservation. The awards were given away for the first time on December 14, 1991 which is now celebrated as National Energy Conservation Day throughout the country. Chief Engineer (C&E), CEA was a member of Technical Sub-Committee to assist the Award Committee in the finalization of awards. During the year 2009, 101 proposals received from six industrial sectors viz. Aluminium,Automobile,Chemical, Chlor-Alkali,Dairy and Fertiliser sectors were evaluated by CEA.

2.12.4 Environment Management Award for Coal/Lignite based Thermal Power Stations

It was decided to introduce this new category of award w.e.f. the year 2008-09 to promote best strategy and management of environmental issues by coal/lignite based thermal power stations. The scheme was prepared and circulated to all the coal/lignite based TPSs requesting them to furnish information on various environmental parameters such as CO_2 emission, SPM emissions at stack, Fly Ash Utilisation and Effluent Discharge etc. In all, 31 TPSs submitted the requisite information which was scrutinized and evaluated as per the Award Assessment Criteria laid down. Based on the evaluation carried out, Budge Budge TPS of M/s. CESC Ltd. was adjudged as the best performing power station from the point of view of environment management.

2.13 Fuel Management and Analysis

Central Electricity Authority (CEA) plays a pivotal role in establishing a system of coal allocation to power projects based on New Coal Distribution Policy.

2.13.1 Fuel Supply Agreement (FSA)

As per the New Coal Distribution Policy of Govt. of India, the supply of coal to power plants is made through enforceable Fuel Supply Agreement (FSA) with coal companies. The FSA provides for a mechanism to ensure quantity and quality supply of coal to Power Utilities.

CEA pursued with the Power Utilities and Coal India limited for signing of FSA for a capacity of 64,147 MW existing as on 31.03.2009.

Out of 24 Power Utilities required to sign FSA with Coal India Limited (CIL) for a coal quantity of around 306 Million MT, 22 have signed FSAs. Remaining FSAs are under negotiation and are expected to be signed shortly.

2.13.2 Monitoring Mechanism of Coal Supply to Power Stations

The coal stock position at various thermal power stations in the country is stringently being monitored in Central Electricity Authority on a daily basis. During the year 2009-10, seventy nine (79) power stations aggregating to a total installed capacity of 74452 MW were monitored on a daily basis. As on 31st March 2010, the Critical (coal stock less than 7 days) and Super Critical (coal stock less than 4 days) power stations were nineteen (19) and eight (8) respectively. All India Coal stock position as on 31st March 2010 was 14.2 Million Tonnes equivalent to 13 days of consumption against the normative all India stock requirements of 21 Million Tonnes. This is an improvement in All India coal stock position since the stock position as on 1st April, 2009 had 28 critical power stations, 18 super critical power stations and All India coal stock was 11.16 Million Tonnes equivalent to 10 days of consumption. Power Utilities were persuaded to import coal as per their target.

Reasons for the critical coal stock at various thermal power plants were inadequate availability of indigenous coal from Coal India Limited. During the year 2009-10, there was a growth of only 0.9% in coal supplies from Coal India Limited. The major reasons for less coal stock were inadequate availability of coal to meet the demand of Power Sector, transportation constraint from mine head to Railway siding in CCL and MCL area, transportation constraint from MCL (Talcher) to power plants located in eastern region, delay in import of coal and non-availability of adequate number of railway rakes etc.

Based on the Daily Report and interaction with the concerned power utilities, the critical issues were deliberated in the meetings of the various Committees with a view to address the constraints. The Committees to monitor coal supply are as follows:-

- Fuel Infrastructure Committee, headed by Member (Energy), Planning Commission
- Infrastructure Constraints Review Committee, headed by Secretary (Co-ordination)
- Inter-ministerial Sub-group constituted by the Infrastructure Constraints Review Committee headed by Joint Secretary, Ministry of Coal

2.13.3 Coal Scenario for the Power Sector during 2009-10

2.13.3.1 Coal availability during the year

For the All India coal based generation target of 525 BUs for the year 2009-10, the requirement of coal was estimated to be 404 Million Tonnes (MT). This also includes coal requirement for building the coal stock at power stations to normative level. During the year 2009-10, Ministry of Coal/Coal India Limited had committed to supply 313 Million Tonnes coal, 30 MT of coal was expected from SCCL and 20 MT from captive mines (Bengal Emta, ICML and Panem). Thus, a total of 363 MT coal was expected from indigenous sources. To meet the estimated requirement of 404 MT of utility power stations, an import target of 28.7 MT was fixed.

2.13.3.2 Comparative Coal Supply Position in the year 2009-10

Coal receipt consumption and stock position at various utility power stations during the last 3 years is given as under:

(Million Tonnes)

STATUS	YEAR		
	2007-08	2008-09	2009-10
Demand	340.000	378.00	404
Availability#	319	343	363
Receipt (indigenous coal)	318.532	342.621	352.3
Receipt (Imported coal)	10.153	16.054	23.2
Total Receipt * (including Imported Coal)	328.685	358.675	375.5
Opening Stock (includes Imported coal)	14.122	11.037	11.719
Consumption * (includes Imported coal)	329.632	355.378	367
Closing Stock (includes Imported coal)	11.037	11.719	14.553

Coal availability from indigenous sources only
* In terms of equivalent raw coal

2.13.3.3 Source-wise Receipt of Coal during the year 2009-10

During the year 2009-10, details of source-wise committed quantity and actual receipt at the power stations is given below:

(Million Tonnes)

	Committed Quantity (MT) (April-March 2010)	Actual Receipt (MT) (April-March 2010)	% Receipt
CIL	313	296.5	95
SCCL	30	33.2	111
Captive Mines	20	22.6	113
*Bengal Emta	2.7	3.5	130
* ICML	2.6	2.7	100
* Panem	6.5	8.4	129
* Bermo	0.2	0.2	100
* Jindal	5.4	5.5	102
* Kemta	2.5	2.3	92
Import	28.7*	23.2	81
Total	**391.7**	**375.5**	**96**

* 25.7 MT equivalent to 38 MT of indigenous coal to meet the shortfall in domestic coal and 3 MT for project designed on imported coal.

2.13.3.4 Import of the coal during the year 2009-10

During the year 2009-10, against a target of 28.7 MT for import of coal, the power utilities in the country have imported around 24.6 Million Tonnes of coal. Out of this, 23.2 MT has been received at the power stations and 1.4 MT is available at port. Utility-wise details of annual targets of imported coal and receipt at power stations are given below:

As on 31.03.2010

Sl. No.	Board/Utility	Annual Target of Imported Coal	Receipt at TPSs during Apr-Mar 2010	Available at Port	Total	Pro-rata Receipt %
		(Million Tonnes)				
	1	2	3	4	5=(3+4)	6
1	HPGCL	0.600	0.669	0.000	0.669	112
2	PSEB	0.600	0.000	0.000	0.000	0
3	RVUNL	0.800	0.872	0.000	0.872	109
4	UPRVUNL	0.400	0.353	0.000	0.353	88
5	MPGCL	0.600	0.000	0.000	0.000	0
6	TORRENT AEC	0.500	0.692	0.000	0.692	138
7	GSECL	1.480	1.403	0.046	1.449	98
8	MAHAGENCO	2.200	2.559	0.000	2.559	116
9	RELIANCE	0.500	0.668	0.001	0.669	134
10	AP GENCO	0.800	0.75	0.000	0.750	94
11	TNEB	1.800	2.011	0.026	2.037	113
12	KPCL	0.800	0.908	0.000	0.908	114
13	OPGCL	0.020	0.000	0.000	0.000	0
14	DVC	0.800	0.303	0.000	0.303	38
15	CESC	0.500	0.331	0.039	0.370	74
16	WBPDCL	0.800	0.872	0.000	0.872	109
17	NTPC	12.500	6.313	1.363	7.676	61
18	TROMBAY	3.000	2.416	0.000	2.416	81
19	PATHADI	0.000	0.016	0.000	0.016	0
20	JSW ENERGY	0.000	1.201	0.000	1.201	0
21	ADANI POWER	0.000	0.822	0.000	0.822	0
	Total	**28.700**	**23.159**	**1.475**	**24.639**	**86**

2.13.3.5 Generation Loss

During the year 2009-10, the Power Utilities reported a generation loss of 14.5 BU due to shortage of coal. Out of this, 6.1 BU reported at Farakka TPS and Kahalgaon TPS was due to delay in import of coal and delay in development of linked coal mine for the above mentioned power plants.

2.13.3.6 Specific Coal Consumption

The specific coal consumption of power plants in the year 2009-10 was 0.72kg / kwh as compared to 0.74 kg / kwh during the year 2008-09. This was due to increase in consumption of imported coal.

2.13.3.7 Coal Quality Issues

It was observed that uncrushed / oversized coal was still received by some of the thermal power stations in the country causing unloading constraints resulting in heavy demurrage charges on Power Utilities. CEA had sent details of the complaints about coal quality, received from power stations to Ministry of Coal, Ministry of Power, Ministry of Railways and Coal India Limited for necessary remedial action.

2.13.3.8 Estimated Coal Requirement for the year 2010-11

For the year 2010-11, a coal based capacity addition programme of 14550 MW including capacity addition of 11675 MW based on indigenous coal and 2875 MW based on imported coal is envisaged. CEA estimated that the total coal requirement is 445 MT comprising of 434 MT from indigenous coal based projects and 11 MT for the projects based on imported coal. The total coal availability from indigenous sources is expected to be 388 MT resulting in a shortfall of 46 MT of indigenous coal availability. The Power Utilities have been advised to import 35 MT to bridge this shortfall in availability of domestic coal.

2.14 Gas supply to Gas based Power Stations

Out of total 1,59,398.49 MW installed generating capacity in the country as on 31st March 2010, 17055.85 MW (about 10 %) was gas/liquid (excluding DG stations) fuel based. CEA monitored the supply of gas to power stations of total 15769.27 MW capacities which use gas as the primary fuel. The liquid fuels, being freely available, were not monitored by CEA. However, the fuel consumption data for liquid fuel based GT stations and DG stations are being collected and compiled from the year 2007-08 and report being sent to all concerned.

2.14.1 Gas Requirement & Supply Position

The production and supply of gas had not been keeping pace with the growing demand of gas in the country, including for that of power sector. Even the commitments of gas allocations made earlier to power stations were not fulfilled. Supply of gas to gas based power plants during last few years had been as under:

S. No.	Year	Capacity at the end of year (MW)	Gas Required* (MMSCMD)	Average Gas Supplied (MMSCMD)	Shortfall (MMSCMD)
(1)	(2)	(3)	(4)	(5)	(6)=(4)-(5)
1	2000-01	9028.70	44.54	24.40	20.14
2	2001-02	9432.90	46.31	24.33	21.98
3	2002-03	9949.00	48.26	25.12	23.14
4	2003-04	10,154.90	49.25	25.62	23.63
5	2004-05	10,224.90	49.73	30.70	19.03
6	2005-06	10,919.62	53.38	35.37	18.01
7	2006-07	12,444.42	61.18	35.10	26.08
8	2007-08	13,408.92	65.67	38.14	27.53
9	2008-09	13,599.62	66.61	37.45	29.16
10	2009-10	15769.27	78.09	55.45	22.64

* Normative gas requirement at 90% PLF taking GCV of gas= 9000 K.Cal/SCM (except for Ramgarh CCGT for which GCV is 4150 K.Cal/SCM), station heat rate- 2900K.Cal/kWh for open cycle and 2000 K.Cal/kWh for combined cycle and as on last day of the year.

MMSCMD – Million Metric Standard Cubic Metres per Day

It may be seen from above that the gas supply for gas based power stations has been inadequate. It was enough to operate these stations at about 52 % PLF only during 2007-08. Similarly, the average gas supply during 2008-09 was 37.45 MMSCMD, against the requirement of 66.61 MMSCMD to operate the stations at 90% PLF, which was sufficient to operate these stations at about 50.6% PLF.

The production of gas from KG basin (D-6) has started from April 2009 and hence the gas supply to Gas based GT stations has improved since then. The average gas supply during the year 2009-10 was 55.45 MMSCMD, against the requirement of 78.09 MMSCMD (as on 31.3.2010) to operate the stations at 90% PLF, which was sufficient to operate these stations at about 63.98% PLF.

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Mundra Power Project

CHAPTER – 3

POWER SYSTEMS PLANNING AND D]EVELOPMENT

3.1 Transmission Planning

All issues relating to planning and development of Transmission System in the country are dealt in the Power System Wing of CEA. This includes evolving long term and short term transmission plans. The network expansion plans are optimized based on network simulation studies and techno economic analysis. This also involves formulation of specific schemes, evolving a phased implementation plan in consultation with the Central and State transmission utilities and assistance in the process of investment approval for the Central Sector schemes, issues pertaining to development of National Power Grid in the country and issues relating to trans-country power transfer. Transmission planning studies are being conducted to identify evacuation system from generation projects and to strengthen the transmission system in various regions. The studies for long-term perspective plans are also being carried out on All India basis for establishing inter regional connectivity aimed towards formation of the National Power Grid system. The National Power Grid system is being evolved to facilitate free flow of power across regional boundaries, to meet the short fall of deficit regions from a surplus region, for evacuation of power from project(s) located in one region to the beneficiaries located in other region(s) as well as facilitate trading of electricity among buyers and sellers in various regions.

3.2 Inter-regional Transmission System in India-National Grid

A National Power Grid in the country is being developed in phased manner. By now, all the regional grids have already been inter-connected and total transmission capacity of inter-regional transmission system, as on 31-03-2010 was 20750 MW. At present, except Southern Region, all the other four regions are inter-connected in synchronous mode and are operating in parallel.

Total inter-regional transmission capacity by the end of 9th Plan was 5750 MW. During 10th Plan i.e. 2002-07, a total of 8300 MW of inter-regional capacities were added. Thus, total inter-regional transmission capacity by the end of 10th Plan was 14050 MW.

During 11th Plan i.e. 2007-12, inter-regional transmission systems of 18600 MW capacity have been planned and it is expected that, by end of 11th Plan, total inter-regional transmission capacity of the National Power Grid would be increased to 32650 MW. Out of the programme for 11th Plan, 2400 MW capacity was added during 2007-08, 3300 MW during 2008-09 and 1000 MW during 2009-10. Thus a capacity addition of 6700 MW has already been added in 11th Plan up to 31-03-2010.

Details of existing and planned inter-regional transmission capacity up to end of 11th Plan are shown in **Annexure-3A.**

3.3 Regional Standing Committees on Power System Planning

3.3.1 Introduction

The Regional Standing Committees on power system planning constituted by CEA have representation of CEA, Transmission Utilities of constituent States of the region, Central Transmission Utility (i.e POWERGRID), representative of Central Sector Generating Companies and Regional Power Committee. The requirement of inter-state transmission system for evacuation of generation and for system improvement are evolved on the basis of power

system study and firmed up through discussion in the meetings of the Regional Standing Committee of power system planning.

3.3.2 Standing Committee Meetings held during 2009-10

Northern Region

- 27th Meeting of the Standing Committee on Power System Planning of Northern Region held on 30th May, 2009 in Nainital, Uttarakhand.
- 28th Meeting of the Standing Committee on Power System Planning of Northern Region held on 23rd February, 2010 at NRPC, New Delhi.

Southern Region

- 28th Meeting of the Standing Committee on Power System Planning of Southern Region held on 15-06-2009 at Coorg, Karnataka.
- 29th Meeting of the Standing Committee on Power System Planning of Southern Region held on 27-08-2009 at Hydeabad, Andhra Pradesh.

Western Region

- Special meeting of the Standing Committee on Power System Planning of Western Region held on 18-04-2009 at WRPC, Mumbai.
- 29th meeting of the Standing Committee on Power System Planning of Western Region held on 10-09-2009 at Ahmedabad.

Eastern Region

- Standing Committee Meeting on Power System Planning of Eastern Region was held on 14-09-2009.

The issues pertaining to transmission system planning which were taken up during these meetings are given in **Annexure – 3B.**

3.4 Examination of DPR/FR of Hydro Power Projects for processing of clearance by CEA

Following is the list of DPRs/FRs of hydro power projects examined for processing of clearance from power evacuation aspects :

Northern Region

Himachal Pradesh

i) Renuka Dam (40 MW)
ii) Sainj HEP (100 MW)
iii) Bajoli Holi HEP (100 MW)
iv) Kutehr HEP (240 MW)

Uttaranchal

i) Rupsiabagar HEP (327 MW)
ii) Bawala Nandprayag HEP (300 MW)

Southern Region

i) Polavaram HEP (12x80 MW) of APGENCO in Andhra Pradesh.
ii) Gundia HEP (2x200 MW) of KPCL in Karnataka.

Eastern Region

i) Examined the revised project reports for addendum works in the Bihar sub-transmission system-Phase-II, Part-II.
ii) DPR for re-alignment of existing 66kV Tadong to Phodong S/C at Perbing along with 2x5MVA 66/11kV sub-station and 11kV distribution system for supply of power to Perbing area in Sikkim.
iii) FR-cum-DPR for Mangdechu HEP (4x180 MW) in Bhutan by M/s NHPC Ltd.
iv) FR-cum-DPR for Sankosh HEP (8x500+3x60 MW) in Bhutan by M/s THDC Ltd.
v) FR-cum-DPR for Punatsanghu-II HEP (6x165 MW) in Bhutan by M/s WAPCOS.
vi) DPR for LILO of existing 66kV Melli - Tadong D/C at Marchak along with 2x7.5 MVA 66/11kV sub-station and 11kV

distribution system for supply of power to Marchak area in Sikkim.

vii) FR-cum-DPR for Teesta-IV HEP (4x130 MW) in Sikkim by M/s NHPC Ltd.

viii) FR-cum-DPR for Panan H.E. Project (4x75 MW) in Sikkim by M/s Himagiri Hydro Energy Pvt. Ltd.

North-Eastern Region

i) Siang Lower HEP (9x300 MW)
ii) Demwe Lower HEP (5x342 + 40 MW)
iii) Tato –II HEP (4x175 MW)
iv) Nyamjangchhu HEP (6x150 MW)
v) Dibbin HEP (120 MW)
vi) Tawang –I HEP (4x250 MW)
vii) Tawang –II HEP (3x250 MW)
viii) Nafra HEP (2x48 MW)
ix) Gongri HEP (90 MW)
x) RCE for Kameng HEP (4x150 MW)

Central Sector

i) Transmission System associated with Sasan (4000 MW) UMPP
ii) Transmission System associated with Mundra (4000 MW) UMPP
iii) Transmission System associated with Korba-III (500 MW)

3.5 Examination and appraisal of Transmission Schemes for approval under Section 68 of Electricity Act, 2003 during 2009-10

A list of transmission proposals examined for approval u/s 68 is given below:

- Common System associated with Simhapuri, Meenakshi, Krishnapatnam (Navyuga) and Krishnapatnam(APPDCL) LTOA projects in Krishnapatnam area of Andhra Pradesh.
- Common System associated with Coastal Energen Private Ltd. and Ind –Barath Power(Madras)Limited LTOA generation project in Tuticorin Area Part-A.
- Common System associated with Coastal Energen Private Ltd. and Ind –Barath Power (Madras) Limited LTOA generation project in Tuticorin Area-Part-B.
- Common Transmission System associated with East Coast and NCC Power Projects in Srikakulam Area.
- Eastern Regional Strengthening Scheme-III.
- Revised Eastern Regional Strengthening Scheme-III.
- Transmission System for transfer of power from generation projects in Sikkim to NR/WR and transmission system for development of new pooling station in Northern part of West Bengal/Bihar and transfer of power from Bhutan to NR/WR.
- Transmission system for immediate evacuation of power from Tilaiya UMPP (4000MW) by PGCIL in Jharkhand.
- Transmission system for evacuation of power from Orissa IPPs Phase-I.
- Eastern Regional Strengthening Scheme-IV.
- Combined Transmission system in NR/WR/ER for evacuation of power from Orissa IPPs Phase-I.
- Installation of overhead lines under Transmission System associated interconnection between Electrical Grid of India and Bangladesh- Indian portion.
- Dedicated Transmission System for connecting Jindal TPS (2x600 MW) with the Angul pooling station of CTU (PGCIL).
- 400 kV Pallatana-Silcher-Bongaigaon D/C line, being developed under JV by M/s NETC as part of evacuation system associated with Palatana GBPP (726.6 MW) and Bongaigaon TPS (750MW).
- Laying of inter-state dedicated 2500MW (± 500 MW) HVDC Bipole Mundra (Gujarat) – Mohindergarh (Haryana) transmission line.

- Transmission System associated with Tehri PSP.
- Northern Regional System Strengthening Scheme-XXI.
- Northern Regional System Strengthening Scheme-XXII.
- System Strengthening Scheme in NR for Tilaiya, Nabinagar and Barh-II.
- Northern Regional System Strengthening Scheme-XXIII.
- Transmission system associated with Mauda generation project.
- Transmission system associated with Vindhyachal–IV generation project.
- Transmission system associated with IPPs in Madhya Pradesh, Chhattishgarh, Orissa and Jharkhand.
- Prior approval of the Government under Section 68 of the Electricity Act, 2003 for Split Bus Arrangement & Reconfiguration / Shifting of Terminating lines at 400 kV Raipur Substation.
- Prior approval of the Government under Section 68 of the Electricity Act, 2003 for installation of overhead lines under Transmission System associated with Mauda (1000 MW) generation project.
- Prior approval of the Government under Section 68 of the Electricity Act, 2003 for installation of overhead lines under Transmission System associated with Rihand-III (2x500 MW) and Vindhyachal-IV (2x500 MW) generation project.
- Prior approval of the Government under Section 68 of the Electricity Act, 2003 for Transmission System for IPP generation projects in Madhya Pradesh & Chhattisgarh.
- Approval of the Government under Section 68 of the Electricity Act, 2003 for Transmission System for development of pooling stations in Sikkim and transfer of power to a new pooling station in Northern Part of West Bengal/ Bihar.
- Prior Approval of the Government under Section 68 of the Electricity Act, 2003 for Transmission System of various IPPs in Chhattisgarh coming up in different stages.

3.6 Examination and appraisal of Transmission Schemes for approval under Section 164 of Electricity Act, 2003 during 2009-10

i) 400kV Teesta-Kishengang D/C Quad line via Magan pooling station by JV of POWERGRID and M/s Teesta Urja Ltd.

ii) Laying of inter-state dedicated 2500MW ±500 kV HVDC Mundra(Gujarat)-Mohindergarh (Haryana) transmission line scheme.

iii) Western Region System Strengthening Scheme-II.

3.7 Cross-Border Power Exchange

3.7.1 India-Bangladesh Grid connectivity

In order to facilitate Cross-Border power exchange between India and Bangladesh, it has been decided bilaterally to establish an electrical inter-connection between India and Bangladesh through a ±500MW HVDC asynchronous link at Bheramara (Western Part, Bangladesh) to be connected through Baharampur (India) – Bheramara (Bangladesh) 400kV D/C line along with establishment of 400kV switching-station at Baharampur (India) by looping-in and looping-out of Farakka-Jeerat 400kV Single circuit line. The project is targeted for completion within a period of 30 months from the date of award by PGCIL. The Indian portion of the line will be funded by PGCIL and the portion within Bangladesh would be funded by Govt. of Bangladesh.

3.7.2 India-Bhutan Agreement

The Royal Govt. of Bhutan has set the target of development of 10,000 MW by the year

2020 and Govt. of India has committed to assist in this target. The hydro-electric projects will require construction of numerous infrastructure (both lines and substation) for export of surplus power for meeting the energy needs of the Country. In this regard, RGoB requested CEA to prepare the National Transmission Grid Master Plan (NTGMP). In this context, MoU between CEA and RGoB was inked on 22-12-2009 in Delhi appointing CEA as consultant. The consultancy period for the NTGMP study will be one and half years from the date of award of the consultancy. The Inception Report for the arrangement was prepared and submitted to Bhutan.

3.7.3 India-Nepal Power Exchange Committee Meeting

The 9th Meeting of Indo-Nepal Power Exchange Committee (PEC) was held on 10-11th August, 2009 in New Delhi, India. The Nepalese delegation was led by Managing Director, Nepal Electricity Authority (NEA). The Indian delegation was led by Member (Power System), Central Electricity Authority (CEA). The following issues were discussed and resolved:-

1. Review of power exchange points:-

   i) Revival of the 33kV Lohia (UPCL)-Mahendranagar (Nepal) line by UPCL to supply load of 5 MW at Mahendranagar in Nepal.

   ii) Re-conductoring 6-spans of 33kV Sitamarhi (BSEB)-Sursand-Jaleshwar (Nepal) line with dog-conductor, and bay reinforcement of Sursand sub-station by BSEB.

2. Revision of the Power Exchange Tariff:-

The present tariff of INR 3.96 was valid up to June, 2009 and it was decided to retain the 5.5% escalation in tariff for the period up to June 2010 for power exchange.

3. Status for opening of LC by NEA:-

NEA opened LC in favour of BSEB in regard to payment for supply of power to Nepal.

4. Proposal for increase in quantity of power exchange beyond 50 MW:

a) Import of power beyond 50 MW should be tied up by Nepal directly from the Indian electricity market through an agency such as PTC or with BSEB on mutually acceptable tariff.

b) Status for construction of Cross Border Transmission Line i.e. 400kV Muzaffarpur-Dhalkebar D/C line between India and Nepal: - Nepal was to explore the financial viability to sign PPA/TSA.

3.8 Additional Works

3.8.1 Model Transmission Agreement

- Provided technical inputs to the Planning Commission for developing a Mutual Transmission Agreement for PPP route with provision for viability gap funding.

3.8.2 Power Market Regulation

- The draft Power Market Regulation published by CERC for public comments of CEA were informed to CERC in the interest of an appropriate market design suitable for Indian conditions.

3.8.3 Revision of UI charges

- The proposal of CERC to revise the UI rates for Inter-State Transmission System (ISTS) was submitted and suggestions were furnished with the aim of raising the level of deterrence so that deviations from the dispatch schedule are minimal & frequency excursion can be controlled.

3.8.4 Advice to CERC on connectivity of small hydro projects as well as on different transmission related issues

- The CERC Regulations do not allow direct connectivity to ISTS for power stations of capacity less than 25 MW. It is expected that hydro stations of less than 25 MW would first get connected to the STU. It was brought to the notice of CERC that STUs of States like Sikkim, Arunachal Pradesh, Himachal Pradesh etc. are not equipped to provide connectivity to generating stations to the State Grid and such a dispensation would jeopardise the development of IPP hydro projects. CEA has already prepared Master Plan for Sikkim, HP, Uttaranchal etc. for providing direct connectivity to a number of HEPs in the range of 90-250 MW. CERC was advised to review their regulations for Long Term Access.

3.8.5 Vetting of price variation in bills of transmission works under Kabul-Phul-e-Khumri transmission system in Afghanistan.

3.9 Study, analysis and formulation of policies on specific issues relating to transmission

3.9.1 Long Term Planning Studies

Transmission system planning studies were carried out to evolve a composite system for evacuation of power from generation projects envisaged beyond 11th Plan. Studies were carried out to identify long-term system strengthening requirements in various regions/States. A list of studies carried out to evolve long term perspective plan are as below:

- Transmission System for Evacuation of Power from Yeramaras (2x800 MW) & Edlapur (1x800 MW) Generation Projects of KPCL near Raichur in Karnataka.
- Establishing connectivity to Yelahanka 2x500 MVA,400/220 kV S/S and Additional ISTS In-feed for Bangalore.
- System studies for Strengthening/ Restructuring of Bangalore 400kV ring arrangement.
- VIP Strengthening connectivity of SV Chatram 400 kV S/S of TNEB.
- Transmission System studies for evacuation of power from Udangudi TPS (2x800 MW) project.
- Power system studies were carried out to evolve the transmission system for evacuation of power from generation projects envisaged during 12th Plan for NEP.
- System strengthening scheme of Haryana, keeping in view various thermal projects.
- System strengthening scheme of Rajasthan, keeping in view various thermal projects.
- System strengthening scheme of Punjab, keeping in view various thermal projects.
- Transmission planning studies for strengthening of Northern Region network i.e Northern Regional System Strengthening Scheme – XXI, XXII, XXIII.
- Transmission system associated with the Tilaiya Ultra Mega Power Project (4000 MW) in Jharkhand, Nabinagar (1000MW) of Railways and NTPC, Barh-II (1320 MW) and IPPs in Jharkhand, Orissa, MP, Chattisgarh and Maharashtra.
- System Studies for Sasan / Vindyachal pool connectivity / Power evacuation system from Rihand-III TPS (2x500 MW).

3.9.2 Short Term Planning Studies

System studies were carried out for evolving transmission system for evacuation of power from generation projects anticipated during 10th Plan. A list of the studies carried out is given below:

- Short circuit and load flow studies for Enhancing System Reliability by LILO of 400 kV Dehar-Bhiwani and 400 kV Dehar-Panipat.
- Load flow studies carried out to study the revised project report for infrastructural development at 220 kV & 132 kV transmission level under Prime Minister's Reconstruction Plan for J&K State was examined and fresh load flow studies were carried out with the proposals and recommended the same to MoP.
- Transmission planning studies for strengthening of 400 kV and 220 kV network in northern part of Tamil Nadu.

3.10 Consultancy services and assistance to various utilities

(i) **Power Development Department, Govt. of J&K:** 220kV and 132kV Transmission Projects under Prime Minister's Reconstruction Program.

(ii) **Bhutan Power Corporation, Govt. of Bhutan:** 132kV and 66kV Transmission and substation works.

(iii) **WAPCOS:** Transmission and Substation work relating to Salma Hydro Project, Afghanistan.

(iv) **Damodar Valley Corporation:** Design of 220kV Multicircuit, 132kV and 33kV Transmission Line Towers.

(v) **Assistance to Delhi Transco Ltd. and APTRANSCO** in the preparation of technical specification and evaluation of tenders for 220 kV & 132 kV XLPE Cables and GIS Substation.

3.10.1 Representation/Nomination in the Committees

(a) A Committee under the Chairmanship of Chief Engineer (SETD), CEA was constituted to investigate causes of failure and to suggest remedial measures to avert/ minimize the recurrence in respect of the following:-

i) Transmission line towers of 220kV & above Voltage Class

ii) Various substation equipment of 220 kV and above Voltage Class

(b) CEA is represented on Electro-technical Division Council and Indian National Committee- International Electro-technical Commission and Chairman of Conductors and Accessories for Overhead Lines Sectional Committee.

3.11 Analysis of causes of failure of Transmission Line Tower & Sub-station equipment

3.11.1 Transmission Line Towers Failure of 400 kV line Towers

Failures of 400 kV transmission line towers of Power Grid were investigated and remedial measures suggested. Standing Committee of Experts headed by CE (SETD), CEA submitted report in respect of the following lines:-

1. 400 kV Dadri-Ballabhgarh D/C Line
2. 400 kV Allahabad- Mainpuri D/C Line
3. 400 kV Jabalpur-Itarsi D/C Line
4. 400 kV Dadri- Mandola D/C Line
5. 400 kV Vindhyachal- Jabalpur ckt.-I & II D/C Line
6. 400 kV Farakka-Sagardighi Circuit-I and Farrakka- Durgapur Line
7. 400 kV Kanpur-Ballabhgarh S/C Line (Kanpur Etah Section)
8. 400kV Korba- Bhilai circuit-I S/C Line
9. 400 kV Khandwa-Dhule D/C Line
10. 400kV Meerut- Muzaffarnagar S/C Line
11. 400 kV Malda- New Purnia LILO D/C Line.

3.11.2 Sub-station Equipment

As a part of activity of Standing Committee to assess the cause of failure of

various Sub-station equipment of 220 kV and above voltage class, investigation in respect of the following utilities was carried out and recommendation sent to concerned utility:

a) Failure of two 400/220/33 kV, 315 MVA transformers in Mandola Substation of PGCIL.

b) Failure of 220/66-33 kV, 100 MVA transformer in Park Street Substation of Delhi Transco Ltd.

c) Failure of 220/66-33 kV, 100 MVA transformer in Baddi Substation of HPSEB.

3.12 Technology Improvement Programme in Power System

After completion of training at Chicago, USA, following Pilot Project was taken up with SEBs in following area:

i) Residual Life Assessment (RLA) of Substation Equipment

Construction of any transmission system requires a huge amount of investment and the cost of EHV Substation equipment contributes a major portion of cost of the transmission system. As the transmission lines and substations are growing older, there is a need of proper condition monitoring of substation equipment to assess the residual life of various substation equipment and ensure proper maintenance of the equipment. A pilot project on "Residual Life Assessment of Substation Equipment" has been taken up with the MSEB(now MSETCL).

Following diagnostic tools have been procured and installed in 220/33 kV Mudsighi, 400/220kV Kolhapur-II Substation of MSETCL at Kolhapur:

i) Digital Earth Tester
ii) Transformer Winding Resistance Meter
iii) Contact Resistance Meter
iv) Automatic relay test kit (3 phase)
v) Circuit Breaker Operation Analyzer
vi) Leakage current monitor for lightning arrester
vii) Automatic Capacitance & Tan Delta Measuring Equipment.

In addition to above, the following equipment are being utilized in GETCO, Ahmedabad. The following diagnostic tools which were earlier used in MSETCL are at present being utilized by GETCO, Ahmedabad:

1) On-line Dissolved gas Analyzer for Transformer
2) Partial Discharge Measuring Equipment for Transformer
3) Frequency Response Analyzer for Transformer

3.13 Construction Monitoring of Transmission Projects

The monitoring of construction of transmission lines and sub-stations at voltage levels of 220 kV and above is being carried out with a view to achieve completion of transmission system both to ensure evacuation of power from new Generating Stations as well as to strengthen the power system network in the country.

For the year 2009-10, programme for stringing of 280 Ckm at ±500 kV HVDC, 632 Ckm of 765 kV, 9548 Ckm of 400 kV and 7103 Ckm of 220 kV transmission lines was envisaged. Against this programme, the stringing of transmission lines actually achieved during the year 2009-10 was 280 Ckm of ±500 kV HVDC, 445 Ckm of 765 kV, 7857 Ckm of 400 kV and 5139 Ckm of 220 kV lines. Details of transmission lines completed during the year 2009-10 are given in **Annexure-3C**.

Voltage-wise / Sector-wise actual achievement vis-à-vis programme for the year

2009-10 in respect of transmission lines are given in **Charts I** to **IV**.

Similarly, for the year 2009-10 in respect of transformation capacity, a programme of addition of 2500 MW at ±500 kV HVDC 13860 MVA at 400 kV and 14260 at 220 kV was envisaged. Against this programme, the achievement during the year was 5225 MVA at 400 kV level and 11735 MVA at 220 kV respectively. In respect of ±500 kV HVDC terminal as against the programme of 2500 MW, the achievement during 2009-10 is NIL as the ±500 kV HVDC line and converter stations are yet to be commissioned even though the same are ready for commissioning. Details of sub-stations completed during 2009-10 are given in **Annexure-3D**.

Voltage-wise / Sector-wise actual achievement vis-à-vis programme for the year 2009-10 in respect of Sub-stations are given in **Charts V** and **VI**.

Chart-I

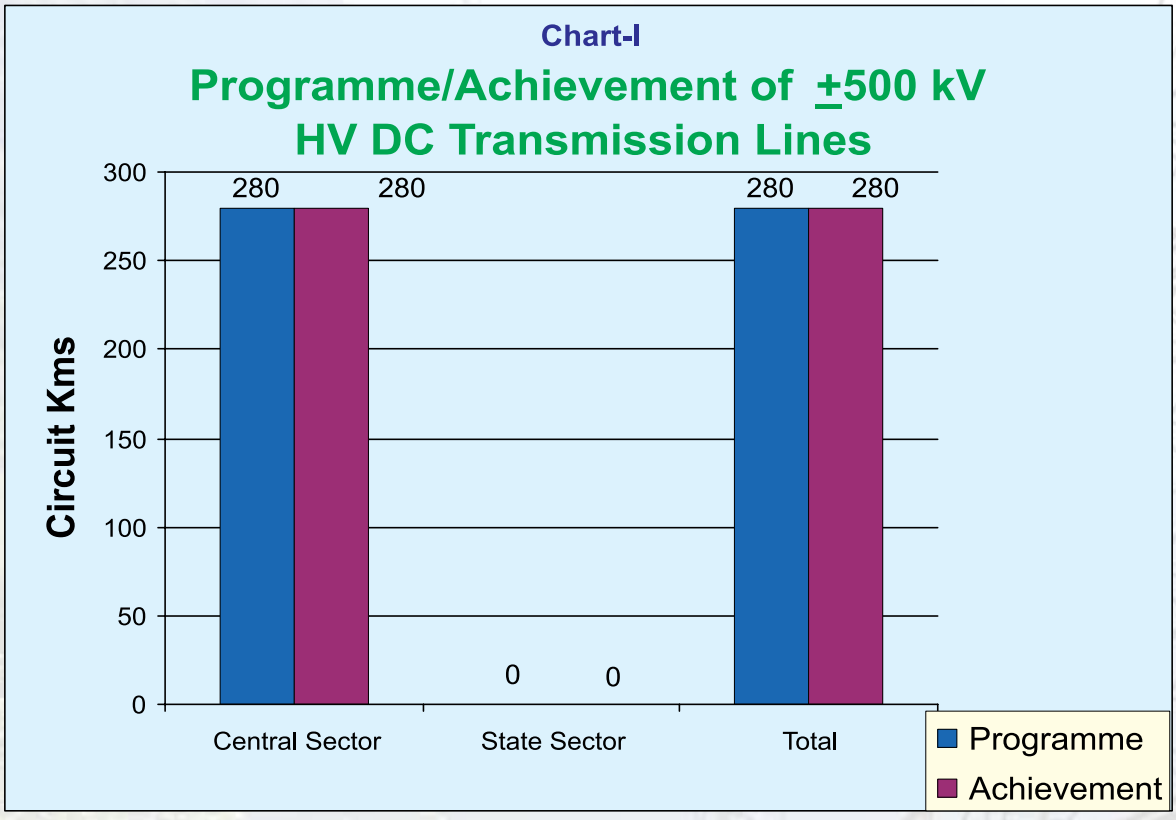


Chart-II

Programme/Achievement of 765 kV Transmission Lines

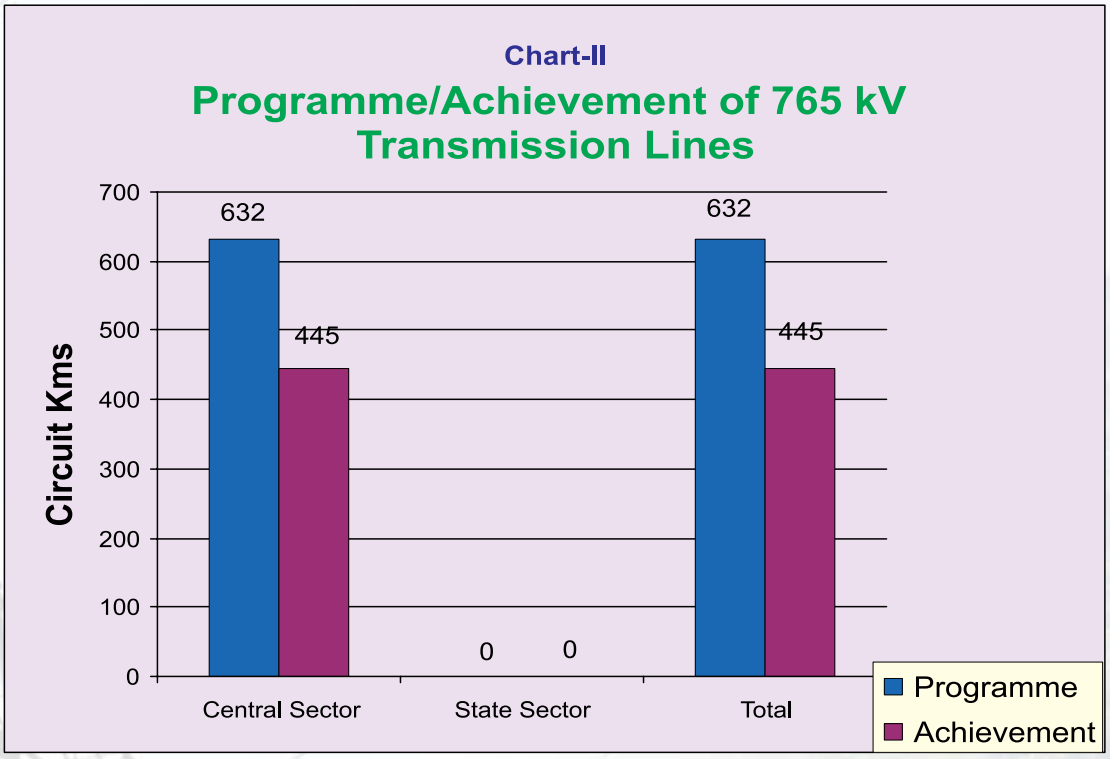


Chart-III

Programme/Achievement of 400 kV Transmission Lines

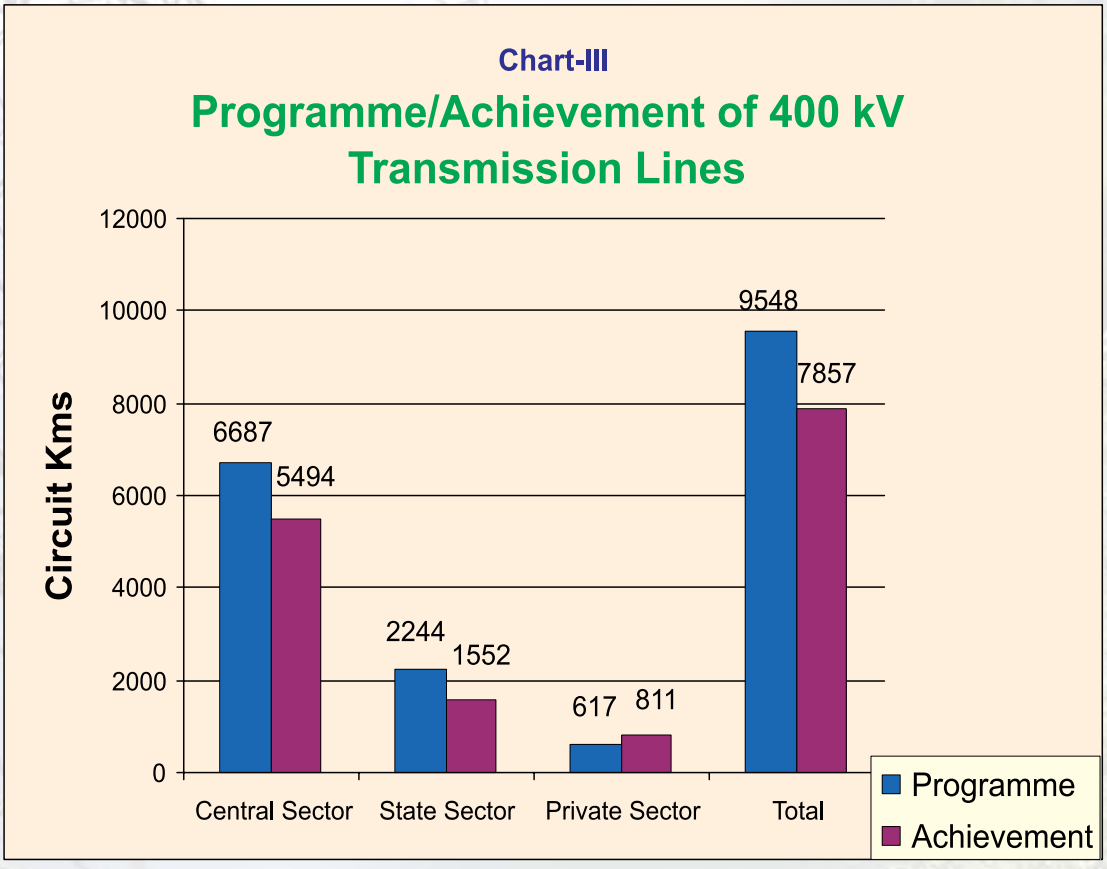


Chart-IV

Programme/Achievement of 220 kV Transmission Lines

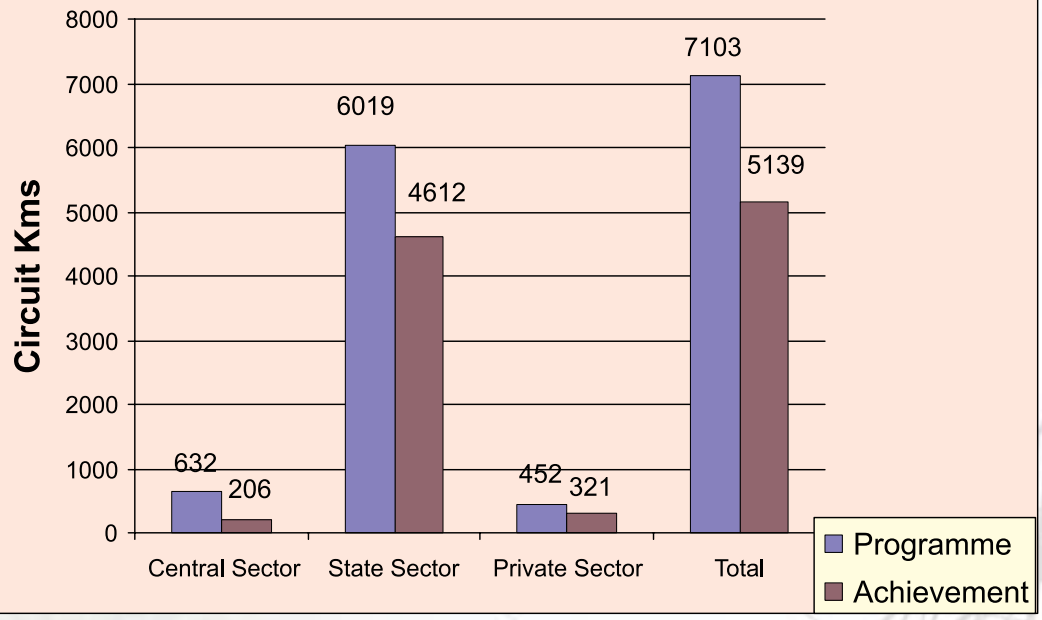
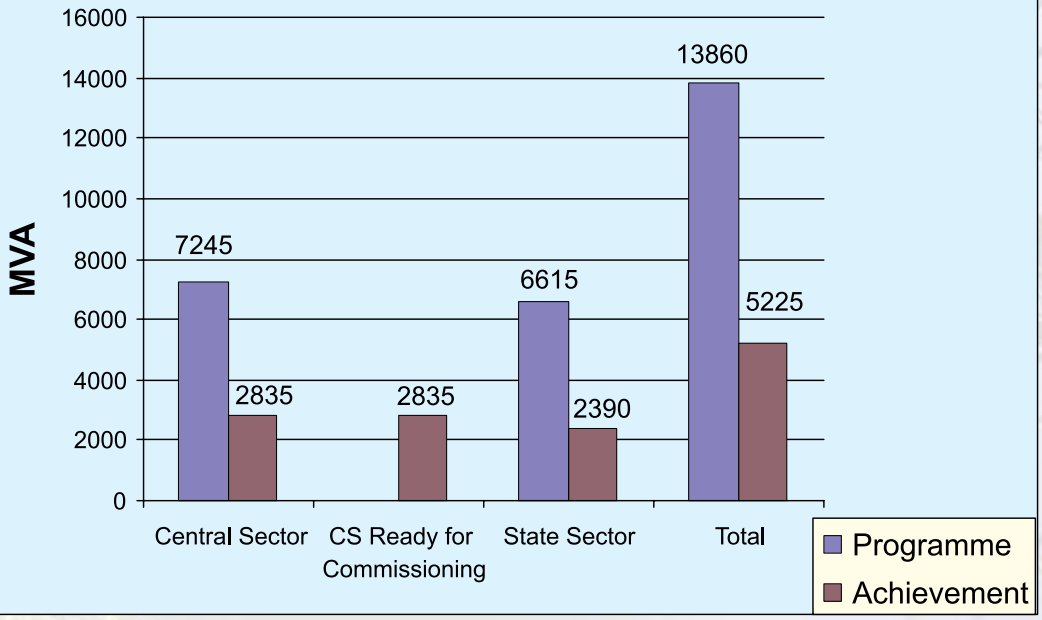
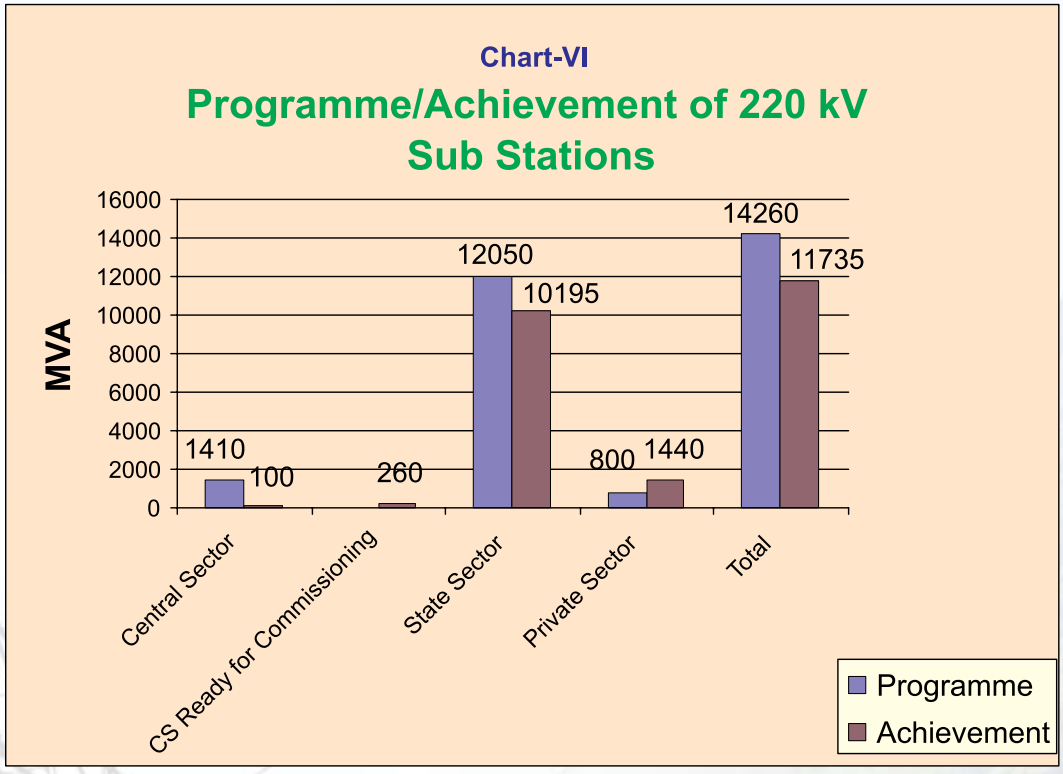


Chart - V

Programme/Achievement of 400 kV Sub Stations





3.14 Inspection of Electrical Installations

The Indian Electricity Act, 2003 stipulates statutory inspection of electrical installations by Central and State Inspectors in respect of installations within their respective jurisdictions. The Electrical Inspectorate at the Central and State levels are assisted by designated Electrical Engineers to discharge these functions. The Chief Engineer (Electrical Inspectorate), CEA has been appointed as Chief Electrical Inspector for the Central Government installations all over India and those within Union Territories. The Chief Electrical Inspector is assisted by five Regional Inspectorial Organizations (RIOs) with Headquarters at New Delhi, Chennai, Shillong, Mumbai & Kolkata in discharging the various responsibilities, briefly described as under :

a) Statutory periodic inspection of electrical installations and issue of notices to the owners of installations for compliance under Rule 46 of the Indian Electricity Rules, 1956.

b) Scrutiny of references received under Rules 63/47A of I. E. Rules, 1956, for inspection and granting approval for energisation of High/Extra High Voltage installations/ generating units.

c) Inspection of electrical installations in Cinema house and issue of No Objection Certificates for grant of Annual Licence to the Cinema house under the respective Cinematography Act in force in the Union Territories.

d) Investigation of fatal and non-fatal electrical accidents and remedial measures to be taken to avoid recurrence of such accidents in future.

e) Scrutiny of cases regarding construction under overhead lines involving infringement of Rules 79, 80 & 82 of I.E.Rules, 1956.

f) Issue of Electrical Contractor licenses and Competency Certificates to Supervisors and Wiremen through the Licensing Board in respect of Union Territory of Puducherry.

g) Scrutiny of applications for relaxation of I.E.Rules and granting of such relaxation, if necessary.

3.15 Resume of Inspection Work Done

1) The Electrical Inspectorate and its five Regional Inspectorial Organisations inspected a number of installations comprising of 208017 Eq. MV and collected a revenue of Rs. 357.80 lakhs during 2009-10, the region-wise break-up of which is given below:

RIO	Eq. MV installations (Nos.)		Fee Collected (Rupees in Lakhs)	
	2008-09	2009-10	2008-09	2009-10
N Delhi	58572	43220	102.00	62.76
Chennai	27195	46070	81.29	131.54
Mumbai	34643	62300	59.41	96.74
Shillong	16605	13473	26.59	36.88
Kolkata	44711	42954	73.54	29.88
Total	**181726**	**208017**	**342.83**	**357.80**

3.15.1 Major Achievement in terms of Inspection during the Year 2009-10 (Important Installations Inspected)

A) New Inspection Cases (under Rule 63/47A of I.E.Rules 1956)

a) ± 500 kV terminals at Balia and Bhiwadi, 400 kV S/S at Bhinmal, Koteshwar GIS, Gurgaon GIS, Wardha, Vizag, Trivandrum, Karur, Karaigudi, Hassan, Puducherry, Hosur, 400 kV reactors at Aurangabad, Akola, Korba, Bina, Trichy, Madurai, Vijayawada, Salem, 400 kV bays at Nalagarh, Bhiwadi, Aurangabad, Akola, Neyveli, Ranchi S/S, 220 kV S/S at Dimapur, Barjora, 132 kV Dimapur S/S.

b) Transmission lines: 765 kV Bina-Seoni, ± 500 kV Balia-Bhiwadi HVDC, 400 kV Agra-Bhiwadi, Koldam-Nalagarh, Bhiwadi-Moga, Jodhpur-Kankroli, Bhopal-Damoh, Neyveli-Pugalur, Tirunelveli-Udumalpet, LILO of 400 kV Zerda-Kankroli at Bhinmal, LILO of 400 kV Hissar-Moga line at RGTPS Hissar, LILO of Sriperumbudur-Neyveli line at Puducherry, 220 kV Kalayneshwari-Maithon line etc.

c) Generating Units; RAPP NPCL (Unit-5&6), Dadri TPS (U-5&6), Barsingsar TPS (U-1&2), Jharli TPS (U-1&2).

B) Periodical Inspections (under Rule 46 of I.E. Rules, 1956)

Extra emphasis was laid on periodical inspection of large plants in Power and Petrochemical Sector under Rule 46 of I.E. Rules, 1956. Important projects covered are :

a) Generating plants: Faridabad Gas of NTPC, Tehri HEP of THDC, Ramagundum TPS, Kaiga, Kathalguri, Loktak HEP, Kopili HEP, ST 1 & 2 etc.

b) 400/220 kV S/S at Nalagarh, Abdullapur, Mandola, Bassi, Barielly, Amritsar, Fatehabad, Vindhyachal, Bhadrawati, Satna, Boisar, Bina, Durg, Purnia, Jamshedpur, HVDC Bhadrawati, HVDC Talchar, Munirabad, Hiriyur, Kolar, Vijayawada, Bongaigoan, Misa etc.

CHAPTER – 4
GRID MANAGEMENT

4.1 Organizational Structure in Grid Operation and Management

Central Government has established Regional Power Committee (RPC) in each region in accordance with provisions of Electricity Act, 2003 to facilitate integrated operation of the power system in that region. The real time operation of the power system is looked after by the Regional Load Despatch Centres (RLDCs) set up in the five Regions and on the national level by National Load Despatch Centre (NLDC). The Regional Power Committee is a conglomerate of all the players partaking in grid operation, i.e. Regional Load Despatch Centre, generating companies, transmission utilities, distribution utilities, power traders, etc. Its Secretariat is manned by the officers of CEA. Regional Power Committee operates through a number of Sub-Committees, viz. Operation Sub-Committee, Commercial Sub-Committee, Protection Sub-Committee, System Studies Sub-Committee and Technical Coordination Sub-Committee. The Operation Sub-Committee meets every month to review the grid operation in the previous month and plan grid operation for the next month. The Commercial Sub-Committee discusses all commercial related issues viz. energy accounting related matters, maters pertaining to SEMs settlement of dues etc. The Protection Sub-Committee discusses and finalises protection schemes including protection coordination. The System Studies Sub-Committee meets periodically for the purpose of System Studies. The Technical Coordination Sub-Committee meets before the Regional Power Committee for putting up matters for decision in the Regional Power Committee. The RPCs play an important role in planning grid operation, since they are responsible for protection coordination, outage planning of generating units and transmission system, planning reactive compensation etc. Member (GO&D), CEA is also Member of the Regional Power Committees and guides the Committees to arrive at amicable solutions in case of disputes between Members of the Committees through unbiased decisions.

The Grid Management Division of CEA monitors the power supply position in the country, prepares the All-India monthly power supply position, coordinates all matters of grid operation and management between the five Regions, coordinates inquiry of grid disturbances, recommends to the Ministry of Power the quantum of allocation from the unallocated quota of Central Generating Stations and also coordinates the implementation of the allocation through the Regional Power Committees. The anticipated power supply position for the next year known as Load Generation Balance Report is prepared every year. CEA also prepares Regulations containing Standards pertaining to Grid and connectivity to it. Regulations for operation of inter-State transmission system are specified by the Central Electricity Regulatory Commission.

4.2 Power Supply Position

The Central Electricity Authority brings out the All India Power Supply Position on a monthly basis, both in terms of energy and peak giving the requirement, availability and shortage in Million Units (MUs) as well as in percentage and the peak demand, peak met and peak shortage both in terms of Mega Watt (MW) and percentage. The total energy requirement in the country during 2009-10 was 830,594 MUs as against 777,039 MUs during the previous year, registering an increase of 6.9%. The total energy availability in the country during 2009-10 during the aforesaid period was

746,644 MUs as against 691,038 MUs during the previous year, registering an increase of 8.1%. The energy shortage during the year 2009-10, therefore, decreased from 86001 MUs to 83950 MUs registering a decrease of 2.4%. The peak demand during the year 2009-10 was 119,166 MW as against 109,809 MW during the previous year, registering an increase of 8.5%. The peak demand met during the aforesaid period was 104,009 MW as against 96,785 MW during the previous year, registering an increase of 7.5%. However the peak shortage increased from 13,024 MW (11.9%) to 15,157 MW (12.7%). An overview of power supply position in terms of energy and peak demand for the period from 1997-98 to 2009-10 is presented in **Exhibit-I** and **Exhibit-II** respectively. The State / Region-wise power supply position during the year 2009-10 is enclosed at **Annexure-4A.**

Exhibit-I

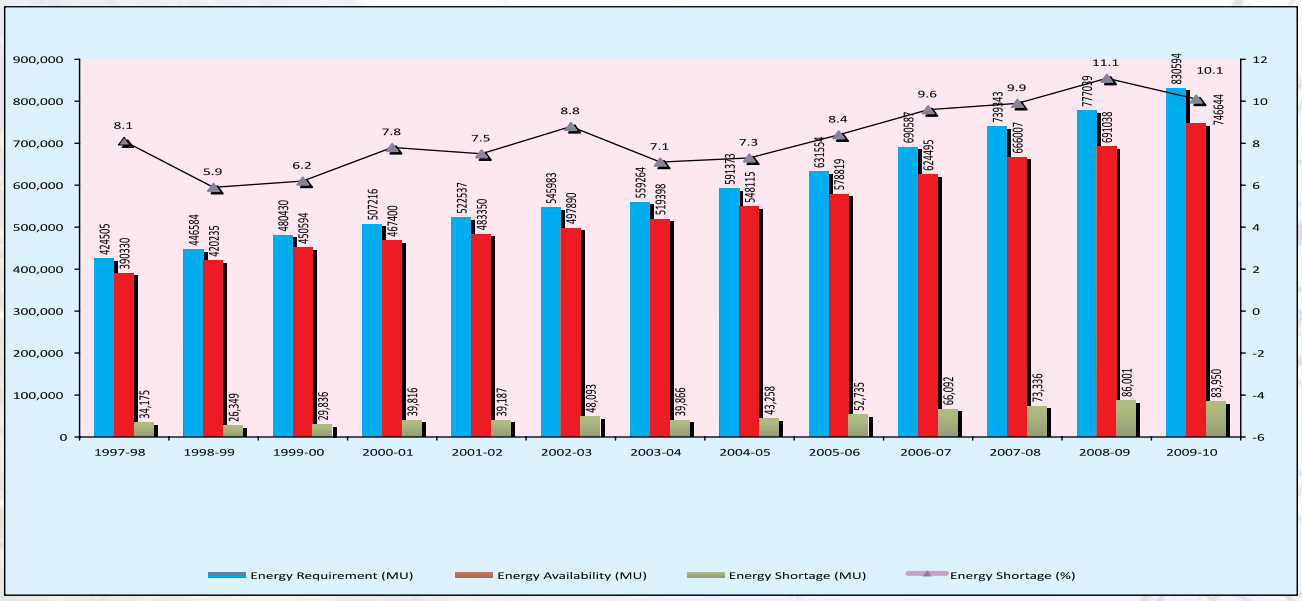
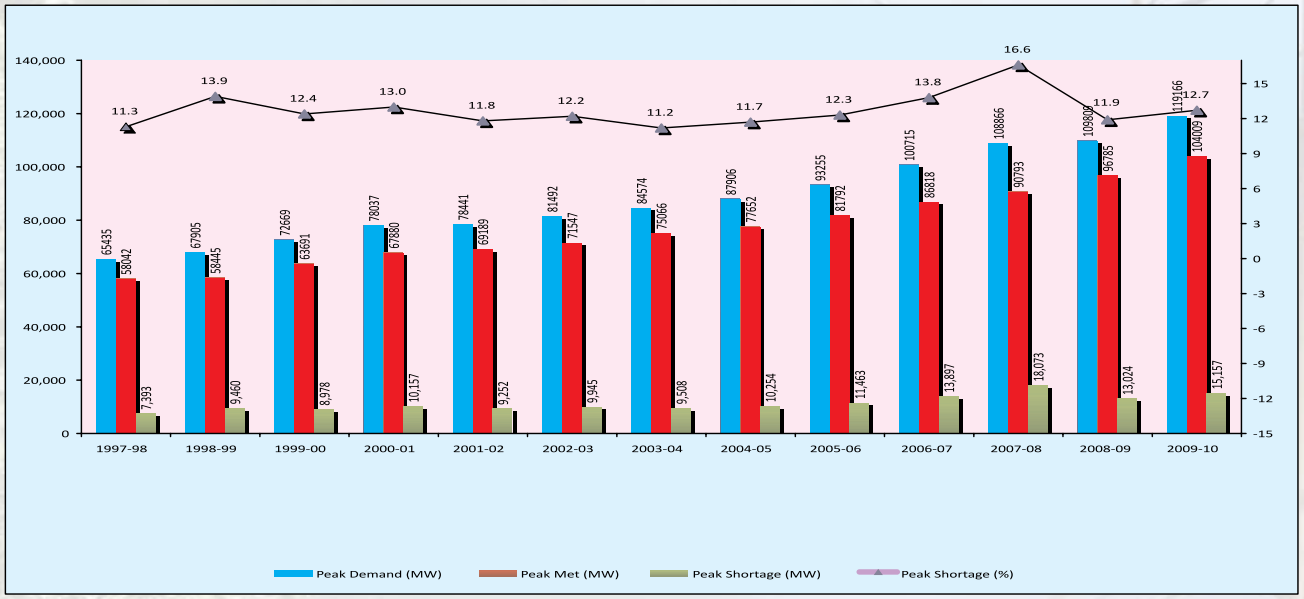


Exhibit-II



4.3 Optimum Utilization of available Generating Capacity - Inter Regional Exchanges of Power

Northern, Western, Eastern and North-Eastern Grid (NEW Grid) with an installed generating capacity of 1,16,022 MW as on 31.03.2010 and peak load of 91,748 MW for the year 2009-10 are connected through synchronous links. Southern Region, with an installed generating capacity of 43300.5 MW as on 31.03.2010 and peak load of 32,178 MW for the year 2009-10 is connected with Eastern Region and Western Region through asynchronous HVDC links. The total inter-Regional transmission capacity as on 31.03.2010 is 20,750 MW which includes 132/110 kV Inter-regional link of 600 MW capacity. The power transfer capacity as on 31.03.2010 was 6,330 MW between Eastern Region and Northern Region, 2,990 MW between Eastern Region and Western Region, 3,630 MW between Eastern Region and Southern Region, 1,260 MW between Eastern Region and North Eastern Region, 4,220 MW between Western Region and Northern Region and 1,720 MW between Western Region and Southern Region. Synchronous operation of the Northern, Western, Eastern and North-Eastern Regional Grids and asynchronous operation of the Combined Grid with the Southern Grids helped in export of surplus/ unutilised power across various Regions.

All regional grids experienced shortages of varying degrees as well as some seasonal/ off-peak surpluses. These surpluses were exported by surplus States to deficit State. During 2009-10, Eastern Region was the net exporter, whereas Northern, Western, Southern and North-Eastern Regions were net importers of power. Himachal Pradesh and J&K in Northern Region, Goa, Gujarat and DNH & Daman Diu in Western Region, Jharkhand, Bihar and Damodar Valley Corporation in Eastern Region, Arunachal Pradesh, Manipur, Mizoram, Nagaland and Tripura in North- Eastern Region and Puducherry in Southern Region were net exporters of power during this period.

Govt. of India (GoI) has set up Central Generating Stations (CGS) through GoI Undertakings, viz. NTPC Ltd., National Hydro Power Corporation Ltd. (NHPC), Satluj Jal Vidut Nigam Ltd. (SJVNL), Neyveli Lignite Corp. (NLC), Nuclear Power Corporation (NPC) etc. Except for few stations dedicated to the host State, output of CGS is allocated to various States. About 85% of the installed capacity is allocated as firm shares, whereas about 15% is the unallocated quota, which is allocated by GoI from time to time depending upon relative shortages and contingent conditions. CEA keeps a close watch on the power supply position and recommends to the Ministry of Power the quantum of allocation from the unallocated quota. CEA also coordinates the implementation of the allocation through the Regional Power Committees.

Open Access is a key provision in the Electricity Act, 2003 for utilisation of power in surplus areas by needy States/utilities in deficit areas, besides bringing about competition and enhance efficiency. All such transactions took place through the provision of Short Term Open Access (STOA) though CERC has also made provisions for Medium Term Open Access (MTOA). The inter-regional energy exchanges, which included the long-term and short-term open access transactions, were 26464 MU during the year 2009-10, as compared to 23405 MU during the previous year, showing a growth of 13.1%. The inter-regional exchanges helped a number of States / utilities in all the Regions to bridge the gap between demand and supply of power. Details of Inter-regional exchanges of energy among the Regions during 2008-09 and 2009-10 are given below:

Inter-Regional Exchanges for the year 2008-09 & 2009-10

(Fig. in MU)

Region		2008-2009	2009-2010
From	**To**		
i) Northern	Western	1,337.4	500.5
	Southern	798.9	441.2
	Eastern	21.9	90.3
	North-Eastern	157.5	119.3
Sub Total		**2,315.7**	**1151.3**
ii) Western	Northern	1,784.8	4684
	Southern	1,909.4	2399
	Eastern	36.1	242.2
	North-Eastern	-	7.4
Sub Total		**3730.3**	**7333**
iii) Southern	Northern	1,413.4	2522.3
	Western	1,488.1	804.8
	Eastern	12.4	6.6
	North-Eastern	0.0	0.0
Sub Total		**2913.9**	**3333.7**
iv) Eastern	Northern	8,161.0	8937.6
	Western	3,236.6	2616
	Southern	1,417.5	1542
	North-Eastern	755.6	1188.3
Sub Total		13570.7	14283.9
v) N-Eastern	Northern	383.0	219.6
	Western	412.5	112.1
	Southern	53.9	8.6
	Eastern	24.8	21.3
Sub Total		**874.2**	**361.6**
Total		**23404.8**	**26463.5**

4.4 Operation of Regional Grids

4.4.1 Northern Regional Grid

The Northern Grid has an installed capacity of 42189 MW as on 31-03-2010 consisting of 24851 MW thermal, 13,311 MW hydro, 1,620 MW nuclear and 2407 MW from renewable energy sources. The Northern Grid faced an energy shortage of 11.6% and a peaking shortage of 15.4% during the year 2009-10 as compared to energy and peak shortages of 10.8% and 10.7% respectively during previous year (2008-09). Frequency of the grid remained 89.58 percent of time in the CERC recommended band of 49.2 to 50.3Hz during the current year. Northern Region was the biggest importer of power, importing 8938 MUs from Eastern Region, 2522 MU from Southern Region, 4684 MU from Western Region and 220 MU from North Eastern Region during the year 2009-10. Power was transferred from

Eastern Region to Northern Region over HVDC back-to-back station at Sasaram, Muzaffarpur-Gorahkpur 400 kV D/C line, Patna – Balia 400 kV D/C line and Biharshariff – Balia 400 kV D/C line. Northern Region is also connected to Western Region through Agra – Gwalior 765 kV line 1&2 (presently being operated at 400 kV), Kankroli-Zerda 400kV D/C Line and HVDC back-to-back link at Vindhyachal. With the commissioning of Agra – Gwalior, Patna – Balia, Biharshariff – Balia lines and Kankroli-Zerda, the stability of the combined grid has improved and also this has facilitated free flow of power from the surplus areas to deficit areas.

4.4.2 Western Regional Grid

The Western Grid has an installed capacity of 50,225 MW as on 31-03-2010 consisting of 36,307 MW thermal, 7,447 MW hydro, 1,840 MW nuclear and 4,631 MW from renewable energy sources. The Western Grid faced an energy shortage of 13.7% and a peaking shortage of 17.7% during the year 2009-10 as compared to energy and peak shortages of 14.7% and 16.0% respectively during the previous year (2008-09). With the commissioning of 765 kV Bina-Gwalior 2nd ckt and 765 kV Seoni-Bina S/c lines (both being operated at 400 kV) on 1.3.2010 & 1.4.2010 respectively, the congestion on 400 kV Soja-Kansari line and 220 kV Badod-Kota and Badod-Modak lines got relieved to a considerable extent. With the coming up of ongoing schemes for establishing transmission system by 2011-12, it would become possible to minimise the congestion problems.

4.4.3 Southern Regional Grid

The Southern Grid has an installed capacity of 43301 MW as on 31-03-2010 consisting of 23,155 MW thermal, 11,107MW hydro, 1,100 MW nuclear and 7939 MW from renewable energy sources. The Southern Grid faced an energy shortage of 6.4% and a peaking shortage of 9.7% during the year 2009-10 compared to energy and peak shortages of 8.3% and 7.5% respectively during the previous year. Frequency of Southern Grid remained 94.07% of time in the CERC recommended band of 49.2 to 50.3Hz during the current year. The Southern Region has been both importing and exporting power from/ to other Regions during the current year. They exported power to the extent of 3334 MU to other Regions out of which 2522 MU was exported to Northern Region and 805 MU to Western Region. It imported 1542 MU power from Eastern Region and exported only 6.6 MU to it. The Talcher Stage-II Super Thermal Power Station (4x500 MW) in Eastern Region is dedicated power station for the Southern Region except for 200 MW to the home State of Orissa in ER. The power from this station and surplus power from ER flows over Talcher-Kolar HVDC bi-pole link and HVDC back-to-back link at Gazuwaka and Balimela-Upper Sileru 220kV S/C. It is connected with Western Region through HVDC back-to-back link at Chandrapur.

4.4.4 Eastern Regional Grid

The Eastern Grid has an installed capacity of 21,320 MW as on 31-03-2010 consisting of 17,103 MW thermal, 3,882 MW hydro and 335 MW from renewable energy sources. The Eastern Grid faced an energy shortage of 4.4% and a peaking shortage of 6.3% during the year 2009-10 as compared to energy and peak shortages of 5.7% and 4.6% respectively during previous year. The Eastern Regional Grid operated in synchronism with Western, Northern and North-Eastern Regional Grids.

The Eastern Region was the highest exporter of power among all Regions, exporting a total of 14,284 MUs during 2009-10. It exported 8938 MUs to Northern Region, 2616 MUs to Western Region, 1542 MUs

to Southern Region and 1188 MUs to North Eastern Region. There were marginal imports from all Regions totalling to 360.4 MUs. Eastern Region is the only Region connected to all other Regions. It is connected to Northern Region through Muzaffarpur - Gorahkpur 400 kV D/C line with TCSC, Patna – Balia 400 kV D/C line, Biharshariff – Balia 400 kV D/C line and Sasaram – Allahabad/ Varanasi 400 kV D/C line bypassing of HVDC back-to-back link at Sasaram, to Western Region through 220 kV triple circuit Korba – Budhipadar AC lines and Raipur- Rourkela 400 kV D/C AC lines and Ranchi- Sipat 400 kV D/C line, to Southern Region through Talcher - Kolar HVDC bi-pole link and HVDC back-to-back link at Gazuwaka and to North-Eastern Region through Bongaigaon – Malda 400 kV D/C lines and Birpara – Salakati 220 kV D/C lines.

4.4.5 North-Eastern Regional Grid

The North-Eastern Grid has an installed capacity of 2,289 MW as on 31-03-2010 consisting of 969 MW thermal, 1,116 MW hydro and 204 MW from renewable energy sources. The North-Eastern Grid faced an energy shortage of 11.1% and a peaking shortage of 17.9% during the year 2009-10 as compared to energy and peak shortages of 13.3% and 13.5% respectively during the previous year mainly on account of transmission and distribution constraints. The North-Eastern Grid operated in synchronism with Northern Grid, Eastern Grid and Western Grid. North Eastern Regional Grid is connected directly only to the Eastern Regional Grid and any export of power to the other Regions has to be wheeled through the Eastern Regional Grid. The energy exported from North-Eastern Region to Northern Region, Western Region, Southern Region and Eastern Region was 220 MUs, 112.1 MUs, 8.6 MUs and 21.3 MUs respectively. The total export from this Region to other Regions was 362 MUs. The power transfer from North-Eastern Region to Eastern Region is taking place over Bongaigaon – Malda 400 kV D/C lines and Birpara – Salakati 220 kV D/C lines.

4.5 Monitoring of Capacitor Installation Programme

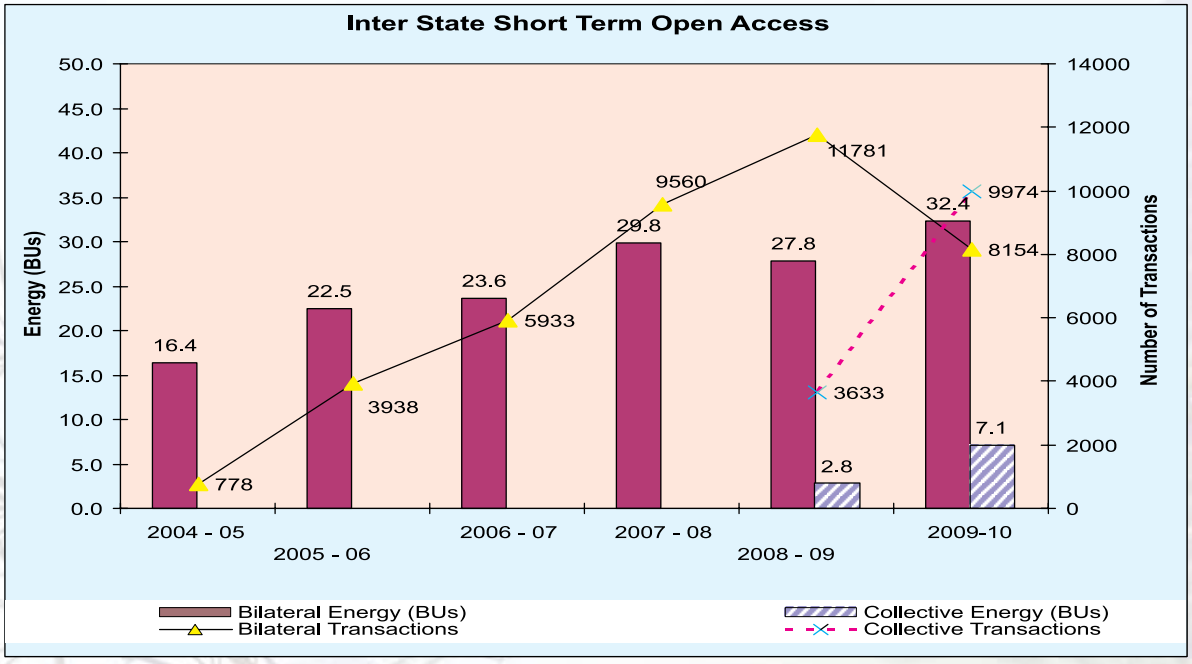
In order to obtain a proper voltage profile in the regional Grids, the capacitor requirement at regional level is assessed by respective Regional Power Committees (RPCs). The capacitor installation programme for the year is finalised in consultation with the constituents of the Region. The actual installation of shunt capacitors during the year 2009-10 was 593.12 MVAR and 49.6 MVAR in Northern and Southern Regions respectively leaving a shortfall of 4322.88 MVAR and 269.2 MVAR in Northern and Southern Region respectively as per the details given at **Annexure–4B**. The progress of capacitor installation in the country has been slow. The matter is being followed up by CEA and RPCs. Capacitors were not required to be installed in the Eastern and North-Eastern Regions, as there were no problems of low voltages in these regions.

4.6 Trading Licensees and Power Exchanges

The two power exchanges namely Indian Energy Exchange Ltd. (IEX) and Power Exchange India Ltd. (PXIL) started operation in October 2008 and since then the volume of energy transacted through power exchanges has increased significantly. During the year 2009-10, energy transactions through Power Exchange (collective transactions) has increased to 7.1 BUs from 2.8 BUs i.e. an increase of 254% and the number of such transactions has increased to 9974 during the year 2009-2010 from 3633 during the previous year i.e. the increase of 275%. During 2008-09, energy transacted through power exchanges formed 9.2% of the total energy scheduled through Short Term Open Access (STOA) which has increased to

18% during the year 2009-10. Bilateral energy transactions have also increased to 32.4 BUs during year 2009-10 from 27.8 BUs during the previous year inspite of a decline in number of bilateral energy transactions from 11781 transaction during the year 2008-09 to 8154 transactions during the year 2009-10. Growth of inter-State energy transactions in terms of volume as well as number through STOA since year 2004-05 is shown in **Exhibit-III**.

Exhibit-III



4.7 Infrastructure of RPC Secretariats

All the Regional Power Committees, except North Eastern Regional Power Committee at Shillong have their own office building and staff quarters. The SFC memo for construction of office-cum-residential complex for NERPC, Shillong and RIO, NE, Shillong was approved at a cost of Rs. 1144 lakhs by Ministry of Power in January 2008.The construction work has been awarded to "M/s Infrastructural Development Consortium", Shillong by CPWD, Shillong and the work is likely to be completed during 2010-2011. An amount of Rs. 325 lakhs has been placed with CPWD, Shillong vide Under Secretary (Budget)'s letter dated 13/08/2009 for the current financial year 2009-10 out of which only an amount a Rs. 24.69 lakhs could be utilized towards construction of Office building and staff quarters.

4.8 Power & Telecommunication Co-ordination Committee (PTCC)

PTCC Directorate of CEA continued to follow up cases for expeditious PTCC clearance of EHT transmission lines of voltages 220 kV and above through discussions with Bharat Sanchar Nigam Ltd. (BSNL), Railways and SEBs/Power Utilities. CEA also rendered assistance to the State Power Utilities in resolving complex PTCC cases of voltage level of 132 kV and below.

90th Central PTCC meeting was held on 30th October, 2009 at Bangalore. The meetings were attended by officers of the rank of Chief Engineer from SEBs/Power Utilities, Chief General Managers from Bharat Sanchar Nigam Ltd. (BSNL) and senior officers from Railways and Defence. In the meetings, many contentious issues which are in the interest of Power Sector

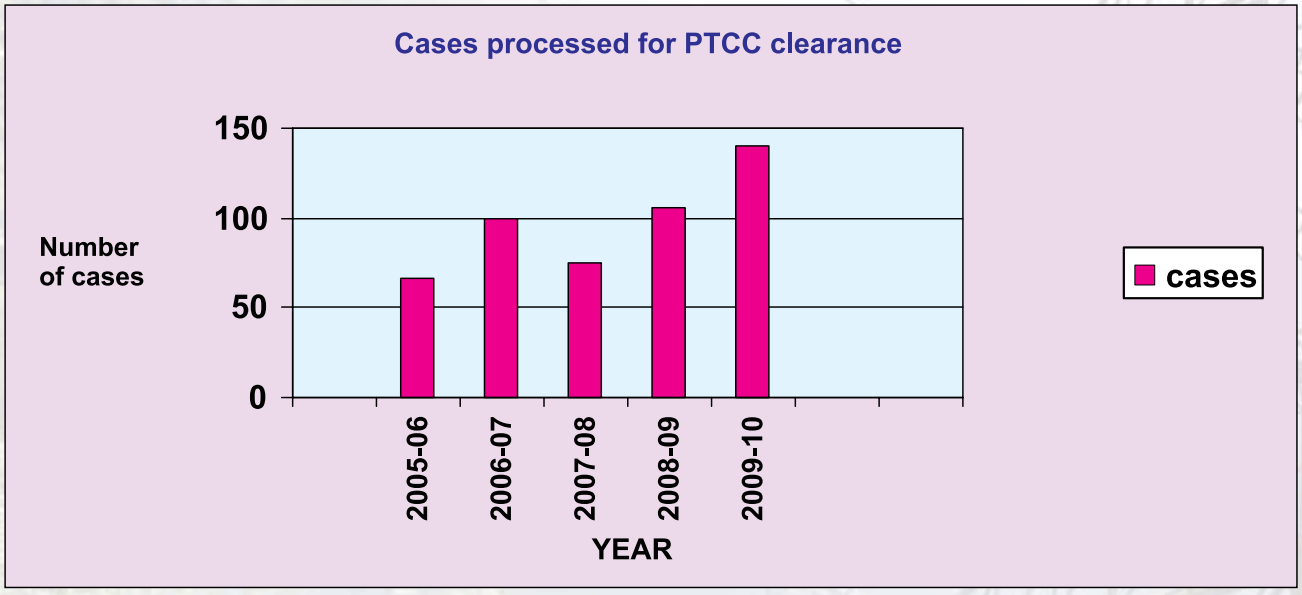
were discussed. Some of the important decisions taken in the meeting are as under:

1) The Central PTCC decided that the private parties who intend to erect EHT power lines of voltage level 220 kV and above should submit their PTCC route approval proposals directly to CEA. For power lines of 132 kV and below, the PTCC route proposals should be submitted to member power state transmission utility / central power utility/ SLPTCC of the concerned State.

2) The PTCC Manual was finalized by the sub-committee formed for revision of PTCC Manual. The draft of the PTCC Manual was placed before the Central PTCC in the 90th Central PTCC Meeting for acceptance. The PTCC Manual was finalized after incorporating minor changes.

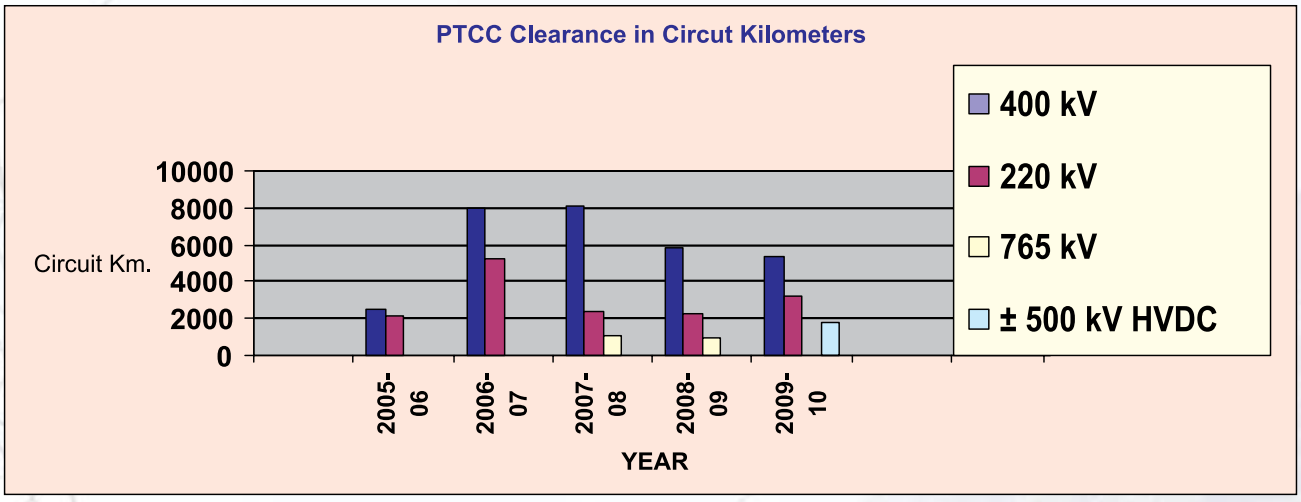
3) On the request from Director (Telecom), Railway Board, a five day refresher training course on PTCC was conducted by CEA officers in the month of June 2009. Thirty five officers from all the 17 zones of the railways attended the refresher course. The training was conducted at IRISET, Secunderabad.

During 2009-10, 140 new cases of EHT power lines (220 kV and above) were received for processing of PTCC route approval. A bar chart indicating the number of cases received for PTCC route approval during the last five years is given below:



During 2009-10, CEA has sent Induced Voltage (IV) comments for 110 cases to DEs (T), PTCC, BSNL for issuing necessary PTCC route approvals. About 3200 ckms of 220 kV lines, about 5450 ckms of 400 kV lines and 1800 ckms of ± 500 kV HVDC lines were accorded PTCC clearance to enable Power Utilities to commission their lines on schedule.

A bar chart indicating the Circuit kilometers of 220kV, 400kV, 765 kV and ± 500 kV HVDC transmission lines for which PTCC route approval was accorded during the last five years is given below:



It can be seen from the above data that the number of cases received for PTCC route approval have increased by 38%. The total circuit kilometers of the EHT lines (Total length of 220 kV, 400 kV & 500 kV HVDC) for which PTCC route approval has been accorded, has increased by 15%.

4.8.1 Computerisation of PTCC

In order to cut down the processing time of PTCC route approval, a proposal for the computerization of PTCC process was forwarded to Ministry of Power for sanction and is under process by MoP. The estimated cost of the scheme is Rs. 1466 Lakhs. A budget provision of Rs.100 Lakhs has been kept for the year 2010-11 towards appointing the consultant.

4.9 Establishment of Load Despatch & Telecommunication Facilities for Power Sector

All the five Unified Load Despatch and Communication (ULDC) schemes are in operation for about last 8 years. Unified Load Despatch Scheme Monitoring Group (USMG) which has been inter-alia entrusted the work of formulating minimum standard requirements for ULDC scheme (phase-II) for replacement / upgradation / expansion and O&M of the ULDC system in Northern Region, CEA has been providing technical input to the Group / Committee.

4.10 National Load Despatch Centre (NLDC)

The National Load Despatch Centre (NLDC) was commissioned last year and the same has been running successfully.

4.11 Frequency Allocation Co-ordination for Microwave and Power Line Carrier Communication (PLCC)

CEA co-ordinates and follows up with Wireless Planning and Co-ordination (WPC) Wing of Department of Telecommunications (DoT) to accord frequency allocation for PLCC system of new power transmission lines and VHF/ UHF / Microwave systems of power utilities.

As per the WPC, the frequency band 2.3-2.4 GHz used for microwave communication in the ULDC schemes for Load Despatch systems is to be vacated. CEA examined the case and has been providing required technical input to the Ministry of Power.

During the financial year 2009-10, frequency allocations for PLCC for

about 181 cases have been made by WPC Wing of DoT. CEA intervened for early allocation for the cases of POWERGRID ER-I, NHPC Sewa-II, NHPC Teesta-III, Torrent POWERGRID Ltd., POWERGRID NR-I, POWERGRID NR-II, GSECL, Jaypee POWERGRID and others with WPC Wing of DoT for expediting the allocation of frequency for their new power lines.

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Inspection of Tower Failure

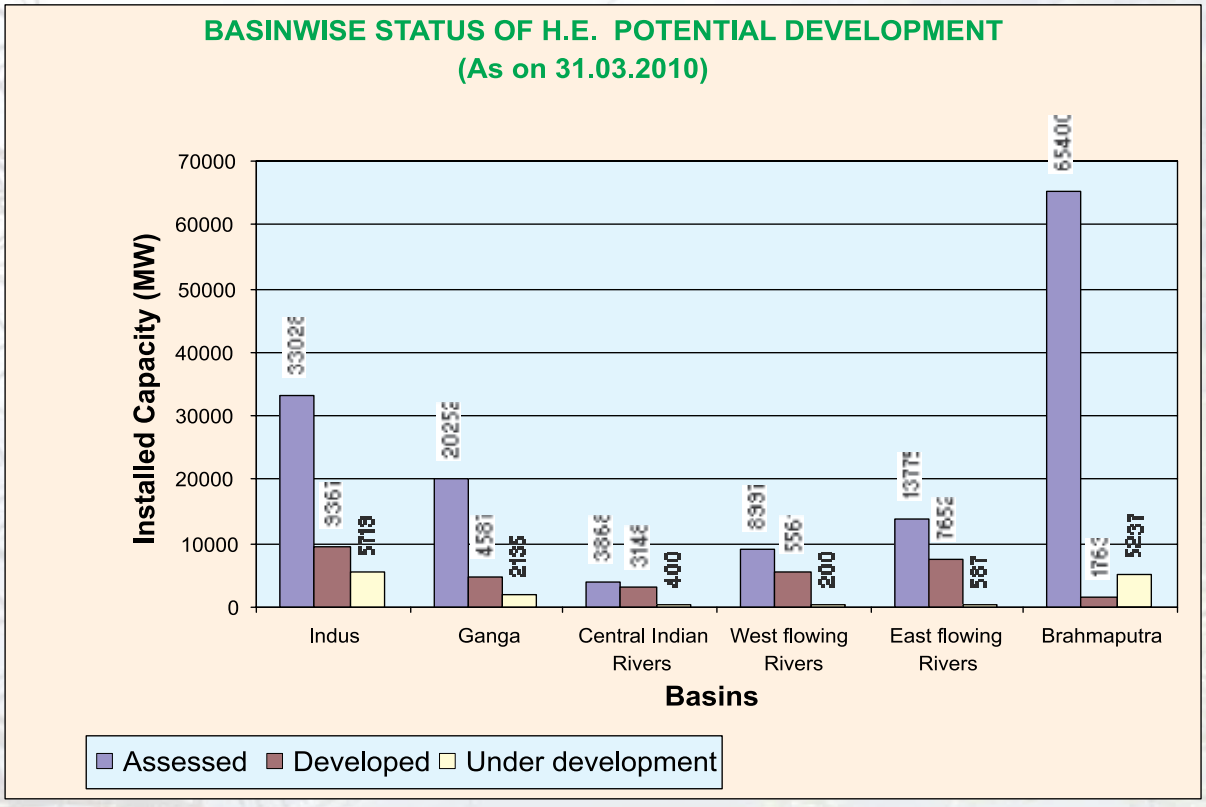
CHAPTER – 5

HYDRO POWER DEVELOPMENT

5.1 Hydro Potential and its Development

The re-assessment studies of hydro-electric potential of the country, completed by Central Electricity Authority in 1987, have assessed the economically exploitable hydro power potential in terms of installed capacity as 148701 MW out of which 145320 MW of capacity is from schemes having capacity above 25 MW.

The basin-wise details of hydro-electric potential development in terms of installed capacity are indicated in the table below. As on 31.03.2010, the hydro-electric schemes in operation account for only 22.1% and those under execution for 9.8 % of the total potential in terms of installed capacity. Thus, the bulk of the potential (68.1%) remains to be developed.



The re-assessment studies have also identified 56 sites for Pumped Storage Schemes (PSS) with probable total installation of about 94,000 MW. At present, 11 Pumped Storage Projects having total installed capacity of 4809.60 MW are under operation and one Pumped Storage Project (1000 MW) is sanctioned and is being taken up for construction.

In addition, the study for the assessment of small hydro potential has been completed in June, 1996 by CEA. 1512 small hydro-electric schemes with aggregate installed capacity of about 6782 MW on canal falls/ rivers have been identified.

5.2 50,000 MW Hydro-Electric Initiative

Under the 50,000 MW Initiative, preparation of Preliminary Feasibility Reports (PFRs) of 162 hydro-electric projects spreading in 16 States was taken up by CEA as nodal agency in the year 2003-04 with CPSUs/State agencies as Consultants. CEA's role included overall coordination, facilitating collection of data, quality control by vetting conceptual planning, assessment of power benefits, selection of project parameters, evacuation of power and monitoring of works. National Hydro-Electric Power Corporation Ltd., WAPCOS, North-eastern Electric Power Corporation, Satluj Jal Vidyut Nigam Ltd. and number of State Power Utilities were associated to complete these feasibility studies. The PFRs were completed in Sept., 2004 for all these projects with an installed capacity of 47,930 MW.

As a follow-up of preparation of PFRs, it has been decided to take up implementation/ preparation of DPRs for attractive schemes selected from PFR schemes thereby providing a shelf of projects for execution in the near future. Out of 162 schemes (47930 MW) for which PFRs have been prepared, at first instance, based on their preliminary techno-economic analysis, 78 schemes (34020 MW) whose first year tariff works out below Rs. 2.50/kWh have been considered as low tariff H.E. schemes and have been selected for taking up of detailed survey & investigation and preparation of DPR/implementation. The details of these schemes are enclosed at **Annexure-5A**. Out of these, action has been initiated for 77 schemes (33951MW) for S&I and preparation of DPRs by CPSUs/SPSUs / SEBs /IPPs.

Out of these, DPRs of 21 schemes (7973 MW) have already been prepared. DPRs for 20 schemes (14479 MW) are scheduled to be prepared during 2010-11 and 2011-12. The work of preparation of DPRs of remaining 36 schemes (11499 MW) is held up due to proposed change in Agency / Allotment by State Govt., issues related to Environment & Forest Clearance and local agitation etc. These 77 schemes are expected to yield benefits during 12th Plan and beyond.

5.3 Construction Monitoring of Hydro Projects

CEA is performing the duties of monitoring of the power projects in pursuance of Section 73 (f) of Electricity Act, 2003. CEA has nominated a nodal officer for each ongoing project who continuously monitors the progress at site through frequent site visits and interaction with the developers. The respective nodal officer is responsible for submitting a report on the progress of each of the on-going power project on a monthly basis highlighting the critical areas where corrective actions are required. CEA holds review meeting with the developers and other stakeholders and highlights the critical issues to Ministry of Power and Project Authorities and suggests the remedial actions. Regular visits were made by the officers to the various project sites for progress review.

5.4 Hydro Capacity Addition during 2009-10

Target hydro capacity addition for the year 2009-10 was 845 MW and the capacity achieved against this target was 39 MW. Project-wise details are given at **Annexure-5B**.

5.4.1 Hydro Capacity Addition Programme during 2010-11

Hydro Capacity Addition Programme for the year 2010-11 is 1466 MW (649 MW in Central Sector, 356 MW in State Sector, and 461 MW in Private Sector). Project-wise details are given at **Annexure- 5C.**

5.4.2 Survey & Investigation of Hydro Projects

In order to accelerate the pace of hydro development in the country, CEA provides assistance to various Central/State agencies in the matter of survey, investigation and preparation of DPRs of hydro projects. CEA has been monitoring the physical and financial progress of survey and investigation of all the hydro schemes.

5.5 Power Project Planning & Optimization Studies

During the year, the project planning & optimization studies including power potential studies were carried out for Umngot H.E. Project (3x80 MW), Meghalaya.

5.6 Studies and other Activities Related to Hydro Power Planning

5.6.1 Indus-Water Treaty Matters

The study relating to impact of Kishenganga on Kohala & Neelum Jhelum Projects in Pakistan was carried out.

CEA examined Points of Difference and Disputes on the issues relating to the pondage of Kishenganga, Nimoo Bazgo and Chutak Hydro Electric Project as raised by Govt. of Pakistan and the matter was discussed in Permanent Indus Commission meeting.

5.6.2 Revision of Design Energy

- The proposal of SJVNL for review of design energy of Nathpa Jhakri Hydro Electric Project (1500 MW) in H.P. has been approved by the Authority in June, 2009 as 6612 MU as against 6951 MU earlier.
- The proposal of THDC for review of design energy of Tehri Hydro Electric Project Stage-I (1000 MW) in Uttarakhand has been approved by the Authority in January, 2010 as 2797 MU as against 3091 MU earlier.
- Report of Strategic Foresight Group (SFG) on Brahmaputra Water Diversion by China was examined & commented upon.
- Material for preparation of Report of Inter-ministerial Group (IMG) constituted for expeditious development of hydro potential in NER was provided.
- White Paper on the 'Development of Hydropower Resources of Sikkim' was examined.

5.7 Capacity Addition during the 12th Plan

As per the studies carried out by CEA to assess the requirement of additional capacity during the 12th Plan (2012-17), to meet the All India peak demand and energy requirement at the end of 12th Plan, a capacity addition of more than 100,000 MW in the 5 years period of 2012-17 would be required, out of which 20,000 MW is proposed to be added through hydro projects.

An exercise has been carried out in CEA to identify candidate hydro projects for inclusion in the 12th Plan and beyond. A shelf of 109 candidate projects aggregating to 30920 MW for realising benefits during 12th Plan, based on their status of preparedness has been finalised. List of these schemes is given at **Annexure-5D**. A document titled 'Hydro Development Plan for 12th Five Year Plan (2012-2017)' was also prepared in this regard and circulated to all concerned. It has been proposed that the concurrence of the hydro projects envisaged for commissioning during 12th Plan should be obtained and orders for the main packages awarded by the developer during the 11th Plan itself.

5.8 Co-operation with Neighbouring Countries

Development of water resources of the common rivers of India and neighbouring countries of Nepal, Bhutan and Myanmar for

mutual benefits has been under consideration with these countries. During the year, following works were handled:

- Power potential studies were carried out for Naumure H.E. Project corresponding to different irrigation scenarios.
- Feasibility Study Report of Arun-3 Project prepared by SJVNL/ WAPCOS was examined from commercial viability aspects.
- In the 5th Meeting of Nepal-India Joint Committee on Water Resources (JCWR), Terms of Reference (ToR) for establishment of Pancheshwar Development Authority were finalized.
- Proposal of NHPC for undertaking additional and confirmatory investigations for preparation of updated DPRs in respect of Tamanthi & Shwezaye HE Projects, Myanmar was examined.
- The cost Estimates for preparation of DPR of Amochu (620 MW), Chamkharchu-I (670 MW), Kuri Gongri (1800 MW), Kholongchu (486 MW), Wanchu (900MW) and Bunakha (180 MW) were examined and recommended to MoP. Subsequently, agreements between GoI and RGoB were signed for Amochu, Chamkharchu-I, Kuri Gongri, Kholongchu HE Projects.
- The Pre-feasibility Report on viability of Bunakha HEP (180 MW) prepared by THDC was examined and views of CEA have been sent to MoP.
- The Feasibility Study Report of Wangchu HEP (900 MW) prepared by SJVNL was examined and recommended for development as RoR scheme.
- The Empowered Joint Indo-Bhutan Group Meeting was held on 22.03.2010. Views of CEA regarding Conversion of Wangchu HE Project type from Storage to ROR type were accepted.

5.8.1 Other International Cooperation

- The matters relating to cooperation with the countries like Russia, Canada, Congo & Tajikistan have been dealt.
- A team of officers from MoWR, MEA and CEA visited China to attend Meeting of Joint Expert Level Mechanism (ELM) between India and China to discuss issues relating to trans-border rivers including exchange of hydrological data of Brahmaputra River etc.

5.9 Hydro Power Plants Performance & Operation Monitoring

- Performance of 572 units in 160 hydro stations having capacity above 25 MW with aggregate installed capacity of 35312.45 MW was analyzed in respect of their outages & generation and report on the review of HE stations for the year 2008-09 was finalized.
- Mid-term review of generation performance of hydro-electric stations of the country for the year 2009-10 was carried out in Dec., 2009 after withdrawal of South-West monsoon by interaction with SEBs, Power Deptts. and CPSUs. The generation targets were reviewed for the remaining part of the year 2009-10.
- Month-wise/station-wise hydro generation targets in respect of hydro power generation having capacity above 25 MW for year 2010-11 were drawn in consultation with various utilities and tentatively fixed at 111352 MU which was about 3.69% lower than generation targets for the year 2009-10.
- To accord recognition to hydro power stations for their all round performance,

performance data of HE Stations having installed capacity of 100 MW and above was analyzed and three HE Stations namely Bhakra Power House (5x108+5x157 MW), Baspa-II (3x100 MW) and Pong (6x66 MW), BBMB, were recommended for National Award for best performance under "National Award for the year 2008-09 for Meritorious Performance in Power Sector".

5.9.1 Hydel Generation Performance during year 2009-10

The region-wise summary of hydro generation performance in the country is as follow:

Region	Target MU	Generation MU	Deviation (+/ -)	
			MU	(%)
Northern	52289.00	48976.52	(-)3312.48	(-)6.33
Western	16116.00	13301.45	(-)2814.55	(-)17.46
Southern	32324.00	29996.37	(-)2327.63	(-)7.20
Eastern	10310.00	8228.35	(-)2081.65	(-)20.19
N-Eastern	4429.00	3413.58	(-)1015.42	(-)22.93
All India	**115468.00**	**103916.27**	**(-)11552.73**	**(-)10.00**

Against the target of 115468 MU, the actual energy generation during the year 2009-10 was 103916.27 MU which is 10% less than the target. Hydro generation is less than the target in all Regions in the country.

5.10 Renovation and Modernization of Hydro Electric Power Projects

5.10.1 R&M Phase-I Programme

Recognising the benefits of the R&M programme, Govt. of India set up a National Committee in 1987 to formulate strategy on R&M of hydro power projects. Based on the recommendations of the National Committee and subsequent reviews, a programme for renovation, modernization 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. The total cost of these schemes was estimated as Rs.1493 Crores with expected benefit of 2531 MW.

5.10.2 R&M Phase-II Programme

As per the hydro policy of Govt. of India declared in 1998, renovation & modernization of hydro power plants accorded priority. Accordingly, 67 hydro R&M schemes having an aggregate capacity of 10318 MW were identified to be undertaken under Phase-II programme till the end of 10th Plan to accrue a benefit of 3685 MW at an estimated cost of Rs. 2161 Crores.

5.11 National Perspective Plan

CEA formulated the National Perspective Plan for hydro power stations in the year 2000 and incorporated R&M proposals under Phase-II programme alongwith the left out schemes as recommended in Phase-I programme of National Committee. The left out schemes were those which were either under implementation or were yet to be implemented. This Perspective Plan was

for 9th, 10th and 11th Plans with 117 schemes having an aggregate installed capacity of 19370 MW with benefit of 7755MW at an estimated cost of Rs.4654 crores.

5.11.1 8th, 9th & 10th Plan Achievements

Under the hydro R&M programme, 65 (15 in Central Sector and 50 in State Sector) hydro-electric schemes (13 upto the 8th Plan, 20 in the 9th Plan and 32 in the 10th Plan) with an installed capacity of 10511 MW at a cost of Rs.1,726 Crores have been completed by the end of the 10th Plan (i.e. by 31.03.2007) and have accrued a benefit of 2351 MW through Life Extension, Uprating and Restoration.

5.11.2 11th & 12th Plan Programme

At the beginning of 11th Plan i.e. May/ June, 2007, a total of 62 hydro R&M schemes were programmed with an installed capacity of about 11340 MW at an estimated cost of Rs. 4035 Crs. to accrue a benefit of about 4393 MW through life extension, uprating and restoration. The programme was finalized in consultation with SEBs/Utilities.

During Dec., 2007, Two (2) hydro R&M schemes of Rajasthan having Inter-State issues were dropped due to disagreement between Rajasthan and Madhya Pradesh. Further, three (3) schemes of APGENCO namely Hampi, Machkund and Tungbhadra; One scheme of TNEB namely Sholayar-I and one scheme of KPCL namely Bhadra were shifted to 12th Plan on the request of Project Authorities as the generating units were running satisfactorily. Also, one scheme of BBMB namely Dehar was split into two schemes Dehar Ph. A and Dehar Ph.B. Thus, presently 56 hydro R&M schemes having an installed capacity of about 10810 MW at a revised/updated estimated cost of Rs. 4203 Crores programmed to accrue a benefit of about 4099 MW through life extension, uprating and restoration are under implementation.

Annual review meetings were held with various utilities in CEA during March/ April,2010. As per the outcome of discussions, one scheme namely Bhadra HEP of KPCL has been declared as completed. Now 29 schemes are planned for implementation during the 11th Plan.

Till date (as on 31.03.2010), 13 Schemes (out of 29 targeted schemes) with an installed capacity of 3204 MW at a cost of about Rs. 205 Crores have been completed and have accrued a benefit of 380 MW through life extension & uprating. The R&M works on balance 16 ongoing schemes (installed capacity 4684 MW) are under various stages of implementation i.e. Ongoing, Tendering, DPR preparation, finalization and RLA Studies etc.

Further, 26 more hydro schemes planned for implementation in 11th Plan have now been shifted to 12th Plan (envisaging 8 R&M schemes), as RLA studies of these schemes could not be completed or units are running comparatively satisfactorily. Also, a new R&M scheme of Rengali HPS has been proposed by OHPC for completion in 12th Plan. Thus, a total of 35 schemes are now envisaged for completion during 12th Plan. After completion of the R&M works of these projects, having total installed capacity of 3183 MW, there will be a benefit of 2795 MW through Life Extension & Uprating at an estimated cost of Rs. 3075 Crores (provisional).

5.12 Plan-wise summary of hydro R&M schemes (as on 31.03.2010)

i) Hydro R&M schemes completed up to 10th Plan

Sl.No.	Plan Period	Nos. of Projects			Installed Capacity (MW)	Estimated Cost (Rs. in Crs.)	Actual Expenditure (Rs. in Crs.)	Benefit (MW)
		Central Sector	State Sector	Total				
1.	Upto 8th Plan Schemes completed	2	11	13	1282	126	127	429
2.	9th Plan Schemes completed	8	12	20	4892	598	570	1093
3.	10th Plan Schemes completed	5	27	32	4337	1016	1029	829

ii) Hydro R&M schemes planned during 11th Plan (Revised)

Sl.No	Plan Period (2007-2012)	No. of Projects			Installed Capacity (MW)	Estimated Cost (Rs. in Crs.)	Actual Expenditure (Rs. in Crs)	Benefit (MW)
		Central Sector	State Sector	Total				
a)	Programmed (Original)	10	46	56	10810	4203	842	4098.45 [244.00(U) + 3824.45 (LE)+ 30.0 (Res.)]
b)	Programmed (Revised)	5	24	29	7888	1524	692	2029.30 [216.00(U) + 1798.30(LE) + 15.0(Res.)]
c)	Completed	2	11	13	3204	272	205	380.00 [10.00(U) + 370.00(LE)]
d)	Ongoing	3	3	16	4694	1251	487	1649.30 [206.00(U) + 1428.30(LE) + 15.00(Res.)]

iii) Hydro R&M schemes programmed for 12th Plan (Revised)

Sl.No	Plan Period (2012-2017)	No. of Projects			Installed Capacity (MW)	Estimated Cost (Rs. in Crs.)	Actual Expenditure (Rs. in Crs.)	Benefit (MW)
		Central Sector	State Sector	Total				
a)	Programmed (Revised)	4	31	35	3183	3075	196	2795.15 [67.25(U) + 2712.90(LE) + 15.00(Res.)]
b)	Ongoing	2	6	8	847	513	128	534.40 [519.40(LE) + 15.0(Res.)]
c)	Under Tendering	2	8	10	970	1187	68	970.00 [22.00(U) + 1948.00(LE)]
d)	Under DPR Finalisation	-	7	7	465.75	470.16	-	501.00 [35.25(U) + 465.75(LE)]
e)	Under RLA Studies	-	10	10	900	905	-	789.75 [10.00(U) + 779.75(LE)]

Note: - Installed capacity, Benefit & cost rounded to nearest zero.
Abbreviations: MW – Mega Watt; Res. – Restoration; U – Uprating; LE – Life Extension

5.13 Programme for the year 2009-10

During the year 2009-10, it was programmed to complete 14 schemes (earlier programme of 12 schemes – two (2) schemes of MSPGCL namely Vaitarna at Sl. No.12 & Koyana at Sl. No. 13 were advanced from 2011-12 and declared completed/closed by the Project Authorities) having an installed capacity of 5038 MW. On completion of these schemes, there will be a benefit of 692 MW through Life Extension & Uprating at an estimated cost of about Rs. 262 crores (till date actual expenditure of Rs. 140 crores has been incurred).

Sl. No.	Name of Scheme	Installed Capacity (MW)	Agency
1	Dehar Ph-A	6x165	BBMB
2	Dehar Ph-B	6x165	BBMB
3	Lower Sileru	4x115	APGENCO
4	Upper Sileru	4x60	APGENCO
5	Srisailam RB	7x110	APGENCO
6	Nagjhari, U1 to U6	3x150 + 3x135	KPCL
7	Sharavathy Ph.B	10x103.5	KPCL
8	Supa	2x50	KPCL
9	Lingnamakki	2x27.5	KPCL
10	Jaldhaka St. I	3x9	WBSEB
11	Koyna St-III	4x80	MSPGCL
12	Vaitarna	1x60	MSPGCL
13	Koyna Dam	2x18	MSPGCL
14	Loktak	3x30	NHPC

5.14 Achievement during the year 2009-10

The following eight schemes (one from Central Sector & seven from State Sector) having an aggregate installed capacity of about 2350 MW (installed capacity of Dehar Ph. B not included in the total as it has been accounted for in the other scheme namely Dehar Ph. A of same station) have been completed during the year 2009-10 at an actual cost of Rs. 59 Crores and accrued benefits of 330 MW through life extension.

Sl. No.	Name of Scheme	Installed Capacity (MW)	Agency
1.	Dehar Ph-B	6x165	BBMB
2.	Nagjhari, U1 to U6	3x150 + 3x135	KPCL
3.	Sharavathy Ph.B	10x103.5	KPCL
4.	Supa	2x50	KPCL
5.	Bhadra	2x12	KPCL
6.	Upper Sileru	4x60	APGENCO
7.	Vaitarna	1x60	MSPGCL
8.	Koyna Dam	2x18	MSPGCL

5.15 Miscellaneous works undertaken/ completed

i) Inquiry Committee for Accident at Sabirigiri HEP (Kerala)

An Inquiry Committee was constituted under the chairmanship of Chief Engineer (HE&RM) to find the causes of accident and Renovation & Modernization (R&M) works undertaken by M/s VA Tech. The committee submitted its report on causes of accident to KSEB on 17.11.2008. The team of CEA engineers visited the project from 15.03.2009 to 20.03.2009. The report on R&M works has been finalized and sent to KSEB.

5.16 Programme for the year 2010-11

For the year 2010-11, it is programmed to complete eight (8) schemes having an installed capacity of 2738 MW (installed capacity of Nagjhari U-4 to 6 of KPCL is not included in the total as it has been accounted for in the other scheme namely Nagjhari, U-1 to U-6 of same station which is programmed for completion during the year 2009-10). On completion of these schemes, there will be a benefit of 422 MW through Life Extension & Uprating at an estimated cost of about Rs. 310 crores.

Sl. No.	Name of Scheme	Installed Capacity (MW)	Agency
1.	Dehar Phase-A	6x165	BBMB
2.	Lower Sileru	4x115	APGENCO
3.	Nagarjuna Sagar	1x110+ 7x100.8	APGENCO
4.	Nagjhari, U-4 to U-6	3x135	KPCL
5.	Lingnamakki	2x27.5	KPCL
6.	Sabirigiri	6x50	KSEB
7.	Jaldhaka St. I	3x9	WBSEB
8.	Loktak	3x30	NHPC

5.17 Concurrence of CEA to Hydro Electric Schemes

After the enactment of The Electricity Act, 2003 and its coming into force w.e.f. 10th June, 2003, the Central Electricity Authority is required to accord concurrence to Hydro Generation Schemes estimated to involve a capital expenditure exceeding such sum as may be fixed by the Central Government from time to time, as per provisions of Section 8 of this Act.

The Government of India vide their Notification No.S.O. 550(E) dated 18th April, 2006 have fixed the following limits of capital expenditure for the Hydro Power Development Schemes exceeding which the concurrence of Central Electricity Authority is required:-

1) Rs.2500 Crores provided that:

a) Scheme is included in the National Electricity Plan(NEP) as notified by the Central Electricity Authority under sub-section(4) of Section 3 of The Electricity Act, 2003 and the same conforms to the capacity and type (run-of-river/storage) as mentioned in NEP; and

b) The site for setting up hydro generating station has been allocated through the transparent process of bidding in accordance with the guidelines issued by the Central Government under Section 63 of The Electricity Act, 2003.

2) Rs.500 Crores for any other scheme not covered by clauses (a) & (b) above.

5.17.1 Techno-Economic Appraisal/ Concurrence of Hydro Schemes

During the year 2009-10, CEA had appraised and accorded concurrence to three hydro generation schemes aggregating to 4570 MW capacity with an estimated financial investment of Rs. 21650.83 Crores.

5.17.2 Reduction in Cost of Hydro Power Generation Projects

It has been observed that in most of the cases, the cost estimates indicated by the project proponents in their Detailed Project Reports (DPRs) were on the higher side due to various reasons. On receipt of the DPRs, the same were thoroughly scrutinized by the various appraisal divisions of CEA and CWC/GSI before the proposals were considered by CEA for its concurrence.

Review meetings were convened from time to time by Member (Hydro) CEA with the project developers and Chief Engineers of Appraisal Divisions of CEA, CWC and GSI in order to sort out the outstanding issues/ remove bottlenecks in the DPRs with the objective of minimizing the time for appraisal process and optimizing the proposed capital cost.

During the year 2009-10, three (03) hydro generation schemes aggregating to 4570 MW capacity were accorded concurrence and net reduction in estimated cost achieved for these projects worked out to Rs 3239.32 Crores (about 13.01%) in hard cost as detailed in **Annexure-5E.**

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Nathpa Jhakri - Dam

CHAPTER – 6
THERMAL POWER DEVELOPMENT

6.1 Selection of sites for Thermal Power Projects

In the context of the need to set up additional thermal power stations to meet the power requirements of the country up to the year 2012 A.D. and beyond, CEA had in September, 2001 constituted a Committee under the chairmanship of Member (Thermal) consisting of members from different Ministries/ Deptts./ SEBs etc. for selection of sites for large coastal/ Pit head and other thermal power stations. As the process of selection of sites is of continuous nature, the above mentioned Committee has been converted into a Standing Committee. Teams consisting of members of the Committee from CEA, Planning Commission, MOE&F, CMPDI, Railways etc. are being constituted for visiting the sites tentatively identified by the State agencies from time to time. These teams also interact with various States/Central departments for assessing the availability of various inputs required for setting up of thermal power plants like land, water, fuel etc.

Initially, the Committee had requested various State Govt. agencies/SEBs/CPSUs to furnish details of sites already identified or those under investigation. The various sites, for which details have been received, have been visited by the teams of the Site Selection Committee and reports have been finalised. The teams of the Site Selection Committee are being deputed to new sites in different States as and when request is received from the State Govt./ State Utilities for assessing the feasibility of the identified sites. In order to derive economy of scale, a need has been felt to identify large sites near pitheads and coastal areas where big capacity plants say 3000-5000 MW can be set up. Keeping this objective in mind, CEA awarded following studies for identification of large pithead and coastal sites using satellite mapping through remote sensing:

i) Study awarded to National Remote Sensing Agency (NRSA), Hyderabad in June 2003 for identification of large coastal sites. NRSA submitted reports for the states of Gujarat, Maharashtra, Tamil Nadu and Andhra Pradesh.

ii) Study awarded to M/s Central Mine Planning Design Institute (CMPDI), Ranchi in August 2003 for identification of large pithead sites. CMPDI submitted reports for pithead sites totaling to about 36,000 MW.

iii) Study awarded to M/s CMPDI in March 2007 for additional pithead sites. CMPDI submitted the reports for 20,000 MW of pithead sites.

iv) Study awarded to CMPDI in February 2009 for selection of sites near load centers in Haryana and Madhya Pradesh. The Study is under progress by CMPDI. Draft reports of the study have been submitted in January 2010.

v) Study awarded to IIT, Roorkee in February 2009 regarding restoration of MDDL of Rihand Reservoir to the designed level, its implication on the existing power plants and additional water availability. The Study is under progress. Draft report of the study has been submitted in February 2010.

The Site Selection Committee has visited and finalized reports on the new sites in the following States:

i) Eight sites in Tamil Nadu and Pondicherry
ii) Six sites in Gujarat
iii) Eight sites in Maharashtra

iv) Six sites in DVC area
v) Eight sites in Andhra Pradesh
vi Seven sites in Haryana
vii) Five sites in M.P.
viii) Twelve sites in Rajasthan
ix) Ten sites in Orissa
x) Twelve sites in Chhattisgarh
xi) Six sites in Punjab

Based on the report of CMPDI, NRSA and site visits by the teams of the Site Selection Committee, a large shelf of sites had been created having potential of more than 2,00,000 MW. Many sites from this shelf have been identified for benefits during the 11th Plan & 12th Plan. The sites for some of the Ultra Mega Power Projects (UMPPs) have been identified from the shelf of sites created under the scheme. The reports of CMPDI & NRSA have been sent to the State Govts. for necessary action for development of the identified sites.

CMPDI in their draft reports submitted in January 2010 for selection of sites near load centers have identified 24 sites in the States of Haryana and Madhya Pradesh. Visits to the identified sites by a team of officers from CEA, CMPDI & State Electricity and Irrigation Deptt. along with local revenue officials are being made to assess the suitability of the sites with reference to availability of land & water and environmental aspects.

6.2 Setting up of Ultra Mega Power Projects (UMPPs)

Ultra Mega Power Projects (UMPPs) are being promoted with a view of providing power to all at a reasonable rate and ensuring fast capacity addition by Ministry of Power, Government of India as an initiative facilitating the development of UMPPs of 4000 MW capacity each under tariff based international competitive bidding route. Project specific Shell Companies (Special Purpose Vehicles) as 100% subsidiaries of Power Finance Corporation Limited have been created for carrying out developmental work consisting of tie up of inputs/clearances and the bidding process for selection of developers for the UMPPs. Various inputs for the UMPPs are tied up by the SPV with assistance of MoP & CEA. CEA is involved in selection of sites for these UMPPs.

Initially following nine (9) UMPPs were proposed to be set up in different States:

i) Sasan Ultra Mega Power Project in M.P-coal pithead- 6x660 MW
ii) Mundra Ultra Mega Power Project in Gujarat- coastal- 5x800 MW
iii) Krishnapatnam Ultra Mega Power Project in A.P.- coastal- 4000 MW
iv) Ultra Mega Power Project in Jharkhand-coal pithead- 4000 MW
v) Ultra Mega Power Project in Chhattisgarh-coal pithead- 4000 MW
vi) Ultra Mega Power Project in Orissa-coal pithead- 4000 MW
vii) Ultra Mega Power Project in Tamil Nadu-coastal- 4000 MW
viii) Ultra Mega Power Project in Maharashtra-coastal- 4000 MW
ix) Ultra Mega Power Project in Karnataka-coastal- 4000 MW

The UMPPs are awarded through tariff based international competitive bidding. Out of above nine (9) UMPPs, four UMPPs namely Sasan in M.P., Mundra in Gujarat, Krishnapatnam in Andhra Pradesh and Tilaiyya in Jharkhand have been awarded and transferred to the developers selected through tariff based competitive bidding. Sasan, Mundra, Krishnapatnam and Tilaiya UMPPs are at different stages of implementation. As per the present status of projects intimated by the developers, one unit of 660 MW of Sasan UMPP and two units of 800 MW each of Mundra UMPP are expected

to be commissioned in 11th Plan. The status of implementation of UMPP projects already awarded is shown in **Annexure-6A**.

In addition to nine UMPPs originally identified, request has come from some of the State Governments for installation of additional UMPPs in their States. These are given below:

i) Two Additional UMPPs of 4000 MW each in Orissa
ii) Second UMPP in Gujarat- 4000 MW
iii) Second UMPP in Andhra Pradesh- 4000 MW

In regard to four UMPPs in Chhattisgarh, Orissa, Tamil Nadu and Second UMPP of Andhra Pradesh, the sites have been finalized and the site related studies have been taken up by the consultants appointed by M/s Power Finance Consultancy Corporation Ltd. The bidding process for selection of developer for Chhaattisgarh UMPP has been initiated with the issue of Request for Qualification document on 15.3.2010. The bidding process for remaining three UMPPs is expected to start in 2010. The sites for UMPPs in Maharashtra and Karnataka are yet to be finalized. The sites in Gujarat and Orissa for additional UMPPs are under investigation.

Govt. of Andhra Pradesh have vide letter dated 12.3.2010 recommended 3rd UMPP in Andhra Pradesh at Kakinada. CEA has requested the State Govt. to furnish the details of the site which is awaited.

Five coastal sites offered by Govt. of Orissa for additional UMPPs were visited by CEA/PFC team. CEA has requested Govt. of Orissa for arranging a meeting at Bhubneshwar to finalise the site. Another site in Balangir Distt. of Orissa has been visited by CEA/PFC team on 19.4.2010. Orissa Govt. has been requested to furnish certain details regarding land availability, water availability & other details. The same are awaited.

6.3 Private Sector Participation

With the enactment of Electricity Act, 2003, a whole new system was evolved where private players were invited to be an active participant in the Power Sector. The Electricity Act, 2003 has created a legal framework for development of electricity supply industry through liberalized generation, market development and providing non-discriminatory open access to the generators and consumers. In order to achieve these objectives, the Government has issued National Electricity Policy and Tariff Policy. For the purpose of facilitating procurement of power through competitive bidding, the Government has issued guidelines for tariff based competitive bidding. The Standard Bid Documents for procurement of power under long-term and medium-term Power Purchase Agreements have been notified for Case-I and Case-II bidding. Many States have invited bids for development of thermal power projects through tariff based competitive bidding Case-II. Details of such Case-II tariff based competitive bidding projects totaling to 31,580 MW are shown in **Annexure-6B**. The Government has also set up Special Purpose Vehicle (SPV) under PFC for collective procurement of power on behalf of the distribution utilities by inviting tariff based bids for supplying power from Ultra Mega Power Projects. Procurement of power through tariff based competitive bidding does not require any upfront capital investment by the Government and the responsibility of mobilizing financial and technical resources for operating generating facilities vests with the project developer/ independent power producer.

The Private Sector has responded enthusiastically to the opening up of the power market and a substantial amount of generating capacity is coming up through IPPs in coal, lignite, gas and hydro power projects. The Government is committed to carry this process forward. It is for the first time in history of Power Sector in India that Private Sector is showing keen interest

in investing and setting up generating facilities. As a result, the scenario in the generation sector appears quite promising and Government of India is making its best efforts to facilitate this process by helping the independent power producers to overcome various challenges in the way of project implementation. The Private Sector contributed 1970 MW to thermal generation capacity during period 2002-07. Since then thermal generation capacity of 5920 MW has been commissioned in 11th Plan and another about 16266 MW thermal generation capacity is under construction in Private Sector. The Private Sector is likely to contribute substantial generating capacity in the 12th Plan period (2012-17).

Ministry of Power vide Office Memorandum dt 21.10.09 has issued Coal Linkage Policy for 12th Plan Projects and requested CEA to prequalify and prioritize 12th Plan Projects. CEA requested all the developers to furnish information in the prescribed format for which applications for coal linkage were received in CEA by Nov., 2009. In response to this, CEA has received details regarding 122 thermal power projects in Private Sector totaling to 1,23,800 MW. CEA is carrying out exercise to prequalify and prioritize the projects based on the criteria given in MoP Office Memorandum dated 21.10.09.

6.4 Construction Monitoring of Thermal Power Projects

At the start of 11th Plan, a capacity of 78,700 MW (Thermal: 59693 MW + Hydro: 15627 MW + Nuclear: 3380 MW) was targeted for addition during 11th Plan period. However, as per the Mid-Term Appraisal, a revised target of 62374 MW (Thermal: 50757 MW + Hydro: 8237 MW + Nuclear: 3380 MW) with high degree of certainty was envisaged for commissioning during the 11th Plan.

As against the target of 50757 MW thermal capacity addition during 11th Plan, a capacity of 18211 MW (year wise details given in Fig-1) has been commissioned till March, 2010 and balance capacity of 32546 MW is targeted for commissioning during the remaining period of 11th Plan.

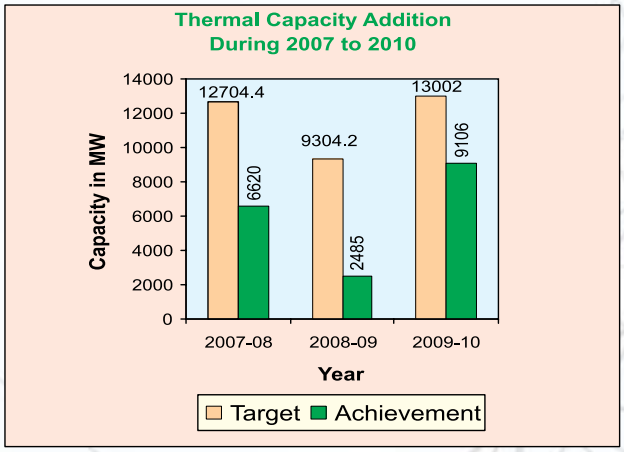


Fig.-1

CEA closely monitors the progress of various constructional activities of thermal power projects under execution in the country. Project monitoring related activities emerge from Section 73 (f) of Electricity Act, 2003. Functions and Duties of Authority which inter-alia envisages "To Promote and Assist in Timely Completion of Various Schemes and Projects." Visits are made by CEA officers to the project sites for assessing the progress of various construction activities and rendering necessary advice/assistance in resolving the problems being faced by the project authorities to meet the schedule of commissioning. Regular review meetings are held in CEA with Project Authorities, main plant & equipment manufacturers and other equipment suppliers to review the progress.

6.4.1 Key Initiatives

Based on the past experience, there has been a significant shift in approach in the area of project monitoring. Some key initiatives taken in the recent past in the role of a facilitator include the following:

- BHEL was impressed upon for augmentation of manufacturing capacity, advance placement of order for long delivery of critical items, availability of adequate construction machineries, augmenting erection of construction teams, high pressure welders and skilled fitters etc.
- Sensitizing the industry to the need of capacity building in manufacturing/supply of main plant equipment and balance of plant equipment.
- Reviewed and shared the qualifying requirements for possible adoption by project authorities to enable participation by new vendors.
- Detailed schedules were drawn up for equipment supplies and project milestones commitments from project authorities and equipment suppliers/executing agencies for on-going 11th Plan projects.
- Took up the issue regarding employment visas for foreign personnel employed on power projects to avoid delays in projects where equipment was outsourced from abroad etc.

6.5 Thermal Capacity Addition Programme

6.5.1 Capacity Addition achieved during 2009-10

During the year 2009-10, thermal capacity of 9106 MW was added against a programme of 13002 MW, which is the highest addition in any previous year. The details of the projects programmed/ commissioned during the year are shown in **Annexure-6C**. Some of the main reasons identified for the delays include delayed and non-sequential supply of equipment, slow civil works along with interfacing problems with equipment erection, repatriation of erection and commissioning personnel in projects sourcing equipment from abroad etc.

6.5.2 Thermal Capacity Addition Target during 2010-11

During the year 2010-11, a thermal capacity addition of 17,793 MW is targeted. Quarter-wise break up of the targeted capacity addition is as under:

Year 2010-11	Capacity (MW)
Ist Quarter	3849.5
IInd Quarter	4644
IIIrd Quarter	4131
IVth Quarter	5168.5
Total	**17793**

The details of the projects are shown in **Annexure-6D**.

6.6 Thermal Technology Development

6.6.1 Supercritical Technology

CEA has been actively associated in developing road map for introduction of new technologies for thermal power generation.

At present, the largest thermal unit size in operation is 500 MW and a few units of 600 MW with sub-critical steam parameters are under construction. CEA has been facilitating adoption of higher size units with supercritical technology. About 40 supercritical units of 660/800 MW are under construction and some of them would be commissioned in 11th Plan itself. Initial supercritical units were designed with parameters of 247 kg/cm^2, 537/565 ^{0}C. Higher parameters of 247 kg/ cm^2, 565/593 ^{0}C are being adopted for new supercritical units. In 12th Plan, supercritical units are likely to constitute a majority of coal based capacity addition.

Efforts have been made to encourage international manufacturers to set up manufacturing facilities for supercritical units in

India so as to create indigenous manufacturing capability. As a result, four joint venture companies have been set up between international manufacturers and Indian companies for manufacturing supercritical boilers/turbo-generator in the country. To kick start the new joint ventures, bulk tendering of 11 Nos. 660 MW supercritical units of NTPC & DVC has been undertaken by NTPC through International Competitive Bidding (ICB) with the mandatory condition that the successful bidders would have to set up manufacturing facilities in India as per Phased Manufacturing Program (PMP) being specified in the bid document. CEA has been actively associated in the whole process and the progress of PMP would be monitored by a Committee under CEA.

6.7 Draft Standard Design Criteria/ Guidelines for Balance of Plant of 2x500 MW (or above) Thermal Power Projects

Draft Standard Design Criteria/Guidelines for Balance of Plant of (2x500 MW or above) Thermal Power Projects was prepared by CEA. NTPC was also associated in the preparation of this document. The document covers scope, design criteria, equipment features and performance guarantee tests etc. for important equipment and associated electrical and civil works. Draft Standard Design Criteria/Guidelines has been uploaded on CEA website and Power Utilities, manufacturers and consultants have been requested for comments.

6.8 Task Force to Examine Technical Issues related to Solar Power Plants

A Task Force was constituted by MNRE under Chairperson, CEA to examine technical issues related to feasibility of integrating solar power plants with thermal / hydro-electric power stations and connectivity of solar roof top systems with grid. The task force examined the issues and report was submitted to MNRE.

6.9 Important activities

Following activities were also undertaken in Thermal Wing of CEA:

1) On request of GERC, a study for normative operational parameters of heat rate, secondary fuel oil consumption, auxiliary power consumption and plant availability/ load factor was undertaken and recommendations were furnished to GERC.

2) A Committee was set up by Ministry of Power (MoP) under the chairmanship of Member (Thermal), CEA and comprising members from power utilities and security agencies for development of Infrastructure Protection Plan in Thermal Power Sector. The work of the Committee is under progress.

3) CEA alongwith M/s. BHEL has taken up study for development of optimal blending methodology of Indian coal with imported coal.

4) Officers of CEA have been involved in Certification of goods required for UMPP for grant of Deemed Export benefit.

5) Officers of CEA were represented on following committees :

   a) Committee set up under Member (Industry), Planning Commission to examine the disadvantages being faced by the domestic power equipment manufacturing industry.

   b) Committee to examine dry cooling system for condenser cooling in thermal power projects set up by CEA.

   c) Committee to review the land requirement for thermal power plants set up by CEA.

d) Committee set up by CERC for formulating methodology for setting up targets of energy savings for power stations under Perform, Achieve & Trade (PAT) scheme of National Mission for Enhanced Energy Efficiency (NMEEE).

e) Committee for Preparation of Standard Criteria/Guidelines for Switchyard.

f) Committee to investigate the cause of damage of Turbine and Generator Bearings of 110 MW Unit-III at PTPS constituted by HPGCL.

6.10 Renovation & Modernisation of Thermal Power Stations

The main objective of Renovation & Modernisation (R&M) of thermal generating units is to make the operating units well equipped with modified / augmented latest technology equipment and systems with a view to improving their performance in terms of output, reliability and availability, reduction in maintenance requirements, ease of maintenance and minimizing inefficiencies. The R&M programme is primarily aimed at generation sustenance and overcoming problems. The Life Extension (LE) programme on the other hand focuses on plant operation beyond their original design life after carrying out specific life assessment studies of critical components.

6.10.1 Renovation and Modernisation (R&M) and Life Extension Programme (LEP) from 7th Plan onwards till 10th Plan

R&M Programme in a structured manner was initiated in 1984 as a centrally sponsored programme during 7th Plan.

The momentum for undertaking R&M works continued during the 8th & 9th Plan but the same could, however, not be sustained during 10th Plan as per the details given below:

S. No.	Five-Year Plan	Year	No. of TPS / No. of Units	Capacity (MW)	Additional Generation Achieved MU/ Annum	Equivalent MW
1	7th Plan & 2 Annual Plans	85-86 to 89-90 & 90-91, 91-92	**34 / 163**	**13570**	10000	2000
2	8th Plan (R&M) (LEP)	92-93 to 96-97	**44 / 198** 43/(194) 1 (4)	**20869** (20569) (300)	5085	763
3	9th Plan (R&M) (LEP)	97-98 to 2001-02	**37 / 152** 29/ (127) 8/ (25)	**18991** (17306) (1685)	14500	2200
4	10th Plan (R&M) (LEP)	2002-03 to 2006-07	**9/25** (14 out of 57 planned) (11 out of 106 *)	**3445** (2460) (985)	2000	300

* Out of 106, 23 units were considered under PIE programme and 45 units were found techno-economically unviable.

6.10.2 National Perspective Plan

Based on the discussions held with Ministry of Power, various utilities, PFC and BHEL, CEA has prepared a document on "National Perspective Plan for Renovation & Modernisation and Life Extension &

Uprating (LE&U) of thermal power stations upto the year 2016-17". This document also includes revised guidelines for Renovation & Modernization /Life Extensions works on coal / lignite based thermal power stations and this document was released by Honorable Minister of Power on 14.12.2009 on the occasion of Energy Conservation Day.

In the Perspective Plan, 53 units (7318 MW) for LE works and 76 units (18965 MW) for R&M works have been identified in 11th Plan and for 12th Plan 72 units (16532 MW) for LE work and 23 units (4871 MW) for R&M work have been identified.

6.11 Life Extension / R&M Programme

6.11.1 LE/R&M Programme during 11th Plan (2007-08 to 2011-12)

Status of implementation of LE & R&M works during 11th Plan as on 31st March, 2010 is furnished at **Annexure-6E** & **Annexure-6F** respectively. Break up of units identified for LE / R&M works during 11th Plan State Sector-wise and Central Sector-wise is furnished as under :

Sl No.	Particular	State Sector		Central Sector		Total (State sector + Central Sector	
		No. of units	Capacity (MW)	No. of units	Capacity (MW)	No. of units	Capacity (MW)
1.	LE works	33	4524	20	2794	53	7318
2.	R&M works	27	6015	49	12950	76	18965
	Total	**60**	**10539**	**69**	**15744**	**129**	**26283**

6.11.2 Estimated funds requirements for LE and R&M programme during 11th Plan

The estimated fund requirements for LE and R&M programme for 11th Plan is Rs. 16920 crores, comprising Rs. 12433 crores and Rs. 4487 crores for LE and R&M programme respectively, as would be seen from the table given below:-

Sl. No.	Particulars of Works	No. of TPSs	No. of Units	Capacity (MW)	Estimated Cost(Rs. Crores)
1	L.E. Program	23	53	7318	12433
2	R&M Program	21	76	18965	4487
	Total				**16920**

6.11.3 Life Extension Programme Status during 2007-08 to 2009-10 of the 11th Plan

During the first three years of 11th Plan (till March 2010), LE works have been completed in 10 units comprising 7 units in the State Sector and 3 units of NTPC in the Central Sector out of total 53 units planned for 11th Plan. Sector-wise details of units where LE works have been completed are furnished as under:

Sl. No.	Name of TPS	Unit No.	Capacity (MW)
Central Sector			
1	Anta CCGT (NTPC)	GT – 1 to 3	3x89
State Sector			
2	Obra TPS	1	40
3	Obra TPS	2	40
4	Obra TPS	6	94
5	Harduaganj TPS	5	60
6	Panipat TPS	1	110
7	Ukai TPS	1	120
8	Ukai TPS	2	120

6.11.4 R&M Programme Status during 2007-08 to 2009-10 of the 11th Plan

Similarly, during the first three years of the 11th Plan (till March 2010), R&M works have been completed in 56 units comprising 18 units and 38 units in the State and Central Sector respectively as against total 76 units planned for the 11th Plan. Sector-wise details of units where R&M works have been completed are furnished as under:

Sl. No.	Name of TPS	Unit No.	Capacity (MW)
Central Sector			
	DVC		
1	Durgapur TPS	3 & 4	130+ 210
NTPC			
2	Korba STPS	1 to 6	3x200+3x500
3	Vindhyachal STPS	1 to 6	6x210
4	Ramagundem STPS	1 to 6	3x200+3x500
5	Farakka STPS St-I	1 to 3	3x200
6	Tanda TPS	1 & 3	2x110
7	Talcher TPS *	5 & 6	2x110
8	Singrauli STPS	1 to 7	5x200+2x500
9	Unchahar TPS St–1	1 & 2	2x210
10	Rihand St–1	1 & 2	2x500
State Sector			
11	Ropar TPS	1 to 6	6x210
12	Koradi TPS	5 to 7	1x200+2x210
13	Chandrapur TPS	1 to 6	4x210+2x500
14	Parli TPS	3 to 5	3x210

* In addition, R&M completed in Talcher TPS Unit – 1 to 4 (4x60 MW) which were not originally envisaged for R&M works in National Perspective Plan by NTPC.

6.11.5 Overall LE / R&M Status during 11th Plan (From April 2007 to March 2010)

Out of 53 units (7318 MW) for LE works and 76 units (18965 MW) for R&M works planned for 11th Plan, LE works in 10 units (851 MW) and R&M works in 56 units (14610 MW) were completed during the first three years of the 11th Plan. Gist of LE and R&M works completed during the 11th Plan (till March 2010) are tabulated below:

Sl. No.	Particulars	State sector		Central sector		Total (State + Central)	
		No. of units	Capacity (MW)	No. of units	Capacity (MW)	No. of units	Capacity (MW)
A)	LE works						
1.	Completed during 11th Plan (till March 2010)	7	584	3	267	10	851
B)	R&M works						
	Completed during 11th Plan (till March 2010)	18	4350	38	10260	56	14610
	Total	**25**	**4934**	**41**	**10527**	**66**	**15461**

6.12 Target vis-à-vis Achievement for LE/R&M Programme during the first three years of the 11th Plan

Out of 129 units planned for LE/R&M works during 11th Plan (60 units in State Sector and 69 units in Central Sector with a capacity 26,283 MW), LE/R&M works in respect of 66 units (25 in State Sector and 41 in Central Sector) of total capacity of 15,461 MW were completed (till March, 2010). In addition, 4 units of Talcher TPS of 60 MW each which were not originally envisaged for R&M works in National Perspective Plan, were also completed. In terms of units as well as capacity, 52% and 59% of targets planned for 11th Plan have been achieved respectively during the first three years of the 11th Plan.

Further, out of remaining 63 units, Life Extension / R&M works are to be completed in respect of 56 units of total capacity of 9552 MW during remaining period of 2 years of the 11th Plan and further LE works on another 7 units in the State Sector of total capacity of 1270 MW are likely to slip beyond 11th Plan.

6.12.1 Main Reasons of shortfall in achieving LE / R&M targets

- In power deficits scenario, utilities hesitate to take longer shut down for undertaking LE works.
- Delay in supplies of equipment by the suppliers.
- Shortage of BoP suppliers/contractors in the country.
- Non-availability of dedicated R&M team with most of the SEBs /PSUs.
- Lack of co-ordination between the contractors and their sub-contractors.
- Surprises, when the unit is opened up for carrying out the R&M/LE works, new defects or damaged components are observed resulting in delay in procurement & rectification.

- Non-availability of funds and poor financial condition of State Electricity Boards (SEBs).

6.12.2 Improvement in PLF due to implementation of R&M / Life Extension works

There has been considerable improvement in most of the units where Life Extension works were carried out. The details of PLF before and after LE works are tabulated below:

Change in PLF where Life Extension works completed during the 11th Plan.

(Status as on March 2010)

Sl. No.	Utility	Name of Station	Unit No.	Before LEP/ Derated	PLF before LEP **	PLF after LEP	Remarks
1	UPRVUNL	Obra	2	40	0	75.0	Unit synchronised on 5th February, 2009.
2	UPRVUNL	Obra	6	94	0	66.0	Unit synchronised on 20th March, 2008.
3	UPRVUNL	Harduaganj	5	60	0	55.0	Unit synchronised on 27th May,2008.
4	GSECL	Ukai	1	120	40	65.0	Unit synchronised on 24th May, 2008.
5	HPGCL	Panipat	1	110	58	78.0	Unit synchronised on 4th Nov, 2008.
6	UPRVUNL	Obra	1	40	0	65.0	Unit synchronised on 4th May, 2009.
7	GSECL	Ukai	2	120	52	71.0	Unit synchronised on 24th February, 2010.

** Average PLF of last three years before LE.

6.12.3 LE and R&M Targets during 2010-2011 & 2011–12 of 11th Plan

Broad details of State / Central Sector-wise LE/ R&M works to be taken up during 2010-2011 & 2011-12 of 11th Plan are furnished below:

Sl. No	Particulars	State Sector		Central Sector		Total (State + Central)	
		No. of units	Capacity (MW)	No. of units	Capacity (MW)	No. of units	Capacity (MW)
1	LE works	19	2670	17	2527	36	5197
2	R&M works	9	1665	11	2690	20	4355
	Total	**28**	**4335**	**28**	**5217**	**56**	**9552**

Unit-wise and Sector-wise details of LE and R&M works to be taken up during the remaining two years of 11th Plan are furnished in **Annexure-6G** & **Annexure-6H** respectively.

6.12.4 Inordinate delay in completion of Life Extension (L.E.) works of thermal power stations being undertaken by OEM

Ministry of Power had issued guidelines for undertaking R&M and Life Extension works in respect of thermal power stations vide letter No.12/6/99-Th.3 dated 8/12 Janauary, 2004. The guidelines inter-alia provided that the power stations where BHEL has supplied the main plant e.g. Boilers and TG (BTG) sets, the R&M work may be awarded through negotiations with BHEL. Accordingly, various State utilities awarded contract for undertaking R&M-cum-L.E. works at their thermal units to BHEL as OEM through negotiated route.

From time to time, the State utilities such as UPRVUNL, GSECL, HPGCL etc. have been informing CEA that shut down period of their thermal units for execution of R&M-cum-LE works being undertaken by BHEL are getting abnormally extended for a period of 13 to 21 months as against envisaged shut down period of 6 to 9 months, thereby aggravating power supply position and revenue loss to their respective States and, thus, defeating the very purpose and spirit of cost effectiveness of the R&M and LE works at the thermal power stations in making available the additional cheaper power from the old existing thermal units. The statement indicating actual date of completion of life extension works viz-a-viz actual date of commencement of the life extension works undertaken by BHEL is tabulated below:

Details of Actual Date of Completion of Life Extension Works Vis-à-vis Actual Date of Start of Life Extension Works being completed/ undertaken by BHEL

Sl. No.	Name of the TPS, Unit No. & Capacity (MW)	Actual Date of Start of LE works (shut down)	Actual date of completion of LE work	Shut down planned as per the contract	Actual time (shut down) taken for completion of LE works	Remarks
1.	Panipat TPS, Unit – 1, (110 MW)	25.09.2007	04.11.08	6 months	more than 13 months	-
2.	Ukai TPS, Unit - 1, (120 MW)	06.09.2006	May,08	7 months	more than 19 months	Though the LE works were completed in 16.9.2007 but the machine was back in service only in May, 2008 after rectifying the teething problems. The unit has touched 110 MW and is yet to achieve full load (120 MW).
3.	Ukai TPS, Unit - 2, (120 MW)	12.08.2008	17th March, 2010	7 months	more than 19 months	The unit is running at a load of about 100 MW and yet to achieve full load (120MW).
4.	Obra TPS, Unit - 9, (200 MW)	02.11.2008	May, 2010*	10 months	19 months	The unit is expected to be synchronized in May, 2010 after a delay of 9 months.

*Expected date of completion of LE works.

The common reasons for delay in implementation of R&M-cum-LE schemes of BHEL supply units as experienced by some of the State utilities are:

i) Delayed and non-sequential supply of materials from various BHEL units (Bhopal, Ranipet, Hyderabad).
ii) Mismatching of spares supplied. A lot of rectification had to be done at site for BTG components.
iii) Deployment of inadequate skilled manpower.
iv) Lack of co-ordination amongst BHEL's various units.

CEA has impressed upon BHEL to look into factors as brought out above, causing considerable extension of shut down period of thermal units where LE works are being carried out by BHEL as OEM.

A strong message is required to percolate both at corporate level and unit levels of marketing and project management group of BHEL so that optimum utilization of existing generating assets already created in the Power Sector may be made through timely and successful implementation of R&M-cum- LE programme envisaged in the 11th Plan.

6.12.5 Initiative taken by MoP / CEA for improvement in performance of thermal power stations during 11th Plan

The Partnership-in-Excellence (PIE) programme of 10th Plan, launched by MoP in August 2005 continued in 11th Plan till June 2008 aiming at improving the performance of such stations which were running at PLF much below 60% by associating good operating units like NTPC, Tata Power etc. It was intended for adoption of better O&M practices in these stations so that the utilities could sustain better operating parameter on their own after completion of PIE programme.

CEA identified thermal stations which were running at PLF below 60%. NTPC was chosen as partner in 16 thermal power stations and Tata Power was selected in case of Dhuvaran TPS. Four stations decided to take self-improvement measures. CEA was actively associated in scheme identification, monitoring and facilitating implementation of PIE programme through interaction with utilities, equipment suppliers, agencies associated with PIE programme and visiting power plants regularly. The PIE programme has been concluded in all identified thermal power stations by June 2008.

There has been improvement in most of the stations with significant improvement in the following:

Sl. No.	Name of the plant / utility	Capacity under PIE Programme (MW)	PLF Before PIE Programme (Apr-Sep 2005) (%)	PLF after PIE Programme (2007-08) (%)
1	Bokaro 'B / DVC	630	45.5	70.9 %
2	Chandrapura / DVC	390	58.8 %	69.4 %
3	Rajghat / IPGCL	135	42.5 %	75.5 %
4	Ennore / TNEB	280	22.0 %	59.3 %
5	Dhuvaran / GSECL	280	27.0 %	71.0 %
6	Kutchlignite / GSECL	215	28.3 %	72.9 %

6.12.6 Future vision for Life Extension / R&M Programme

Coal based thermal power generation provides a major share of power availability in the country. About 70% (539.5 BU) of total generation (771.5 BU) comes from coal / lignite based power plants. At present, generation from coal / lignite units of 200 / 210 MW and above capacity contributes about 73% (469.5 BU) of thermal generation (640.8 BU) and 60.85% of total generation. The first 200 MW unit was installed in Obra in 1977. Prior to that, the units were of smaller size and many of these were of non-reheat type with lower efficiency. Over a period of past few decades, there has been growth in the size of thermal units and in steam parameters resulting in plant's better efficiency.

So far, R&M activities were confined to old, small size units to sustain their operation, improve plant availability and extend their operating life. However, such units are highly inefficient and beset with various operational problems. It is aimed to gradually decommission such units.

Today, 200/210/250/300 MW and 500MW coal/lignite units (69810 MW) consisting of 82.6% of coal/ lignite based installed capacity of 84535 MW form the backbone of Indian Power Sector. A large number of 200/210 MW machines and few 500MW machines are in operation for 15-25 years or more. Such machines through efficiency integrated R&M provide a good opportunity for performance enhancement through technology intensive R&M. Plant specific energy audit studies and techno-economic analysis are proposed to be carried out for defining & implementation of efficiency integrated R&M/LE schemes.

6.13 External Co-operation for R&M of Thermal Power Station

World Bank and KfW-Germany have committed to provide an aid of US$180 million and Euro 90 million respectively for energy efficient R&M at few identified thermal power stations in India. Also METI (Ministry of Economy, Trade and Industry) and MoP have agreed to extend their cooperation in sharing of technical expertise as well as in actual implementation of mutually agreed techno-economical R&M solutions.

6.13.1 KfW assisted Programme

Under Energy Efficiency Programme, KfW Development Bank, Germany has provided a soft loan of Euro 90 million for the implementation of energy efficient R&M at the following thermal power plants:

i) Bokaro 'B' TPS, U-1, 2 & 3 (3x210MW) of DVC.

ii) Kolaghat TPS, U-1, 2 & 3 (3x210MW) of WBPDCL.

iii) Nasik TPS, U-3 (210MW) of MAHAGENCO.

In addition to the above, KfW has provided a grant of Euro 1.3 million for preparation of Feasibility Reports/DPR to identify and finalize the scope of works for R&M/LE for the above seven units through a consultant. M/s Evonik Energy services Pvt. Ltd, Essen, Germany has been selected as consultant through ICB route to prepare Feasibility Study / DPR for the above seven units at three power stations. The implementation of R&M/LE works based on the Feasibility Report would be taken up by the concerned utilities.

Present Status

a) Nasik TPS

The Feasibility Report has been submitted by the M/s Evonik in Feb., 2010. MAHAGENCO have requested to incorporate some additional R&M works before finalization of the DPR.

b) Bokaro 'B' TPS

RLA, Steam Path Audit (SPA) and Energy Audit completed. The reports have been sent

to DVC for their comments. Draft Feasibility Reports for Unit-1, 2 & 3, Bokaro 'B' TPS are under preparation and likely to be submitted by mid of May, 2010.

c) Kolaghat TPS

RLA, Steam Path Audit (SPA) and Energy Audit completed. Draft Feasibility Reports for Unit-1, 2 & 3 of Kolaghat TPS are under preparation and likely to be submitted by 1st week of May 2010.

6.13.2 World Bank assisted Programme

World Bank is financing a project under the title "Coal Fired Generation Rehabilitation Project –India" for Energy Efficient Renovation & Modernisation (EER&M) of coal fired generation units through rehabilitation of 640 MW of capacity across three States i.e., West Bengal, Maharashtra & Haryana as per following details:

i) Bandel TPS, U-5 (210 MW) of WBPDCL
ii) Koradi TPS, U-6 (210MW) of Mahagenco.
iii) Panipat TPS, U-3 & 4 (2x110MW) of HPGCL.

This project would be funded through IBRD loan of US$180 Million and GEF grants of US$45.4 Million. Out of GEF grant of US$45.5 Million, US$ of 7.5 million have been earmarked for technical assistance components. CEA has been provided a grant of US$ 1.1 Million out of this technical assistance component to carry out various studies related to R&M in India through appointment of some consultants.

A) Pilot R&M Projects Funded by World Bank

i) Bandel TPS, Unit-5

DPRs for the R&M project consisting following major packages have been prepared by the M/s Evonik Energy Services (project design consultant):-

i) Main Plant Package (BTG -Boiler, Turbine & Generator)
ii) Coal Handling System Package (CHP)
iii) Ash Handling Package & Water System Package (AHP & Water)
iv) Electrical System Package

Fund allocation for the project is around US$ 59 Million (Loan) and US$ 12.45 million (Grant). As per tender document, the execution period of the project is 24 months.

Main Plant Package

The first stage bids for BTG were evaluated and Evaluation Report submitted to World Bank. Out of four bids received, only one was found responsive. WBPDCL had negotiations with other three bidders to cover up the deficiencies as advised by the World Bank to make other three bids responsive. But the three bids could not be turned up to be responsive. WBPDCL has referred the matter to CEA for advice.

Request for issuance of NOC in respect of Environmental Issues is yet to be received from WBPCB.

ii) Koradi TPS, Unit-6

Fund allocation for the Koradi TPS is around US$ 59 Million (Loan) and US$ 12.45 Million (Grant). M/s Evonik Energy Services (Project Design Consultant) prepared the DPR of the project consisting four major packages BTG, Electrical, CHP & other BOP. The DPR & Technical Specification approved by MAHAGENCO, has been sent to World Bank. World Bank has suggested some modifications in the Technical Specification. The same are being incorporated in the Specification. NIT is expected to be floated in April, 2010. Further, for the selection of the Project Implementation Support Consultant, EOI published on 02.02.10. The submission date was 09.03.10 which has been extended as sufficient EOIs have not been received.

iii) Panipat TPS, unit-3&4

Fund allocation for the Panipat TPS is around US$ 62 million (Loan) and US$ 13 million (Grant). RP document for selection of Project Design Consultant is under finalization. While M/s SMEC, Gurgaon has submitted Inception Report dt. 23.12.2009 for Rapid Social Assessment (RSA), M/s ENZEN, Bangalore started carrying out Environment Assessment Due Diligence (EADD) w.e.f 26.02.2010.

B) Technical Assistance to CEA

The World Bank is providing technical assistance of US$1.1 Million as a part of GEF grant under Coal Fired Generation Rehabilitation Project to CEA for addressing the barriers to energy efficient R&M in India. The scheme would be implemented through appointment of consultants for carrying out the following studies:

a) Study on reduction of barriers to R&M interventions in thermal power stations in India.

b) Study on developing markets for implementation of R&M in thermal power stations in India.

c) Review of experience from Pilot R&M interventions in thermal power stations in India.

d) Review of institutional capacity and capacity strengthening interventions at CEA.

An Implementation Support Consultant (ISC) would also be appointed to assist CEA in procurement of the above consultancy services and in implementing the "Technical Assistance to CEA" project. The appointment of ISC through ICB route is under process. The Expression of Interest (EOI) was invited from the consultants through advertisement. Six consultants submitted their EOI for the ISC job and shortlisting has been done based on the evaluation of received EOIs. The Request for Proposal (RfP) document is under preparation which is likely to be issued to the shortlisted consultants in the month of May 2010.

6.13.3 Japan-India Co-operation for Pre-Primary Study of Efficiency and Environmental Improvement of Coal Fired Stations

India and Japan have been going through a series of intense discussions to materialize the bilateral cooperation, based on the spirit of cooperation in the Power and Coal Sectors as envisaged in the Joint Statement, at the Japan-India Energy Policy Dialogue on September 17, 2008. Furthermore, the discussion during the Steering Committee and the subsequent Working Group of Japan-India Energy Policy Dialogue on March 16, 2009 brought Japan and India, respectively represented by METI (Ministry of Economy, Trade and Industry) and MoP, to an agreement that the efficiency improvement in existing thermal power stations in India is a highly prioritized area of cooperation. METI and MoP have agreed to extend their cooperation in sharing of technical expertise as well as in actual implementation of mutually agreed techno-economical R&M solutions.

In the spirit of above, an MoU between Central Electricity Authority and Japan Coal Energy Centre (JCOAL) for preliminary study of Efficiency and Environment Improvement Study in coal fired power plants is to be signed during the meeting of India-Japan high level Energy Dialogues is to be held in New Delhi on 30.4.2010. The purpose of this MoU is to carry out necessary diagnostic activities for few candidate coal-fired power plants pertaining to Energy Efficient Renovation & Modernisation works and finding out measures to overcome barriers for promoting R&M, towards carrying out efficiency and environmental improvement of coal-fired power plants in India.

6.14 Fly Ash Generation & Utilization

6.14.1 Fly Ash Utilisation

The total ash being generated by 81 thermal power stations pertaining to various Power Utilities works out to about 117 Million Tonnes per annum. It is estimated that for the total thermal capacity of coal/lignite based TPSs by end of 11th Plan, the ash generated in the form of fly ash (80-90%) and bottom ash (10-20%) would be of the order of 173 Million Tonnes per annum considering 38% ash content in coal as an average and at 80% PLF. The beneficiation of coal by reduction in the percentage ash content and by blending with imported coal will reduce the total quantity of ash generation.

Presently, the major areas of application of fly ash include:

i) Cement manufacturing
ii) Roads and embankment construction
iii) Structural fill for reclaiming low lying areas
iv) Brick/Block/Tiles manufacturing
v) Mine- filling
vi) Agriculture, Forestry and Wasteland development
vii) Part replacement of cement in mortar, concrete and ready mix concrete
viii) Hydraulic structure (Roller compacted concrete)
ix) Ash Dyke Raising
x) Building components – Mortar, Concrete, Concrete Hollow Blocks, Aerated Concrete Blocks etc.
xi) Other medium and high value added products (ceramic tiles, wood, paints) pavement blocks, light weight aggregate, extraction of alumina, Cenospheres, etc.

As mentioned above, by the end of 2012, the ash likely to be generated from coal/lignite thermal plants shall be of the order of 173 Million Tonnes per annum. A number of measures are being taken to encourage various sectors to utilize fly ash. The targets of ash utilization are primarily governed by the MoE&F Notification dated 14th September, 1999 and its amendment Notification dated 27th August, 2003 & 3rd November, 2009 as well as Hon'ble High Court of Delhi directions vide its judgments dated 4th December, 2002, 10th March, 2004 as well as 5th August, 2004.

In the latest MoEF's amendment Notification issued on 3rd Nov. 2009, all coal and/or lignite based thermal power stations and/or expansion units in operation before the date of this notification are to achieve the target of 100% fly ash utilization in five years from the date of issue of this notification and the new coal and/or lignite based thermal power stations and/or expansion units commissioned after this notification have to achieve 100 % ash utilization in 4 years from the date of commissioning.

6.14.2 Monitoring of Fly Ash Generation and Utilization

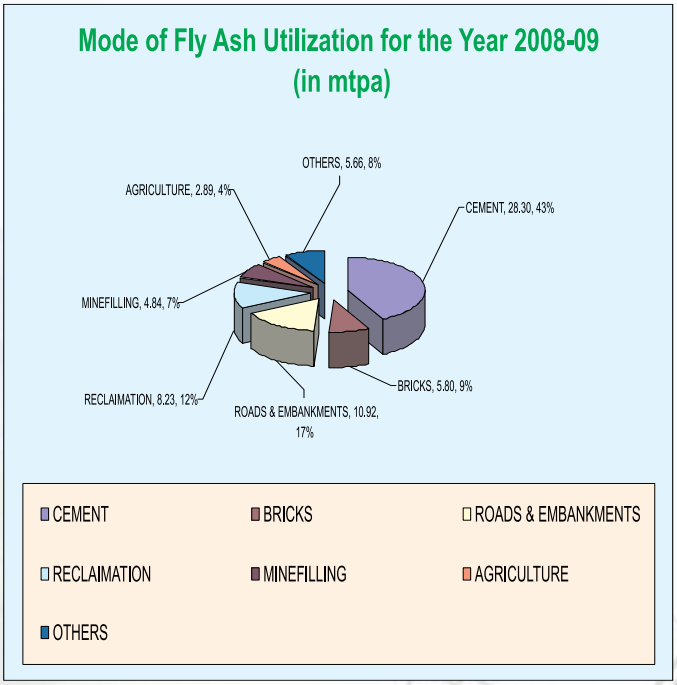
CEA monitors the fly ash generation and ash utilization of coal/lignite based thermal power plants pertaining to power utilities of the Centre and the States. CEA has initiated half yearly monitoring of data during the year 2008-09. The following main activities were carried out during the year:

a) The data pertaining to 2008-09 (from April 2008 to March 2009) was sought from 81 coal/lignite based power plants pertaining to 29 power utilities in 17 States. The overall percentage of ash utilization for 2008-09 has been worked out to be about 57%. The ash utilization in various modes of ash utilization during the year 2008-09 is shown in **Graph-I**.

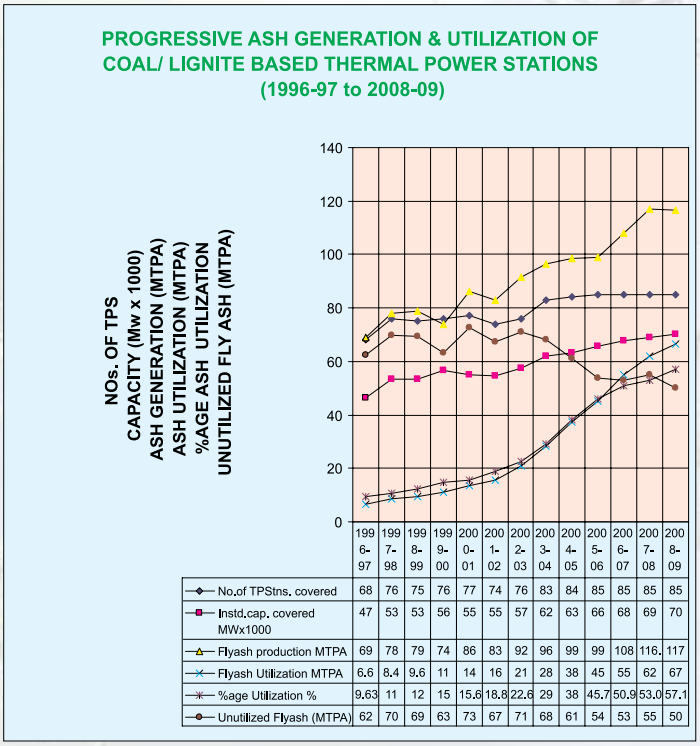
b) The progressive ash utilization data up to the year 2008-09 has been compiled. **(See Graph-II)**.

c) A report on Fly ash Generation and utilization data of 81 Thermal Power Stations as utilities-wise, region-wise, sector-wise for the year 2008-09 was prepared. The actual ash generated was 116.69 MT and ash utilized was 66.64 MT and the overall utilisation percentage was 57.11.

Graph-I



Graph-II



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CAPTER – 7

DISTRIBUTION AND RURAL ELECTRIFICATION

7.1 Restructured Accelerated Power Development Reforms Programme (R-APDRP) during 11th Plan period

After the comprehensive evaluation of the APDRP programme, which was short closed in Feb. 2009, Ministry of Power approved the Restuctured Accelerated Power Development and Reforms Programme (R-APDRP) during the 11th Five Year Plan with revised terms and conditions as a Central Sector Scheme. The focus of Restructured APDRP (R-APDRP) in 11th Plan and beyond is on actual, demonstrable performance in terms of loss reduction. State Power Utilities are expected to reduce AT&C losses to 15%. The Utilities are also expected to achieve the following target of AT&C loss reduction for the utility as a whole:

- Utilities having AT&C loss above 30%: Reduction by 3% per year
- Utilities having AT&C loss below 30%: Reduction by 1.5% per year

The expected programme size of Re-structured APDRP during 11th Plan is Rs. 51,577 crore. It is proposed to cover urban areas – towns and cities with population of more than 30,000 (10,000 in case of special category States). In addition, in certain high-load density rural areas with significant loads, works of separation of agricultural feeders from domestic and industrial ones and of High Voltage Distribution System (11 kV) will also be taken up.

Projects under the scheme are proposed to be taken up in two Parts. Part-A is proposed to include the projects for establishment of baseline data and IT applications for energy accounting / auditing & IT based consumer service centers. Part-B shall include regular distribution strengthening projects.

Expected investment in Part-A (Baseline System) shall be Rs. 10,000 crores and that in Part-B shall be Rs. 40,000 crores.

Initially, funds for the projects under both the parts will be provided through loan (100% for Part-A and 25% for Part-B), balance to be raised by State utilities through Financial Institutions, except special category and North-eastern States for which under Part-B, 90% loan will be provided which will be converted into grant on fulfillment of conversion conditionalities.

PFC is acting as a single window service and coordinating with agencies involved such as MoP, APDRP Steering Committee, CEA, Electricity Distribution Utilities, Implementing Agencies and various Consultants for speedy and timely completion of projects under the Re-structured APDRP and thus assist the Distribution Utilities in achieving loss reduction targets.

As on 31st March 2010, under Part A, projects for 1380 towns for 44 Discoms of 26 States at an estimated cost of Rs.5030.28 crores have been sanctioned and an amount of Rs1334.76 crores has been disbursed so far.

CEA is member of the various committees constituted by MoP for implementation of Part-A and Part-B of R-APDRP.

7.2 Status of Metering

A Committee was constituted on the recommendation of Working Group on "Metering Issues" constituted by Forum of Regulators to bring out common standard for kVAh metering in respect of all high- end consumers for connected load of 20 KW and

above under the chairmanship of Chief Enginer (DP&D) CEA. The term of reference of the Committee is to standardize the parameters for kVAh metering and methodology for the Harmonic measurement and reactive power measurement. The report of the Committee is under finalization.

7.3 Guidelines for Specifications for Transformers

- Member(GO&D), CEA took a meeting on 17th November, 2009 with power utilities to share the experience of power utilities regarding Guidelines for 'Specification of Energy Efficient Outdoor Type Three Phase and Single Phase Distribution Transformer' issued by CEA and use of Amorphous Core Transformers.
- Matter regarding revision of limits of maximum losses of various capacity of distribution transformers included in the Guidelines of CEA is under examination.

7.4 Reports of Sub Group–I constituted for Grid Interactive Roof Top Solar PV System

(a) A Task Force was constituted by MNRE under the chairmanship of Chairperson, CEA to examine the technical issues related to feasibility of integrating solar power plants with thermal/hydro power plant and inter-connectivity of solar rooftop system with the grid. The Task Force comprised of members from CEA, Ministry of Power, Ministry of Environment & Forest, MNRE, BEE, NTPC, NHPC, BHEL, CEL, RCEL, RRVUNL and GEDA. The first meeting of the Task Force was held on 18th June, 2009 at CEA Headquarters, New Delhi. During the meeting, three sub-groups were formed to look into interconnectivity of solar rooftop system with the grid, integration of solar power plant with the existing thermal power plant and integration of solar power plant with the existing hydro plant. Sub Group-I was also requested to prepare a Feasibility Report for installing solar plant in Leh and Sewa Bhawan.

The first meeting of the Sub Group-I was held in July, 2009 at CEA Headquarters and based on the comments/ suggestions of the Committee Members and stakeholders, the following Reports were finalized and submitted to MNRE and also uploaded on CEA website for wide use:

1. Report of Sub Group-I on the Grid tied Rooftop Solar PV system
2. Detailed Project Report for Grid tied Rooftop Solar PV power plant at Sewa Bhawan
3. Technical Specification of Grid tied Rooftop Solar PV system for Sewa Bhawan

(b) A Seminar on 'Solar Power Generation in India and Related Technologies' was organized in association with CBIP on 9th Februray, 2009 at New Delhi. CEA made the presentation in this seminar.

(c) A tour to Leh was undertaken to study the feasibility of setting up of SPV plant there. The Feasibility Report for setting up of SPV Power Plant at Leh has been prepared and is being submitted to MNRE and Govt. of J&K.

7.5 Committee for HVDS system for Gujarat

A Committee, to assess the fund requirement for agriculture demand side management on HVDS in the State of Gujarat, was constituted by MoP under the chairmanship

of CE (DPD), CEA having members from PFC and REC. The report of the Committee is under finalization.

7.6 Preparation of Monthly Progress Report for Reliability Index

CEA is collecting information in respect of number and duration of outages of power supply to consumer and reliability index besides the outages of 11 kV feeders in respect of State capitals & major towns with population of more than eight lakhs as well as other towns having population of more than one lakh. This information is being made available to CEA every month by various distribution companies where GIS system has been completed.

7.7 Works related to Union Territories (UTs)

CEA rendered technical assistance to the UTs viz Andaman & Nicobar Islands, Lakshadweep Islands, Dadra & Nagar Haveli, Daman & Diu, Pondicherry, Chandigarh and Delhi including NDMC in project/ DPR formulation, technical clearance of Generation, Transmission & Distribution Schemes of UTs, preparation of Technical Specification for procurement of equipment, vetting of NITs/ acceptance of tenders, advise to UT Administration on specific technical, organizational and staff matters etc. as and when referred to. CEA also renders technical advise to DONER and NCRPB as & when requested.

The following main works were completed in respect of Union Territories (UTs):

7.7.1 Andaman & Nicobar (A&N) Islands

1. The scheme for augmentation of DG capacity and T&D system at Havelock Islands during 11th Plan period was accorded technical clearance.
2. Draft EFC Memo in respect of RCE for DPR of Restoration /Revival of damaged power supply infrastructure in various islands / areas in Andaman & Nicobar Island affected by earthquake & tsunami on 26.12.2004 was vetted and comments sent to MoP/ UT Administration.
3. CEA officers attended various meetings of the Standing Committee for Time and Cost Overrun in respect of RCE for DPR of Restoration/Revival of Power Sector in various Islands of UT of Andaman & Nicobar Islands affected by earthquake & tsunami chaired by Addl. Secretary, MoP.
4. CEA officers attended EFC meeting taken by Secretary(Finance), GoI to consider the RCE for the scheme of Restoration/Revival of the Power Sector in the various Islands of UT of A&N Islands affected by earthquake and tsunami on 26.12.04 at an estimated cost of Rs. 297.53 Crores.
5. Scheme for establishment of new DG Power House of 1x1000 kVA capacity at Mayabander was examined.

7.7.2 Lakshadweep

Technical Specifications for RMUs, distribution transformers and other equipments for augmentation of distribution system at various islands of UT of Lakshdweep were examined.

7.7.3 Dadra & Nagar Haveli (D&NH)

1. The schemes for establishment of new 66/11 kV, 2x15 MVA S/S at Kala, augmentation of S/C 66 kV transmission line to Double Circuit line from Kharadpada to Dadra and 66 kV power supply arrangement to M/s JBF Industries Ltd. from Rakholi S/S were accorded technical clearance.

2 Schemes for establishment of 66/11 kV S/Ss at Piperia, Velugam and Sailly and Revised

Cost Estimates for augmentation of 66 kV S/C line from Kharadpada to Rakholi to D/C line were technically examined.

3. Proposal for award of works for augmentation of 220/66 kV Khardapada S/S from 3x100 MVA to 4x100 MVA capacity was examined.

4. Technical bids for procurement of Comprehensive Power Distribution Network Planning & Management Software for UT of D&NH were examined.

7.7.4 Daman & Diu

1. The schemes for establishment of new 66/11 kV, 2x15 MVA S/S at Bhimpora and normal development works during 2009-10 in UT of Daman & Diu were accorded technical clearance.

2. Technical bids for procurement of Comprehensive Power Distribution Network Planning & Management Software for UT of Daman was technically examined.

3. Technical Specifications for the scheme for establishment of 66/11 kV, 2x15 MVA S/S at Bhimpora were examined.

4. Scheme for installation of pre-paid meters in UT of Daman & Diu was technically examined.

5. Technical bids for supply, erection, testing and commissioning of 66 kV bays at Verkund, Dalwada and Ringanwada S/Ss were examined.

7.7.5 Delhi/ NDMC / NCRPB

(a) Works related to New Delhi Municipal Committee (NDMC)

Chief Engineer (DPD), CEA took a meeting for reviewing power supply in NDMC area during the Commonwealth Games, 2010.

Proposal for inclusion of new works in 11th Plan scheme of NDMC and report on Electricity Distribution Reforms in NDMC areas were examined.

(b) National Capital Region Planning Board (NCRPB)

1. Rendering assistance to National Capital Region Planning Board (NCRPB) for preparation of Functional Plan for Power 2021 for National Capital Region.

2. Matter regarding creation of separate Discoms for the NCR areas in the States of UP, Haryana & Rajasthan was examined and comments were sent to NCRPB.

7.7.6 Other works

- Examination of the Scheme for Transmission & Distribution works in the State of Himachal Pradesh to be executed by HPPTCL through Multi-Lateral Funding Agency.

- Conduction of Mock Test exercise at CPWD 11 kV Parliament House S/S to test the reliability of power supply to Parliament House before commencement of each Parliament Session.

- A presentation was made in the International Conclave on key inputs for 12th Plan and beyond. Recommendations on Distribution Sector, as discussed in International Conclave on key inputs for 12th Plan and beyond held on 18th & 19th August, 2009, were also prepared.

- Preparation of material on Distribution Sector for Mid-Term Appraisal of 11th Plan period was also undertaken.

- Examination of the R&D projects on Distribution Sector during 11th Plan period was done.

- The matter regarding review of the list of items and norms of expenditure from Relief Funds of Calamity Relief Fund (CRF) / National Calamity Contingency Funds (NCCF) for the period 2010-2015 was examined.
- CEA officers attended various meetings in Bureau of Indian Standards (BIS) under various technical committees.
- Material regarding Mission Mode Project on Smart Grid in Distribution Sector was also prepared.
- CEA officers attended various meetings taken by Secretary (Power) to review the Quarterly Performance of REC and RGGVY.
- Comments / material regarding rural electrification on the points raised in Standing Committee on Energy, Consultative Committee on Power and National Conference of Chief Secretaries etc. were also prepared.
- Notes on Rural Electrification in North Eastern Region in respect of PMO References were also prepared.
- Comments were sent on the recommendations contained in 131st Report of the Committee on Petition, Rajya Sabha on praying for integration and empowerment of Leprosy Affected Persons (LAPs) .
- Comments were sent on the recommendations contained in the 30th Report of the Standing Committee on Energy on 'Role of CERC and SERCs in Protection of Interests of consumers' pertaining to the Ministry of Power.
- Comments / views were sent on the minutes of the meeting on power situation in North Eastern States including Sikkim held in MoP.
- Comments were sent on Private Members Bill raised by Shri Amir Alam Khan, MP, Rajya Sabha regarding Rural Electrification Authority Bill, 2009.
- Material was furnished for examination of estimates on the subject 'Power Generation – Demand and Supply' relating to Ministry of Power.
- Material was furnished for various speech/ questionnaire/news item for Hon'ble Minister of Power.

7.8 Rural Electrification

7.8.1 Status of Rural Electrification in the Country

During 2009-10 (upto February, 2010), 1,473 inhabited villages have been electrified and 2,16,777 pumpsets have been energized. Cumulatively, 4,97,838 inhabited villages constituting 83.8% have been electrified out of a total of 5,93,732 inhabited villages and 1,61,84,257 pumpsets have been energised in the country.

It is observed that:

- 7 States namely Andhra Pradesh, Delhi, Goa, Haryana, Kerala, Punjab and Tamil Nadu and all UTs except Andaman & Nicobar Islands have achieved 100% village electrification.
- 12 States namely Gujarat, Himachal Pradesh, J&K, Karnataka, Madhya Pradesh, Chattisgarh, Maharashtra, Manipur, Sikkim, Uttar Pradesh, Uttaranchal & West Bengal have achieved more than the National Average of village electrification (82.3%).

- 10 States namely Arunachal Pradesh, Assam, Bihar, Jharkhand, Meghalya, Mizoram, Nagaland, Orissa, Rajasthan & Tripura are lagging behind the National Average of village electrification.

The charts showing the Plan-wise and State-wise progress of village electrification and pumpsets energisation as on 28.02.2010 are given at the end of this chapter.

7.8.2 Continuation of Rajiv Gandhi Grameen Vidyutikaran Yojna in 11th Plan – Scheme of Rural Electricity Infrastructure and Household Electrification

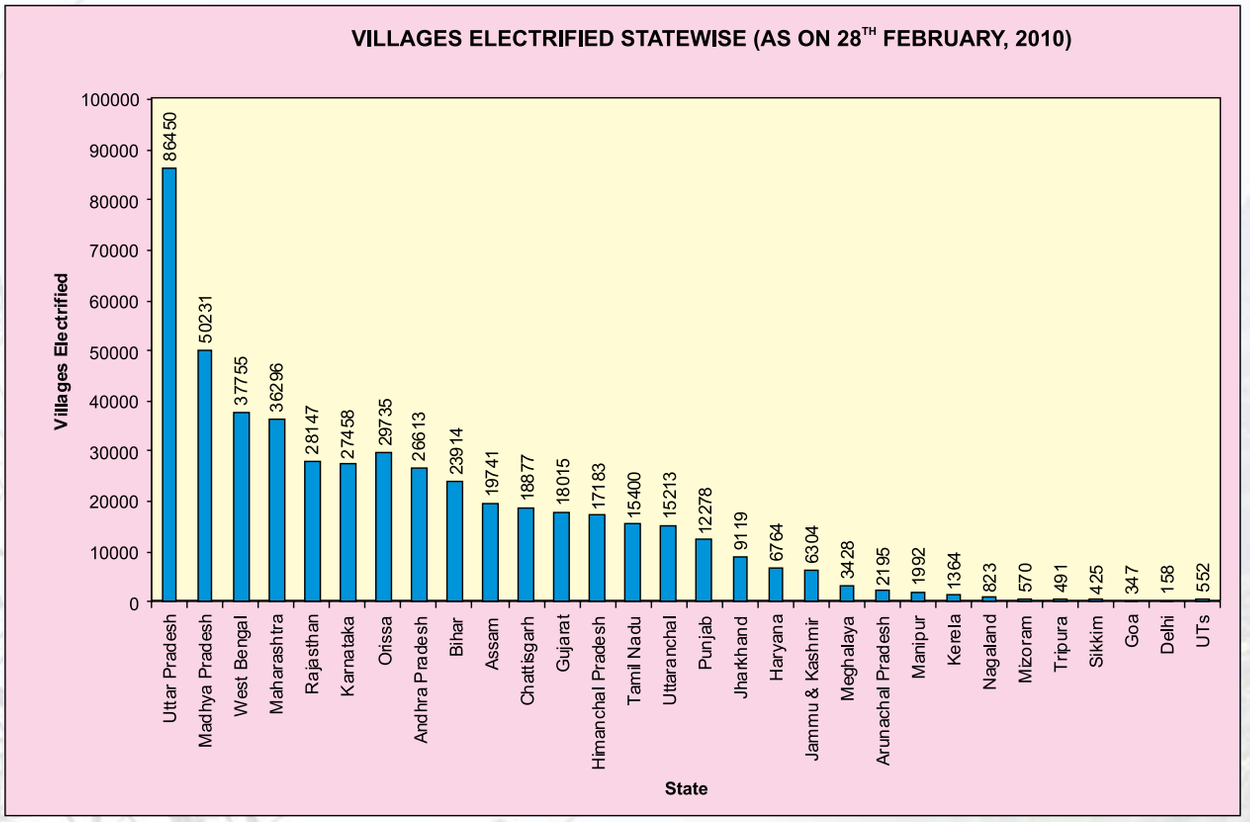
Central Govt. approved continuation of "Rajiv Gandhi Grameen Vidyutikaran Yojna-Scheme of Rural Electricity Infrastructure and Household Electrification" Scheme in the 11th Plan for attaining the goal of providing access to electricity to all households, electrification of about 1.15 lakh un-electrified villages and electricity connections to 2.34 crore BPL households by 2009. The approval has been accorded for capital subsidy of Rs. 28,000 crores during the 11th Plan Period.

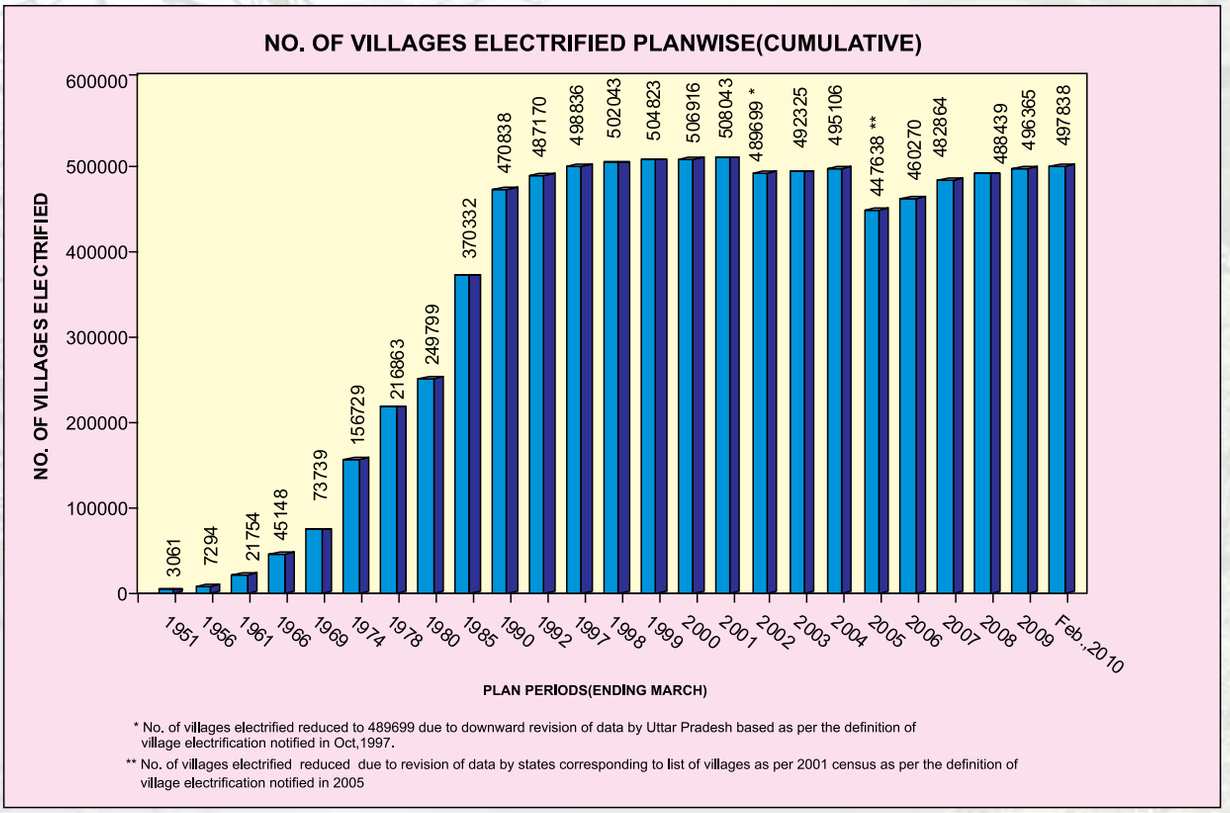
Under the scheme, projects were financed with 90% capital subsidy by the Central Government for provision of Rural Electricity Distribution Backbone (REDB), Creation of Village Electrification Infrastructure (VEI), Decentralised Distributed Generation (DDG). There is a provision of subsidy of Rs. 540 crores for DDG under the scheme. Guidelines for village electrification through Decentralized Distributed Generation(DDG) under RGGVY in the 11th Plan has been approved and circulated vide OM No.44/1/2007-RE dated 12th January, 2009.

Meetings of Monitoring Committee are taken by Secretary (Power) at regular intervals regarding the implementation of RGGVY. 78,256 villages and 1.12 crore rural households including one crore BPL households have been electrified under the scheme upto 31.3.2010. Rs.20927.80 crores have been released upto 31.03.2010.

7.8.3 Preparation of Monthly Progress Report for Village Electrification & Pumpset Energisation

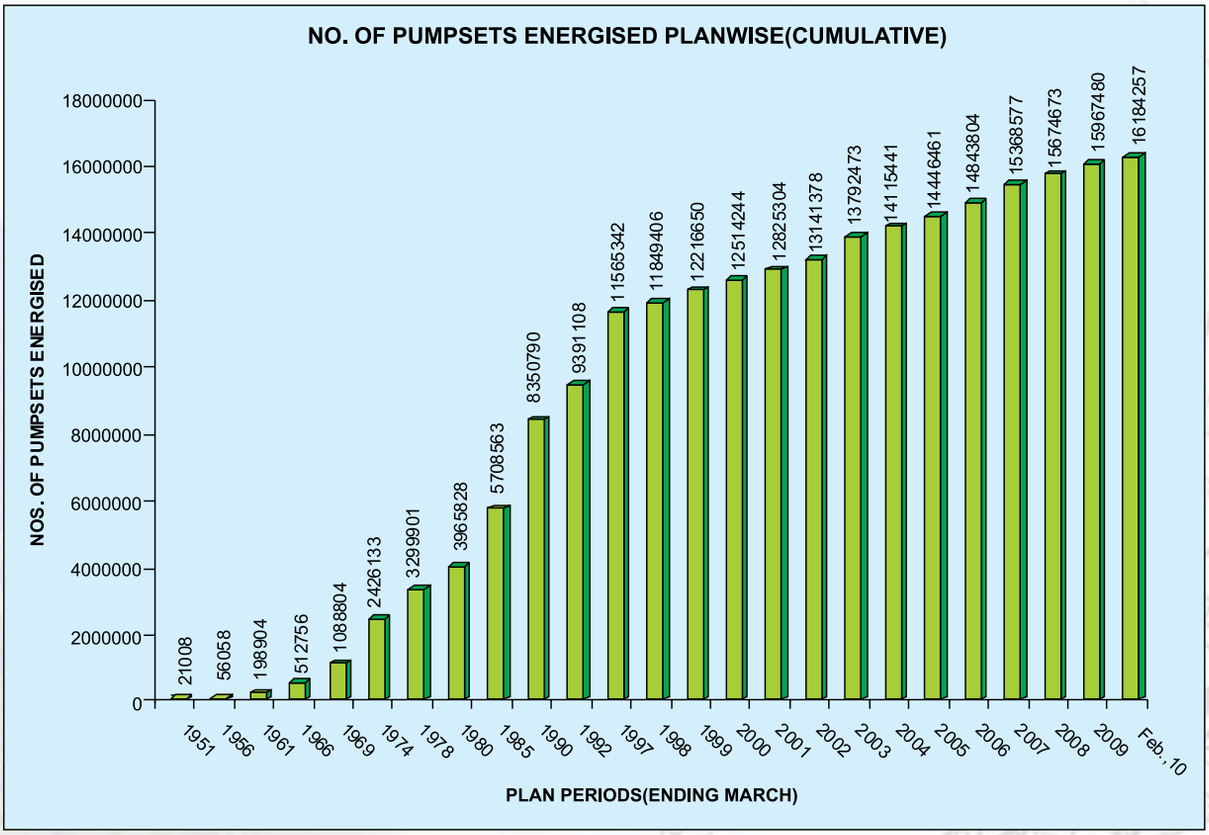
The task of collection and compilation of data in respect of achievement of rural electrification and energisation of pumpsets in the country and issue of Monthly Progress Reports for use of all Departments/ Ministries/ Planning Commission/ various High-powered Committees like Consultative Committee of Power etc. was also performed in CEA.





* No. of villages electrified reduced to 489699 due to downward revision of data by Uttar Pradesh based as per the definition of village electrification notified in Oct,1997.

** No. of villages electrified reduced due to revision of data by states corresponding to list of villages as per 2001 census as per the definition of village electrification notified in 2005


NO. OF PUMPSETS ENERGISED PLANWISE(CUMULATIVE)
NOS. OF PUMPSETS ENERGISED
18000000
16000000
14000000
12000000
10000000
8000000
6000000
4000000
2000000
0
21008
56058
198904
512756
1088804
2426133
3299901
3965828
5708563
8350790
9391108
11565342
11849406
12216650
12514244
12825304
13141378
13792473
14115441
14446461
14843804
15368577
15674673
15967480
16184257
1951
1956
1961
1966
1969
1974
1978
1980
1985
1990
1992
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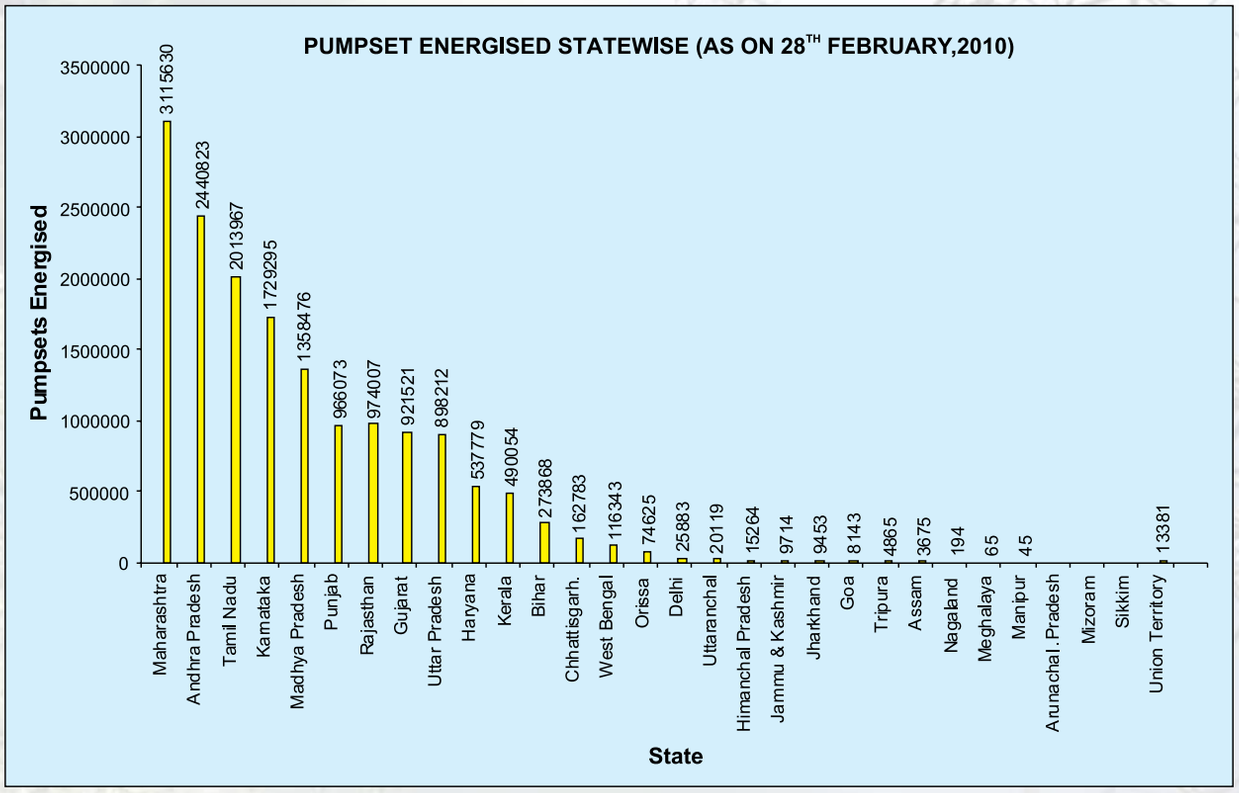
PLAN PERIODS(ENDING MARCH)


PUMPSET ENERGISED STATEWISE (AS ON 28TH FEBRUARY,2010)
Pumpsets Energised
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
3115630
2440823
2013967
1729295
1358476
966073
974007
921521
898212
537779
490054
273868
162783
116343
74625
25883
20119
15264
9714
9453
8143
4865
3675
194
65
45
13381
Maharashtra
Andhra Pradesh
Tamil Nadu
Kamataka
Madhya Pradesh
Punjab
Rajasthan
Gujarat
Uttar Pradesh
Haryana
Kerala
Bihar
Chhattisgarh.
West Bengal
Orissa
Delhi
Uttaranchal
Himanchal Pradesh
Jammu & Kashmir
Jharkhand
Goa
Tripura
Assam
Nagaland
Meghalaya
Manipur
Arunachal.Pradesh
Mizoram
Sikkim
Union Territory
State

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CHAPTER – 8
DESIGN & ENGINEERING SERVICES

8.1 Design & Engineering of Hydro Electric Projects

Central Electricity Authority renders design & engineering services for detailed engineering to Hydro Power Projects under execution in the Central/State Sectors and neighbouring countries. Design & Engineering includes complete design, techno-economic analysis, preparation of specifications, tender evaluation, selection and sizing of equipments, detailed layout and schematic drawings for hydro turbine, generator, transformer, switchyard equipment and other auxiliaries.

The legacy of CEA in rendering the design and engineering of hydro electric projects is for a period of 50 years since 1960. Seventy five (75) hydro electric projects in India and neighbouring countries having aggregate installed capacity of over 15,757 MW (details given in **Annexure-8A**) which were completely designed and engineered by this organisation during this period are in successful commercial operation. The design consultancy of hydro electric projects includes projects with conventional hydro generating units, bulb/tubular type units, pumped storage schemes and underground power stations with unit capacity from few KW to 250 MW. CEA is fully equipped to provide state-of-the-art design and engineering services for hydro power projects of any type and capacity.

8.2 Programme and Achievement during 2009-10

During 2009-10, CEA continued consultancy services for design and engineering of electrical and mechanical works of ten (10) hydro electric projects. Out of these, Eight (8) projects are in India and two (2) are in neighbouring countries with aggregate installed capacity of about 3363 MW including large hydro power projects such as Loharinag Pala (4x150 MW), Tapovan Vishnugad (4x130 MW) and Punatsangchu St.I (6x200 MW), Bhutan. The hydro power projects for which design & engineering services were rendered by CEA during 2009-10 are as given below:

Hydro Power Stations for which Design & Engineering Services are being rendered by CEA

S.No	Project	State/Executing Agency	Capacity (MW)
Northern Region			
1.	Koteshwar	Uttarakhand/THDC	4x100
2.	Loharinag Pala	Uttarakhand /NTPC	4x150
3.	Tapovan Vishnugad	Uttarakhand /NTPC	4x130
4.	Rampur *	Himachal Pradesh/SJVNL	6x68.67
North Eastern Region			
5.	Myntdu Leshka	Meghalaya/MeSEB	2x42
6.	Myntdu Leshka(Extn.)	Meghalaya/MeSEB	1x42
7.	Ganol	Meghalaya/MeSEB	3x7.5
8.	New Umtru *	Meghalaya/MeSEB	2x20

S.No	Project	State/Executing Agency	Capacity (MW)
Neighbouring Countries			
9.	Punatsangchu St.I	Bhutan/PHPA	6x200
10.	Salma *	Afghanistan/WAPCOS	3x14
	Total		3363

* Review Consultancy

Some of the major works completed during the year under consultancy services are as given below:-

2 (Two) technical bids for auxiliary equipments were evaluated and about 7,000 sheets of manufacturers' drawings were examined for Koteshwar H.E.Project (4x100 MW), Myntdu H.E.Project (2x42 +1x42 MW), Loharinag Pala (4x150 MW), Tapovan Vishnugad H.E.Project (4x130 MW), Salma H.E. Project, (3x14 MW) and New Umtru H.E.Project (2x20 MW). Tenders for Fire Protection System and Ventilation System of Myntdu H.E. Project (2x42 +1x42 MW) were evaluated. Design Memos for 50 (fifty) E&M equipments for Loharinag Pala H.E.Project and Tapovan Vishnugad H.E. Project were examined. 100 Civil construction drawings for Loharinag Pala H.E.Project (4x150 MW), Tapovan Vishnugad H.E.Project (4x130MW), Koteshwar H.E.Project (4x100 MW) and Myntdu H.E.Project (2x42 MW) were examined. During the year, layout drawings of Power House, Switchyard etc. were also finalized for the Loharinag Pala H.E.Project (4x150 MW), Tapovan Vishnugad H.E Project (4x130 MW) and Salma H.E.Project (3x14 MW).

Technical Specifications for Power Transformers, 420 kV XLPE Cables and GIS along with 10 drawings were under preparation for Punatsangchu (Stage-I) H.E.Project, Bhutan.

During the site visit to New Umtru H. E. Project (2x20 MW), CEA suggested some modifications in the layout of Power House resulting in the deletion of unloading bay and hence reducing the overall height of the Power House thereby reducing the overall cost of the project.

8.3 Scrutiny / Examination of DPRs of new HE Projects

The Chapters on Electro-Mechanical Equipment, related drawings and the quantities of 19 DPRs of new HE Projects and associated clarifications/ drawings/documents etc. as received from time to time were examined and commented upon. A list of these HE Projects is as under:

S. No.	Project	State/ Executing Agency	Capacity (MW)
1.	Jamrani HEP	Uttarakhand	3x10
2.	Lower Siang HEP	Arunachal Pradesh	9x300
3.	Mangdechhu HEP	Bhutan	4x180
4.	Nyamjang	Arunachal Pradesh	6x150
5.	Dibbon HEP	A.P.	2x60
6.	Tawang-I	Arunachal Pradesh	3x250
7.	Tawang-II	Arunachal Pradesh	4x250
8.	Demwe Lower HEP	Arunachal Pradesh	1750
9.	Nafra HEP	Arunachal Pradesh	2x48

S. No	Project	State/ Executing Agency	Capacity (MW)
10.	Polavaram HEP	Andhra Pradesh	12x80
11.	Tato-II HEP	Arunachal Pradesh	4x175
12.	Bowala Nand Prayag HEP	Uttarakhand	4x75
13.	Sankosh HEP	Bhutan	8x500 + 3x20
14.	Umerhut Pump Scheme	U.P.	
15.	Kutchar HEP	H.P.	3x80
16.	Teesta (St. IV) HEP	Sikkim	4x130
17.	Panan HEP	Sikkim	4x70
18.	Sainj HEP	H.P.	2x50
19.	Bajoli Holi HEP	H.P.	3x60
20.	Kolodyne HEP	Mizoram	4x115
21.	Gongri HEP	Arunachal Pradesh	3x30
22.	Lethang HEP	Sikkim	3x32

8.4 Preparation of DPRs of new HE Projects

The Chapters for Electro-Mechanical Equipment alongwith related drawings and bill of material for the following H.E. Projects were prepared under consultancy assignment:-

S. No.	Project	State/ Executing Agency	Capacity (MW)
1.	Punatsangchu– II	Bhutan	6x165
2.	Seli HE Project	Himachal Pradesh	4x80
3.	Raoli H. E. Project	Himachal Pradesh	4x105
4.	Umngot H.E. Project	Megha-laya	3x80

8.4.1 Scrutiny of proposals for Foreign Assistance/Bilateral Co-operation for HE Projects.

Various proposals regarding the foreign assistance/bi-lateral co-operation pertaining to HE Projects as received from Ministry of Power were examined and commented upon.

8.5 Scrutiny of Innovative Proposals/ Schemes for Hydro Power Generation

The following innovative proposals as received from time to time were examined from feasibility point of view and commented upon:

i. Generation of Electricity from sea waves and river water from Shri G.Chandran Palakkan.

ii. Innovative idea regarding prevention of the floods in Andhra Pradesh from Shri J.P.Narayan.

iii. Renovation & upgradation of all old hydro power stations to increase their capacities by replacing the old insulation with epoxy insulation and increasing the insulating properties by mixing the Nano composite fillers in the epoxy from Sri Satyamorthy, S.E(Retd.), KSEB.

8.6 Other Miscellaneous Works

i. Scrutiny of the Chapter on "Small Hydro Power Definitions and Glossary of Terms" of Standards/ Manuals/ Guidelines for Small Hydro Power Development" being prepared by Alternate Hydro Energy Centre, IIT, Roorkee.

ii. Scrutiny of draft manuals for "Prevention against Flooding of Hydro Power Stations" being prepared by CBIP.

iii. Examination of technical issues related to integration of Solar Power Plant with existing

Hydro Power Plants and connectivity of solar roof top systems with grid.

iv. Examination of causes of failure of sickle plates of penstocks of Srisailem Left Bank HEP & remedial measures.

v. Scrutiny of draft Standards as received from BIS from time to time.

8.7 Design and Engineering of Thermal Projects

The following design & engineering assignments as a part of consultancy work were carried out:

a) Review consultancy for Yamunanagar Thermal Power Project (2x300 MW)

b) Review consultancy for Hisar Thermal Power Project (2x600 MW)

c) Review consultancy for Raghunathpur TPP (2x600 MW).

8.8 Design & Consultancy Assignments (Civil aspects) for Thermal/ Hydro/ Power Transmission Projects

CEA is providing consultancy services for Thermal Power Projects / Power Transmission Schemes. The civil aspects of cost estimates for stage-I and stage-II activities of Hydropower Projects under three-stage clearance of H.E. Projects are also being examined. The monitoring of Fly Ash Generation and Utilization at Thermal Power Stations pertaining to Power Utilities in various States is being carried out. Assistance on civil engineering matters to various Wings/ Divisions of CEA / MoP is also provided, whenever required. The main works carried out during the stated period are given as under:

8.8.1 Design and Consultancy Assignments (civil aspects) for Thermal/Power Transmission Projects

1) Consultancy services to Power Development Department, Govt. of J&K in respect of Transmission Project under Prime Minister's Reconstruction Programme.

2) Review Consultancy Services to DVC, Kolkata for Raghunathpur Thermal Power Station.

3) Technical works in respect of other Thermal Power Plants viz. Yamuna Nagar TPS, RG TPP Hissar, Suratgarh TPP under Rajasthan Vidhyut Utpadan Nigam Ltd.

The details of works carried out during the year are given at **Annexure-8B**.

8.8.2 Assignment pertaining to Civil Works of Hydro-electric Projects

CEA is providing following necessary assistance for civil works pertaining to H.E. Projects being referred to it.

1) Preliminary comments on DPR of H.E. Projects.

2) Checking and finalization of Quantities of Civil Works for DPR of H.E. Projects.

3) Checking / finalization of phasing of Cost of Civil Works for DPR of H.E. Projects.

4) Finalization of Cost Estimate for Stage-II activities of H.E. Projects.

Details of the above works are at **Annexure-8C**.

8.8.3 Consultancy and Technical Support

a) The Technical Specifications for Remote Terminal Unit (RTU) and PLC Communication system for existing and new 132kV and 220kV power line networks in Jammu & Kashmir Region were prepared by CEA and forwarded to Power Development Department (PDD), Government of J&K. Technical Bid Evaluation in respect of Kashmir Region has been completed and award may be placed shortly. In regard to Jammu Region, technical clarification sought by Bidders is being processed.

b) A request for taking technical consultancy services of CEA has been made by Energy

& Power Development Department, Government of Sikkim for their Central Load Despatch Centre (CLDC) Phase-II. The Memorandum of Understanding has been signed for taking up the job.

c) CEA rendered technical consultancy to Meghalaya State Electricity Board (MeSEB) for Tele-communication and SCADA system. The scheme is at advance stage of implementation.

d) Technical support and input has been provided for the project 'Salma Dam HEP, Afghanistan' through M/s WAPCOS for PLCC equipment and 48V D C power supply system, EPABX system and associated accessories.

e) NCA has installed an RTU at River Bed Power House (RBPH) at Narmada Complex in Kevadia, Gujarat to enable transmission of data to Western Regional Load Despatch Centre (WRLDC). CEA has provided technical inputs to NCA.

f) CEA officers participated in the discussions in the meetings organized by BIS, CIGRE, etc. A meeting of Fibre Optics, Fibres, Cables and Devices Sectional Committee LITD 11 was organized by BIS on 21st December, 2009 at New Delhi to discuss Indian Standard on Fibre Optics. CEA officers participated in the discussions organized by BIS regarding Power System Control and Associated communications- Sectional Committee- LITD 10 in joint session with SCADA Working Group for Power Sector to discuss Indian Standard on SCADA.

8.4 Scrutiny of Bill of Quantity (BoQ) of Small HE Schemes Certification as Capital Goods

Bill of Quantity (BoQ) of 8 (eight) small/ mini HE schemes viz. Manjanadaka (2x5 MW), Dadupur (4x1.5 MW), Kadamane (4x7.5 MW), Varahi Tail Race (2x7.5 MW), Dandela (3x4.35 MW), Birahi Ganga (2x2.4 MW), Somanamardi (1x6 MW), Somavathi (2x3 MW) comprising of electromechanical equipment for the generating units, associated auxiliaries, transmission lines etc. received for the purpose of certification as capital goods were examined and commented upon.

8.5 Assessment of Requirement of Electrical Equipment and Steel for 12th & 13th Plan Periods

An assessment regarding the requirement of electrical equipment and steel for various hydro projects to be taken up during 12th and 13th Plans was made.

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Tehri HPP - Machine Hall

CHAPTER – 9
ECONOMIC AND COMMERCIAL ASPECTS OF POWER INDUSTRY

The Electricity Act, 2003 was notified in June, 2003. The Act replaces the three earlier Acts, namely-the Indian Electricity Act 1910, Electricity (Supply) Act, 1948 and the Electricity Regulatory Commission Act, 1998. As per the 2003 Act, CEA has inter-alia been entrusted with duties and functions relating to collection/recording of data/information relating to generation, transmission, distribution, trading and utilization of electricity and to carry out studies relating to cost, efficiency, competition etc. to evaluate the financial performance of the power sector.

9.1 Performance of State Electricity Boards/ State Power Utilities

9.1.1 Average realization vis-a`vis Average Cost of Supply

The average cost of supply of electricity was 246 paise/unit during 2001-02. It decreased to 238 paise/unit during 2002-03. Thereafter, it gradually increased to 293 paise/unit during 2007-08.The average realisation from sale of power has gradually increased from 181 paise per unit during 2001-02 to 239 paise per unit during 2007-08. The table below gives the average cost of supply and average realization covering all sectors in the country on the basis of the data made available by various SEBs/Utilities:

Average Cost of Supply and Average Realization of Electricity (from All Sectors)

(in paise/unit)

Year	Average Cost of Supply	Average Realisation	Gap
2001-02	246.00	181.00	65.00
2002-03	238.00	195.00	43.00
2003-04	239.00	203.00	36.00
2004-05	254.00	209.00	45.00
2005-06	260.00	221.00	39.00
2006-07	276.00	227.00	49.00
2007-08	293.00	239.00	54.00

Source: PFC Reports on the performance of the State Power Utilities.

9.1.2 Commercial Losses

Various power utilities in the country have been suffering losses over the years without subsidy. State-wise details of total commercial losses of power utilities for the period 2001-02 to 2007-08 are indicated below:

Year-wise Commercial Losses of Power Utilities

Year	Losses (Rs. Crores)
2001-02	29331
2002-03	21245
2003-04	19107
2004-05	23995
2005-06	20869
2006-07	27101
2007-08	31862

Source: PFC Reports on the performance of the State Power Utilities.

9.1.3 Settlement of Dues

The gap between average revenue realization and average cost of supply remained constantly high causing erosion over the years in the volume of internal resources generation by the SEBs and led many of them to virtual bankruptcy. The level of commercial losses of the SEBs/ utilities depended inter-alia on the unaccounted energy losses, effective subsidies incurred towards sales to agriculture and domestic sectors, efforts to neutralize them through cross subsidization and the level of subventions provided by the State Governments. Gross subsidy on energy sales had been increasing over the years because of the policy of some of the States to provide electricity at subsidized rates to agriculture and domestic consumers.

Consequently, SEBs were unable to make full payments to Central Power Sector Utilities (CPSUs) for purchase of power and coal resulting in accumulation of huge outstanding amount to be paid by SEBs to CPSUs. This adversely affected the growth and performance of CPSUs. This payment deficit continues to rise and threaten the viability of the Central Power Utilities. Poor creditworthiness of SEBs also effectively blocked investments by the Private Sector despite the enabling and encouraging framework laid down by the Centre. Even in the post reform period, managerial and financial inefficiency in the State Sector utilities adversely affected capacity addition and system improvement programmes.

In pursuance of the reforms process, the Expert Group constituted by the Government under the chairmanship of Member (Energy), Planning Commission recommended a scheme for one-time settlement of dues payable by the SEBs to CPSUs and Railways. This one-time settlement scheme (launched on 5th March, 2001) of dues owed by SEBs/Utilities to CPSUs, was aimed at making loss-making power utilities bankable. In terms of the Scheme, 60% of interest/surcharge on the delayed payments/ dues as on 30.9.2001 was waived and the rest of the dues were securitized through tax-free bonds issued by respective State Governments.

Considerable progress has been made since in the settlement of dues payable by SEBs to CPSUs and the Railways. All State Governments signed the Tripartite Agreement envisaged under the scheme, which was between the State Government, Reserve Bank of India and the Government of India. Out of these, 27 States have issued bonds amounting to Rs.31,581 crores. Goa had no outstanding dues. The Government of the National Capital Territory of Delhi securitized its outstanding dues by converting their dues into long-term advances of Rs.3,376 crores payable to the CPSUs concerned separately under Bi-partite Agreements, as they do not have the power to issue bonds.

9.1.4 Trend in Outstanding Dues to CPSUs by SEBs/Utilities

CEA has been monitoring the status of the outstanding dues payable by SEBs to CPSUs. The total dues outstanding to various CPSUs for the period 2002-03 to 2009-10 are given in the table below:

Year	Total Outstanding Dues (as on 31st March, 2010) (Rs. in Crore)		
	For 7 PSUs	For 10 PSUs	For 11 PSUs
2002-03	41335.36		
2003-04	6747.52		
2004-05	6080.79		
2005-06	2840.75		
2006-07	2909.66		
2007-08	3045.19	3795.81	
2008-09	4069.92	4290.01	
2009-10	5837.66	6081.83	6081.83*

*11th PSU namely NHDC has reported no outstanding dues

A statement indicating the status of outstanding dues as per the information received from CPSUs upto 31-03-10 is given in **Annexure-9A**.

9.2 Electricity Tariff & Duty and Average Rates of Electricity Supply

In fulfillment of its obligations under Section 73(i) & (j) of the Electricity Act, 2003, CEA brings out a publication titled "Electricity Tariff & Duty and Average Rates of Electricity Supply in India". The latest edition (March, 2009) contains information on tariffs applicable in various States/Utilities as effective on 31st July, 2008. Average rates of electricity supply presented in this edition have been worked out on the basis of the Tariff Orders issued by the State Electricity Regulatory Commissions and Tariff Notifications issued by the concerned SEBs/ Power Departments/Utilities.

Further, the publication incorporates a comparative study of estimated average rates of electricity in various States of the country. Though, it is somewhat difficult to compare the tariffs applicable in the various States, as the parameters considered by the State Electricity Boards/State Electricity Regulatory Commissions for fixing consumer tariff are not identical, an attempt has been made to work out average rates for various categories of consumers for the purpose of a broad comparison. The methodology followed involves assumption of certain sanctioned load (kW) and monthly electricity consumption (kWh) level for each category of consumers separately. Considering the rates of sale of electricity for various slabs as notified by the supplier, the average per unit rates have been worked out. The electricity duty/ taxes applicable are added to these rates to arrive at the estimated average per unit cost payable by different categories of consumers.

A statement indicating estimated average category-wise rates of electricity for various utilities in the country updated up to 31-03-2010 is given at **Annexure-9B**.

9.3 References on Techno-financial matters in Power Sector

The following references on issues concerning financial/commercial matters of Power Sector were received from MoP/other Ministries/ Trade & Industry associations during the year on which CEA's comments/ recommendations were sent to MoP/ concerned departments:

(i) Suggestions for annual budgetary exercise relating to Customs & Central Excise Duty for 2009-10

(ii) Service Tax on Wheeling/ Transmission of Power

(iii) Levy of Service tax on electricity transmission & SLDC charges

(iv) Implementing the Integrated Energy Policy (IEP) : Action Taken Report by Ministry of Power

(v) Report of the Study Group for preparation of a Road Map for Rapid Economic Development of Uttar Pradesh

(vi) Suggestions for annual budgetary exercise relating to Customs & Central Excise Duty for 2010-11

(vii) Disciplines in domestic regulations at the WTO

(viii) Exemption of excise duty on liquid fuels (Low Sulphur Heavy Stock, Naptha, Diesel & Furnace Oil) used for power generation

(ix) Clarifications on the exemptions for Mega & Ultra Mega Power Projects

9.4 Data Bank for Cost of Generation of Power

The process of creating a data bank regarding rate of sale of power classified by type of generation for various Utilities/SEBs/Power Departments is under progress. With the creation of a large number of generating companies, the work of data collection, sifting and compilation has increased manifold. A statement indicating region-wise rate of sale of power for various Central, State & Private utilities in the country for the period the year 2008-09 is given at **Annexure-9C**.

9.5 Progress in Bidding Process of Ultra Mega Power Projects (UMPPs)

CEA has been regularly associated with the finalization of Request for Qualification (RfQ), Request for Proposal (RfP) and Power Purchase Agreement (PPA) for setting up of Ultra Mega Power Projects (UMPPs) in the country and in this regard, had represented in various committees. The successful bidders for four Ultra Mega Power Projects have already been selected through the tariff based International Competitive Bidding process, based on the Capacity and Super/ Critical technology, specified in the RfQ & RfP documents issued by the shell companies and Letter of Intent has been issued to the successful developers. The bidders quoted the tariff for 25 years. Power Finance Corporation is the designated Nodal Agency for the entire bid process. The status of various UMPPs is as under:

i. Mundra UMPP (5x800 MW) in Gujarat

The Letter of Intent (LoI) was awarded to M/s Tata Power Ltd. on 28th December, 2006 with a levelised tariff of Rs. 2.264 per Kwh. The project was handed over on 23.04.07.

ii. Sasan UMPP (6x660 MW) in Madhya Pradesh

The Letter of Intent (LoI) was awarded to M/s Reliance Power Ltd. on 1st August, 2007 with a levelised tariff of Rs. 1.196 per Kwh. The project was handed over on 07.08.07.

iii. Krishnapatnam UMPP (5x800 MW) in Andhra Pradesh

The Letter of Intent (LoI) was awarded to M/s Reliance Power Ltd. on 30th November, 2007 with a levelised tariff of Rs. 2.333 per Kwh. The project was handed over on 29.01.08.

iv. Tilaiya UMPP in Jharkhand

The Letter of Intent (LoI) was awarded to M/s Reliance Power Ltd. on 12.02.2009 with a levelised tariff of Rs. 1.7704 per Kwh. The project was handed over on 7.8.09.

v. Chhattisgarh UMPP

RfQ for this project has been issued by M/s Chhatisgarh Surguja Power Limited on 15.03.2010.

9.6 Consultancy Services

9.6.1 Nuclear Power Tariff Fixation

In terms of provisions of Department of Atomic Energy Act, 1962, CEA has examined the power tariff related proposal of Nuclear Power Corporation of India Limited in respect of Rajasthan Atomic Power Station Units 2, 3 and 4 for the period 01.12.2008 to 30.11.2013 and recommendations were sent to DAE.

9.6.2 Hydro Electric Projects of Bhutan

A number of Hydro Electric Projects are presently under operation / construction in Bhutan. These projects are being financed by Government of India. The tariff of power being sold by Royal Government of Bhutan to India is decided on case to case basis. To have a uniform policy / Model of Tariff for future hydro-electric projects of Bhutan, a committee had been set up by Ministry of Power. The studies of proposed Tariff Model were carried out.

9.6.3 Development of Transmission Projects

To promote private participation in development of transmission projects, Government of India had issued guidelines for selection of Transmission Service Provider through Tariff based Competitive Bidding route. Accordingly PFC/REC (BPC of the projects) had launched three transmission projects based upon these guidelines. The projects are:

i. Transmission scheme for enabling import of NER/ER surplus power by NR - LoI issued to Sterlite Technologies Ltd. on 07.01.2010.

ii. North Karanpura Transmission Scheme - LoI issued to M/s Reliance Power Transmission Ltd. on 18.12.2009.

iii. Talcher-II Transmission Scheme - LoI issued to M/s Reliance Power Transmission Ltd. on 18.12.2009.

9.7 Nomination of CEA officers to Bid Evaluation Committees

a) To promote private participation in development of transmission projects, Government of India had issued guidelines for selection of Transmission Service Provider through Tariff based Competitive Bidding route.

"Bid Evaluation Committees for selection of Transmission Service Providers" were set up. Officers of E&C Wing CEA were nominated in these committees. These projects are:

i. Transmission system enabling surplus power transmission from ER/NER to NR.

ii. North Karanpura Transmission system.

iii. Talcher –II Transmission system.

b) In order to avail services of the international consultant in the field of transmission planning during various stages of formulation and review of the base document of the Perspective Transmission Development Plan of India upto 2022, it was decided to appoint the Consultant under the scheme entitled "Optimization of National Grid Programme for the period 2012-22"

by limited tendering process under the competitive bidding route.

To evaluate the bids called for appointment of consultants, a "Committee for Evaluation of Price Bid for appointment of International Consultant/ Expert" was formed. The officer of E&C Wing, CEA was nominated in the Committee.

c) A "Tender Evaluation Committee for Evaluation of Proposals for Selection of consultants" was constituted for carrying out the following studies under the Technical Assistance being provided to CEA under World Bank funded Coal Fired Generation Rehabilitation Project for addressing barriers to energy efficient rehabilitation & modernization of coal fired generating units in India:

(i) Implementation Support Consultant.

(ii) Consultant for studies regarding reduction of barriers to R&M interventions in thermal power stations in India.

(iii) Consultant for studies regarding developing markets for implementation of R&M in thermal power stations in India.

(iv) Consultant for review of experience form pilot R&M interventions in thermal power stations.

(v) Consultant for studies regarding strengthening institutional capacity at CEA.

The officer of E&C Wing, CEA was nominated in the Committee.

d) Power Sector has been facing financial resource crunch. To find out the ways for mobilization of financial resources and reducing the cost of Power Sector projects, MoP had set up a Committee of Experts on "Cost Benefit Analysis for granting fiscal incentives/ concessions for Power Sector". The officer of E&C Wing, CEA was nominated in the Committee.

e) As an effort of addition of more & more generation capacity under Ultra Mega Power Project policy, one more project namely Chhattisgarh UMPP in addition to earlier awarded four projects, has been launched. This project is also to be awarded based on tariff based competitive bidding guidelines.

For evaluation of bids for this project, an "Expert Committee (RfQ) for bid evaluation of Chhattisgarh UMPP" has been formed by Chhattisgarh Surguja Power Ltd. The officer of E&C Wing, CEA has been nominated in the Committee.

f) Rate of Royalty on coal & lignite was fixed in July 2007 which was to be revised every 3 years. For this purpose, Ministry of Coal under the chairmanship of Additional Secretary (Coal) has set up a Committee/ Study Group on revision of "Rates of Royalty on Coal & Lignite". The officer of E&C Wing, CEA has been nominated in the Committee.

9.8 The Electricity Act, 2003 & Follow-up

9.8.1 Electricity (Amendment) Act, 2007

The Electricity (Amendment) Act, 2007 amending certain provisions of the Electricity Act, 2003 has been enacted on 29th May, 2007 and brought into force w.e.f. 15th June, 2007. The main features of the Electricity (Amendment) Act, 2007 are:

- Central Government jointly with State Government to endeavor to provide access for electricity to all areas including villages and hamlets through rural electricity infrastructure and electrification of households.

- No licence required for sale from captive units.
- Deletion of the provision for "Elimination" of cross subsidies. The provision for reduction of cross subsidies would continue.
- Definition expanded to cover use of tampered meters and use for unauthorized purpose. Theft made explicitly cognizable offence and non-bailable.

9.8.2 Formulation of Regulations under the Electricity Act, 2003

As per Section 177 of the Electricity Act, 2003 (the Act), the Authority has been vested with the powers to make regulations. Following regulations have been notified:

i) Installation & Operation of Meters – notified on 17.3.2006.

ii) Procedures for Transaction of Business – notified on 18.8.2006.

iii) Technical Standards for Connectivity to the Grid – notified on 21.02.07.

iv) Furnishing of Statistics, Returns & Information - notified on 10.04.2007

Following regulations have been sent to Ministry of Power for notification after following the procedure of previous publication and getting vetted by Ministry of Law & Justice:-

i) Grid Standards for Operation & Maintenance of Transmission Lines u/s 34 of the Act.

ii) Amendment to the regulations on "Installation & Operation of Meters" u/s 55 (l) and 73(e) of the Act.

iii) Measures relating to Safety & Electric Supply u/s 53 of the Act.

Following regulations have been sent to Ministry of Power for vetting by Ministry of Law & Justice after following procedure of previous publication:

i) Technical Standards for Construction of Electric Plants and Electric Lines u/s 73(b) of the Act.

ii) Safety Requirement for Construction, Operation & Maintenance of Electrical Plants & Electric lines u/s 73 (c) of the Act.

9.9 Status of Power Sector Reforms

9.9.1 Restructuring of State Electricity Boards/Electricity Departments/ Power Departments

Though all the States have signed MoU/ MoA with MoP for unbundling/ corporatisation of State Electricity Boards (SEBs)/Power Deptts./ Electricity Departments, so far, out of 21 States in which all matters relating to generation, transmission and distribution of electricity were managed by respective SEB, 14 States have reorganized their SEBs viz. Orissa, Haryana, Andhra Pradesh, Chhattisgarh, Karnataka, Uttar Pradesh, Uttrakhand, Rajasthan, Delhi, Gujarat, Madhya Pradesh, Assam, Maharashtra and West Bengal.

Individual States are approaching the Central Government from time to time seeking extension of time for reorganization of their State Electricity Boards. As per the Electricity Act, 2003, the period of extension of continuing the SEBs is to be decided mutually by the State Government and Central Government. While considering request for extension on a case by case basis, the Central Government takes into consideration the progress made in the reorganisation and then decides as to how much extension should be agreed to. The Central Government has conveyed its consent to the following States for extension of time for reorganizing the SEBs:

S. No.	Name of State	Extension accorded upto
1.	Bihar	15.03.2010
2.	Himachal Pradesh	15.06.2009*
3.	Jharkhand	15.03.2010
4.	Kerala	31.03.2010
5.	Meghalaya	31.03.2010
6.	Punjab	15.02.2010
7.	Tamil Nadu	15.03.2010

*Request for extension not yet received

Besides the above, in eight States, viz. J&K, Goa, Sikkim, Arunachal Pradesh, Manipur, Mizoram, Nagaland and Tripura, all matters relating to generation, transmission and distribution of electricity are managed by the respective Power Departments/ Energy Department. The Electricity Act, 2003 is silent about State Power Departments. However, the State of Tripura (15th State- apart from the 14 States where SEBs have been reorgainsed) has created Tripura State Electricity Corporation Limited (TSECL) as a single Corporation to look after generation, transmission and distribution, trading and SLDC operations.

In addition there are six Union Territories (except Delhi) viz. Chandigarh, Puducherry, Lakshadweep, Andaman & Nicobar Island, Daman & Diu and Dadra & Nagar Haveli, which are having their own Power Department.

9.10 National Electricity Fund

The creation of National Electricity Fund (NEF) was announced in the Finance Minister's Budget Speech of Financial Year 2008-09. The objective of the NEF is to provide financial support to the State Power Utilities (SPU) for improving their Transmission & Distribution infrastructure. A Committee constituted under the chairmanship of Member (Power), Planning Commission considered various aspects of establishing the NEF. The Terms of Reference of the Committee are as follows:-

- Propose a structure to mobilise funds needed and arrangements for making it available to State Governments.
- Suggest other modalities under which the funds would be disbursed to the States and power utilities.

The following are the reasons to setup NEF:

- The focus of investment has been primarily towards generation;
- Commensurate investment not being made in T&D;
- State Power Utilities (SPU) neither have requisite financial resources nor have adequate borrowing capacity;
- The lenders perceive distribution projects of comparatively high risk;
- Borrowing at commercial rates by SPU from FIs, Banks, NBFCs, etc. for different schemes may be difficult;
  - Returns linked to AT&C losses
  - Level of reduction in AT&C losses may not be sufficient to service the debt.

The MoP have proposed to bridge this gap by 45% loan from NEF, 45% from counterpart loan from PFC/REC and 10% equity from SPU. The mobilization of funds for NEF has been proposed from multi-lateral agencies like World Bank, ADB and also from disinvestment of Power Sector CPSEs. For counter-part funding by PFC/REC, mobilization of funds has been proposed through a small fraction of India's foreign exchange reserves to be allocated by RBI to PFC/REC, SLR status to bonds issued by PFC/REC, Capital Gain Bonds to PFC/REC and External Commercial Borrowings (ECB).

Following issues need to be resolved in the process of setting up the NEF:

- The Plan scheme for interest subsidy may be extended to loans from the banking sector and other financial institution rather than restricting the subsidy only to loans taken from PFC & REC.
- The interest subsidy scheme be initially made applicable only for distribution work.
- Only non-Restructured Accelerated Power Development and Reforms Programme (R-APDRP) projects and schemes be made eligible under NEF.

PFC shall be the Nodal Agency to process the claim for subsidy received from various financial institutions including commercial banks and would also prepare terms and conditions for release of interest on subsidy amount.

9.11 Monitoring of National Electricity Policy-2005

As per the provisions of Section 3 of the Electricity Act, 2003, the Central Government is required to prepare the National Electricity Policy and Tariff Policy in consultation with the State Governments and the Central Electricity Authority. The Central Government may also, from time to time, in consultation with the State Governments and the Authority review or revise the National Electricity Policy and Tariff Policy so prepared. CEA decided to monitor the State-wise progress on actionable points contained in the National Electricity Policy.

CEA identified actionable points in the NEP and sent a questionnaire to all State Governments. Responses were received from 23 States. A meeting was also called to confirm and update the status of States of Northern Region on 8th September, 2009. These were tabulated and uploaded on CEA website. Brief findings are listed below:-

i. **Grid Code:** As per the National Electricity Policy, the SERCs were required to notify the Grid Code under the Electricity Act, 2003 not later than September 2005. Out of the 22 respondent States with SERCs, only Madhya Pradesh had notified the Grid Code within the required time period.

ii. **Independent functioning of SLDCs:** NEP has called attention to the fact that the spirit of the provisions of the Electricity Act is to ensure independent system operation through the Load Despatch Centres. However, no timeline for independent operation of SLDCs has been laid down in NEP. It is seen that SLDCs are still being operated by the State Transmission Utility in each of the respondent States. While some States have established SLDCs that are separate from the point of view of accounting and budgeting, operationally they continue to function under the State Transmission Utility.

iii **Initiation of Energy Audit and Declaration of Results:** A time-bound programme had to be drawn up by the SERCs for segregation of technical and commercial losses through energy audits. Energy accounting had to be conducted in each defined unit as determined by SERCs and its results had to be declared not later than March 2007. The responses received so far show that most of the discoms have only initiated action on energy audits. On the whole, however, results of Energy Audit have yet to be declared. Five States have reported that they have not yet initiated work related to energy audits. Some States have also reported that while they are taking work on energy audits, they are not yet in a position to undertake segregation of technical and commercial losses.

iv. **Open Access Charges:** Charges related to open access on transmission and cross subsidy surcharge for users of the distribution system have been fixed by the SERCs in

most of the respondent States The exceptions are the States of UP, Goa, Kerala, Mizoram, Nagaland and Arunachal Pradesh.

v. **Metering:** The NEP lays emphasis on comprehensive metering. Incomplete information on this crucial issue from most States reveals that this issue is not being monitored with the sincerity and intensity it merits.

- 11 kV Feeders: Metering on 11kV feeders is complete or near complete in 10 of the respondent States viz. HP, Rajasthan, Haryana, Maharashtra, Andhra Pradesh, Bihar, West Bengal, Orissa, Nagaland and Arunachal Pradesh. Of the remaining States, some discoms have reported 100% metering.

- DTRs: The status of metering of distribution transformers is something that needs to be focused on in all the respondent States. Only Delhi, Andhra Pradesh and Gujarat (Surat & Ahmedabad) provided 100% DTR meterings. The problems with respect to DTR metering could be for a combination of technical, social, financial reasons. Policy should be addressed to finding solutions for problems that are common to a majority of States.

- Consumers: On the issue of metering of individual consumers, most States have reported significant progress with Delhi Haryana, Himachal Pradesh, Rajasthan, Gujarat, Andhra Pradesh, Kerala, Tamil Nadu and Karnataka reporting 100% metering of individual consumers. However, metering of agricultural services is still to be achieved in most States including those which have reported 100% metering of non-agricultural consumers.

vi. **Standards for Loss Levels:** Emphasizing the overriding importance of containing system losses, the NEP has required the SERCs to set standards for loss levels from time to time. While responding to CEA's Question whether a long-term trajectory for reduction of AT&C losses has been specified by the SERCs, 11 of the 23 respondent States with regulatory commissions in place have said that such a trajectory has not yet been specified.

vii. **Third-party Testing of Consumer Meters:** SERCs were required to put in place independent third-party meter testing arrangements. This was meant to be a confidence building measure amongst the consumers and a mechanism to gather their support for the reform process. 13 out of 23 respondent States have not put this mechanism in place.

viii **Supervisory Control And Data Acquisition (SCADA):** A time-bound programme for implementation of SCADA and Data Management System was to be obtained from the distribution licensees and approved by SERCs. Only Delhi and Gujarat have responded in the affirmative. This system is not in place in the distribution companies in any other State. While no timeline is specified in the NEP for this purpose, it needs to be emphasized that the NEP states that these systems are useful for efficient working of distribution utilities. Action on essential efficiency measure needs to be initiated in a time-bound fashion. Reforms in the distribution segment need to be focused if the Power Sector is to turn around.

9.12 Tariff Analysis

For monitoring of Tariff Policy 2006, the questionnaire is under preparation in the financial year 2009-10 for seeking the information from the SERCs.

The Economic Policy Division of CEA has examined the Multi Year Tariff Orders for Delhi (for three discoms) for financial year 2008-09 and 2009-10. Tariff Order received from Gujarat

Electricity Regulatory Commission for financial years 2009-10 & 2010-11 has been examined in respect of issues relating to T&D Losses, Annual Revenue Requirement, Cost of Supply, Power Purchase Cost and O&M Expenses, etc.

9.13 Expenditure in Power Sector

CEA collated the capital expenditure based on the information available with the monitoring divisions of CEA and presented a consolidated picture of the expenditure incurred in generation, transmission and distribution segments of the Power Sector during financial years 2007-08 and 2008-09. A snapshot picture of expenditure in the Power Sector during 2007-08 and 2008-09 is given below:

(Figures in Rs. Crores, at Current Prices)

Sector	Type	2007-08	2008-09
Central	Thermal	13,501.87	15,444.11
	Hydro	3,974.90	5,349.90
	Nuclear	1,886.00	604.00
	Transmission	6,703.02	8,300.54
	Distribution	184.26	310.04
Total Central		26,250.05	30,008.59
State	Thermal	14,560.63	14,065.49
	Hydro	1,681.30	1,584.60
	Transmission	7,503.91	11,080.50
	Distribution	14,010.34	15,570.04
Total State		37,756.18	42,300.63
Private	Thermal	12,190.52	19,415.69
	Hydro	1,495.80	2,274.80
	Distribution	1,681.00	1,954.26
Total Private		15,367.32	23,644.75
All India	Thermal	40,253.02	48,925.29
	Hydro	7,152.00	9,209.30
	Nuclear	1,886.00	604.00
	Transmission	14,206.93	19,381.04
	Distribution	15,875.60	17,834.34
Grand Total-All India		79,373.55	95,953.97

NOTE

1	Investment in Thermal and Hydro projects benefiting 11th Plan and 12th Plan are included.
2	Investment in CPPs and NCE and Renewables are not included.
3	Investment (Normative basis) in UMPPs (Sasan and Mundra) is included.
4	Investment in Transmission: (220kV and above) for 2007-08 shows actual investment [Data from BSEB and States from North-East except ASEB (Assam) and Meghalaya have not been made avaialble.]; for 2008-09 data relates to estimated investment (except-PGCIL, UPPCL and DTL).
5	Investment in distribution (33kV and below) includes only for 23 out of 35 States/UTs (54 out of 73 Discoms/ SEBs including UTs). Data from Bihar, Goa, Jharkhand, Kerala, Karnataka (2 Discoms), Orissa (3 discoms), Sikkim, Arunachal Pradesh, Assam, Nagaland and Tripura , and UTs (Chandigarh, Lakshadweep, DNH) have not been made available.

9.14 Study on Projected Cost of Generating Electricity

Economic Adviser, Central Electricity Authority participated in the meeting organized by IEA/OECD Secretariat in Paris on 28th and 29th April, 2009. IEA/OECD has designed formats for reporting "Projected Cost of Generating Electricity" from plants that could be commissioned by around 2015.

The study aims to assess the projected cost of generating electricity using wide range of technologies, covering coal-fired and natural gas-fired plants, nuclear power plants, renewable source plants (including hydro, wind, solar and combustible renewable) and combined heat and power plants. Cost data are being generated on state-of-the-art power plants which can be commissioned by around 2015 and equipments that are commercially available now or will become so in the immediate future. The projected costs calculated with this data are intended to provide information for assessing the competitiveness of alternative technologies that may be chosen for electricity system expansion within next few years. Therefore, the data cover all the technology and plant specific cost components borne by electricity producers, including investment, O&M cost and fuel costs as well as costs related to pollution control, waste management and other health & environmental protection measures. The cost estimates reported incorporated all the elements borne by producers which include pre-construction, overnight construction, O&M cost (fixed and variable), fuel cost (including transportation, storage and waste management and disposable where applicable) and decommissioning cost.

In this context, a group of officials from Planning, Thermal, Hydro and E&C Wings of CEA has been constituted to fill-in the said formats for reporting projected cost of generating electricity from different technologies in India.

Two hydro-electric projects (one RoR type and the other storage type) and two thermal power plants (one on super-critical technology and the other on sub-critical technology) have been identified for the study.

9.15 Constitution of Electricity Regulatory Commissions (ERCs)

All the States except Arunachal Pradesh have constituted their respective State Electricity Regulatory Commission (SERC). The States of Manipur & Mizoram have constituted a Joint ERC. All the SERCs except the SERC of Sikkim are functional.

A separate Joint Electricity Regulatory Commission (JERC) has been constituted by the Central Government for Union Territories (except Delhi). On the request of Government of Goa, the State has been included in the JERC for UTs (other than Delhi). The nomenclature of JERC for UTs has been changed to "JERC for Goa and Union Territories".

9.15.1 Constitution of Special Courts

So far, 23 States viz. Assam, Andhra Pradesh, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Manipur, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, Uttrakhand, West Bengal and Delhi have set up Special Courts for expeditious disposal of cases relating to the theft of electricity.

9.15.2 Constitution of Consumer Grievances Redressal Mechanism

Consumer Grievances Redressal Forums (CGRF) have been constituted in 22 States by various distribution licensees for redressal of grievances of consumers.

Ombudsmen have been appointed in 22 States to look into the non-redressal of grievances by the CGRF.

9.16 Assistance to Ministry of Power

- Reply furnished in respect of taking action under Rule-3 of the Works of Licensee Rules, 2006 with Section-67 & 68 of the Electricity Act, 2003 in the case of approval and permission in respect of dedicated transmission line for Mundra Adani Power.
- Reply furnished on the reference received from Ministry of Statistics and Programme Implementation regarding draft rules under the Collection of Statistics Act, 2008.
- Comments furnished to MoP regarding 'Final Report of the State Advisory Committee – Electricity Board'.
- Material/ reply furnished to MoP regarding issues raised during the meeting taken by Principal Secretary to Hon'ble Prime Minister of India.
- Comments furnished to MoP regarding reference on The Delhi Industrial Development Operation and Maintenance Bill-2009 for prior approval of Central Government.
- Comments furnished to MoP regarding reference on The Karnataka Maintenance Bill-2009.
- Comments furnished to MoP regarding Note for Cabinet for approval of the proposal for enactment of Engineers Bill, 2009.
- Comments furnished to MoP regarding reference on 'Study to identify Anomalies in the Electricity Act, 2003'.
- Comments furnished to MoP regarding reference on 'Preparation of Warehousing (Development and Regulation) Appellate Authority Procedure Rules, 2010'.
- Comments furnished to MoP regarding reference on 'Substantially belated implementation of Rule-33 by Discoms-Recovery of charges from consumers who received connection on & after 01st July, 1966 and the effective date of implementing said Rules'.
- Comments furnished to MoP regarding reference on Draft Cabinet Note proposing amendments to the Companies Act, 1956 – Ministry of Corporate Affairs.

9.17 Legal Assistance/Advice to Utilities

- Comments furnished to the reference received from Energy & Petrochemical Deptt., Govt. of Gujarat regarding "Permission for laying overhead transmission line u/s 68(i) of the Electricity Act, 2003."
- Comments furnished to Chhattisgarh State Power Distribution Company Ltd. in respect of reference received from South Eastern Coalfields Ltd., Bilaspur regarding dispute between MPSEB & CSEB after the formation of new State of Chhattisgarh (Refund of Rs 21.36 Crores unilaterally deducted from coal sale bills by CSEB against power bills of Hasdeo area for the period May, 2001 to November, 2001).

9.18 Court Cases

Following court cases have been dealt with:

- Writ Petition (Civil) 79 of 2005 filed in the Hon'ble Supreme Court of India-Occupational Health and Safety Association v/s Union of India & Others-regarding Pollution by Thermal Power Plant.

- Writ Petition (Civil) 328 of 1999 filed in the Hon'ble Supreme Court of India – Power Crisis in NCT of Delhi v/s Union of India & Others- regarding Power Crisis in NCT of Delhi.
- Special Leave Petition (C) N0. 34941 of 2009 filed in the Hon'ble Supreme Court of India– M/s Indure P. Ltd. v/s Chhattisgarh State Power Generation Company Ltd. & Others - regarding tendering process followed by Chhattisgarh State Power Generation Company Ltd.
- Writ Petition (C) 40 of 2005 filed in the Hon'ble High Court of Sikkim- Shri Nar Bahadur Bhandari v/s UoI, CEA and Others- regarding commissioning of Hydro Project.
- Writ Petition No.211 of 2008 filed in the Hon'ble High Court of Uttrakhand - Shri Bharat Jhunjhunwala v/s. NHPC & Others- regarding Commissioning of Hydro Project.
- Writ Petition (Civil) No.32588 of 2008 filed in the Hon'ble High Court of Kerala- Kerala Electricity Employees Confederation v/s. Union of India & Others – regarding unbundling of State Electricity Board.
- Civil/Criminal Misc. Writ Petition No.1861 of 2009 filed in the Hon'ble High Court of Allahabad- Sh.Rajnath Mishra Vs. Union of India & Others- regarding billing of electrical energy without installing the meter.
- Writ Petition No.6021 of 2009 filed in the Hon'ble High Court of Rajasthan – J.K.Cement Ltd. v/s. Rajasthan Rajya Vidyut Prasaran Nigam Ltd. & Others regarding laying of transmission line.
- Writ Petition No. 6477 of 2009 filed in the Hon'ble High Court of Karnataka– Shri G.R.Mohan v/s UoI & Others - regarding the shortage of power in the State of Karnataka.
- Writ Petition No. 17329 of 2009 filed in the Hon'ble High Court of Andhra Pradesh – Ch. Venugopal Rao v/s UoI & Others- regarding laying of 400 kV Double Circuit line for evacuation of power from Vijyawada Thermal Power Station commissioned by APGENCO.
- Writ Petition No. 2866 of 2010 filed in the Hon'ble High Court of Bihar – Shri Ramjan Ansari v/s State of Bihar & Others – regarding expediting the commissioning of the Sinafdar HEP.
- C.C. No. 1210 of 2009 filed in the Hon'ble Court of Metropolitan Magistrate Tees Hazari, Delhi – Gaurav Kumar Gupta v/s NDPL & Others - regarding release of payment of bills.

9.19 Re-organisation of States – Redressal of Grievances of Employees

Consequent to reorganisation of States of Bihar (Bihar & Jharkhand), Madhya Pradesh (Madhya Pradesh & Chhattisgarh) and Uttar Pradesh (Uttar Pradesh & Uttrakhand), the distribution of employees and their grievances are to be examined and decided by Chairperson, CEA as Appellate Authority. During the year, 116 cases have been examined and recommendations sent to the respective Board/State Government after the approval of Appellate Authority.

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CHAPTER – 10
POWER GENERATION

10.1 Power Generation

Generation of power by the utilities & IPPs stood at about 771173 million units during the year 2009-10. This represents the growth of about 6.6% over the same period during previous year 2008-09 as per details given below:

Power Generation during 2009-10

Category	Programme (MU)	Actual (Tentative) (MU)	Shortfall(-) / Excess (+) (MU)	% of Pro-gramme	Growth (%) w.r.t. previous year Actual Generation
Hydro	115,468	106,656*	(-)8812	92.4	(-)5.7
Nuclear	19,000	18,654	(-)346	98.2	26.8
Thermal	648,479	640,522	(-)7957	98.8	8.5
Bhutan Import	6,564	5,341	(-)1223	81.4	(-)9.5
Total All India	789,511	771,173	(-)18338	97.7	6.6

*Including generation from some small hydro stations up to 25 MW capacity

It is seen from above table that during the year 2009 –10:

- Annual growth rate in power generation was about 6.6% over the same period during previous year 2008-09.
- Thermal power generation registered a growth rate of 8.5% mainly due to improved gas availability at the gas power plants located on the HBJ gas pipeline due to allocation of gas from KG D-6 basin resulting in higher growth rate of 32.6 %.
- Growth rate in nuclear power generation was 26.8% due to better availability of nuclear fuel.
- The negative growth in power generation from hydro power station was mainly due to less inflows into reservoirs resulting from low rainfall during monsoon.

The sector-wise PLF/Generation during 2009-10 is given below:

	PLF (%)	TARGET (MU)	ACTUAL (MU)
CENTRAL SECTOR			
THERMAL	85.5	261148	264739
NUCLEAR	51.1	19000	18654
HYDRO		43239	40874
Total		**323387**	**324267**

STATE SECTOR			
THERMAL	70.9	303192	287913
HYDRO		67123	60326
Total		**370315**	**348239**
PRIVATE SECTOR (UTILITIES)			
Total		**28486**	**28099**
PRIVATE SECTOR (IPPs)			
THERMAL*	84.8	57201	61304
HYDRO		3558	3923
Total		**60759**	**65227**
BHUTAN IMPORT			
HYDRO		**6564**	**5341**
ALL INDIA			
THERMAL		648479	640522
NUCLEAR		19000	18654
HYDRO		115468	106656
BHUTAN IMPORT		6564	5341
Total		789511	771173

*Includes import from some of the Captive Plants

10.2 Plant Load Factor of Thermal & Nuclear Power Stations

During the year 2009-10, the average PLF of thermal and nuclear power plants was 77.5% and 51.1% respectively. 53 thermal stations achieved PLF higher than the All India average PLF of 77.5% as per details given in the table below:

List of Thermal Power Stations which have achieved PLF above National Average of 77.5 % during the year 2009-10

S.No.	Name of Stations	State	Sector	Installed Capacity (MW)	PLF (%)
1	Dahanu TPS	Maharashtra	Pvt	500	102.3
2	Korba STPS	Chhattisgarh	Central	2100	97.6
3	Unchahar TPS	Uttar Pradesh	Central	1050	97.3
4	Simhadri	Andhra Pradesh	Central	1000	97.3

List of Thermal Power Stations which have achieved PLF above National Average of 77.5 % during the year 2009-10

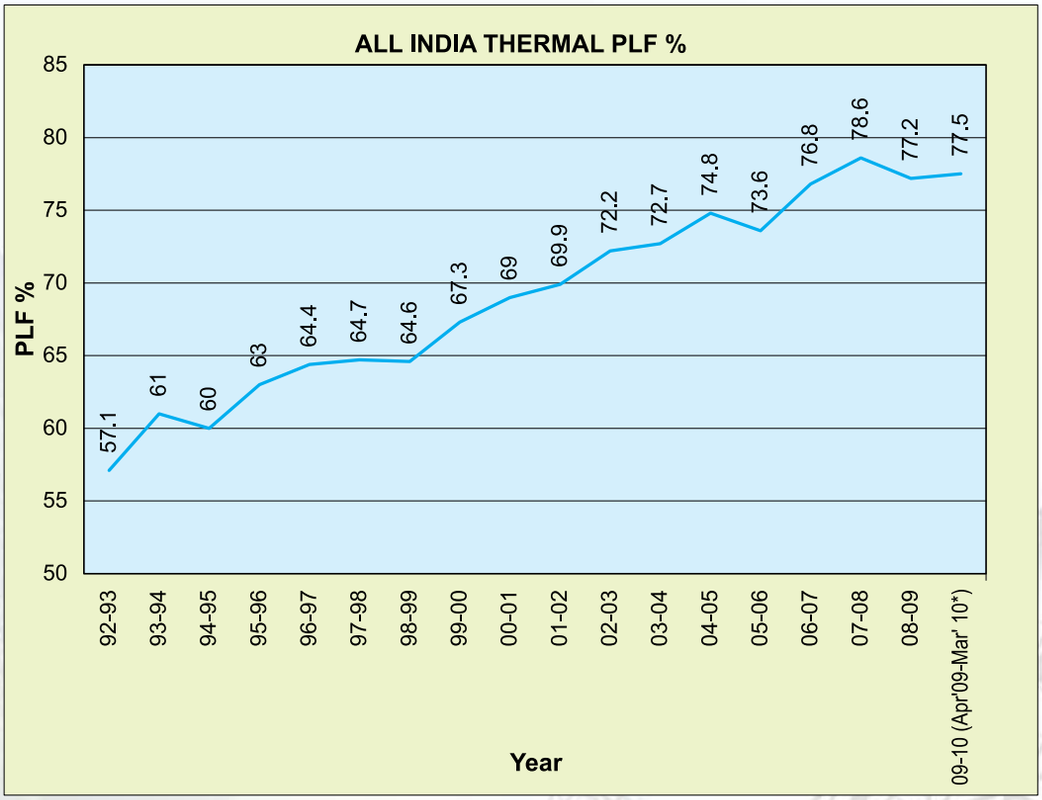
5	Dadri (NCTPP)	Uttar Pradesh	Central	1330	96.7
6	Torrent Power SAB.	Gujarat	Pvt	340	96.6
7	Vindhyachal STPS	Madhya Pradesh	Central	3260	96.6
8	Rihand STPS	Uttar Pradesh	Central	2000	95.6
9	GH TPS (Leh.Moh.)	Punjab	State	420	95.3
10	Ramagundem STPS	Andhra Pradesh	Central	2600	94.8
11	Budge Budge TPS	West Bengal	Pvt	750	93.6
12	Ramagundem - B TPS	Andhra Pradesh	State	63	93.5
13	Sipat STPS	Chhattisgarh	Central	1000	93.3
14	Op Jindal TPS	Chhattisgarh	Pvt	1000	93.2
15	Southern REPL. TPS	West Bengal	Pvt	135	93.2
16	Singrauli STPS	Uttar Pradesh	Central	2000	92.8
17	Tanda TPS	Uttar Pradesh	Central	440	92.2
18	Kothagudem TPS (New)	Andhra Pradesh	State	500	92.1
19	GH TPS II (Leh.Moh)	Punjab	State	500	91.5
20	Ropar TPS	Punjab	State	1260	91.1
21	Talcher STPS	Orissa	Central	3000	90.4
22	Titagarh TPS	West Bengal	Pvt	240	89.8
23	Kota TPS	Rajasthan	State	1240	89.7
24	Mundra TPS	Gujarat	Pvt	660	89.0
25	Talcher (Old) TPS	Orissa	Central	470	88.9
26	Korba-West TPS	Chhattisgarh	State	840	88.6
27	Dr. N.Tata Rao TPS	Andhra Pradesh	State	1760	87.8
28	North Chennai TPS	Tamil Nadu	State	630	87.6
29	Korba East V	Chhattisgarh	State	500	87.6
30	Torrent Power AEC	Gujarat	Pvt	60	87.0

List of Thermal Power Stations which have achieved PLF above National Average of 77.5 % during the year 2009-10

31	Mettur TPS	Tamil Nadu	State	840	86.8
32	Rayalaseema TPS	Andhra Pradesh	State	840	86.6
33	Panipat TPS	Haryana	State	1360	85.7
34	Wanakbori TPS	Gujarat	State	1470	84.8
35	Anpara TPS	Uttar Pradesh	State	1630	84.0
36	Surat Lig. TPS	Gujarat	Pvt	250	83.5
37	Badarpur TPS	Delhi	Central	705	82.7
38	Suratgarh TPS	Rajasthan	State	1500	82.3
39	Neyveli TPS-II	Tamil Nadu	Central	1470	82.0
40	Neyveli TPS(Z)	Tamil Nadu	Pvt	250	81.9
41	Khaparkheda TPS- II	Maharashtra	State	840	81.8
42	Yamuna Nagar TPS	Haryana	State	600	81.3
43	Neyveli (Ext) TPS	Tamil Nadu	Central	420	81.0
44	Torangallu TPS	Karnataka	Pvt	860	81.0
45	Raichur TPS	Karnataka	State	1470	80.8
46	Ib Valley TPS	Orissa	State	420	80.5
47	Korba-II	Chhattisgarh	State	200	80.0
48	Kothagudem TPS	Andhra Pradesh	State	720	79.7
49	Bhilai TPS	Chhattisgarh	Central	500	79.5
50	Bakreswar TPS	West Bengal	State	1050	78.3
51	Neyveli TPS - I	Tamil Nadu	Central	600	78.2
52	Tuticorin TPS	Tamil Nadu	State	1050	77.9
53	Gandhi Nagar TPS	Gujarat	State	870	77.6

It may be seen from the above table that 21 thermal power stations with an aggregate installed capacity of 25248 MW had the distinction of achieving PLF above 90%. All India Sector-wise/Organization-wise, thermal generation, target & actual generation, PLF for the year 2009-10 is given in **Annexure-10A.**

The trend in All India PLF from 1992-93 onwards is shown below:



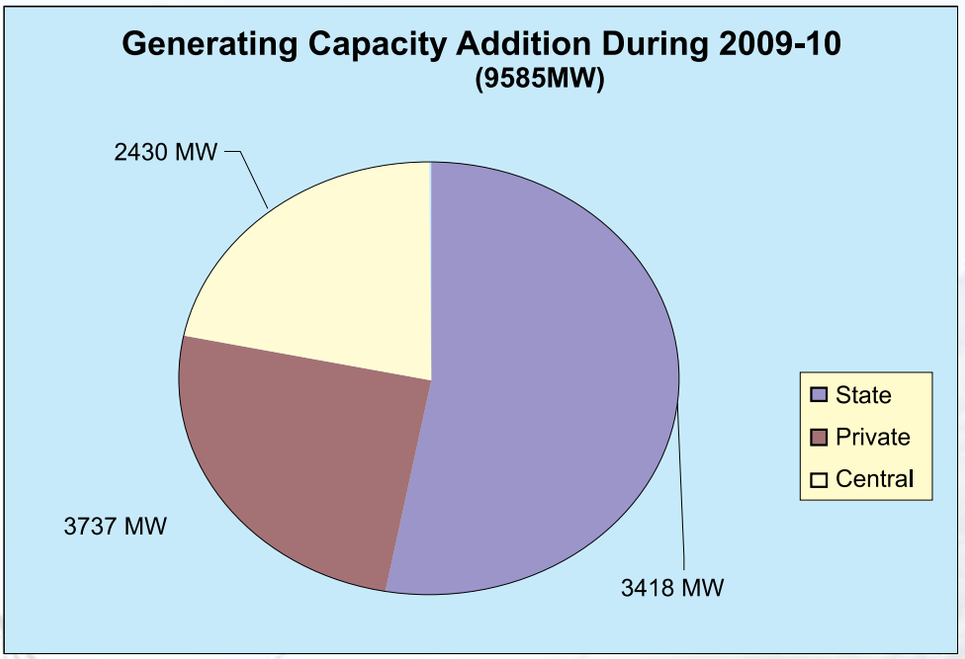
10.3 Generating Capacity Addition

During the year, a total of 9585 MW generation capacity was added which comprised 39 MW of hydro and 9546 MW of thermal. The capacity addition during the last 7 years is given below:

Year	Central Sector	State Sector	Private Sector	Total
2003-04	3035.00	816.62	100.00	3951.62
2004-05	2778.00	1571.32	70.00	4419.32
2005-06	1370.00	1531.48	660.80	3562.28
2006-07	4630.00	1693.00	551.80	6874.80
2007-08	3240.00	5273.00	750.00	9263.00
2008-09	750.00	1821.20	882.50	3453.70
2009-10	2430.00	3418.00	3737.00	9585.00

Note: i) During 2004-05, Upration in Hydro=50.40 MW & Nuclear=50 MW
ii) During 2005-06, Upration in Hydro=24 MW & Nuclear=50MW
iii) The above figures do not include Deration, Retirement and Installed Capacity of Renewable Energy Sources.

Sector-wise generating capacity addition during 2009-10 is also shown in the chart below:



10.4 Installed Electricity Generation Capacity

Total All India Installed Electricity Generation Capacity as on 31.3.2010 is 159398.49 MW comprising of Thermal 102453.98 MW, Hydro 36863.40 MW, Nuclear 4560.00 MW and 15521.11 MW from Renewable Energy Sources (RES). The details are shown in the Tables given below:

Type	Central Sector (MW)	State Sector (MW)	Private Sector (MW)	Total (MW)
HYDRO	8565.40	27065.00	1233.00	36863.40
THERMAL	37867.23	49625.73	14961.02	102453.98
NUCLEAR	4560.00	0.00	0.00	4560.00
RES	0.00	2701.12	12819.99	15521.11
Total	**50992.63**	**79391.85**	**29014.01**	**159398.49**

State-wise/ Region-wise/ Sector-wise and prime mover-wise summary of installed capacity under utilities is given in **Annexure-10B.**

The growth of installed generating capacity (reconciled) in the country is shown in the table below:

(Capacity in MW)

Year (at the end of)	Thermal	Nuclear	Hydro	Wind*	Total
Dec.1947	854	-	508	-	1362
Dec.,1955	1755	-	940	-	2695
March, 1961	2736	-	1917	-	4653
March, 1966	4903	-	4124	-	9027
March, 1974	9058	640	6966	-	16664

Year (at the end of)	Thermal	Nuclear	Hydro	Wind*	Total
March, 1980	16424	640	11384	-	28448
March, 1985	27030	1095	14460	-	42585
March, 1990	43764	1565	18307	-	63636
March, 1991	45768	1565	18753	-	66086
March, 1992	48086	1785	19194	-	69065
March, 1996	60083	2225	20986	-	83294
March, 1997	61012	2225	21658	900	85795
March, 1998	64005	2225	21904	968	89102
March, 1999	67566	2225	22479	1024	93294
March, 2000	70193	2680	23857	1155	97885
March, 2001	72343	2860	25153	1270	101626
March, 2002	74429	2720	26269	1628	105046
March, 2003	76762	2720	26767	1628	107877
March, 2004	77969	2720	29507	2488	112684
March, 2005	80902	2770	30942	3812	118426
March, 2006	82410	3360	32326	6191	124287
March, 2007	86015	3900	34654	7760	132329
March, 2008	91907	4120	35909	11125	143061
March, 2009	93725	4120	36878	13242	147965
March, 2010	102454	4560	36863	15521	159398

*Renewable Energy Sources (RES) includes Small Hydro Project, Biomass Gasifier, Biomass Power, Urban & Industrial Waste Power.

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Visit of CEA officers to Bokaro Thermal Power System for RLA nd Steam Path Audit conducted by M/s Evorik Energy Germany

CHAPTER – 11
POWER DEVELOPMENT IN NORTH-EASTERN REGION

11.1 Hydro-electric Potential in North-eastern Region

As per Re-assessment Studies carried out by CEA, hydro potential of the North Eastern Region in terms of installed capacity has been estimated as 58971 MW (58356 MW above 25 MW capacity). Out of the above, 1116 MW (above 25 MW capacity) have been harnessed so far while projects amounting to 2876 MW (above 25 MW capacity) are under construction. State-wise identified hydro-electric potential (above 25 MW) of North-eastern Region and its status of development is given below:

Region / State	Identified potential as per Re-assessment Study (MW)		Capacity Developed (Above 25 MW) (MW)	Capacity Under Construction (Above 25 MW) (MW)
	Total	(Above 25 MW)		
Meghalaya	2394	2298	156	166
Tripura	15	0	0	0
Manipur	1784	1761	105	0
Assam	680	650	375	0
Nagaland	1574	1574	75	0
Arunachal Pradesh	50328	50064	405	2710
Mizoram	2196	2131	0	0
Total	**58971**	**58356**	**1116**	**2876**

11.2 Survey & Investigation of Hydro Projects

The Government approved a Three Stage Clearance procedure for hydro projects to be executed by CPSUs in consultation with MoF and MoEF. Under Stage-I, the CPSUs will incur expenditure on Survey & Investigation and preparation of Pre-feasibility Report. Under Stage-II, the CPSUs will undertake activities relating to detailed investigation and preparation of Detailed Project Report. During this Stage, pre-construction activities and infrastructure development including land acquisition will also be undertaken. Under Stage-III, approval of PIB/CCEA would be sought for investment decision in respect of construction of the projects.

11.3 Preparation of DPRs under 50,000 MW Hydro Initiative

Ranking studies were earlier completed by CEA in October, 2001 in order to expedite hydro power development in the country in a systematic manner. Subsequently, Preliminary Feasibility Reports (PFRs) were prepared in respect of 62 schemes in NE region under "50,000 MW Hydro Electric Initiative" launched by Govt. of India in May, 2003. Low tariff H.E. schemes 17 Nos. (with first year tariff less than Rs.2.50/kWh) with aggregate capacity of 17,487 MW have been selected for taking up of detailed survey & investigation and preparation of DPR/ implementation. Out of these, DPR of 6 schemes namely Talong (225MW), Dibbin (120MW), Badao (70 MW),

Mawhu (90 MW), Demwe Lower (1750 MW) and Tato-II (700 MW) have already been prepared. The status of preparation of DPRs for H.E. projects in North Eastern Region is given at **Annexure-11A.**

11.4 Mega Hydro Electric Projects planned in North-eastern Region

The Region presents very attractive sites for providing large storage with multi-purpose aspects of development. Major developments are under various stages in Siang, Subansiri and Dibang basins in Arunachal Pradesh and Tipaimukh (1500 MW) in Manipur.

11.4.1 Siang Basin Projects – Arunachal Pradesh

Due to large scale submergence and displacement of population involved in the original project proposal, 4 kms. upstream of Rotung village in Arunachal Pradesh, the project was modified into three separate schemes envisaging a total capacity of about 13,600 MW in three power houses. Brief details of these three schemes are as under:

S. No.	Name of the scheme	Location (Distt./ Village)	Capacity (MW)	Present Status
1.	Siang Upper/ Intermediate H.E Project Upstream of Yingkiong near Pugging village on Siang River	East Siang/ Pugging	11,000	Feasibility Report (FR) prepared by NTPC for Siang Upper Stage-I (6000 MW) and Stage-II (3750 MW) avoiding submergence of important towns. State is yet to allot the project for implementation.
2.	Siang Middle H.E. Project 15 kms. upstream of Raying near Roing village on the Siyom River which is a tributary of Siyom River	West Siang/ Roing	1,000	DPR of the project was earlier prepared and submitted by NHPC in September, 2003 and returned by CEA in September, 2003. Environmental clearance accorded by MoEF on 11.02.05. Subsequently, State Govt. allocated the project for execution on BOOT basis and an agreement in this regard has been signed on 22.02.06 between Reliance Energy Ltd. & Govt. of Arunachal Pradesh. DPR likely during 2010-11.
3.	Siang Lower H.E. Project Upstream of Pasighat near Routung village	Near Pasighat/ Routung	2,700	The project was earlier allocated by Govt. of Arunanchal Pradesh to NHPC and Commercial viability of the project to NHPC was accorded by CEA on 25.03.2004. The State Govt. later on allocated the project to JP Associate Ltd. (JAL) for project development on BOOT basis and MoA was signed on 22.02.2006 between JAL and Govt. of Arunanchal Pradesh. Further in pursuance to Tripartite Agreement signed on 13.12.2007, all aspects of obligation were transferred to Jaiprakash Power Ventures Ltd. Subsequently, to incorporate an SPV for implementation of Lower Siang HEP, M/s Jaypee Arunachal Power Limited (JAPL) was formed to which Govt. of Arunanchal Pradesh accorded its consent.

S. No.	Name of the scheme	Location (Distt./ Village)	Capacity (MW)	Present Status
				DPR submitted by M/s JPVL was for an installed capacity of 2,400 MW. After series of meetings/ discussions, value additions were made by CEA/ CWC, changes in layout were suggested due to which, it has been possible to accommodate one more generating unit of 300 MW thus increasing installed capacity of project from 2,400 MW to 2,700 MW and increasing design energy from 12,478 GWh to 13,237 GWh. Concurrence of CEA to Siang Lower HE project for installed capacity of 2,700 MW was accorded on 15.2.2010.

11.4.2 Subansiri Basin Projects – Arunachal Pradesh

The originally identified project envisaged installed capacity of 4,800 MW. Subsequently, Govt. of Arunachal Pradesh accorded approval for development of three separate projects in place of earlier single project proposal in order to avoid submergence of Daporijo town and also to reduce displacement of people and to have minimal impact on the environment. The three separate schemes envisage total capacity of 5,600 MW and are as under:

S. No.	Name of Scheme	Location (District/ Village)	Capacity (MW)	Present status
1.	Subansiri Lower H.E. Project Gerukamukh village near original site on Subansiri River	Lower Subansiri / Gerukamukh	2,000	The project has been approved by CCEA on 09.09.2003 & is under construction by NHPC. The project is likely to be commissioned during 2012-14.
2.	Subansiri Middle H.E. Project Upstream of Tamen village on Kamla river which is tributary of Subansiri river	Lower Subansiri/ Tamen	1,600	Project allotted to M/s Jindal Power Ltd. DPR likely by April, 2012.
3.	Subansiri Upper H.E. Project. Upstream of Daporijo near Mengal village on Subansiri River	Upper Subansiri/ Menga	2,000	The project is allotted to M/s KSK.

11.4.3 Tipaimukh Dam Project (6x250 = 1500 MW) – Manipur

Tipaimukh H. E. Project is a multipurpose project involving hydro power generation, flood control and irrigation. The scheme envisages construction of a dam across river Barak immediately downstream of the confluence of the Tuivai River. The scheme envisages an installed capacity of 1,500 MW (6x250 MW). The project was entrusted to M/s NEEPCO for execution. However, lately MoP vide its letter dated 06.07.09 communicated that the implementation of the project would be done through a Joint Venture

among NHPC (69%), SJVNL (26%) and Govt. of Manipur (5%). Formation of Joint Venture is in progress.

The project was techno-economically cleared by CEA vide its letter dated 2.7.2003 at an estimated cost of Rs.5163.86 crores at December 2002 price level including IDC of Rs.757.26 crores. Part estimate of Rs.9.52 crores for undertaking some works on priority under Stage-II activities of the project was recommended by CEA on 2.04.2004.

Revised Cost Estimates of the project were cleared by CEA for an amount of Rs.6701.97 crores including IDC of Rs.816.40 crores at December 2004 price level on 6.05.2005. This estimate also included additional provision of Rs.1100.78 crores as Net Present Value (NPV) @ Rs.5.8 lakh per Hectare of submerged forest land converted for non-forestry use.

First PIB meeting was held on 25.10.2005. As per the minutes of the meeting, MoP had to submit a Supplementary Note to be studied and considered in the Core Group of the PIB for finalizing its recommendations. Second PIB meeting was held on 31.01.2006 which recommended the project for placement before CCEA for consideration, subject to the following observations:

i) Costs relating to flood moderation, diversion of National Highways and external security may be borne by the concerned administrative departments. The costs should be updated and availability of funds confirmed in the Note for CCEA.

ii) Ministry of Power may take up the issue of high NPV cost with the MoE&F and reflect the outcome in the Note for CCEA.

iii) Ministry of Power may persuade the State Governments of Mizoram and Manipur to reduce their share of free power from the project.

iv) Project costs may be updated to December 2005 price level.

v) Ministry of Power would obtain Environment and Forest Clearance before submitting the proposal for consideration of CCEA.

vi) Risks relating to law and order and R&R to be explained clearly in the CCEA Note, along with strategies for risk mitigation. Views of Manipur and Mizoram Governments in this regard to be brought on record.

vii) PPAs may be firmed up before the project is submitted for consideration of CCEA.

viii) Adequacy of technical investigations, including critical design parameters, may be confirmed by the project authority to avoid any future surprises.

As per PIB observations, following actions have been taken:

i) The updated Revised Cost Estimates submitted by NEEPCO to CEA at November, 2005 price level were vetted by CEA on 22.03.2006 as Rs.5026.84 crores (as hard cost excluding IDC, flood moderation, diversion of National Highway and external security). Subsequently, CEA vetted the IDC component as Rs.828.99 crores (November, 2005 price level) in August, 2006. Thus, the total cost at November, 2005 price level works out to Rs.5855.83 crores. This cost did not include the cost of flood moderation, diversion of National Highway and external security.

ii) In a meeting taken by Secretary (Power) on 26.2.2008 in MoP, NEEPCO indicated that MoWR on 15.12.2005 had conveyed approval for meeting cost of flood component. Ministry of Shipping, Road Transport and Highways conveyed their 'In Principle Approval' to meet cost of National Hightway diversion on 14.9.2006. MHA conveyed 'In Principle Approval' on

28.9.2006 of cost for providing external security with the mention that decision regarding this would be required to be taken by CCEA.

iii) The project has been accorded Environment Clearance on 24.10.2008.

iv) The Forest and Environment Department, Govt. of Manipur has submitted the revised proposal for diversion of forest land to MoEF, Govt. of India on 23.03.09. The revised proposal for diversion of forest land has been processed by the Department of Forest, Govt. of Mizoram and the same is expected to forward its recommendation to MoEF, Govt. of India shortly.

v) Formation of Joint Venture: As per MoP letter dated 06.07.09, the implementation of the project would be done through a Joint Venture among NHPC (69%), SJVNL (26%) and Govt. of Manipur (5%). Formation of Joint Venture is in progress.

11.4.4 Dibang Multipurpose Project- (12x250 = 3000MW) – Arunachal Pradesh

Dibang Multipurpose Project located on Dibang River in Lower Dibang Valley district of Arunachal Pradesh has been conceived to provide flood moderation benefits to the downstream areas of the project besides power generation. The scheme envisages an installed capacity of 3000 MW.

As per decision taken in a meeting held in July, 2006 between Hon'ble Chief Minister of Arunachal Pradesh and Hon'ble Minister of Power, an MoU for execution of the project as a joint venture was signed between NHPC and Govt. of Arunachal Pradesh on 21.09.2006. Later, an MoA was signed on 24th June, 2007 between Govt. of Arunachal Pradesh and NHPC for execution of the project by NHPC on ownership basis without any equity participation by the State Govt.

CEA accorded concurrence to the project on 23.1.2008. The estimated present day cost of the project at November, 2007 price level including IDC and FC without provision for external roads and bridges is Rs.15886.39 crores and with external roads and bridges is Rs. 16425.65 crores.

The project was considered at PIB meeting held on 28.1.2008. As per minutes of meeting circulated by MoP on 27.2.2008, the project was recommended for posing to CCEA for approval of Rs.15886.39 crores without provision of cost component for external roads and bridges subject to following conditions.

1) Possibility of funding through external debt and subordinate debt may also be explored to reduce the cost of the project.

2) The cost of external roads, bridges and providing flood moderation benefits should not be loaded to the project cost.

3) The construction period of 9 years needs to be compressed so that the benefits from the project could accrue much earlier, thereby resulting in reduction in IDC and FC charges.

4) The difference between base cost and completion cost of the project seems to be on higher side as compared to other Hydro Projects, which needs to be examined further.

The PIB suggested that a committee should be set up to address the above issues and finalise report which would be taken into consideration while preparing the Note for CCEA. Meanwhile, environment, forest and other statutory clearances for the project may also be obtained to facilitate posing of the project to CCEA for Investment Approval.

In pursuance of PIB meeting, a Committee was set up by MoP on 23.4.2008 which submitted its report with the following recommendations:

(a) Considering remoteness of the place, present infrastructure, future development to be undertaken, etc. compression of construction period is not feasible.

(b) Keeping in view the location of the project (border State), stipulated conditions being imposed by foreign funding agencies and the national security concern, external funding is not taken into consideration.

(c) There is energy generation loss of about 880 MU due to flood moderation. The cost of flood moderation should be borne by MoWR.

(d) Rate of interest on loan to be considered as 11% instead of 11.5%. Exemptions on Excise Duty and Custom Duty as applicable to Mega Projects to be considered. The cost of project was recommended as Rs.14892.04 crores as against Rs.15886.39 crores (without external roads) as cleared by CEA. In the report, the cost apportioned to flood moderation component was taken as Rs.1107 cores.

MoWR vide their letter dated 28th August, 2008 forwarded their recommendation on cost of flood moderation component for Dibang MPP as Rs.1074 crores. NHPC on 22.9.2008 intimated that the total cost of the project at November, 2007 price level considering grant of Rs.1074 crores for flood moderation works out to Rs.14905.21 crores including IDC and FC of Rs.1916.43 crores.

The Environment & Forest Clearances are yet to be accorded.

Earlier, as per EIA Notification, 1994, EIA/EMP reports were prepared and public hearing for Lower Dibang Valley District was conducted on 29.01.2008. Public Hearing for Dibang Valley District could not be conducted due to public agitation. In the meantime, extended period for submitting the proposal for Environmental Clearance under EIA Notification, 1994 expired on 13.09.2008 and the proposal needed clearance under new EIA Notification, 2006.

Terms of Reference (ToR) for pre-construction activities and EIA/EMP studies as per new notification were approved on 17.08.2009. Additional studies of EIA/EMP reports as per ToR were awarded on 18.11.09. The Fresh hearing in both districts needs to be conducted.

Forest land involved is 5056.5 ha and proposal was submitted to the Conservator of Forests (Cons) & Nodal Officer (FC) on 16.01.2006. Degraded forest land required for compensatory afforestation i.e 10113 ha has been identified and that proposal has been submitted to Conservator of Forests, Tezu by respective forest divisions. The State Govt. has not yet submitted the proposal to MoEF, Govt. of India.

11.5 Identification of Candidate Hydro Projects for 12th Plan

Action has been initiated to take up candidate H.E. projects for survey and investigation/ DPR preparation and other construction activities well in advance so as to achieve the ambitious programme of capacity addition in the coming Plans. To meet the requirement of additional capacity during the 12th Plan (2012-17), a shelf of 87 candidate hydro projects having aggregate capacity of 20,334 MW has been prepared which included 21 schemes with aggregate capacity of 8,019 MW in N.E. region. Considering the present preparedness and anticipated difficulties in execution, the benefits from the shelf of 21 candidate projects in North-eastern Region has been revised to a capacity of about 6,519 MW. A list of Candidate Hydro Projects in North-eastern Region for benefits during 12th Plan is given at **Annexure-11B.**

11.6 Status of Various Hydro Power Projects in North-eastern Region

11.6.1 Central Sector Projects

A) Sanctioned Projects

i) Tuirial HEP (2x30 = 60 MW), Mizoram, NEEPCO

The project was approved in July, 1998 at an estimated cost of Rs.368.72 crores with likely completion by 2006-07. This project was under execution with loan assistance from JBIC and presently under hold due to poor law & order conditions and agitation by claimants of crop compensation.

Continuation or otherwise of the project is being reviewed due to increase in the project cost and resumption of work is dependent upon viability of the project, which is under consideration of the Govt. of India. The project cost is financed substantially under loan assistance of 11,695 Million Japanese Yen from Japan Bank of International Co-operation (JBIC).

CEA on 3.11.05 informed MoP that the present day cost of the project at October 2004 price level is likely to be Rs. 687.80 crores (including IDC of Rs. 40.05 crores and financing charges Rs. 0.16 crores). The first year tariff at this cost comes to Rs. 3.69/kwh and with this high cost/tariff, project appears to be unviable.

The Revised Cost Estimates have been vetted by CEA a number of times and lastly, CEA vide letter dated 27.8.09 approved the total hard cost of Rs. 836.14 Cr (civil works-699.47 Cr. + E&M works-136.67 Cr.) at June, 2009 Price Level subject to certain observations and informed the same to MoP.

Subsequently, PIB meeting was held on 19.03.10 for considering revival of Tuirial H.E project. As per minutes of meeting, NEEPCO has to update the cost estimates of the project at March 2010 Price Level.

ii) Loktak Down Stream (66 MW), Manipur, NHPC

The project, to be executed by NHPC, was cleared by CCEA for an Installed Capacity of (3x30=90 MW) on 31.12.1999 at an estimated cost of Rs.78.62 crores including IDC of Rs.46.95 crores (April 1999 price level). The Environmental Clearance was granted by MoEF on 4.2.99 and Forest Clearance on 3.1.97.

The project is now proposed to be executed by a Joint Venture between NHPC and Government of Manipur with revised capacity of 66 MW. CEA accorded concurrence on 15.11.2006 to the revised proposal with reduced capacity of 66MW.

The MoU and Promoters' Agreement for implementation of the project on joint venture basis were signed by Govt. of Manipur with NHPC on 14.9.2007 and 26.9.2008 respectively. The "Loktak Downstream Hydroelectric Corporation Limited" has also been incorporated on 23.10.2009.

NHPC vide their letter dated 16.02.2010 requested CEA for transfer of TEC in favour of newly formed Joint Venture Company(JVC) viz. Loktak Downstream Hydroelectric Corporation Limited. CEA vide its communication dated 11.03.2010 informed NHPC that a request of transfer of TEC has to be made by the new agency i.e Loktak Downstream Hydroelectric Corporation Limited. Request from the JVC is awaited.

Ministry of DoNER vide their letter dated 24.11.2008 have accorded administrative and financial approval for central financial assistance form Non-Lapsable Central Pool of Resources (NLCPR) to the Govt. of Manipur towards the Barrage component of the project amounting to Rs. 9862.80 lakhs which is 90% of the barrage

approved cost of Rs. 10958.67 lakhs. For balance Rs. 100 Crores, grant has to be arranged by Govt. of Manipur from the appropriate authority.

Environment & Forest Clearance for the revised proposal of project for installed capacity of 66 MW is yet to be accorded. MoEF on 16.11.2006 asked NHPC to obtain fresh Environmental Clearance. Prior/Environmental clearance for undertaking pre-construction activities and approval of ToR for the EIA & EMP studies has been accorded by MoEF on 20.4.2007. EIA/EMP studies are under progress with Centre for Interdisciplinary Studies on Mountain and Hill Environment, University of Delhi, New Delhi (CISMHE).

Regarding Forest Clearance, proposal for diversion of 223.5 ha. of forest land has been submitted by Project Authorities to State Forest Department on 26.5.2009.

iii) Pare Hydro Electric Project (2x55=110 MW) in Arunachal Pradesh

Pare HEP located in Papumpare District of Arunachal Pradesh was accorded concurrence of CEA on 24th Sept., 2007 for an estimated present day cost of Rs.553.25 crores including IDC & FC of Rs.49.26 crores at June 2007 Price Level.

CCEA approval has been accorded to the project on 4.12.2008 for Rs.573.99 crores including IDC of Rs.67.66 crores and FC of Rs.0.40 crores at June, 2007 Price Level. The completion cost considering 44 months as construction period is estimated as Rs.674.45 crores including IDC as Rs.76.52 crores and FC as Rs.0.47 crores.

B) CEA Cleared Projects

(i) Tuivai H.E. Project (3x70=210 MW) in Mizoram cleared for Central Sector and transferred to State Sector

The scheme was considered in concurrence meeting of CEA and concurrence letter was issued on 19.2.1999. The present day cost at March 1997 price level was Rs. 964.22 crores including IDC component of Rs.47.31 crores. The completed cost was estimated as Rs.1258.84 crores including IDC of Rs.58.89 crores.

NEEPCO submitted Revised Cost Estimates of the project in July 2003. CEA vide its letter dated 28.05.2004 approved an amount of Rs.1122.51 crores (April 2003 Price Level) including IDC component of Rs.15.18 crores. Design energy of 620.82 GWh has been taken corresponding to TG efficiency of 92% (instead of 87% taken at the time of TEC).

As per minutes of meeting taken by Secretary (Power) on 12.01.2006, at the request of the State Govt. of Mizoram, Ministry of Power/ NEEPCO agreed to hand over the project to the State Government. Besides, it was suggested that State Govt. may consider making NEEPCO a Joint Venture partner. The decision of State Govt. is awaited.

11.6.2 State Sector Projects

A) CEA cleared Projects

i) Bairabi Dam (2x40=80 MW), Mizoram, by Power & Electricity Deptt., Govt. of Mizoram

The project, to be executed by Power and Electricity Department, Mizoram, was given concurrence by CEA at an estimated completed cost of Rs.549.43 crores (including IDC of Rs.13.99 crores) and present day cost of Rs.441.67 crores (including IDC of Rs.11.25 crores) at March 2000 Price Level on 9.11.2000.

As informed by Govt. of Mizoram, at the time of examination of DPR, funds for the project were proposed to be provided by Govt. of India as Central Assistance with terms and conditions of assistance to be governed by the rules followed in case of Special Category State i.e. 90% grant & 10% loan (with simple interest @ 10%). However, no Letter of Commitment

from Govt. of India or Comfort Letter to this effect was made available to CEA. CEA found this project to be viable in case the project was funded on the aforesaid basis (90% grant). In the event of any change in the funding pattern, the project would require a fresh examination and Techno-economic Clearance for which the Govt. of Mizoram should revert back to CEA. One of the conditions stipulated in TEC letter was that if time gap between TEC and actual start of work is more than 3 years, a fresh TEC of the project would be required.

Proposal for funding the project through various agencies was being pursued by the State Govt. On the request of State Govt., validity of TEC had been extended six times, last one being up to 8.11.2007.

Govt. of Mizoram on 21.08.2007 requested for further extension of TEC indicating that Mizoram was seeking Viability Gap funding for the project. CEA observed that during the last seven years, more hydrological data would have become available necessitating reassessment of power potential. As the Cost Estimates were more than 7 years old, they needed revision. Moreover, Govt. of Mizoram proposed to adopt public-private partnership mode for implementation of the project, which would change the funding pattern as well as executing agency. Taking these factors in view, CEA did not consider it appropriate to grant further extension of validity of TEC. The Govt. of Mizoram was informed accordingly vide CEA letter dated 1.10.2007.

11.6.3 Private Sector Projects

A) CEA Concurred Projects:

a) Demwe Lower HE Project (5x342 + 1x40=1750 MW), Arunachal Pradesh by M/s ADPPL

Demwe Lower HE Project was accorded concurrence by CEA on 20.11.2009 for an estimated cost of Rs. 13144.91 Crores (Completion Cost). MoEF has accorded Environmental Clearance to the project on 12.2.10. Forest Clearance is under process.

Financial closure is yet to be achieved.

b) Dibbin HE Project(2x60=120 MW), Arunachal Pradesh

Dibbin HE Project was accorded concurrence by CEA on 04.12.2009 for an estimated cost of Rs. 728.54 Crores (Completion Cost). Environment and Forest Clearance is under process. Financial closure is yet to take place.

c) Lower Siang HE Project (9x300= 2700 MW), Arunachal Pradesh by M/s JAPL

Lower Siang HE Project was accorded concurrence by CEA on 15.02.2010 for an estimated cost of Rs. 19990.74 Crores (Completion Cost). Environment and Forest clearance is under process. Financial closure is yet to take place.

11.6.4 H.E. Projects Allotted for implementation in the N.E. Region and yet to be taken up for construction

A total of 92 H.E. Projects (above 25 MW capacity) with aggregate capacity of 39513 MW have been allotted in N.E. Region to Central and Private Sector for implementation in the near future and yet to be taken up for construction. Further 25 schemes with aggregate capacity of 16175 MW have been identified which are yet to be allotted/ referred by State. Category-wise, these schemes are summarized below:

Summary of H.E Projects (above 25 MW capacity) in the N.E. Region (yet to be taken up for construction)

Name of State	Central		Private		Unallocated/State		Total	
	No.	I.C. (MW)	No.	I.C. (MW)	No.	I.C. (MW)	No.	I.C. (MW)
Ar. Pradesh	4	5870	75	29512	8	14785	87	50167
Assam	-	-	-	-	5	360	5	360
Manipur	2	1566	-	-	3	195	5	1761
Meghalaya	1	90	7	1745	7	635	15	2470
Mizoram	3	730	-	-	1	60	4	790
Nagaland	-	-	-	-	1	140	1	140
Total (NER)	**10**	**8256**	**82**	**31257**	**25**	**16175**	**117**	**55688**

11.7 Status of Construction of Thermal Power Projects in North-eastern Region

The progress of various thermal power projects under construction in North-eastern Region is given below:

a) Lakwa Waste Heat Recovery Project (Steam Turbine -37.2 MW):

The project is being executed by Assam Power Generating Company Limited in the Sibsagar District of Assam State. EPC contract was placed on M/s BHEL in March, 2010. The project progress has been delayed due to very slow progress on civil construction front. The project is now targeted for commissioning in October 2010.

b) Bongaigaon TPS (3x250MW):

Project is being executed by M/s NTPC at Salakati, Kokrajhar District of Assam. MoEF clearance has been obtained and coal linkage for the project has been accorded by Ministry of Coal. Order of Main Plant Package has been placed on M/s BHEL in February, 2008. Boiler drum has been lifted in January, 2010 and Condenser erection is also under progress for Unit-1. Boiler erection has started for Unit-2 in March, 2010 and for Unit-3, it is expected to start by June, 2010. The constraints being faced in project execution include slow progress of civil works and law & order problem. The anticipated dates of commissioning for Unit-1, 2 & 3 are July, 2011, January, 2012 and March, 2012 (Best Effort Basis) respectively.

c) Tripura CCPP (2x 363.3 MW):

Project is being executed by joint venture of ONGC, Govt. of Tripura & Infrastructure Leasing and Finance Services (IL&FS) at Palatana, Tripura. Main Plant Order has been placed on M/s BHEL in June, 2008. Project is delayed due to problem in transportation of heavy equipments to site, transmission lines/ power evacuation/ start-up power and finalization of Feasibility Report for infrastructure requirement for use of Ashuganj Port & land route in Bangladesh to reduce time of transportation of machinery to site. The project is likely to be commissioned in 12th Plan.

d) Baramura Gas Based Project, Unit-5 (1x21 MW)

The project is an extension unit being executed by Tripura State Electricity Corporation Ltd. (TSECL) in District Agartala, Tripura. EPC contract was awarded to M/s BHEL in March, 2008 with a target date of commissioning as November, 2009. The project is now likely to be commissioned by June, 2010.

e) Namrup CCGT (70 MW GT/ + /30 MW ST)

Namrup 100 MW is a replacement power project being executed by APGCL in Distt. Dibrugarh, Assam. EPC contract was awarded to M/s BHEL in February, 2009 with a target date of commissioning as January, 2012. Civil Works Order is yet to be placed. The project is now expected to be commissioned in 12th Plan.

11.8 Detailed Status of New Thermal Power Projects in North-eastern States

Details of new thermal power projects proposed in North-eastern States is given below:

i) **Tripura Gas Based Power Project-104.74 MW -** The project was recommended in PIB meeting held on 20.1.09. Investment Approval has been accorded vide MoP letter dated 14th July, 2009 at a cost of Rs. 421.01 crores including IDC. The techno-commercial offer for main plant equipment has been negotiated with M/s BHEL. As the cost of the project was on the higher side when compared to the cost approved during Investment Approval, M/s NEEPCO submitted Revised Cost Estimate amounting to Rs. 623.44 crores to Ministry of Power for approval which has been discussed in the Standing Committee for determining the responsibility for time & cost overrun on the Revised Cost Estimates. The Revised Cost Estimates are yet to be approved.

ii) **Garo Hills Coal Based Thermal Power Project, Meghalaya, M/s NEEPCO – 500 MW -** As informed by M/s NEEPCO, Govt. of Meghalaya has made the MoA non-operational in April, 2008 till further order.

iii) **West Khasi Hills Coal Based TPP, Meghalaya- M/s NEEPCO- 240 MW** - M/s NEEPCO have informed to have submitted a draft MoA as well as JV proposal with Govt. of Meghalaya for the development of Project.

(iv) **Margherita Coal based TPP, Assam (JV of NEEPCO & APGCL) -250 MW -** M/s NEEPCO has proposed to set up Margherita TPP with an installed capacity of 250 MW in Joint Venture with APGCL. The Joint Venture Company (JVC) agreement is yet to be finalized.

(v) **Margherita TPP-JV of NTPC & APGCL-500 MW-**As per the letter dated 20.7.09 from Hon'ble Minister, Power Public Enterprise, Industry & Commerce, Govt. of Assam, they are in discussion with M/s NTPC to implement another thermal project of 500 MW capacity in eastern part of Assam in Joint Venture with Assam Power Generation Company Ltd.

A team of NTPC, CEA and APGCL officials along with revenue officials visited the site on 18.9.2009 at Margherita for examining the feasibility of installing 2x250 MW units when it was observed that the site selected by APGCL is highly undulating. As per the draft report of M/s NTPC, APGCL is conducting the topographic survey of the area so as to reexamine the plant layout to minimize ground level variations and optimize leveling cost.

11.9 R&M Schemes (Hydro) of North-eastern Region

Nine (9) existing hydro schemes of North-eastern Region with an aggregate installed

capacity of 544 MW have been identified for R&M works to accrue a benefit of 212 MW. The R&M activities of four schemes have already been completed at an actual expenditure of Rs. 105.68 Crores to accrue a benefit of 61 MW. The remaining five schemes are under various stages of implementation and are likely to be completed during the 11th Plan to accrue a benefit of 151 MW at an estimated cost of Rs. 348 Crores. The Scheme-wise status (as on 31.01.2010) of the R&M works of the hydro schemes of North-eastern Region is given hereunder:-

S. No.	Name of Scheme, Agency, State	Installed Capacity (MW)	Cost (Rs. in Crs.)	Benefits (MW)	Status
1.	Khandong, U-1, NEEPCO, Meghalaya	1x25	0.62*	25 (Res.)	U-1 Restoration works completed in 1991-92.
2.	Gumti, TSECL, Tripura	3x5	17.50*	-	R&M works completed in 1994-95.
3.	Khandong, NEEPCO, Meghalaya	2x25	3.35*	-	R&M works completed in 2003-04.
4.	Umium St.I MeSEB, Meghalaya	4x9	84.21*	36 (LE)	RM&LE works completed in 2002-03.
5.	Loktak, NHPC, Manipur	3x30 (Derated)	18.55@	15 (Res.)	R&M and Restoration works are ongoing. Unit-I commissioned on 05.09.2009. All R&M works likely to be completed by 2009-10.
6.	Umium St.II, MeSEB, Meghalaya	2x9	90.46@	18 (LE) + 2 (U)	RM&LE works yet to commence. JBIC funding. Likely to be completed by 2011-12.
7.	Kopili, NEEPCO Assam	2x50 + 2x50	66.42@	-	BHEL, the OEM have submitted their offer. Placement of order under process. Likely to be completed in 2011-12.
8.	Kyrdemkulai, MeSEB, Meghalaya	2x30	168.00@	60 (LE) + 6 (U)	RM&U works to commence after completion of Umium Stage-II works. DPR under preparation. Likely to be completed in 12th Plan.
9.	Khandong, NEEPCO, Meghalaya	2x25	5.00@	50 (LE)	R&M works yet to commence.

Abbreviations: MW – Mega Watt; Res. – Restoration; U – Uprating; LE – Life Extension
**= Actual, @= Estimated*

11.10 Installed Capacity in the N.E. Region

The total installed capacity in the Region is as under:

Sector	Installed Capacity (MW)
Hydro	1116.00*
Thermal	968.74
RES	204.16
Nuclear	-
Total	**2288.90**

**Excluding small hydro schemes covered under Renewable Energy Sources.*

11.11 Hydro Power Generation Performance

Hydro power generation during the year 2009-10 in the North-eastern Region is 3416.80* MU against a target of 4404.00 MU, which shows 77.58 % achievement.

11.12 Ministry of Development of North-eastern Region (DONER)

1. The following ST&D schemes of NE States for funding under NLCPR were technically cleared-
   - Scheme for complete electrification of Lord Buddha Statue including garden along with conversion of existing overhead LT lines into U/G cables with modernization and refurbishment of existing electrical network at Rabong Bazar in South Sikkim.
   - Scheme for installation of 1x15 MVA Transformer & extension bay at 66/11 kV Substation, Mamring, South Sikkim.
   - Scheme for erection of 33 kV line from Mebo to Dambuk for evacuation of power in Arunachal Pradesh.
2. The following schemes were examined for NE States and comments were sent to DONER/ NE States–
   - Scheme for construction of 33 kV transmission line from Namchi to Damthang and Temi and Sub-station at Temi/Damthang in Sikkim for funding under NLCPR.
   - Scheme for erection of 11 kV line from 132/33 kV Karong S/s to Senapati New Secretariat Complex with installation of new distribution transformers in Manipur to be funded under NLCPR.
   - Scheme for installation of 2x2.5 MVA, 3 /11 kV S/s along with associated 33 kV line at Mao in Manipur, to be funded under NLCPR.
   - Scheme for construction of 66/11 kV, 2x2.5. MVA S/s at Old Namchi and upgradation of 2x2.5 MVA S/s to 2x7.5 MVA S/s at Namchi, Sikkim to be funded under NLCPR.

11.13 Status of Rural Electrification in North-eastern Region

During 2009-10 (upto Feb. 2010), 6 (six) inhabited villages have been electrified and no pumpsets have been energized. Cumulatively, 29,665 inhabited villages constituting 73.5% have been electrified out of a total of 40,377 inhabited villages and 8,844 pumpsets have been energized in the North-eastern States.

11.14 The issues pertaining to Sectoral Development of Power System in the North-eastern Region

(i) Sectoral meeting on Development of Power System in the North-eastern Region

The Sub-Group, constituted under the chairmanship of Member (Power System), CEA, tabled a report on comprehensive transmission, sub-transmission and distribution system in NER & Sikkim in Dec. 2007 in consultation with the States of NER and POWERGRID. The scheme was formulated in three phases/ Phase-I during 2007-11, Phase-II during 2011-14 and Phase-III during 2014-17. Subsequently, the job for preparation of DPR was entrusted to M/s PGCIL.

Accordingly, POWERGRID has prepared and submitted a DPR in January 2010 covering requirements of intra-State and inter-State transmission, sub-transmission and State-wise distribution system in NER and Sikkim at an estimated cost of Rs 9890.17 Crores. The details of the estimated cost are given below:

(Rs. in crores)

Sl. No.	State	Transmission & Sub-Transmission (132 kV & above)		Distribution	Sub-Total	Consultancy	Total
		Phase-I	Phase-II				
1.	Inter-State	44.49	250.23	00	294.72	39.01	333.73
2.	Ar. Pradesh	413.39	312.05	316.87	1042.31	137.96	1180.27
3.	Assam	711.74	940.55	741.72	2394.00	316.87	2710.87
4.	Manipur	196.88	185.52	260.21	642.61	85.06	727.67
5.	Meghalaya	920.50	0.00	283.85	1204.35	159.41	1363.76
6.	Mizoram	263.37	222.17	145.01	630.55	83.46	714.01
7.	Nagaland	915.77	00	152.08	1067.85	141.34	1209.19
8.	Tripura	343.21	229.19	284.55	856.95	113.43	970.38
9.	Sikkim	400.77	00	200.00	600.77	79.52	680.29
	Total	**4210.12**	**2139.71**	**2384.29**	**8734.11**	**1156.06**	**9890.17**

The total estimated cost of Rs.9890.17 crores is later reduced to Rs.8709.89 crores, after excluding portion of works of the scheme in sensitive border areas.

It is proposed that 85% of the project cost would be funded through the World Bank and balance 15% from internal sources.

In order to accelerate the development of transmission system in NER, proposal of the States / PGCIL for adopting 90% grant and 10% loan methodology is being explored by Ministry of Power.

(ii) Master Transmission Plan evolved earlier with suitable pooling and de-pooling points for evacuation of power from various hydro-electric projects in Arunachal Pradesh / NER envisaged during 11th Plan and beyond is being reviewed because of changed generation scenario, enhanced capacity and new hydro projects.

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Tehri HPP - Dam

CHAPTER – 12

TRAINING AND HUMAN RESOURCE DEVELOPMENT

12.1 Training of Manpower in CEA

As Human Resource is an essential resource for carrying out any business or service of an organization, it is required to be developed to produce a quality product/service at a reasonable price. To attain this objective, the technical, managerial and behavioral competence of the human resources are developed and enhanced through training. Keeping this objective in view, HRD of CEA has been organizing various training programmes in technical, managerial, IT, health and other areas to keep them abreast of technology and bringing about attitudinal change in consonance with the need of rapidly changing era of globalization. HRD has also been making efforts to keep stock of the infrastructure available for the development of human resources in the Power Sector. CEA has been following up with the utilities/organizations on the status of implementation of the National Training Policy for the Power Sector. To fulfill its statutory role under Rule 3 of IE Rules 1956, CEA has been sending teams to visit Power Sector institutes for their evaluation in terms of infrastructure, utilization and quality of training programmes and facilitate CEA accreditation for them in line with the CEA Guidelines for recognition of training institutes of Power Sector. CEA has been advising/recommending various measures to the training institutes/Power Sector organizations for improvement in the training infrastructure and methodologies for enhancing the skills and productivity of the personnel.

It has been the motto of CEA Management to impart at least one week training annually to each employee of CEA.

12.1.1 Management Development & Refresher Training Programme

The management development programmes for CEA Officers conducted at professional institutes of national and international repute like Indian Institute of Management (IIM), Ahmedabad, Management Development Institute (MDI), Gurgaon, Indian Institute of Public Administration (IIPA), New Delhi & Administrative Staff College of India (ASCI), Hyderabad were organized.

The officers/officials were deputed for various in-service refresher training programmes, technical courses, workshops, seminars, conferences etc. at Power Management Institute (PMI), NTPC, Noida, Engineering Staff College of India (ESCI), Hyderabad, Institute of Secretarial Training & Management (ISTM), New Delhi, Central Board of Irrigation & Power (CBIP), New Delhi, Structural Engineering Research Centre (SERC), Chennai, etc. The programmes organized for enhancing the managerial and interpersonal skills and for awareness about good health included the topics such as effective communication for managers and leaders, Right to Information Act, communication and listening skills, Yoga, Physical and Mental Exercise, Motivation, leadership and team building, stress management, etc. The man-days for these programmes were 988.

12.1.2 Customized Training Programmes

i) DM/SCADA System, Protection System, Protection Philosophy & HV Equipment

20 Officers were imparted training on DM/SCADA System, Protection System, Protection Philosophy & HV equipment at Areva T&D Technical Institute, Noida and Chennai for a period of two weeks in two groups. The mandays for this programme were 200.

ii) Development of Leadership & Administrative Financial Acumen

50 Officers were imparted Training in two batches on Development of Leadership & Administrative Financial Acumen at Indian Institute of Public Administration (IIPA), New Delhi. The mandays for this programme were 250.

iii) Management Development Programme on Finance for Non-Finance Executives

15 officers were imparted training on Finance for Non-Finance Executives programme at Management Development Institute (MDI), Gurgaon. The mandays for this programme were 75.

12.1.3 Training of Group-D employees of CEA

Twenty Six Group-D employees were imparted training in the fulfillment of provisions of the Notification of the Government on the recommendation of the Sixth Pay Commission. Each employee was imparted training of two hours daily for 15 Days i.e for 30 hrs. The man days of this programme were 87.

12.1.4 Comprehensive Training programme on Tobacco Cessation for CEA Officers/ Officials

Two workshops of 25 participants each on Tobacco Cessation for CEA officials were conducted by Sri Ganga Ram Hospital, New Delhi at CEA. Programme was for 75 man-days.

12.1.5 In-house Training Programme

The following programmes were organized through various organizations for enhancing the managerial and inter-personnel skills and for awareness about good health:

1) Wellness programme on the way to live holistically by Dr. Shiv Prasad Chauhan of Anandampath, Public Service Organization.
2) How to write ACR by Shri Chandan Mukherjee, Dy. Director (ISTM)
3) Presentation on "Solid Bio Fuel as Coal Firing Coal Based Thermal Power Plant" by M/s Abellon Clean Energy Ltd.
4) Presentation on "Enhancing Employee Commitment and Ownership in Power Utilities" by M/s Right Management India
5) Presentation on "Dry Type Transformers" by M/s Dupont India Pvt. Ltd., Mumbai.

12.2 Foreign Visits/Training Programmes for CEA Officers

Foreign training programmes/ study tours were planned, processed and conducted during the year 2009-10 for CEA engineers. Engineers of CEA were deputed abroad for project consultancy, International Conferences/ Seminars/ Workshops and technology transfer. The details of officers who visited foreign countries during the year 2009-10 are given in **Annexure-12A**.

12.3 Training under Apprentice Act, 1961

Six Degree (Engg.), two Diploma (Engg.), six ITI qualified D/men and thirty five Vocational Apprentices have undergone training in CEA under the Apprentice Act, 1961 during the year 2009-10.

12.4 Recognition of Training Institutes

For ensuring the development of the training infrastructure in the Power Sector and the implementation of statutory requirements of training as per Sub Rule 2(A) & 2(B) of Rule 3 of IE Rules 1956, the Power Training Institutes/ Centres of various SEBs/Utilities are visited by CEA officers for giving renewal/recognition to their Institutes. The following 22 training institutes/centres were visited and accorded recognition/ renewal of recognition during the year 2009-10:

S. No.	Name of the Institute
1.	Employee Development Centre, Kahalgaon STPS of NTPC Ltd.
2.	Hydro Training Institute, Kuthiraikalmendu, TNEB
3.	Centre for Research and Industrial Staff Performance, Bhopal.
4.	National Power Training Institute(SR), Neyveli
5.	Jindal Institute for Power Technology, Raigarh, Chhattisgarh
6.	Power Engineer Training and Research Centre, KSEB, Moolamattam
7.	Officer Training Institute, RVPNL, Jaipur
8.	Technical Training Centre Dahanu Thermal Power Station, REL
9.	National Power Training Institute (ER), Durgapur
10.	O&M Solution Power Training Institute, Bhubaneswar
11.	Employee Development Centre, Ramagundam STPS of NTPC Ltd.
12.	Training Institute Dr. Narula Tata Rao Thermal Power Station (formerly VTPS), Vijayawada, APGENCO
13.	Employee Development Centre, Singrauli STPS, NTPC Ltd.
14.	Employee Development Centre, Rihand STPS, NTPC Ltd.
15.	O&M Training Institute, CESC Ltd., Kolkata
16.	Plant Training Centre at Titagarh Generating Station CESC Ltd.
17.	Training Institute, Southern Generating Station, CESC Ltd., Kolkata
18.	Plant Training Centre, Budge Budge Generating Station, CESC Ltd., Kolkata
19.	GMR Energy Training Institute, Mangalore
20.	Employee Development Centreof NTPC at BTPS, New Delhi
21.	Employee Development Centre, National Capital Power Station of NTPC at Dadri (UP)
22.	Employee Development Centre at Farakka STPS of NTPC.

12.5 "Adoption of ITI" Scheme

Central Electricity Authority and the Ministry of Power organized an International Conclave on 'Key Inputs' for Accelerated Development of Power Sector during 11th Plan on 4th & 5th July, 2007 wherein Utilities, State Governments, Central & State Regulatory Commissions and other organizations participated. In the wake of the International Conclave, the 'Adoption of ITI Scheme' was launched by MoP & CEA and the CPSUs were advised to adopt one or more ITIs near to the project sites to build up the required skilled manpower.

Nine Central Sector Power Utilities have adopted fifty two ITIs (including 8 new ITIs under construction) near their project sites to upgrade them to provide quality manpower for the Power Sector. CEA has been facilitating the process of adoption of ITIs and monitoring the progress of adoption.

During October 2007, the Ministry of Power organized a Seminar on "Requirement of Highly Qualified Manpower for the Power Sector". In the follow up to the decisions taken in the Seminar, the Ministry of Power constituted five Task Forces on Integration of ITIs to build up a base of skilled manpower. The Task Forces have submitted their reports. Task Force-IV inter alia included 'Establishing a Power Job Portal'. In accordance with the recommendations of the Task Force, a web portal exclusively for power

related jobs has been established to work as an interface between job seekers and employers. Twelve Central Public Sector Undertakings/ Govt. bodies in the Power Sector have registered themselves on the website and are publicizing their vacancies on the website.

CEA & MoP organized 2nd International Conclave in August 2009 on key inputs in which more support from power developers including Private Sector for adoption of ITIs was emphasized.

All power developers have been requested to take action on Planning Commission direction for adoption of ITI by each generating plant with more than 100 MW capacity.

12.6 Recreation and Sports Club

The Recreation Club of CEA has been a major source of inspiration for the employees of CEA for the development of extra-curricular activities. This is achieved by way of conducting indoor and outdoor games every year. The Recreation Club also takes part in both indoor and outdoor Inter-Ministry/Inter-CPSU Tournaments.

During 2009-10, the CEA's sports teams participated in various Inter-CPSU/Inter-Ministry tournaments for the following events:

(i) Athletic

Sh. Dinesh Rawat, an outstanding athlete of CEA, has brought laurels to CEA and also to the country as ever before and continues to do so. He won one Silver Medal in the 400 meter individual race with a new Asian Record and one Bronze Medal in the 4x100 meter Relay race in the age group of 40 plus in the **World Master Athletics Championships** held at Lahiti, Finland from 30th July to 8th August, 2009. He also won three Gold Medals in 100meter, 200meter & 400meter events in the Inter-PSU Athletic Championship held at Chandigarh from 15th to 16th March, 2010. He was declared the **"Best Athlete"** of the Championship. Since the inception of the Inter-PSU Athletics Championships, he has been the Best Athlete in each of the Inter-PSU Athletics Championships. He has also been deputed as Chief Coach by the Delhi State Athletic Team for the forthcoming Commonwealth Games 2010.

(ii) Table Tennis

During the year 2009-2010, CEA's Table Tennis has made the following achievements:-

Participated in Inter-CPSU Table Tennis Team Tournament held at Tanakpur Power Station Banbassa, Distt. Champawat (Uttrakhand) from 6th April to 8th April, 2009 under the aegis of PSCB hosted by NHPC Ltd.

The performance of the team in this event is as follows.

i) Team Event - Runners up
ii) Sh. Sanjeev Dhingra - Runner up (Singles Open)
iii) Sh. Sanjeev Dhingra- Runner up & Sh. Sanjeev Beri (Double Open)

The Team also participated in Inter-CPSU Table Tennis Team Tournament held at Gymkhana AIIMS, Ansari Nagar, New Delhi from 3rd to 6th March, 2010 under the aegis of Power Sports Control Board hosted by Power Finance Corporation Ltd.

Performance of the Team in this event is as follows:-

i.	Team Event	-	Runners up
ii.	Sh. Sanjeev Dhingra	-	Runner up (Singles Open)
iii	Sh. Sanjeev Dhingra Sh. Sanjeev Beri	-	Runners up (Double Open)

iv Sh.K.R. Vohra
Sh. Man Mohan Singh - 2nd Runners up (Double Open)

iii) Chess

CEA Chess Team took part in the 14th Inter-PSU Chess Tournament conducted by Tehri Hydro Development Corporation at Rishikesh from 19th to 23rd April, 2009.

The achievement by CEA Chess Team is as under:-

i) Team Event - Ist Position (Winners)
ii) Sh. K. Ravinder Nath - Ist Runners-up (Open)

The Team also participated in the 15th Inter-CPSU Tournament conducted by NHPC at Faridabad from 6th to 8th January, 2010.

Following results were secured by the CEA Chess Team:-

i) Team Event - 1st Position (Winners)
ii) Sh. D.K. Gupta - Ist Position (Individual Open)
iii) Sh. K.N Pant - 2nd Position (Individual Open)

(iv) Carom

CEA Carrom Team participated in the 12th Inter-PSU Carrom Tournament held at Rishikesh under the aegis of THDC. Sh. Chandrashekhar & Sh. K.K. Puri stood 1st & 2nd Runners-up in the Singles Open and also they were declared winners for Doubles Open. Women's Carrom Team also participated in this event and stood at 3rd Position. Performance of the CEA Carrom Team has always been highly remarkable and had performed in high spirits in the past too.

The CEA Sports Team also participated in Volley Ball & Badminton Tournament organized by CPSU.

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Annexure-2A
(Item No.2.8.1)
(1/2)

STATUS OF ONGOING PROJECTS UNDER NATIONAL PERSPECTIVE PLAN ON R&D FOR POWER SECTOR

No	Title of the Project	Project Implementing organization	Project Funding Sources (Rs. Lakh)	Funds Released to lead agencies (Rs. Lakh)	Status of the project
(a) R&D ProjTects initiated During 10th Plan Period:					
1.	Development of Silt Erosion Resistant Material for Turbines of Hydro generators	NML Jamshedpur	NHPC: Rs. 100.00 SJVNL: Rs. 50.00 MoP : Rs. 149.79 **Total Rs. 299.79**	NHPC share: Rs 45.0 lakh SJVNL share: Rs 20.0 lakh MoP share: Rs 149.0 lakh **Total: Rs 214 lakh**	• Slurry erosive Wear studies for benchmarking of 13Cr-4Ni steel have been completed. • Flow modeling through CFD analysis has been initiated • Weldability testing machines are being procured
2.	National Effort to develop Technology for Custom Power Devices(STATCOM)	(i) 4 x 500 kVA by C-DAC for IT-Park. (ii) 2.5 MVAr by BHEL for Bhilai Steel Plant.	C-DAC Rs.125.0 MoP Rs. 125.0 BHEL Rs. 192.5 MoP Rs. 192.5 **Total Rs. 635.0**	(i) MoP Share: Rs 120.0 lakh (ii) MoP share: Rs 162.75 lakh	(i) • For Simulation Studies to validate the algorithm for compensation of neutral current unbalanced current, reactive power and harmonics have been completed. • Design and testing of power and control module of lab prototype for converter, inverter and STATCOM mode has been completed (ii) • Modeling of arc furnace for flicker generation has been completed. • Design of power circuits, control circuits and DSP based control S/W is in progress • Assembly of IGBT power stack is in progress
3.	Development of Superconducting Transformers	EMCO, Mumbai	MoP Rs. 100.0 EMCO Rs. 100.0 **Total Rs. 200.0**	MoP share: Rs 74.25 lakh	• Design of 630 kVA HTS transformer for distribution system is completed. • Three HV and three LV formers has been developed. • HV and LV copper terminations fabricated. • Copper shield Heat Exchanger has been developed. • Testing of 3 prototype cryostat with new resin is underway.

(2/2)

No	Title of the Project	Project Implementing organization	Project Funding Sources (Rs. Lakh)	Funds Released to lead agencies (Rs. Lakh)	Status of the project
4.	To develop a prototype of 132kV Optical Current Transformer for use in the 132kV system	ERDA, Vadodara	PGCIL Rs. 19.0 MoP - **Total Rs. 19.0**	Rs 19.0 lakh to ERDA	• The feasibility of Optical CT in Laboratory has been demonstrated. • ERDA has sought for additional funds of Rs. 63.78 lakh and an additional time slot of two years for Development of Prototype 132kV Optical CT for field trials.
(b) R&D Projects initiated During 11th Plan Period:					
1.	Development of Silt Erosion Resistant Nano-composite Coatings by Physical Vapour Deposition for Hydro Turbine components	IIT Roorkee	MoP Rs. 163.013 **Total Rs. 163.013**	134.838	MoU Signed and initial Funds released
2.	Tunneling in water charge zones under high hydro static pressure	NHPC	MoP Rs. 109.03 **Total Rs. 109.03**	52.20	MoU signed and initial Funds released
3.	Design and development of High Temperature Super Conducting (HTS) fault Current Limiter (FCL)	Crompton Greaves	MoP Rs. 153.20 Crompton Rs 153.19 **Total Rs. 306.39**	Funds not released	MoU still not signed.
4.	Development of Dynamic Voltage Restorer (DVR) based voltage source stabilizers for process industry	C-DAC TNEB	MoP Rs. 81.90 **Total Rs. 81.90**	48.93	MoU signed and initial Funds released
5.	Improvement in reliability, safety and long term performance of power and converter transformers through improvements in quality of transformer oil	CPRI	MoP Rs. 90.0 **Total Rs. 90.0**	50.00	MoU signed and initial Funds released
6.	A study on Stability & reliability of the Power System with large Penetration of Wind Power * Saskatchewan, Canada	CPRI	MoP Rs. 102.43 TNEB Rs. 15.00 Univ.* Rs.54.054 **Total Rs. 171.484**	40.00	MoU signed and initial Funds released

Annexure-2B
(Item No.2.12.2)
(1/2)

AWARDEES FOR THE YEAR 2008-09

Sl.No.	Awarded Station/ Project/ Company	Organisation	Category
A.GOLD SHIELD WINNERS			
1.	Simhadri TPS (1000 MW)	NTPC	Thermal Power Station Performance
2.	Deenbandhu Chhotu Ram TPP, Yamunanagar Unit-1 (300 MW)	Haryana Power Generation Co. Limited	Early completion of Thermal Power Project.
3.	Bhakra Power House (5x108+5x157 MW)	Bhakra Beas Management Board	Hydro Power Station Performance
4.	Varahi Extn H.E. Project, Unit-4 (115 MW)	Karnataka Power Corporation Limited	Early completion of Hydro Power Project.
5.	Transmission System of 220 kV and above – Western Region-I	PGCIL	Transmission System Availability
6.	Transmission System of 132 kV and above, North - Eastern Region	PGCIL	Transmission System Availability
7.	220/132 kV Kishangarh AC Sub-station with 100 MVA Transformer	Rajasthan Rajya Vdyut Prasarn Nigam Limited	Early completion of Power Transmission Project
8.	Tata Power, Maharashtra		Distribution Company Performance
9.	Mandal Mahila Seethampeta, Franchisee of Eastern Power Distribution Company, Andhra Pradesh		Rural Distribution Franchisee Performance
Special Award			
10.	220 kV D/C Transmission line between Pul-e-Khumri to Kabul in Afghanistan	PGCIL	Early completion of Power Transmission Project
B. SILVER SHIELD WINNERS			
1.	Korba STPS (2100 MW)	NTPC	Thermal Power Station Performance
2.	Ramagundam STPS (2600 MW)	NTPC	Thermal Power Station Performance
3.	Trombay TPS Extn, Unit-8 (250 MW)	Tata Power Company Limited	Early completion of Thermal Power Project.
4.	Baspa-II H.E. Project (3x100 MW)	Jaiprakash Hydro Power Limited	Hydro Power Station Performance

(2/2)

Sl.No.	Awarded Station/ Project/ Company	Organisation	Category
5.	Transmission System of 220 kV and above – Eastern Region-I	PGCIL	Transmission System Availability
6.	400 kV D/C Chhabra TPS-Dahra Transmission line	Rajasthan Rajya Vidyut Prasarn Nigam Limited	Early completion of Power Transmission Project
7.	North Delhi Power Limited, Delhi		Distribution Company Performance
8.	M/s Harsha Electricals, Franchisee of HESCOM, Karnataka		Rural Distribution Franchisee Performance
9.	Budge Budge Thermal Power Station (2x250 MW)	Calcutta Electric Supply Company	Best Thermal Power Station in the Category of Environment Management
C. BRONZE SHIELD WINNERS			
1.	Vindhyachal STPS (3260 MW)	NTPC	Thermal Power Station Performance
2.	Rihand STPS (2000 MW)	NTPC	Thermal Power Station Performance
3.	NCPS. Dadri (840 MW)	NTPC	Thermal Power Station Performance
4.	Pong H.E. Project (6x66 MW)	Bhakra Beas Mgt. Board	Hydro Power Station Performance
5.	Madhya Gujarat Vij Company Limited, Gujarat		Distribution Company Performance
6.	M/s Jayalaxmi Electricals, Franchisee of HESCOM, Karnataka		Rural Distribution Franchisee Performance
Consolation Prize			
7.	Vijayawada TPS (1260 MW) (State Sector)	Andhra Pradesh Power Generation Company Ltd.	Thermal Power Station Performance
8.	Torangallu TPS (260 MW) (Private Sector)	JSW Energy	Thermal Power Station Performance

Annexure-3A
(Item No.3.2)

DETAILS OF INTER-REGIONAL TRANSMISSION CAPACITY – EXISTING AND PLANNED FOR 11TH PLAN

(1/2)

Name of System		At the end of 10th Plan i.e. 31.03.2007	Additions during 11th Plan upto 28.02.2010	Existing as on 28.02.2010	Balance program for 11th Plan	At the end of 11th Plan i.e. 31.03.2012
		(a)	(b)	(c=a+b)	(d)	(e=c+d)
ER – SR						
Gazuwaka HVDC back to back		1000		1000	-	1000
Balimela-Upper Sileru 220kV S/C		130		130	-	130
Talcher-Kolar HVDC Bipole		2000		2000	-	2000
Upgradation of Talcher–Kolar HVDC bipole			500	500	-	500
ER-SR total		**3130**	**500**	**3630**	**0**	**3630**
ER –NR						
Muzaffarpur - Gorakhpur 400kV D/C (Quad Moose) with TCSC		2000		2000	-	2000
Dehri-Sahupuri 220kV S/C		130		130	-	130
Patna-Balia 400kV D/C quad		800	800	1600	-	1600
Biharshariff-Balia 400kV D/C quad			1600	1600	-	1600
Barh-Balia 400kV D/C quad					1600	1600
Sasaram–Fatehpur 765kV S/C line-1					2100	2100
Gaya–Balia 765kV S/C					2100	2100
Sasaram: (i) HVDC back to back (ii) Bypassing of HVDC back-to- back to establish Sasaram-Allahabad/Varanasi 400kV D/C line		500	500	1000	-	1000
ER-NR total		**3430**	**2900**	**6330**	**5800**	**12130**
ER - WR						
Rourkela-Raipur 400kV D/C		1000		1000	-	1000
TCSC on Rourkela-Raipur 400kV D/C		400		400	-	400
Budhipara-Korba220kV D/C+S/C		390		390	-	390
Ranchi-Sipat 400kV D/C (40% SC)			1200	1200	-	1200
Ranchi-Rourkela-Raipur 400kV D/C with fixed series capacitor, TCSC in parallel line					1400	1400
Ranchi – Sipat Pooling Point 765kV S/C					2100	2100
ER-WR total		**1790**	**1200**	**2990**	**3500**	**6490**
ER - NER						
Birpara-Salakati 220kV D/C		260		260	-	260
Malda-Bongaigaon 400kV D/C		1000		1000	-	1000
Bongaigaon-Siliguri 400kV D/C Quad	**				1600	1600
ER-NER total		**1260**	**0**	**1260**	**1600**	**2860**

(2/2)

Name of System		At the end of 10th Plan i.e. 31.03.2007	Additions during 11th Plan upto 28.02.2010	Existing as on 28.02.2010	Balance program for 11th Plan	At the end of 11th Plan i.e. 31.03.2012
		(a)	(b)	(c=a+b)	(d)	(e=c+d)
NR - WR						
Vindhychal HVDC back to back		500		500	-	500
Auria-Malanpur 220kV D/C		260		260	-	260
Kota-Ujjain 220kV D/C		260		260	-	260
Agra-Gwalior 765kV S/C line-1 400kV op.		1100		1100	-	1100
Agra-Gwalior 765kV S/C line-2 400kV op.			1100	1100	-	1100
Kankroli-Zerda 400kV D/C			1000	1000	-	1000
NR-WR total		**2120**	**2100**	**4220**	**-**	**4220**
WR-SR						
Chandrapur HVDC back to back		1000		1000	-	1000
Barsur–L.Sileru 200kV HVDC mono pole	@	200		200	-	200
Kolhapur-Belgaum 220kV D/C		260		260	-	260
Ponda – Nagajhari 220kV D/C		260		260	-	260
Narendra/Kolhapur HVDC back-to back with Narendra-Kolhapur 400kV D/C line					1000	1000
WR-SR total		**1720**	**0**	**1720**	**1000**	**2720**
NER/ER-NR/WR						
NER/ER-NR/WR total		**0**	**0**	**0**	**0**	**0**
TOTAL ALL INDIA (200kV & above)		**13450**	**6700**	**20150**	**11900**	**32050**
132kV/110kV Inter-Regional links 4xD/C + 4XS/C = 12 ckts	**$**	**600**	**0**	**600**	**0**	**600**
TOTAL ALL INDIA (110/132kV & above)		**14050**	**6700**	**20750**	**11900**	**32650**

Note:
@ - 200 MW HVDC Monopole is currently not in operation.
$ - 132/110kV lines are operated in radial mode from time to time.
*** - Under Private Sector*

IR Capacity increased from 14100 MW to 16200 MW i.e., addition of 2100 MW during 2007-08. Following Inter-Regional lines were added during 2007-08

1. Talcher – Kolar HVDC capacity increased by 500 MW (July 2007) 500 MW

2. Bihartshariff-Balia 400kV Quad D/C (Oct 2007) 1600 MW

Annexure-3B
(Item no.3.3.2)

ISSUES PERTAINING TO TRANSMISSION SYSTEM PLANNING TAKEN UP DURING 2009-10 (1/3)

28h Meeting of the Standing Committee on Power System Planning in Southern Region

1. Status of Under Construction / Approved Schemes.
2. Transmission System for Evacuation of Power from Yeramaras(2x800 MW)& Edlapur(1x800 MW) Generation projects of KPCL near Raichur in Karnataka.
3. Following Transmission Schemes were agreed
   - Transmission System for Evacuation of Power from Yeramaras(2x800 MW) and Edlapur(1x800 MW) Generation Projects of KPCL
   - Establishing new 765/400kV S/S at Madhugiri, Connectivity to Yelahanka 2X500 MVA400/220 kV S/S and Additional ISTS In-feed for Bangalore.
   - Strengthening/Restructuring of Bangalore 400 kV Ring arrangement
4. Transmission System associated with Simhadri-II TPS.
5. Transmission System associated with Cheyyur UMPP in Tamil Nadu 4000 MW.
6. Tiruvalam 765/400kV and 400/230kV Sub-Stations.
7. Transmission System Strengthening in Tamil Nadu.
8. Start-up Power for Vallur JV TPS of NTPC and TNEB.
9. Temporary Arrangements for Connecting Bhoopalapally TPS of APGENCO with the Grid.
10. Fourth transformer at Ghanapur by PGCIL.
11. Issue regarding Stringing of Neyveli – Pugalur 400kV D/C line.
12. Issue regarding LTOA and Signing of BPTA for the Nagarjuna TPS in Nandikur, Karnataka.
13. Discussions on the Inter State Transmission System(ISTS) Issues in respect of Long Term Open Access Applications(LTOA) made to the Central Transmission Utility(CTU) for Projects in Southern Region.

29th Meeting of the Standing Committee on Power System Planning in Southern Region

1. Status of Under Construction / Approved Schemes.
2. Madhugiri – Yelahanka 400kV D/C Quad transmission line.
3. The Hosur – Electronic City 400kV D/C line.
4. TNEB – Strengthening connectivity of SVChatram 400kV S/S of TNEB.
5. TNEB Transmission Schemes:
   a. Transmission system for evacuation of power from Mettur TPS Stage-III(1x500 MW) project,
      - Transmission system for evacuation of power from wind projects in Tirunelveli/Kayathar area in Tamil Nadu, and
      - Sholinganallur (Ottiampakkam) – Kalivanthapattu(Melakottaiyur) 400kV D/C line.
6. KSEB Proposal for Mysore-Kozhikode 400kV D/C line.
7. Transmission system for evacuation of power from Udangudi TPS (2x800MW).
8. Transmission system for evacuation of power from Simhadri-II TPS of NTPC.
9. Issue Regarding LTOA and Signing of BPTA for the Nagarjuna TPS(by M/s UPCL) in Nandikur, Karnataka.
10. Discussions on the Inter State Transmission System(ISTS) Issues in respect of Long Term Open Access Applications(LTOA) made to the Central Transmission Utility(CTU) for Projects in Southern Region.
11. Transmission system for following projects was decided
    b. Transmission System for East Coast Energy Pvt Ltd (4x660 MW) and NCC Power Project Ltd. (2x660 MW) projects in Srikakulam Area, Andhra Pradesh.
    c. Transmission System for Coastal Energen Pvt Ltd (2x660 MW) and IND Barath Power Madras Ltd (4x350 MW projects in Tuticorin, Tamil Nadu.
    d. Common Transmission System for transfer of power from SR to WR & NR.

(2/3)

Standing Committees meeting on power system planning in Eastern Region was held on 14-09-2009 and resolved the following issues related to transmission system planning

(i) Transmission System Associated with the Tilaiya UMPP (4000 MW) in Jharkhand, Barh-II (1320 MW) & Nabinagar (1000MW) in Bihar (JV of Railways and NTPC).

- Generation Specific Transmission System
- System strengthening scheme in ER
- ATS (under the scope of Generation Developer) to Haldia (600MW), Adunik(1000MW), Essar(1800MW), Electrosteel (1200MW), Corporate (800MW), CESC Dumka (1200MW) and Orissa IPPs Generation Projects

(ii) 400kV Transmission proposals of GRIDCO, Orissa during 11th Plan Period.

(iii) Transmission works of WBSEDCL under State Sector:

27th Meeting of the Standing Committee on Power System Planning in Northern Region

- System strengthening scheme in Punjab
- Evacuation of power from Kutehr HEP (260 MW) in the upstream of Chamera III HEP
- System strengthening of Haryana
- Augmentation of Transformation Capacity at Maharani Bagh Substation
- Transfer of Power from Lucknow 765/400 kV substation towards Western part of Northern Grid
- Tehri PSP Transmission System
- Establishment of Samba 400/220 kV Sub-station in J&K and Provision of Second 400 kV S/C for reliable evacuation of power from Dulhasti HEP
- Augmentation of Transformation Capacity at Bahadurgarh and Lucknow
- Connectivity with HVDC Bipole Terminal at Mohindergarh
- Sasan/Vindchyachal pool connectivity/Power evacuation system from Rihand III TPS (2x500 MW)
- Transmission System Associated with the Tilaiya Ultra Mega Power-Project (4000 MW), in Jharkhand, Nabinagar (1000MW) of Railways and NTPC, Barh-II (1320 MW) and IPPs in Jharkhand, Orissa, MP, Chattisgarh, and Maharashtra"
- Enhancing System Reliability by LILO of 400 kV Dehar-Bhiwani and 400 kV Dehar-Panipat
- Enhancing Reliability of Generation at Paricha Thermal Power Station
- Overloading of 2x315 MVA, 400/220 kV ICTs at Bassi as well as Bhiwadi
- Network Constraints in Uttarakhand
- Evacuation of power from generation projects coming up in Sikkim and Bhutan
- Proposed Evacuation System of various thermal projects in Rajasthan – Agenda by RRVPNL

28th Meeting of the Standing Committee on Power System Planning in Northern Region

- Dehradun – Abdullapur 400kV D/C
- Augmentation of transformation of Raibareilly
- Provision of Bus reactors in Northern region
- Provision of 2 nos. of 220kV line bays at Allahabad POWERGRID sub-station
- Dulhasti-Samba 400kV D/C
- Transmission System associated with Tilaiya UMPP (4000 MW) in Jharkhand
- Transmission system associated with IPPs located in Orissa, Jharkhand, West Bengal, Madhya Pradesh, Chattisgarh and Southern Region
- Grant of Membership for HPPTCL
- Evacuation of Bagliar-II (3x150 MW) and Ratle (690 MW) HEPs in J&K
- MEJA 1320 MW PROJECT – JV of NTPC and UPRVNL
- 400 kV Kishenpur-New Wanpoh D/C line
- Hissar TPS Evacuation system

Special meeting of the Standing Committee on Power System Planning of WR held on 18-04-2009 at WRPC Mumbai

a) Discussion on the methodology and procedure adopted by PGCIL for grant of Open access in the Grid

b) Transmission System Associated with the Tilaiya Ultra Mega Power Project (4000 MW) in Jharkhand, Nabinagar (1000MW) of Railways and NTPC, Barh-II (1320 MW), Rihand-IV (1000MW), Vindhyachal-IV (1000MW) and Mauda (1000MW) of NTPC, and IPPs in Jharkhand, Orissa, MP, Chattisgarh, and Maharashtra

c) Transmission system connected with Vindhyachal pooling station and phasing of transmission works

d) Associated 220 kV Line bays along with 400/220kV ICTS

e) Requirement of Bus Reactors at Nagda/Rajgarh to control high voltages in Dhule Area

f) LILO in Vapi-Magarwara 220 kV D/C line at Ringanwada 220/66 kV S/S

g) Interconnection of state grid with the CTU points

h) Interconnection of Pirana-Bachao 400 kV substation.

i) Non- Availability of bays at Aurangabad substation of MSETCL

29th meeting of the Standing Committee on Power System Planning in Western Region held on 10-09-2009 at Ahmedabad

a) Review of progress on earlier agreed Transmission Schemes

b) Transmission system associated with IPPs located in Orissa, Jharkhand, West Bengal, Madhya Pradesh and Chattishgarh.

c) Transmission system associated with Mauda (2X500 MW) generation project of NTPC.

d) Transmission System associated with Vindhyachal-IV (1000MW) and Rihand-III (1000MW) generation projects of NTPC

e) Connectivity of proposed 400 kV substation of CSPTCL at Bilaspur with 765/400 kV Bilaspur Pooling Station (WR Pooling Station).

f) Connectivity of proposed 220 /132 kV at Raigarh and Kumhari of India Railway with existing Raigarh and Raipur sub-station of POWERGRID for wheeling of power from Nabinagar generation project in ER to their traction sub-stations in Chhattisgarh.

g) Intra State Transmission system at 400kV and 765kV in Maharashtra

h) MSETCL proposal of connectivity of 400 kV Sholapur with South Solapur (PG) under Central Sector

i) Provision of 400/220 kV sub-station to Union Territory of DNH (Dadar and Nagar Haveli) and Daman & Diu

j) Evacuation of power from generation projects coming up in Sikkim and Bhutan

Open Access Applications pertaining to New Generation Projects in Southern Region with target beneficiaries in Western/Northern/Southern Region

Annexure - 3C
(Item No.3.13)

TRANSMISSION LINES COMPLETED DURING 2009-10

(1/8)

Sl. No.	Name of the transmission lines	No. of ckts	Executing Agency	Line Length (CKM)	Stringing Comptd. upto Mar-09 (CKM)	Stringing during 2009-10 (CKM)	Month of Compl-etion
1	2	3	4	5	6	7	8
I. 765 KV LINES							
1.	Bina (PG) – Gwalior (PG) 2nd S/C (initially to be operated at 400kV)	S/C	POWERGRID	233	65	168	Feb-10
2.	Seoni - Bina (initially to be operated at 400KV)	S/C	POWERGRID	293	242	51	Mar-10
	TOTAL CKM OF FULLY COMPLETED (CS) DURING THE YEAR			**526**		**219**	
	TOTAL CKM OF PARTIALLY COMPLETED (CS) DURING THE YEAR					**226**	
	TOTAL (CS)					**445**	
	TOTAL (ALL INDIA)					**445**	
II. ± 500 kV HVDC LINES							
	TOTAL CKM OF FULLY COMPLETED (CS) DURING THE YEAR			**0**	**0**	**0**	
	TOTAL CKM OF PARTIALLY COMPLETED (CS) DURING THE YEAR					**280**	
	TOTAL (CS)			**0**		**280**	
	TOTAL (ALL INDIA)						
III. 400 KV LINES							
PGCIL							
1.	Zerda - kankroli	D/C	POWERGRID	470	470	0	Apr-09
2.	LILO of Ramagundam - Khammam at Warangal	D/C	POWERGRID	28	25	3	Jul-09
3.	LILO of 1 ckt of Madurai (PG) - Trichy (PG) at Karaikudi	D/C	POWERGRID	98	94	4	Jul-09
4.	Bhiwadi - Agra	D/C	POWERGRID	418	405	13	Aug-09
5.	LILO of 1st ckt. of Kankroli-Zerda at Bhinmal	D/C	POWERGRID	55	52	3	Aug-09
6.	Neyveli TS -II - Pugalur	D/C	POWERGRID	398	398	0	Aug-09
7.	Neyveli (Expn.) Sw. Yd.- Neyveli (existing) Sw. Yd.	2xS/C	POWERGRID	3	3	0	Sep-09
8.	LILO of Kahalgaon-Patna at Barh	D/C	POWERGRID	104	101	3	Oct-09
9.	Akola - Aurangabad	D/C	POWERGRID	482	482	0	Dec-09

(2/8)

Sl. No.	Name of the transmission lines	No. of ckts	Executing Agency	Line Length (CKM)	Stringing Comptd. upto Mar-09 (CKM)	Stringing during 2009-10 (CKM)	Month of Compl-etion
1	2	3	4	5	6	7	8
10.	LILO of one ckt of Maithon - Jamshedpur line at Mejia	D/C	POWERGRID	100	0	100	Feb-10
11.	Bhiwadi - Moga	D/C	POWERGRID	702	695	7	Mar-10
	TOTAL CKM OF FULLY COMPLETED 400 kV LINES DURING THE YEAR			**2858**		**133**	
	TOTAL CKM OF PARTIALLY COMPLETED 400 kV LINES (CS) DURING THE YEAR					**5361**	
	TOTAL CKM OF 400 kV LINES (PGCIL)					**5494**	
	DVC						
	TOTAL CKM OF FULLY COMPLETED 400 kV LINES DURING THE YEAR					**0**	
	TOTAL CKM OF PARTIALLY COMPLETED 400 kV LINES DURING THE YEAR					**0**	
	TOTAL CKM OF 400 kV LINES (DVC)					**0**	
	TOTAL CKM OF 400 kV LINES (CS)					**5494**	
	Stctor Sector						
1.	LILO of Srisailam-Nunna at Vijayawada TPS	M/C	Andhra Pradesh	24	0	24	Jul-09
2.	Bhoopalapally -Warangal	D/C	Andhra Pradesh	90	0	90	Feb-10
3.	Meramundali-Mendhasal (Chandaka)	D/C	Orissa	201	200	1	Aug-09
4.	LILO of one ckt of Hissar-Moga at Hissar TPS	D/C	Haryana	3	0	3	Jul-09
5.	Hissar - Fatehbad (1st ckt)	S/C	Haryana	41	0	41	Jan-10
6.	LILO of one Ckt of Asoj-Amreli at Chorania	D/C	Gujarat	39	39	0	Jul-09
7.	Suratgarh STPS -Bikaner	S/C	Rajasthan	162	133	29	Sep-09
8.	LILO Dholpur-Heerapura at Hindaun	D/C	Rajasthan	8	0	8	Dec-09
9.	LILO of Koradi-Chandrapura at New Khaperkheda	D/C	Maharashtra	3	0	3	Nov-09

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Sl. No.	Name of the transmission lines	No. of ckts	Executing Agency	Line Length (CKM)	Stringing Comptd. upto Mar-09 (CKM)	Stringing during 2009-10 (CKM)	Month of Compl-etion
1	2	3	4	5	6	7	8
10.	LILO of Lonikhand - Padghe at Chakan	D/C	Maharashtra	2	0	2	Dec-09
	TOTAL CKM OF FULLY COMPLETED 400 kV LINES (SS) DURING THE YEAR			**573**		**201**	
	TOTAL CKM OF PARTIALLY COMPLETED 400 kV LINES (SS) DURING THE YEAR					**1351**	
	TOTAL CKM OF 400 kV LINES (SS)					**1552**	
	Private Sector						
1.	Mundra-Dehgam	D/C	Adani Power Ltd	868	476	392	Jul-09
2.	LILO of RTPS- Guttur at Thorangallu JSW S/S	D/C	JSW Energy Ltd	16	0	16	Aug-09
3.	Kondapalli - Nunna	D/C	Lanco	44	0	44	Oct-09
	TOTAL CKM OF FULLY COMPLETED 400 kV LINES (PS) DURING THE YEAR			**928**		**452**	
	TOTAL CKM OF 400 kV LINES (PS)					**811**	
	TOTAL CKM OF 400 kV LINES (ALL INDIA)					**7857**	
IV. 220 KV LINES							
PGCIL							
	TOTAL CKM OF FULLY COMPLETED 220 kV LINES DURING THE YEAR						
	TOTAL CKM OF PARTIALLY COMPLETED 220 kV LINES (CS) DURING THE YEAR					**44**	
	TOTAL CKM OF 220 kV LINES (PGCIL)					**44**	
DVC							
	TOTAL CKM OF FULLY COMPLETED 220 kV LINES DURING THE YEAR			**0**		**88**	
	TOTAL CKM OF PARTIALLY COMPLETED 220 kV LINES DURING THE YEAR					**74**	
	TOTAL CKM OF 220 kV LINES (DVC)					**162**	
	TOTAL CKM OF 220 kV LINES (CS)					**206**	
	State Sector						
1.	STPS-Bhadra	S/C	Rajasthan	114	114	0	Apr-09
2.	Raj West-Barmer	D/C	Rajasthan	27	20	7	Apr-09
3.	LILO Heerapura-Kukas at Renwal	D/C	Rajasthan	49	0	49	May-09
4.	Chhabra-Baran-Dahra	S/C	Rajasthan	138	19	119	Jun-09
5.	Kankroli (PG)-Debari	S/C	Rajasthan	63	35	28	Aug-09

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Sl. No.	Name of the transmission lines	No. of ckts	Executing Agency	Line Length (CKM)	Stringing Comptd. upto Mar-09 (CKM)	Stringing during 2009-10 (CKM)	Month of Compl-etion
1	2	3	4	5	6	7	8
6.	LILO Bhilwara-Pali at Bhilwara 400 kV S/S	D/C	Rajasthan	10	0	10	Sep-09
7.	LILO Bhilwara-Bali at Bhilwara 400 kV S/S	D/C	Rajasthan	6	0	6	Sep-09
8.	2nd ckt strng.of Banswara-Debair upto Salumber from Banswara end & LILO for 132 kV S/S at Salumber	S/C	Rajasthan	87	0	87	Sep-09
9.	Hindaun (400 kV)-Hindaun (220 kV)	D/C	Rajasthan	16	15	1	Sep-09
10.	Link line at STPS end for 400KV STPS Suratgarh-Bikaner	S/C	Rajasthan	3.5	0	3.5	Sep-09
11.	Giral TPS-Barmer 2nd ckt	S/C	Rajasthan	35	9	26	Nov-09
12.	Baitoo - Balotra	S/C	Rajasthan	48	0	48	Nov-09
13.	Giral TPS-Baitoo	S/C	Rajasthan	55	0	55	Dec-09
14.	LILO Bassi - Phulera at GSS SEZ -I	D/C	Rajasthan	15	0	15	Jan-10
15.	Kankroli (PG)-Kankroli	S/C	Rajasthan	8	0	8	Mar-10
16.	LILO Bikaner- Nagaur at Bikaner (400 kV)	D/C	Rajasthan	37	0	37	Mar-10
17.	Merta- Makrana-Kuchaman	S/C	Rajasthan	108	0	108	Mar-10
18.	LILO of one ckt of Banswara- Debari at 132 kV GSS Salumber	D/C	Rajasthan	16	0	16	Mar-10
19.	LILO of Sikar- Kuchman at GSS Dhod	D/C	Rajasthan	6	0	6	Mar-10
20.	LILO of one ckt of KTPS-Bewar at Gulabpura	D/C	Rajasthan	13	0	13	Mar-10
21.	D/C line at approach section of 400 kV GSS Akai and 220 kV bays at 400 kV Akai (Jaisalmer)	D/C	Rajasthan	12	0	12	Mar-10
22.	LILO of Moga- Jagraon at Ajiwal	D/C	Punjab	3	0	3	Apr-09
23	LILO of one ckt. of Fateh Garh Churian- Civil Line Amritsar at Majitha(Loop in commid.)	D/C	Punjab	5	0	5	Jul-09

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Sl. No.	Name of the transmission lines	No. of ckts	Executing Agency	Line Length (CKM)	Stringing Comptd. upto Mar-09 (CKM)	Stringing during 2009-10 (CKM)	Month of Compl-etion
1	2	3	4	5	6	7	8
24	LILO of one ckt. of Fateh Garh Churian- Civil Line Amritsar at Majitha(Loop out commid.)	D/C	Punjab	5	0	5	Dec-09
25	Rishikesh-Maneribali Stage-II (3rd ckt)	S/C	Uttarakhand	79	78	1	May-09
26	Ghansali - Chamba	S/C	Uttarakhand	35	10	25	Oct-09
27	Bhauti(PG)-Orai	S/C	Uttar Pradesh	90	90	0	Apr-09
28	Rosa - Hardoi (ckt-I)	S/C	Uttar Pradesh	59	0	59	Jul-09
29	Rosa- Shahjahanpur -I	S/C	Uttar Pradesh	22	0	22	Jul-09
30	LILO of Khurja-Muradnagar at Sikandarabad	D/C	Uttar Pradesh	19	0	19	Oct-09
31	LILO of Sultanpur-Gonda at Sohawal	D/C	Uttar Pradesh	26	0	26	Jan-10
32	LILO of Khurja-Muradnagar at Dadri	D/C	Uttar Pradesh	24	7	17	Feb-10
33	Rosa- Shahjahanpur -II	S/C	Uttar Pradesh	22	0	22	Mar-10
34	LILO of Palli - Gurgaon Sector 52 A at Gurgaon Sector 56	D/C	Haryana	2	0	2	Aug-09
35	Kirori - Masudpur	D/C	Haryana	24	0	24	Oct-09
36	LILO of Bawana - Narela at Bawana DSIDC (loop in portion)	D/C	Delhi	14	13	1	Nov-09
37	LILO of Jabalpur-Itarsi (2nd ckt) at Narsinghpur	D/C	Madhya Pradesh	4	4	0	Apr-09
38	LILO of Ist ckt Itarsi - Bhopal at Hosangabad	D/C	Madhya Pradesh	12	11	1	Apr-09
39	Chindwara- Seoni (PG)	D/C	Madhya Pradesh	134	132	2	Apr-09
40	LILO of 1st ckt of Damoh - Bina D/C at Sagar	D/C	Madhya Pradesh	15	8	7	Apr-09
41	LILO of 2nd ckt of Pitampur- Ratlam at Bad Nagar	D/C	Madhya Pradesh	20	6	14	Apr-09
42	Makronia- Sagar (Traction feeder)	D/C	Madhya Pradesh	10	10	0	Jul-09
43	LILO of 2nd ckt Itarsi - Bhopal at Hosangabad	D/C	Madhya Pradesh	11	0	11	Jul-09
44	Sujalpur-Rajgarh	D/C	Madhya Pradesh	144	108	36	Sep-09

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Sl. No.	Name of the transmission lines	No. of ckts	Executing Agency	Line Length (CKM)	Stringing Comptd. upto Mar-09 (CKM)	Stringing during 2009-10 (CKM)	Month of Compl-etion
1	2	3	4	5	6	7	8
45	LILO of 1st Ckt Jabalpur-Itarsi at Piparia	D/C	Madhya Pradesh	7	7	0	Oct-09
46	Bhopal (400 kV) -Ashta S/S	D/C	Madhya Pradesh	194	180	14	Jan-10
47	LILO of one ckt Satpura-Itarsi at Handia	D/C	Madhya Pradesh	170	42	128	Mar-10
48	Theur- Magarpatta(Urse-Talegaon 2nd ckt)	S/C	Maharashtra	10	0	10	Apr-09
49	LILO of Nerul- Trombay at Somkar	D/C	Maharashtra	1	0	1	Apr-09
50	LILO of Pirangut - Hinjwadi I at Hinjwadi-II	D/C	Maharashtra	10	0	10	Sep-09
51	LILO of Bhigwan-Baramati at Baramati Agro, Shetphal	D/C	Maharashtra	8	0	8	Nov-09
52	LILO of Kandalgaon – Chinchwad D/C at Hinjwadi-II	D/C	Maharashtra	12	0	12	Nov-09
53	Chakan- M/s Volks Wagen	D/C	Maharashtra	5	0	5	Dec-09
54	LILO of Wardha- Badnera at 765 kV Deoli S/S	D/C	Maharashtra	20	0	20	Feb-10
55	LILO of Kalwa – Nassik (Ckt-III) at Airoli (Knowledge Park)	D/C	Maharashtra	1	0	1	Mar-10
56	Chorania -Bala	D/C	Gujarat	59	56	3	Jun-09
57	LILO of Vav-Jagadia on Ckt-1 at Kosamba	D/C	Gujarat	10	0	10	Jul-09
58	Rajpur - Dudhrej	D/C	Gujarat	20	19	1	Jul-09
59	Tunda UMPP - Nanikhakhar	S/C	Gujarat	15	0	15	Dec-09
60	Adani (Mundra) - Versana	D/C	Gujarat	166	24	142	Jan-10
61	Mangrol - Mobha	D/C	Gujarat	219	43	176	Feb-10
62	Raigarh 400 kV (PGCIL) S/S Raigarh	S/C	Chattisgarh	21	12	9	Jun-09
63	Khedamara- Rajnandgaon	D/C	Chattisgarh	50	33	17	Sep-09
64	Bhatapara 400 kV (PGCIL)– Suhela (Bhatapara)	D/C	Chattisgarh	27	11	16	Jan-10

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Sl. No.	Name of the transmission lines	No. of ckts	Executing Agency	Line Length (CKM)	Stringing Comptd. upto Mar-09 (CKM)	Stringing during 2009-10 (CKM)	Month of Compl-etion
1	2	3	4	5	6	7	8
65	LILO of one ckt of Kolhapur - Ponda at Amona	D/C	Goa	3	0	3	Nov-09
66	LILO of Kadur-Nelamangala at Dabaspet (Nelamangala)	D/C	Karnataka	2	0	2	Apr-09
67	Hiriyur - Tallak	D/C	Karnataka	80	70	10	Apr-09
68	Indi- Basavanabagevadi	D/C	Karnataka	170	148	22	Apr-09
69	Link line between Nagjhari-Hubli and Hubli-Gadag line	D/C	Karnataka	3	0	3	Sep-09
70	LILO of Mahalingapur-Bagalkot at Mudol/ Vajaramatti	D/C	Karnataka	2	0	2	Sep-09
71	Bidadi-Kothipura (Ramanagar)	M/C	Karnataka	36	0	36	Sep-09
72	UTPS-Nandikur - Khemar (partly on Multi-ckt Multi-Voltage towers & partly on D/C towers)	D/C, M/C	Karnataka	48	0	48	Oct-09
73	LILO of Mahalingapur-Hubli line at Soundatti	D/C	Karnataka	9	0	9	Dec-09
74	Bastipura - Kadakola	D/C	Karnataka	44	0	44	Feb-10
75	Manali- Tondiarpet	D/C	Tamil Nadu	18	0	18	May-09
76	Meelavittan - M/s Ind Bharat	S/C	Tamil Nadu	9	0	9	Jul-09
77	LILO of Karaikudi - Pudukkottai at Karaikudi 400 kV S/s	D/C	Tamil Nadu	7.5	0	7.5	Aug-09
78	LILO of Pugalur-Alundur at Pugalur S/s 400 kV S/S	D/C	Tamil Nadu	18	0	18	Aug-09
79	Amathapuram-Chekkanoorani	S/C on D/C	Tamil Nadu	110	0	110	Oct-09
80	LILO of Tondiarpet-Mylapore at Basin Bridge	D/C	Tamil Nadu	2	0	2	Nov-09
81	Arasur 400kV S/S- Arasur 230kV S/s	D/C	Tamil Nadu	43	13	30	Jan-10
82	Malumichampatty-Common point- Myvadi	S/C	Tamil Nadu	58	31	27	Jan-10

(8/8)

Sl. No.	Name of the transmission lines	No. of ckts	Executing Agency	Line Length (CKM)	Stringing Comptd. upto Mar-09 (CKM)	Stringing during 2009-10 (CKM)	Month of Compl-etion
1	2	3	4	5	6	7	8
83	Sriperumbudur 400kV S/S-Sripermbudur Sipcot 230 kV S/s	S/C on D/C	Tamil Nadu	15	0	15	Jan-10
84	Tirunelveli 400kV S/s - Udayathur	S/C on D/C	Tamil Nadu	69	41	28	Feb-10
85	M/s Ind Bharat-Chekkanoorani	D/C & S/C	Tamil Nadu	154	0	154	Mar-10
86	LILO of Kayamkulam-Edaman (ckt-2) at Edappon	D/C	Kerala	17	0	17	Jun-09
87	Tap line to Vadakara S/s	D/C	Kerala	2	0	2	Aug-09
88	Garividi - Boddepallipeta	S/C on D/C	Andhra Pradesh	44	44	0	Jul-09
89	Boddepallipeta-Tekkali	S/C on D/C	Andhra Pradesh	44	37	7	Jul-09
90	RTPP-Pulivendula	D/C	Andhra Pradesh	82	68	14	Dec-09
91	LILO of VTS- Podili at Nasararaopet	D/C	Andhra Pradesh	4	0	4	Dec-09
92	LILO of Sonenagar-Garhwa D/C at Japla	D/C	Jharkhand	8	0	8	May-09
93	Biharshariff- Begusarai	D/C	Bihar	150	0	150	Nov-09
94	Budhipadar-Bolangir	D/C	Orissa	312	312	0	Jan-10
95	Tinsukia- Namrup	D/C	Assam	80	0	80	Apr-09
	TOTAL CKM OF FULLY COMPLETED 220 kV LINES (SS) DURING THE YEAR			**4314**		**2434**	
	TOTAL CKM OF PARTIALLY COMPLETED 220 kV LINES (SS) DURING THE YEAR					**2178**	
	TOTAL CKM OF 220 kV LINES (SS)					**4612**	
	Private Sector						
1	Akhakol-Puna	D/C	Torrent Power	72	72	0	May-09
2	Akhakol-Bhatar	D/C	Torrent Power	136	136	0	May-09
3	Akhakol-Ved(Dabholi)	D/C	Torrent Power	52	52	0	Jun-09
4	Budge Budge -Kosba	D/C	CESC	170	48	122	Feb-10
	TOTAL CKM OF 220 kV LINES (PS)			**430**		**321**	
	TOTAL CKM OF 220 kV LINES (ALL INDIA)					**5139**	

Annexure - 3D
(Item No.3.13)
(1/4)

SUB-STATIONS COMMISSIONED DURING 2009-10

Sl.No.	Name of the Sub-station	Voltage Ratio (kV/kV)	Executing Agency	Capacity (MW/ MVA)	Month of completion
1	2	3	4	5	6
I. 400 kV (Sub-station)					
PGCIL					
1	Trivandrum (PG) (Ext) (1x315)	400/220	POWERGRID	315	Jun-09
2	Warrangal S/S (2x315)	400/220	POWERGRID	630	Jul-09
3	Karaikudi S/S (2x315)	400/220	POWERGRID	630	Jul-09
4	Bhimnal S/Stn.(2x315) 1st ICT	400/220	POWERGRID	315	Aug-09
5	Pugalur S/S (2x315)2nd ICT	400/222	POWERGRID	315	Aug-09
6	Roorkee S/S (2nd ICT)	400/220	POWERGRID	315	Mar-10
7	Ludhiana (3rd ICT)	400/220	POWERGRID	315	Mar-10
	TOTAL PGCIL			**2835**	
DVC					
	TOTAL DVC			**0**	
	TOTAL (Central Sector)			**2835**	
1	Mendhasal (2x315)	400/220	Orissa	630	Aug-09
2	Durgapur (6x105)	400/220	West Bengal	630	Dec-09
3	Chakan S/S (3x105)	400/220	Maharashtra	315	Dec-09
4	Jejuri (3x167)	400/220	Maharashtra	500	Jan-10
5	Bikaner S/S (1X315)	400/220	Rajasthan	315	Mar-10
	TOTAL (State Sector)			**2390**	
	TOTAL(All India)			**5225**	
II. 220 kV (Sub-station)					
PGCIL					
1	Sitarganj 2nd ICT	220/132	POWERGRID	100	Jul-09
	TOTAL PGCIL			**100**	
DVC					
	TOTAL DVC			**0**	
	TOTAL (Central Sector)			**100**	
	State Sector				
1	Guragaon Aug(Sector-52A) 3rd Tr.	220/66	Haryana	100	Apr-09
2	Isharwal	220/132	Haryana	100	Apr-09
3	Pehowa Aug (100-50)	220/132	Haryana	50	Jun-09
4	Cheeka Aug (3rd)	220/132	Haryana	100	Jun-09
5	Nissing Aug (3rd)	220/132	Haryana	100	Jun-09
6	Bhuna (2nd Trans.)	220/132	Haryana	100	Jul-09

(2/4)

Sl.No.	Name of the Sub-station	Voltage Ratio (kV/kV)	Executing Agency	Capacity (MW/ MVA)	Month of completion
1	2	3	4	5	6
7	Guragaon Aug (Sector-56)	220/66	Haryana	100	Aug-09
8	Kartarpur (Aug) (2nd)	220/66	Punjab	100	Apr-09
9	Mohali-II (New)	220/66	Punjab	100	Aug-09
10	Bagha Purana (U/G)	220/66	Punjab	100	Aug-09
11	Majitha (U/G)	220/66	Punjab	100	Aug-09
12	Ajitwal	220/66	Punjab	100	Oct-09
13	Renwal	220/132	Rajasthan	100	May-09
14	Baran	220/132	Rajasthan	100	May-09
15	Bhadra	220/132	Rajasthan	100	May-09
16	Mahindra SEZ(1x100)	220/132	Rajasthan	100	Mar-10
17	Gulabpura	220/132	Rajasthan	100	Mar-10
18	Dhod	220/132	Rajasthan	100	Mar-10
19	DSIDC Bawana (2nd Trans.)	220/66	Delhi	100	Jul-09
20	Basti Aug. (160-100)	220/132	Uttar Pradesh	60	Apr-09
21	Sultanpur Aug. (160-100)	220/132	Uttar Pradesh	60	Aug-09
22	Sikandrabad	220/132	Uttar Pradesh	100	Oct-09
23	Muzaffarnagar	220/132	Uttar Pradesh	100	Jan-10
24	Sohawal	220/132	Uttar Pradesh	100	Jan-10
25	Sonkhar	220/33	Maharashtra	50	Apr-09
26	Tembhurni	220/33	Maharashtra	25	Apr-09
27	Magarpatta	220/22	Maharashtra	150	Apr-09
28	Wathar	220/132	Maharashtra	100	Jun-09
29	Wathar	220/33	Maharashtra	50	Jun-09
30	Temghar	220/22	Maharashtra	50	Aug-09
31	Washala	220/22	Maharashtra	25	Aug-09
32	Hinjewadi II S/S	220/22	Maharashtra	50	Oct-09
33	Mahape (3rd Trans.)	220/22	Maharashtra	50	Jan-10
34	Temghar (2nd Tranf.)	220/22	Maharashtra	50	Jan-10
35	Mahad	220/22	Maharashtra	50	Mar-10
36	Airoli (Knowledge Park)	220/22	Maharashtra	50	Mar-10
37	Panvel (3rd Trans.)	220/33	Maharashtra	50	Mar-10
38	Sidhi S/S	220/132	Madhya Pradesh	160	May-09
39	Rajgarh (Biaora)	220/132	Madhya Pradesh	160	Sep-09
40	Beragarh	220/132	Madhya Pradesh	160	Sep-09
41	Nagda	220/132	Madhya Pradesh	160	Sep-09
42	Indore(South Zone)	220/132	Madhya Pradesh	160	Sep-09

(3/4)

Sl.No.	Name of the Sub-station	Voltage Ratio (kV/kV)	Executing Agency	Capacity (MW/ MVA)	Month of completion
1	2	3	4	5	6
43	Badnagar	220/132	Madhya Pradesh	160	Oct-09
44	Chindwara	220/132	Madhya Pradesh	160	Nov-09
45	Piparia	220/132	Madhya Pradesh	160	Jan-10
46	Astha	220/132	Madhya Pradesh	100	Jan-10
47	Badnagar (2nd Traf.)	220/132	Madhya Pradesh	160	Jan-10
48	Bhopal (Chambal) Addl.Tr.	220/132	Madhya Pradesh	100	Mar-10
49	Rajnandgaon	220/132	Chhattisgarh	160	Sep-09
50	Amona (2x50)	220/33	Goa	100	Nov-09
51	Bala (2x50)	220/11	Gujarat	100	Nov-09
52	Dudhrej (2x25)	220/11	Gujarat	50	Nov-09
53	Tallak (2ndTrans.)	220/66	Karnataka	100	Apr-09
54	Haskote	220/66	Karnataka	100	Apr-09
55	Dabaspet (Nelamangala)	220/66	Karnataka	100	Apr-09
56	HSR layout (2x150 - 2x100)	220/66	Karnataka	100	Apr-09
57	Shiralkoppa	220/110	Karnataka	100	Apr-09
58	Sindhanur (1st)	220/110	Karnataka	100	Apr-09
59	Indi (2x100)	220/110	Karnataka	200	Apr-09
60	Naganathapura (1st Trans.)	220/66	Karnataka	100	Jun-09
61	Vajramatti (2x100)	220/110	Karnataka	200	Oct-09
62	Ranebennur (Addl.Trans.)	220/110	Karnataka	100	Oct-09
63	Kustagi (Addl.trans.)	220/110	Karnataka	100	Nov-09
64	Soundatti	220/110	Karnataka	100	Mar-10
65	Naganathapura (2nd Trans.)	220/66	Karnataka	100	Dec-09
66	Sriperumbudur SIPCOT	230/110	Tamil Nadu	100	Apr-09
67	Nokia	230/110	Tamil Nadu	100	Apr-09
68	Ponnapuram (Addl. Trans.)	230/110	Tamil Nadu	100	Apr-09
69	Kadapperi 3rd (80 to 100 MVA)	230/110	Tamil Nadu	20	Apr-09
70	Palladam Addl.Trans.	230/110	Tamil Nadu	100	May-09
71	Mettur (Aug.)	230/110	Tamil Nadu	100	Jun-09
72	Perambalur (Aug.)(100-50)	230/110	Tamil Nadu	50	Jul-09
73	Arni (Addl.Trans.)	230/110	Tamil Nadu	80	Aug-09
74	Thiruvalam Addl.Trans.	230/110	Tamil Nadu	100	Sep-09
75	Alundur (Aug.) (100-50)	230/110	Tamil Nadu	50	Sep-09
76	Amuthapuram Addl.Trans.	230/33	Tamil Nadu	50	Oct-09
77	Renganathapuram Addl.Trans.	230/110	Tamil Nadu	100	Oct-09
78	Koratur Aug.(80 to 100 MVA)	230/110	Tamil Nadu	20	Oct-09
79	Basin Bridge(GMR Vasavi)	230/110	Tamil Nadu	100	Nov-09

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Sl.No.	Name of the Sub-station	Voltage Ratio (kV/kV)	Executing Agency	Capacity (MW/ MVA)	Month of completion
1	2	3	4	5	6
80	Vinnamangalam Aug. (100-50)	230/110	Tamil Nadu	50	Nov-09
81	Nethimedu Aug. (100- 80)	230/110	Tamil Nadu	20	Dec-09
82	Thiruvalam Aug. (100-75)	230/110	Tamil Nadu	25	Jan-10
83	Udayathur	230/110	Tamil Nadu	100	Mar-10
84	Othakalmandapam (3rd Tr.)	230/110	Tamil Nadu	100	Mar-10
85	Salem Aug. (100- 80)	230/110	Tamil Nadu	20	Mar-10
86	Vadakara	220/110	Kerala	100	Aug-09
87	Vadakara 2nd Trans.	220/110	Kerala	100	Dec-09
88	Kundra	220/110	Kerala	200	Dec-09
89	Gajwel 2nd Trans.	220/132	Andhra Pradesh	100	Nov-09
90	Pulivendula	220/132	Andhra Pradesh	100	Dec-09
91	Nasararaopet	220/132	Andhra Pradesh	100	Dec-09
92	Nellore (Manuboin)	220/132	Andhra Pradesh	100	Dec-09
93	New Town AA-III (2x160)	220/132	West Bengal	320	Jul-09
94	New Town AA-III (2x50)	220/33	West Bengal	100	Jul-09
95	Subhasgram	220/132	West Bengal	160	Sep-09
96	Arambag (Aug.)	220/132	West Bengal	160	Sep-09
100	Bhadrak (2nd Traf)	220/132	Orissa	100	Sep-09
101	Samaguri (Aug.)	220/132	Assam	50	Sep-09
102	Namrup (Aug) (2x50)	220/132	Assam	100	Oct-09
	TOTAL (State Sector)	**220**		**10195**	
	JV/Private Sector				
1	Puna (2x160 MVA)1st Trans.	220/66	Torrent Power	160	May-09
2	Bhatar (2x160 MVA)1st Trans.	220/66	Torrent Power	160	May-09
3	Ved (Dabhol GIS) (2x160 MVA) 1st Trans.	220/66	Torrent Power	160	Jun-09
4	Puna (2nd Trans.)	220/66	Torrent Power	160	Jul-09
5	Bhatar (2nd Trans.)	220/66	Torrent Power	160	Jul-09
6	Ved (Dabhol) (2nd Trans) GIS	220/66	Torrent Power	160	Aug-09
7	Kosba (3x160)	220/132	CESC Limited	480	Nov-09
	TOTAL (JV/PS)			**1440**	
	TOTAL (All India)	**220**		**11735**	

Abbreviations

S/C-Single circuit	S-Slippage	ckt-Circuit
D/C-Double circuit	LILO-Loop in Loop out	S/S-Substation
M/C-Multi circuit	TPS-Thermal Power station	kV-Kilo-volt
ckm-Circuit kilometer	MVA-Mega Volt Ampere	Aug-Augmentation

Annexure 4A
(Item No. 4.2)

POWER SUPPLY POSITION DURING 2009-10

State / System / Region	Require-ment	Availa-bility	Surplus / Deficit (-)		Peak Demand	Peak Met	Surplus / Deficit (-)	
	(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(%)
Chandigarh	1,576	1,528	-48	-3.0	308	308	0	0.0
Delhi	24,277	24,094	-183	-0.8	4,502	4,408	-94	-2.1
Haryana	33,441	32,023	-1,418	-4.2	6,133	5,678	-455	-7.4
Himachal Pradesh	7,047	6,769	-278	-3.9	1,118	1,158	40	3.6
Jammu & Kashmir	13,200	9,933	-3,267	-24.8	2,247	1,487	-760	-33.8
Punjab	45,731	39,408	-6,323	-13.8	9,786	7,407	-2,379	-24.3
Rajasthan	44,109	43,062	-1,047	-2.4	6,859	6,859	0	0.0
Uttar Pradesh	75,930	59,508	-16,422	-21.6	10,856	8,563	-2,293	-21.1
Uttaranchal	8,921	8,338	-583	-6.5	1,397	1,313	-84	-6.0
Northern Region	**254,231**	**224,661**	**-29,570**	**-11.6**	**37,159**	**31,439**	**-5,720**	**-15.4**
Chhattisgarh	11,009	10,739	-270	-2.5	2,819	2,703	-116	-4.1
Gujarat	70,369	67,220	-3,149	-4.5	10,406	9,515	-891	-8.6
Madhya Pradesh	43,179	34,973	-8,206	-19.0	7,490	6,415	-1,075	-14.4
Maharashtra	124,936	101,512	-23,424	-18.7	19,388	14,664	-4,724	-24.4
Goa	3,092	3,026	-66	-2.1	485	453	-32	-6.6
Daman & Diu	1,934	1,802	-132	-6.8	280	255	-25	-8.9
D.N. Haveli	4,007	3,853	-154	-3.8	529	494	-35	-6.6
Western Region	**258,528**	**223,127**	**-35,401**	**-13.7**	**39,609**	**32,586**	**-7,023**	**-17.7**
Andhra Pradesh	78,996	73,765	-5,231	-6.6	12,168	10,880	-1,288	-10.6
Karnataka	45,550	42,041	-3,509	-7.7	7,942	6,897	-1,045	-13.2
Kerala	17,619	17,196	-423	-2.4	3,109	2,982	-127	-4.1
Tamil Nadu	76,293	71,568	-4,725	-6.2	11,125	9,813	-1,312	-11.8
Pondicherry	2,119	1,975	-144	-6.8	327	294	-33	-10.1
Lakshadweep	24	24	0	0.0	6	6	0	0.0
Southern Region	**220,576**	**206,544**	**-14,032**	**-6.4**	**32,178**	**29,049**	**-3,129**	**-9.7**
Bihar	11,587	9,914	-1,673	-14.4	2,249	1,509	-740	-32.9
DVC	15,199	14,577	-622	-4.1	1,938	1,910	-28	-1.4
Jharkhand	5,867	5,407	-460	-7.8	1,088	947	-141	-13.0
Orissa	21,136	20,955	-181	-0.9	3,188	3,120	-68	-2.1
West Bengal	33,750	32,819	-931	-2.8	6,094	5,963	-131	-2.1
Sikkim	388	345	-43	-11.1	96	94	-2	-2.1
Andaman- Nicobar	240	180	-60	-25.0	40	32	-8	-20.0
Eastern Region	**87,927**	**84,017**	**-3,910**	**-4.4**	**13,220**	**12,384**	**-836**	**-6.3**
Arunachal Pradesh	399	325	-74	-18.5	95	78	-17	-17.9
Assam	5,122	4,688	-434	-8.5	920	874	-46	-5.0
Manipur	524	430	-94	-17.9	111	99	-12	-10.8
Meghalaya	1,550	1,327	-223	-14.4	280	250	-30	-10.7
Mizoram	352	288	-64	-18.2	70	64	-6	-8.6
Nagaland	530	466	-64	-12.1	100	96	-4	-4.0
Tripura	855	771	-84	-9.8	176	173	-3	-1.7
North-Eastern Region	**9,332**	**8,296**	**-1,036**	**-11.1**	**1,760**	**1,445**	**-315**	**-17.9**
All India	**830,594**	**746,644**	**-83,950**	**-10.1**	**119,166**	**104,009**	**-15,157**	**-12.7**

Annexure 4B
(Item No. 4.5)

STATUS OF CAPACITOR INSTALLATION AS ON 31.03.2010

(All figures in MVAR)

State / U.T. / System	Installed as on 31.03.2009 (A)	Additional. Requirement during 2009-10 (B)	Actual Addition 01.04.2009- 31.03.2010 (C)	Balance (D=B-C)
Northern Region				
Delhi	3476	0	0.000	0.000
Haryana	3359	816	0.000	816.000
Punjab ***	5736	743	550.519	192.481
Rajasthan	3785	484	42.600	441.400
U.P.	5812	1449	0.000	1449.000
Uttarakhand	353	233	0.000	233.000
Himachal Pradesh	514	37	0.000	37.000
Jammu & Kashmir	147	1124	0.000	1124.000
Chandigarh	127	30	0.000	30.000
TOTAL (NR)	**23309**	**4916**	**593.119**	**4322.881**
Western Region				
Gujarat	4621.507	**	0.000	**
Madhya Pradesh	4145.400	**	0.000	**
Chhattisgarh	753.435	**	0.000	**
Maharashtra	5954.446	**	0.000	**
Goa	149.800	**	0.000	**
TOTAL (WR)	**15624.588**	**	**0.000**	**
Southern Region				
Andhra Pradesh	6593.400	55*	0.000	55.0
Karnataka	4493.660	147.8*	49.600#	98.2
Kerala	1005.000	15@	0.000	15.0
Tamil Nadu	3947.500	101*	0.000	101.0
TOTAL (SR)	**16039.560**	**318.8***	**49.600**	**269.2**
TOTAL	**54973.148**		**642.719**	

* *Carry over of 2008-09.*
** *Targets being finalised by WRPC.*
*** *Punjab figures revised by NRPC in Feb10.*
@ *As informed by KSEB*
'#' *As reconciled by KPTCL[May -30 MVAR, Jun - 2.4 MVAR, Jul - 2.5 MVAR,Aug - 2.5 MVAR and Oct - 4.8 MVAR]*

Annexure-5A
(Item No.5.2)
(1/3)

PFRS UNDER 50 000 MW HYDROELECTRIC INITIATIVE (LOW TARIFF PFR SCHEMES)

Tariff: Below Rs.2.50

Scheme		State	Installed Capacity		Estimated Cost (Rs. Cr.)	Annual Energy (GWh)	Tariff (Rs/ kWh)
			Units x Size (MW)	Total (MW)			
Arunachal Pradesh							
1.	Kalai	Arunachal Pradesh	10 x 260.00	2600	6637.67	10608.64	1.01
2.	Naying	Arunachal Pradesh	4 x 250.00	1000	3016.96	5077.15	1.18
3.	Hutong	Arunachal Pradesh	12 x 250.00	3000	7792.29	9901.00	1.28
4.	Oju-II	Arunachal Pradesh	4 x 250.00	1000	3492.99	4629.93	1.46
5.	Tato-II	Arunachal Pradesh	4 x 175.00	700	2608.60	3465.90	1.48
6.	Hirong	Arunachal Pradesh	4 x 125.00	500	2072.78	2535.80	1.62
7.	Bhareli-II	Arunachal Pradesh	5 x 120.00	600	1698.35	2345.00	1.67
8.	Etalin	Arunachal Pradesh	16 x 250.00	4000	14069.14	16071.60	1.70
9.	Kapakleyak	Arunachal Pradesh	4 x 40.00	160	463.52	627.95	1.74
10.	Bhareli-I	Arunachal Pradesh	8 x 140.00	1120	3372.45	4112.40	1.85
11.	Demwe	Arunachal Pradesh	12 x 250.00	3000	9539.40	10823.82	1.97
12.	Niare	Arunachal Pradesh	4 x 200.00	800	3498.55	3356.62	2.02
13.	Oju-I	Arunachal Pradesh	4 x 175.00	700	3526.28	3291.58	2.08
14.	Naba	Arunachal Pradesh	4 x 250.00	1000	4399.89	3995.25	2.14
15.	Dibbin **	Arunachal Pradesh	2 x 50.00	100	371.52	335.72	2.23
16.	Talong **	Arunachal Pradesh	3 x 100.00	300	891.04	915.50	2.24
17.	Kameng Dam	Arunachal Pradesh	5 x 120.00	600	2264.00	2345.55	2.29
18.	Badao **	Arunachal Pradesh	4 x 30.00	120	443.98	441.00	2.32
19.	Attunli	Arunachal Pradesh	4 x 125.00	500	2725.26	2247.32	2.35
Total (19 Schemes)				**21800**			
Himachal Pradesh							
20.	Chamba	HimachalPradesh	3 x 42.00	126	420.90	646.82	1.48
21.	Thopan Powari	HimachalPradesh	3 x 160.00	480	1796.98	1786.26	1.81
22.	Gondhala	HimachalPradesh	3 x 48.00	144	482.50	570.19	1.92
23.	Jangi Thopan	HimachalPradesh	3 x 160.00	480	1805.54	1779.45	2.00
24.	Tidong-II	HimachalPradesh	2 x 35.00	70	309.84	256.18	2.02
25.	Bajoli Holi	HimachalPradesh	3 x 60.00	180	649.22	762.98	2.03
26.	Yangthang	HimachalPradesh	3 x 87.00	261	1120.20	938.02	2.08
27.	Gharopa	HimachalPradesh	3 x 38.00	114	493.59	534.25	2.09

(2/3)

Scheme		State	Installed Capacity		Estimated Cost (Rs. Cr.)	Annual Energy (GWh)	Tariff (Rs/ kWh)
			Units x Size (MW)	Total (MW)			
28.	Khab-I	HimachalPradesh	3 x 150.00	450	1765.89	1551.00	2.24
29.	Luhri **	HimachalPradesh	3 x 155.00	465	2039.98	1825.13	2.41
30.	Khoksar	HimachalPradesh	3 x 30.00	90	373.66	351.91	2.46
Total (11 Schemes)				**2860**			
Jammu & Kashmir							
31.	Kiru **	J&K	4 x 107.50	430	857.58	1935.77	0.77
32.	Kawar **	J&K	4 x 80.00	320	891.37	1426.56	1.09
33.	Bichlari	J&K	2 x 17.50	35	94.40	148.29	1.11
34.	Ratle **	J&K	4 x 140.00	560	1987.92	2483.37	1.40
35.	Shamnot	J&K	4 x 92.50	370	1592.91	1650.19	1.69
Total (5 Schemes)				**1715**			
Karanataka							
36.	Agnashini	Karnataka	4 x 150.00	600	910.71	1431.00	1.07
37.	Gundia **	Karnataka	2 x 150.00	300	531.68	616.00	1.41
38.	Gangavali	Karnataka	2 x 200.00	400	709.68	759.00	1.46
39.	Kalinadi Stage-III	Karnataka	2 x 150.00	300	590.05	610.00	1.67
Total (4 Schemes)				**1600**			
Meghalaya							
40.	Mawhu **	Meghalaya	3 x 40.00	120	434.24	482.96	1.40
41.	Umjaut	Meghalaya	3 x 23.00	69	276.97	276.70	1.51
42.	Umduna	Meghalaya	3 x 19.00	57	226.68	231.24	1.68
43.	Nongkolait	Meghalaya	2 x 60.00	120	392.80	332.87	1.97
44.	Selim	Meghalaya	2 x 85.00	170	652.07	534.68	2.02
45.	Rangmaw	Meghalaya	2 x 32.50	65	268.37	229.60	2.32
46.	Nongnam	Meghalaya	2 x 25.00	50	272.07	212.59	2.44
Total (7 Schemes)				**651**			
Sikkim							
47.	Teesta-I	Sikkim	4 x 80.00	320	1206.59	1298.12	1.80
48.	Dikchu **	Sikkim	3 x 35.00	105	518.50	469.00	2.15
49.	Panan **	Sikkim	4 x 50.00	200	846.08	762.00	2.15
50.	Lachen	Sikkim	3 x 70.00	210	1046.93	865.94	2.35
Total (4 Schemes)				**835**			

(3/3)

Scheme		State	Installed Capacity		Estimated Cost (Rs. Cr.)	Annual Energy (GWh)	Tariff (Rs/ kWh)
			Units x Size (MW)	Total (MW)			
Uttaranchal							
51.	Badrinath **	Uttaranchal	2 x 70.00	140	357.33	702.70	0.81
52.	Garba Tawaghat	Uttaranchal	3 x 210.00	630	1447.77	2483.11	0.90
53.	Arakot Tiuni	Uttaranchal	3 x 24.00	72	310.51	382.90	1.00
54.	Harsil **	Uttaranchal	3 x 70.00	210	578.20	920.57	1.10
55.	Chhunger- Chal	Uttaranchal	2 x 120.00	240	725.53	853.28	1.13
56.	Rishi Ganga - 1	Uttaranchal	2 x 35.00	70	277.01	327.30	1.18
57.	Karmoli	Uttaranchal	2 x 70.00	140	465.60	621.00	1.30
58.	Mapang - Bogidiyar	Uttaranchal	2 x 100.00	200	667.19	882.04	1.30
59.	Taluka Sankri	Uttaranchal	2 x 70.00	140	378.14	559.47	1.33
60.	Deodi	Uttaranchal	2 x 30.00	60	242.34	296.76	1.37
61.	Sela Urthing	Uttaranchal	2 x 115.00	230	696.73	816.73	1.40
62.	Urthing Sobla	Uttaranchal	4 x 70.00	280	888.45	1360.20	1.49
63.	Sirkari Bhyol Rupsia-bagar	Uttaranchal	3 x 70.00	210	899.63	967.97	1.55
64.	Rupsia-bagar Khasiya-bara **	Uttaranchal	2 x 130.00	260	1101.55	1195.63	1.59
65.	Gangotri **	Uttaranchal	1 x 55.00	55	252.61	264.76	1.62
66.	Gohana Tal	Uttaranchal	2 x 30.00	60	270.38	269.35	1.64
67.	Bokang Baling	Uttaranchal	3 x 110.00	330	1120.75	1124.62	1.68
68.	Jelam Tamak	Uttaranchal	2 x 30.00	60	277.92	268.12	1.71
69.	Jakhol Sankri	Uttaranchal	3 x 11.00	33	171.00	144.24	1.71
70.	Bhairon-ghati **	Uttaranchal	2 x 32.50	65	304.32	293.18	1.80
71.	Maleri Jelam	Uttaranchal	2 x 27.50	55	257.85	243.07	1.80
72.	Naitwar-Mori	Uttaranchal	3 x 11.00	33	202.20	151.00	1.85
73.	Bogudiyar - Sirkari Bhyal	Uttaranchal	2 x 85.00	170	859.27	744.00	1.99
74.	Nand Prayag	Uttaranchal	3 x 47.00	141	670.04	794.00	2.05
75.	Jadh Ganga	Uttaranchal	2 x 25.00	50	277.48	220.88	2.19
76.	Lata Tapovan **	Uttaranchal	4 x 77.50	310	1021.30	1123.00	2.21
77.	Rishi Ganga - II	Uttaranchal	1 x 35.00	35	212.98	164.64	2.22
78.	Tamak Lata	Uttaranchal	4 x 70.00	280	988.21	1040.70	2.30
Total (28 Schemes)				**4559**			
Total (Below Rs.2.50) - 78Nos.				**34020**			

*** DPRs Prepared*

Annexure- 5B
(Item No.5.4)

HYDRO CAPACITY ADDITION DURING THE YEAR 2009-10

Sl No.	Name of Project/ State/Organisation Nos.xSize= Capacity MW	Unit No.	Capacity (MW)	Target at beginning of the year	Date of Rotation	Date of commissioning
Units Commissioned during 2009-10						
	Central Sector					
1.	**Priyadarshni Jurala** A.P./APGENCO (6x39)	3	39	05/2009	26.05.09	27.06.09
TOTAL (Commissioned):		**1 Unit**	**39 MW**			

Sl No.	Name of Project/ State/Organisation Nos. xSize = Capacity MW	Unit No.	Capacity (MW)	Target at beginning of the year	Reasons for slippage
Units slipped from 2009-10					
	Central Sector				
1.	**Sewa-II** J&K/NHPC (3x40 MW)	1 2 3	40 40 40	01/2010 02/2010 03/2010	Schedule commissioning of the project got delayed because of leakage in Head Race Tunnel during filling of Water conductor system/ spinning of the machine.
2.	**Teesta Low Dam-III** W.B./ NHPC (4x33 MW)	1 2 3 4	33 33 33 33	02/2010 02/2010 03/2010 03/2010	Commissioning during the year got delayed due to flash flood (AILA) on 26th May, 2009 of the project area. Also, progress of works got affected due to frequent disruption of works because of the local agitation.
	State Sector				
3.	**Priyadarshini Jurala** A.P./APGENCO 6x39 = 234 MW	4 5	39 39	10/2009 02/2010	Single shift working & Visa problem of Chinese Engineers affected the erection, testing & commissioning schedule
4.	**Kuttiyadi Addl. Extn.** Kerala/KSEB (2x50 MW)	1 2	50 50	06/2009 07/2009	Slow progress of erection of Penstock due to extended monsoon period and steep slope delayed the commissioning.
5.	**Myntdu (Leishka) St-I** Meghalaya/MeSEB (2x42)	1 2	42 42	12/2009 02/2010	Commissioning of the units got delayed due to flash flood on 08.10.2009 flooding the power house and affected the already installed equipment.
	Private Sector				
6.	**Allain Duhangan** H.P./ADHPL (2x96)	1 2	96 96	11/2009 12/2009	Delay occurred in completion of Head Race Tunnel & surge shaft works due to bad geology. Power evacuation works are also delayed due to forest clearance issue.
7.	**Malana-II** H.P./Everest P.C. (2x50)	1 2	50 50	12/2009 01/2010	Poor geology in Head Race Tunnel has delayed the completion of works.
TOTAL slippage from 2009-10		**17 Units**	**806 MW**		
TOTAL -Programme:		**18 Units**	**845 MW**		

SUMMARY

Capacity Programmed	**:**	**845 MW**
Capacity Commissioned	**:**	**39 MW**
Capacity Slipped	**:**	**806 MW**

Annexure-5C
(Item 5.4.1)

HYDRO CAPACITY ADDITION PROGRAMME FOR THE YEAR 2010-11

(Excluding projects under Ministry of New & Renewable Energy)

Sl. No.	Name of Project/ I.C. (No. x MW)	State/ Implem. Agency	Unit No.	Benefits (MW)	Likely Commissioning	Remarks
	Central Sector					
1.	**Sewa – II** 3x40= 120 MW	Jammu & Kashmir/ NHPC	U-1 U-2 U-3	40 40 40	May-10 Jun-10 Jun-10	
2.	**Chamera-III** 3x77= 231 MW	Himachal Pradesh/ NHPC	U-1	77	March- 11	2 units (154 MW in 2011-12)
3.	**Uri-II** 4x60= 240 MW	Jammu & Kashmir/ NHPC	U-1 U-2	60 60	February- 11 March- 11	2 units (120 MW in 2011-12)
4.	**Koteshwar** 4x100= 400 MW	Uttaranchal/ THDC	U-1 U-2	100 100	December- 10 March- 11	2 units (200 MW in 2011-12)
5.	**Teesta Low Dam-III** 4x33= 132 MW	West Bengal/ NHPC	U-1 U-2 U-3 U-4	33 33 33 33	January- 11 January- 11 February- 11 February- 11	
	Sub- total			**649**		
	State Sector					
6.	**Kuttiyadi Addl. Ext.** 2x50= 100 MW	Kerala/ KSEB	U-1 U-2	50 50	April- 10 April- 10	
7.	**Priyadarshni Jurala** 6x39= 234 MW	Andhra Pradesh/ APGENCO	U-4 U-5 U-6	39 39 39	May- 10 October- 10 February- 11	3 Untis (117 MW) already commissioned
8.	**Nagarujana Sagar TR** 2x25= 50 MW	Andhra Pradesh/ APGENCO	U-1	25	March- 11	1 unit (25 MW in 2011-12)
9.	**Pulichintala** 4x30= 120 MW	Andhra Pradesh/ APGENCO	U-1	30	March- 11	3 units (90 MW in 2011-12)
10.	**Myntdu** 2x42= 84 MW	Meghalaya/ MeSEB	U-1 U-2	42 42	May- 10 August- 10	
	Sub- total			**356**		
	Private Sector					
11.	**Allain Duhangan** 2x96= 192 MW	Himachal Pradesh/ ADHPL	U-1 U-2	96 96	June- 10 July- 10	
12.	**Budhil** 2x35= 70 MW	Himachal Pradesh/ LANCO	U-1 U-2	35 35	October- 10 November- 10	
13.	**Malana-II** 2x50= 100 MW	Himachal Pradesh/ Everest PC	U-1 U-2	50 50	October- 10 November- 10	
14.	**Chujachen** 2x49.5= 99 MW	Sikkim/ Gati	U-1 U-2	49.5 49.5	September- 10 October- 10	
	Sub- total			**461**		

Annexure-5D
(Item No.5.7)

HYDRO PROJECTS IDENTIFIED FOR BENEFITS DURING 12TH PLAN

(1/3)

Sl. No.	Name of scheme	Type	State	Agency	Installed Capacity (MW)	Benefit in 12th Plan
1.	Bajoli Holi	ROR	Himachal Pradesh	IPP	180	**180**
2.	Chirgaon (Majhgaon)	ROR	Himachal Pradesh	HPPCL	42	**42**
3.	Dhaula Sidh	ROR	Himachal Pradesh	SJVNL	40	**40**
4.	Kutehr	ROR	Himachal Pradesh	IPP	260	**260**
5.	Luhri	ROR	Himachal Pradesh	SJVNL	776	**776**
6.	Renuka dam	STO	Himachal Pradesh	HPPCL	40	**40**
7.	Sainj	ROR	Himachal Pradesh	HPPCL	100	**100**
8.	Kashang - I	ROR	Himachal Pradesh	HPPCL	130	**130**
9.	Kashang-II & III	ROR	Himachal Pradesh	HPPCL	130	**130**
10.	Kashang -IV	ROR	Himachal Pradesh	HPPCL	48	**48**
11.	Shongtong Karcham	ROR	Himachal Pradesh	HPPCL	402	**402**
12.	Tangnu Romai	ROR	Himachal Pradesh	IPP	44	**44**
13.	Lambadug	ROR	Himachal Pradesh	IPP	25	**25**
14.	Tidong-I	ROR	Himachal Pradesh	IPP	100	**100**
15.	Chango Yangthang	ROR	Himachal Pradesh	IPP	140	**140**
16.	Baglihar-II	ROR	J & K	PDC	450	**450**
17.	Kiru	ROR	J & K	NHPC	600	**600**
18.	Kawar	ROR	J & K	NHPC	520	**520**
19.	Kishan Ganga	ROR	J & K	NHPC	330	**330**
20.	Pakhal Dul	STO	J & K	NHPC	1000	**1000**
21.	Ratle	ROR	J & K	To be decided	690	**690**
22.	Kirthai-I	ROR	J & K	PDC	240	**240**
23.	New Ganderbal	ROR	J & K	PDC	93	**93**
24.	Kotlibhel-St-1A	ROR	Uttarakhand	NHPC	195	**195**
25.	Kotlibhel-St-1B	ROR	Uttarakhand	NHPC	320	**320**
26.	Kotlibhel-St-II	ROR	Uttarakhand	NHPC	530	**530**
27.	Lata Tapovan	ROR	Uttarakhand	NTPC	171	**171**
28.	Vishnugad Pipalkoti	ROR	Uttarakhand	THDC	444	**444**
29.	Arkot Tiuni	ROR	Uttarakhand	UJVNL	72	**72**
30.	Alaknanda Badrinath)	ROR	Uttarakhand	IPP	300	**300**
31.	Mapang Bogudiyar	ROR	Uttarakhand	IPP	200	**200**
32.	Bogudiyar Sirkari	ROR	Uttarakhand	IPP	170	**170**
33.	Bowala Nand Prayag	ROR	Uttarakhand	UJVNL	300	**300**
34.	Devsari Dam	ROR	Uttarakhand	SJVNL	252	**252**
35.	Hanol Tiuni	ROR	Uttarakhand	IPP	60	**60**
36.	Jhelam Tamak	ROR	Uttarakhand	THDC	126	**126**
37.	Lakhwar Vyasi	STO	Uttarakhand	NHPC	420	**420**

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Sl. No.	Name of scheme	Type	State	Agency	Installed Capacity (MW)	Benefit in 12th Plan
38.	Nand Prayag Lingasu	ROR	Uttarakhand	UJVNL	100	**100**
39.	Naitwar Mori (Dewra Mori)	ROR	Uttarakhand	SJVNL	56	**56**
40.	Pala Maneri	ROR	Uttarakhand	UJVNL	480	**480**
41.	Bhaironghati	ROR	Uttarakhand	UJVNL	381	**381**
42.	Rupsiyabagar Khasiyabara	ROR	Uttarakhand	NTPC	260	**260**
43.	Singoli Bhatwari	ROR	Uttarakhand	IPP	99	**99**
44.	Tamak Lata	ROR	Uttarakhand	UJVNL	280	**280**
45.	Tuini Plasu	ROR	Uttarakhand	UJVNL	42	**42**
46.	Kishau Dam	STO	Uttarakhand	THDC	600	**600**
47.	Tehri St-II PSS	PSS	Uttarakhand	THDC	1000	**1000**
48.	Shahpur Kandi	STO	Punjab	PSEB	168	**168**
49.	UBDC-III	ROR	Punjab	IPP	75	**75**
50.	Hosangabad	ROR	Madhya Pradesh	NHDC	60	**60**
51.	Handia	ROR	Madhya Pradesh	NHDC	51	**51**
52.	Baurus	ROR	Madhya Pradesh	NHDC	55	**55**
53.	Dummugudem	STO	Andhra Pradesh	APID	320	**320**
54.	Pollavaram MPP	STO	Andhra Pradesh	APID	960	**960**
55.	Singareddy	STO	Andhra Pradesh	APID	280	**280**
56.	Achenkovil	STO	Kerala	KSEB	30	**30**
57.	Pambar	ROR	Kerala	KSEB	40	**40**
58.	Vythiri	ROR	Kerala	KSEB	60	**60**
59.	Athirapally	ROR	Kerala	KSEB	163	**163**
60.	Mankulam	ROR	Kerala	KSEB	40	**40**
61.	Thottiar	ROR	Kerala	KSEB	40	**40**
62.	Kundah PSS	PSS	Tamil Nadu	TNEB	500	**500**
63.	Gundia-I	ROR	Karnataka	KPCL	200	**200**
64.	Gundia-II	ROR	Karnataka	KPCL	200	**200**
65.	Ramam St-I	ROR	West Bengal	WBSEDCL	36	**36**
66.	Ramam St-III	ROR	West Bengal	NTPC	120	**120**
67.	Ramman Ultimate(IV)	ROR	West Bengal	WBSEDCL	30	**30**
68.	Panan	ROR	Sikkim	IPP	280	**280**
69.	Dikchu	ROR	Sikkim	IPP	96	**96**
70.	Rangit-II	ROR	Sikkim	IPP	66	**66**
71.	Rangit-IV	ROR	Sikkim	IPP	120	**120**
72.	Teesta St.-II	ROR	Sikkim	IPP	480	**480**
73.	Teesta St.-IV	ROR	Sikkim	NHPC	520	**520**
74.	Teesta-VI	ROR	Sikkim	IPP	500	**500**

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Sl. No.	Name of scheme	Type	State	Agency	Installed Capacity (MW)	Benefit in 12th Plan
75.	Jorethang Loop	ROR	Sikkim	IPP	96	**96**
76.	Thangchi	ROR	Sikkim	IPP	99	**99**
77.	Bhimkyong	ROR	Sikkim	IPP	99	**99**
78.	Bop	ROR	Sikkim	IPP	99	**99**
79.	Pare	ROR	Arunachal Pradesh	NEEPCO	110	**110**
80.	Siang Lower	STO	Arunachal Pradesh	IPP	2400	**600**
81.	Siang Middle (Siyom)	STO	Arunachal Pradesh	IPP	1000	**1000**
82.	Dibbin	ROR	Arunachal Pradesh	IPP	125	**125**
83.	Londa (Talong)	ROR	Arunachal Pradesh	IPP	160	**160**
84.	Nyamjunchhu St-I	ROR	Arunachal Pradesh	IPP	98	**98**
85.	Nyamjunchhu St-II	ROR	Arunachal Pradesh	IPP	97	**97**
86.	Nyamjunchhu St-III	ROR	Arunachal Pradesh	IPP	95	**95**
87.	Tawang-I	ROR	Arunachal Pradesh	NHPC	750	**750**
88.	Tawang-II	ROR	Arunachal Pradesh	NHPC	750	**750**
89.	Tato-II	ROR	Arunachal Pradesh	IPP	700	**700**
90.	Hirong	ROR	Arunachal Pradesh	IPP	500	**500**
91.	Demwe Lower	ROR	Arunachal Pradesh	IPP	1640	**1640**
92.	Demwe Upper	ROR	Arunachal Pradesh	IPP	1640	**1640**
93.	Kameng Dam	STO	Arunachal Pradesh	IPP	480	**480**
94.	Khuitam	ROR	Arunachal Pradesh	IPP	60	**60**
95.	Turu	ROR	Arunachal Pradesh	IPP	90	**90**
96.	Gongri	ROR	Arunachal Pradesh	IPP	90	**90**
97.	SaskangRong	ROR	Arunachal Pradesh	IPP	30	**30**
98.	Hirit	ROR	Arunachal Pradesh	IPP	28	**28**
99.	Dinchong	ROR	Arunachal Pradesh	IPP	90	**90**
100.	Nafra	ROR	Arunachal Pradesh	IPP	96	**96**
101.	Pema Shelphu(Barpu)	ROR	Arunachal Pradesh	IPP	97.5	**97.5**
102.	Kangtanshiri	ROR	Arunachal Pradesh	IPP	60	**60**
103.	Nyukcha Rong Chhu	ROR	Arunachal Pradesh	IPP	96	**96**
104.	Mago Chhu	ROR	Arunachal Pradesh	IPP	96	**96**
105.	Lower Kopili	ROR	Assam	Assam GENCO	150	**150**
106.	Tipaimukh	STO	Manipur	NEEPCO	1500	**1500**
107.	Loktak D/S	ROR	Manipur	NHPC	66	**66**
108.	Umangi -I	STO	Meghalaya	MeSEB	54	**54**
109.	Kynshi-I	STO	Meghalaya	IPP	450	**450**
						30919.50

Abbreviation: *1. ROR – Run of River 2. STO – Storage*

Annexure-5E
(Item No.5.17.2)

SAVINGS ACHIEVED IN THE HARD COST WHILE CONCURRING/APPRAISING OF HYDRO GENERATION SCHEMES BY CEA DURING 2009-10

(upto 31.12.2009)

Sl. No.	Name of Scheme/ State / Executing Agency	Installed Capacity (MW)	Date of Concurrence by CEA	Hard Cost as per concurrence/ Appraisal (Rs.in Crores)	Hard Cost as per DPR/ Revised (Rs.in Crores)	Saving Achieved (Rs.in Crores)	%age Saving achieved
1.	Dibbin HEP in Arunachal Pradesh by M/s.KSK Dibbin Hydro Power Pvt. Ltd.	2x60=120	4.12.2009	534.67 (P.L.-March 09)	644.95 (P.L.-March 09)	110.28	17.09
2.	Demwe Lower in Arunachal Pradesh by M/s. Athena Demwe Power Pvt. Ltd.	5x342+1x40 =1750	20.11.2009	8347.88 (P.L.-July 08) I.C.-1750 MW	8405.47 (P.L.-Aug. 08) I.C.-1630 MW	57.59	0.6
3.	Lower Siang in Arunachal Pradesh by M/s.Jaypee Arunachal Power Ltd.	9x300=2700	16.02.2010.	12768.28 (P.L.-June 09) I.C.-2700 MW	15839.73 (P.L.-March 08) I.C.-2400 MW	3071.45	19.39
	TOTAL = 03 Nos.	**4570 MW**		**21650.83**	**24890.15**	**3239.32**	**13.01**

Annexure-6A
(Item No.6.2)

STATUS OF IMPLEMENTATION OF ULTRA MEGA POWER PROJECTS ALREADY AWARDED

(1/2)

S.No	Name of UMPP	Capacity (MW)	Status
1.	Mundra UMPP	5 x 800	(i) Mundra UMPP was transferred to the selected developer namely Tata Power Ltd in April 2007. (ii) Financial closure for the project was achieved in April 2008. (iii) About 79% of the total land required (3224.6 acres) have been acquired. (iv) Further, transfer of 662 acres of Govt. land, requirement of which has subsequently, been indicated by the developer owing to change in alignment of outfall water channel, is under process by the Revenue Department. (v) Order for main plant was placed in May 2007 for steam generators and in August 2007 for turbo generators. Orders for all major balance of plant packages have been placed (vi) Piling work for all boilers & turbo generators have been completed. Structural erection and Mechanical erection of Boilers is in progress. Work on TG building, main control building, chimney, general civil works and in other areas are in progress. The hydraulic test for boiler of unit-I completed in March, 2010. (vii) As per latest status first two units of 800 MW each are expected to be commissioning in 11th plan and remaining units in 12th plan.
2.	Sasan UMPP	6x660	(i) Sasan UMPP was transferred to the selected developer namely Reliance Power Ltd in August 2007. (ii) Financial closure for the project was achieved in April 2009. (iii) Out of total land requirement of 3484 acres for the power plant (including coal transportation system) about 64% has been acquired and acquisition for the remaining land is under process. (iv) Order for main plant was placed in June 2008. Orders for civil works in respect of Boilers, T.G, Main Building and CW system have been awarded and Orders for balance of plant are yet to be placed and are stated to be in progress. (v) Construction of boundary wall, storage shed etc is in progress at site. Constructions of 376 houses in R&R colony are completed with all Public facilities. Foundation work in Main Plant - Boiler is in progress, Chimney RCC shell is under construction. (vi) As per latest status first unit of 660 MW is expected to be commissioning in 11th plan and remaining units in 12th plan.

(2/2)

S.No	Name of UMPP	Capacity (MW)	Status
3.	Krinshnapatnam UMPP	6x660	(i) Krishnapatnam UMPP was transferred to the selected developer namely Reliance Power Ltd. in Jan. 2008. (ii) Financial closure for the project is yet to be achieved. (iii) about 2422 acres (92%) has already been acquired and transferred to the developer. Transfer of balance land is under process by the state Government. (iv) The project was awarded with unit configuration of 5x800 MW. The developer had requested for flexibility in project configuration in respect to unit size. Procurers have given their consent for the flexibility in unit size. As per latest status, the developer has placed order for 6x660 MW units. The developer has filed petition & supplementary PPA before CERC on 13.04.10 for their clearance in regard to change in unit configuration. Approval of CERC is awaited. (v) Preliminary works like boundary wall fencing, site grading, construction power supply, site office, stores etc. have been taken up by the developers at site. Area grading in Main Plant area has been completed. (vi) As per the original PPA, the first unit is schedule for commissioning in Sept,2013 and last unit in Oct,2015.
4.	Tilaiya UMPP	6x660	(i) The project has been awarded to M/s Reliance Power Limited on 12.2.09. (ii) The SPV had been transferred on 7.8.09 to the developer. (iii) Financial closure for the project is yet to be achieved (iv) Advance possession of 470 acres of private land taken. (v) First stage forest clearance for Main Plant area has been received on 3.2.10 .Process for final clearance for power plant land under progress. (vi) As per the original PPA, the first unit is schedule for commissioning in May,2013 and last unit in June,2017

ANNEXURE-6B
(Item No.6.3)

PROJECTS BASED ON TARIFF BASED COMPETITIVE BIDDING (CASE-II) BY STATES

S.No.	Name of the Project	Location	Capacity (MW)	Remarks
	Haryana			
1.	Jhajjar	District Jhajjar	2x660	Already awarded and the project is under construction
	Punjab			
2.	Talwandi Saboo	District Mansa	3x660	Already awarded and the project is under construction
3.	Rajpura	Rajpura District Patiala	2x660	Already awarded
4.	Gidderbaha (Ghagga) Thermal Power Project – Stage-I & II, PSEB, Punjab	Distt. Muktsar	4x660	Coal linkage is yet to be tied up
	Rajasthan			
5.	Banswara TPP	Distt. Banswara	2x660	Coal linkage is yet to be tied up
	Madhya Pradesh			
6.	Shahpura	District Jabalpur	2x660	Coal linkage is yet to be tied up
	Uttar Pradesh			
7.	Bara	Distt. Allahabad	3x660	Already awarded and the project is under construction
8.	Karchanna	Distt. Allahabad	2x660	Already awarded
9.	Jawaharpur TPP	Distt. Etah	2x660	Coal linkage is yet to be tied up
10.	Dopaha TPP	Distt. Sonebhadra	3x660	Coal linkage is yet to be tied up
11.	Lalitpur TPP	Distt. Lalitpur	3x660	Coal linkage is yet to be tied up
12.	Yammuna Expressway	Distt. Bulandsahar	3x660	Coal linkage is yet to be tied up
	Chhattisgarh			
13.	Bhaiyathan	District Surguja	2x660	Already awarded
	Maharashtra			
14.	Aurangabad TPP	Distt. Aurangabad	2x800	Project yet to be awarded
	Karnataka			
15.	Gulbarga TPP	Distt. Gulbarga	2x660	Coal linkage is yet to be tied up
16.	Ghatprabha	Distt. Belgaum	2x660	Coal linkage is yet to be tied up
	Bihar			
17.	Thermal Power Project at Kajra, (Instead of Katihar Project Site)	Distt. Lakhisarai	2x660=1320	Coal linkage is yet to be tied up
18.	Thermal Power Project at Chausa, (Instead of Navinagar Project Site)	Distt. Buxar	2x660=1320	Coal linkage is yet to be tied up
19.	Thermal Power Project at Pirpainti,	Distt. Bhagalpur	2x660=1320	Coal linkage is yet to be tied up
	TOTAL		**29,980**	

Annexure-6C
(Item No.6.5.1)

THERMAL PROJECTS COMMISSIONED DURING 2009-10

Sector State	Project Name	Impl. Agency	Unit No.	Cap. (MW)	Actual(A) Comm.Date
CENTRAL SECTOR					
Bihar	Kahalgaon St-2,Ph-2	NTPC	U-7	500	**31-07-09(A)**
Chhattisgarh	Bhilai TPP Expn	NSPCL	U-2	250	**12-07-09(A)**
Jharkhand	Chandrapura TPS Extn.	DVC	U-7	250	**04-11-09(A)**
			U-8	250	**31-03-10(A)**
UP	NCP Project St-II	NTPC	U-5	490	**29-01-10(A)**
			Sub Total	**1740**	
STATE SECTOR					
AP	Vijayawada TPP -IV	APGENCO	U-1	500	**08-10-09(A)**
Gujarat	Kutch Lignite TPS Extn	GSECL	U-4	75	**01-10-09(A)**
	Utran CCPP Extn		GT	240	**08-08-09(A)**
			ST	134	**10-10-09(A)**
Haryana	Rajiv Gandhi TPS,Hissar	HPGCL	U-1	600	**31-03-10(A)**
Maharashtra	New Parli TPP	MSPGCL	U-2	250	**10-02-10(A)**
	Paras TPS Expn		U-2	250	**27-03-10(A)**
Rajasthan	Chhabra TPS	RRVUNL	U-1	250	**30-10-09(A)**
	Giral Lignite-II		U-2	125	**06-11-09(A)**
	Kota TPP		U-7	195	**31-08-09(A)**
	Suratgarh TPP		U-6	250	**29-08-09(A)**
WB	Bakereshwar TPS	WBPDCL	U-5	210	**07-06-09(A)**
			Sub Total	**3079**	
PRIVATE SECTOR					
AP	Gautami CCPP	Gautami Power Ltd	GT-1	145	**03-05-09(A)**
			GT-2	145	**03-05-09(A)**
			ST	174	**03-05-09(A)**
	Konaseema CCPP	Konaseema gas Power Ltd.	GT-1	140	**01-05-09(A)**
			GT-2	140	**01-05-09(A)**
	Lanco Kondapalli Ph-II (GT)	Lanco Kondapalli	GT	233	**05-12-09(A)**
Chhattisgarh	Lanco AmarkantakTPS Ph-1	Lanco Amarkantak Power Pvt. Ltd.	U-1	300	**04-06-09(A)**
			U-2	300	**26-03-10(A)**
Gujarat	Mundra TPP Ph-1(U-1&2)	Adani Power Ltd	U-1	330	**04-08-09(A)**
			U-2	330	**17-03-10(A)**
	Sugen CCPP(Akhakhol)	Torrent Power Gen. Ltd.	Blk-II	382.5	**07-05-09(A)**
			Blk-III	382.5	**08-06-09(A)**
Karnataka	Toranagallu TPP	JSW Energy(Vijayanagar) Ltd	U-1	300	**27-04-09(A)**
Rajasthan	Jallipa-Kapurdi TPP	Raj West Power Ltd. (JSW)	U-1	135	**16-10-09(A)**
UP	Rosa TPP Ph-I	Rosa Power Supply Co.Ltd.-Reliance Energy	U-1	300	**10-02-10(A)**
WB	Budge-Budge- III	CESC	U-3	250	**29-09-09(A)**
				Sub Total	**4287**
				Total	**9106**

Annexure-6D
(Item 6.5.2)
(1/2)

THERMAL UNITS PROGRAMMED FOR COMMISSIONING DURING 2010-11

S.No.	Project Name & Unit No.	Implementing Agency	Main Plant Manufacturer	LOA Date	Capacity (MW)
1st Quarter (April,10 toJune,10)					
1.	Pragati CCGT - III GT-1	PPCL	BHEL	30.05.2008	250
2.	Rajiv Gandhi TPS, Hissar U-2	HPGCL	Chinese	29.01.2007	600
3.	Jallipa- Kapurdi TPP U-2	Raj west power Ltd	Chinese	Mar-07	135
4.	Konaseema CCPP ST	Konaseema EPS	Others	15.03.2001	165
5.	JSW Ratnagiri TPP U-1	JSW Energy (Ratnagiri) Ltd	Chinese	05.10.2007	300
6.	Rithala CCPP GT-1	NDPL	Others		35.75
7.	Raichur TPS U-8	KPCL	BHEL	03.03.2007	250
8.	Lanco Kondapalli Extn. Ph-II ST	Lanco Kondapalli Power Pvt. Ltd.	Chinese	39387	133
9.	Sterlite TPP U-2 (1st)	Sterlite Energy Ltd	Chinese	10.05.2006	600
10.	Jallipa- Kapurdi TPP U-3	Raj west power Ltd	Chinese	Mar-07	135
11.	Rithala CCPP GT-2	NDPL	Others		35.75
12.	Mundra TPP Ph-I U-3	Adani Power Ltd	Chinese	03.01.2007	330
13.	Pragati CCGT - III GT-2	PPCL	BHEL	30.05.2008	250
14.	Mundra TPP Ph-I U-4	Adani Power Ltd	Chinese	03.01.2007	330
15.	JSW Ratnagiri TPP U-2		Chinese	05.10.2007	300
			TOTAL 1st Quarter		**3849.5**
2nd Quarter (July, 10 to Sep, 10)					
16.	Barsingsar (Lignite) U-2	NLC	BHEL	29.12.2005	125
17.	Mejia TPS Extn U-1	DVC	BHEL	12.12.2006	500
18.	Kakatiya TPP U-1	APGENCO	BHEL	27.07.2005	500
20.	Parichha Extn. U-5	UPRVUNL	BHEL	28.06.2006	250
21.	Jallipa- Kapurdi TPP U-4	Raj west power Ltd	Chinese	Mar-07	135
22.	Rithala CCPP ST	NDPL	Others		36.5
23.	Udupi TPP U-1	NPCL	Chinese	24.12.2006	507.5
24.	Mejia TPS Extn U-2	DVC	BHEL	12.12.2006	500
25.	Pragati CCGT - III GT-3	PPCL	BHEL	30.05.2008	250
26.	Pragati CCGT - III ST-1	PPCL	BHEL	30.05.2008	250
27.	Sterlite TPP U-1	Sterlite Energy Ltd	Chinese	10.05.2006	600
28.	Indira Gandhi TPP U-1	APCPL	BHEL	07.06.2007	500
			TOTAL 2nd Quarter		**4644**

(2/2)

S.No.	Project Name & Unit No.	Implementing Agency	Main Plant Manufacturer	LOA Date	Capacity (MW)
29.	Kodarma TPP U-1	DVC	BHEL	29.06.2007	500
30.	Durgapur Steel TPS U-1	DVC	BHEL	27.07.2007	500
31.	Pragati CCGT - III GT-4	PPCL	BHEL	30.05.2008	250
32.	Khaperkheda TPS Expn. U-1	MSPGCL	BHEL	01.01.2007	500
33.	Santaldih TPP Extn Ph-II U-6	WBPDCL	BHEL	23.03.2007	250
34.	Jallipa- Kapurdi TPP U-5	Raj west power Ltd	Chinese	Mar-07	135
35.	JSW Ratnagiri TPP U-3		Chinese	05.10.2007	300
36.	Korba STPP U-7	NTPC	BHEL	24.03.2006	500
37.	Neyveli TPS-II Exp. U-1	NLC	BHEL	19.08.2005	250
38.	Rayalseema TPP St-III U-5	APGENCO	BHEL	06.02.2007	210
39.	Jallipa-Kapurdi TPP U-6	Raj West Power Ltd.(JSW)	Chinese	03.01.2007	135
40.	Pragati CCGT - III ST-2	PPCL	BHEL	30.05.2008	250
41.	Hazira CCPP Extn. GT+ST	GSECL	BHEL	01.01.2008	351
			TOTAL 3rd Quarter		**4131**
42.	Udupi TPP U-2	NPCL	Chinese	24.12.2006	507.5
43.	Harduaganj Ext. U-8	UPRVUNL	BHEL	28.06.2006	250
44.	Parichha Extn. U-6	UPRVUNL	BHEL	28.06.2006	250
45.	JSW Ratnagiri TPP U-4		Chinese	05.10.2007	300
46.	Simhadri STPP Extn. U-3	NTPC	BHEL	26.03.2007	500
47.	Harduaganj Ext. U-9	UPRVUNL	BHEL	28.06.2006	250
48.	Jallipa-Kapurdi TPP U-7	Raj West Power Ltd.(JSW)	Chinese	03.01.2007	135
49.	Anpara-C TPS U-1	Lanco Anpara Power Pvt. Ltd.	Chinese	15.11.2007	600
50.	Maithon RB TPP U-1	DVC	BHEL	25.10.2007	525
51.	Farakka STPS- III U-6	NTPC	BHEL	30.10.2006	500
52.	Durgapur Steel TPS U-2	DVC	BHEL	27.07.2007	500
53.	Bhusawal TPS Expn. U-4	MSPGCL	BHEL	23.01.2007	500
54.	Pipavav CCPP Block-1	GSPCpipavav power co.Ltd.	BHEL	03.03.2008	351
	TOTAL 4th Quarter		**5168.5**		
	TOTAL 2010-11		**17793**		

Annexure-6E
(Item No.6.11.1)

STATUS OF UNITS PROGRAMMED FOR LIFE EXTENSION WORKS DURING 11TH PLAN

Status as on 31-3-2010
(Page 1/3)

1.0 STATE SECTOR

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commis-sioning	Capacity (MW)	Completion Schedule (Actual / Targeted)	Present status / Expected Date of Completion
Uttar Pradesh							
1.	UPRVUNL	Obra	**1**	**1968**	**40**	**2009-10 (Actual)**	**Unit synchronised on 4th May'09**
2.			**2**	**1968**	**40**	**2008-09 (Actual)**	**Unit synchronised on 2nd Feb'09**
3.			**6**	**1973**	**94**	**2007-08 (Actual)**	**Unit synchronised on 20th March'08**
4.			9	1980	200	2010-11 (Target)	Contract agreement signed with BHEL in Feb, 2007. Unit -9 taken under s/d on 2-11-2008. U-9 likely to be synchronised by May 2010. Shutdown of Unit No. 10 &11 will be taken after stabilisation of unit-9. There after unit 12 & 13 will be taken up.
5.			10	1979	200	2010-11 (Target)	
6.			11	1977	200	2011-12 (Target)	
7.			12	1981	200	2011-12 (Target)	
8.			13	1982	200	2011-12 (Target)	
		Total	**8**		**1174**		
9.		H'Gunj	**5**	**1977**	**60**	**2008-09 (Actual)**	**Work completed, unit synchronised in May'08.**
10.			7	1978	110	2011-12 (Target)	LOI issued to BHEL on 25.03.09. Advance payment released in June'09, draft contract prepared by BHEL has been cleared by UPRVUNL and consultant NTPC. Supply of structural material has started.
		Total	**2**		**170**		
11.		Parichha	1	1984	110	2011-12 (Target)	Contract has been negotiated with UPRVUNL by BHEL during Oct'09. LOI with advance on BHEL is awaited.
12.			2	1985	110	2011-12 (Target)	
		Total	**2**		**220**		
13.		Panki	3	1976	105	Likely to slip beyond 11th Plan	BHEL has been asked to furnish scope of work. Order will be placed in 11th Plan, completion in 12th Plan.
14.			4	1977	105		
		Total	**2**		**210**		
15.		Anpara 'A'	1	1986	210	Likely to slip beyond 11th Plan	BHEL has been asked to furnish scope of work. Order will be placed in 11th Plan, completion in 12th Plan.
16.			2	1986	210		
17.			3	1988	210		
		Total	**3**		**630**		
Haryana							
18.	HPGCL	Panipat	**1**	**1979**	**110**	**2008-09 (Actual)**	**Unit synchronised on 4th Nov'08.**
		Total	**1**		**110**		

(Page 2/3)

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commis-sioning	Capacity (MW)	Completion Schedule (Actual / Targeted)	Present status / Expected Date of Completion
Punjab							
19.	PSEB	Bathinda	3	1978	110	2010-11 (Target)	Order placed on BHEL on 6.11.2006. S/d on unit -3 have been taken from 14.1.2010, dismantling work started. Unit expected to be recommisioned by Oct. 2010. Thereafter unit-4 will be taken up.
20.			4	1979	110	2011-12 (Target)	
		Total	**2**		**220**		
21.		Ropar	1	1984	210	Likely to slip beyond 11th Plan	RLA completed, Order expected to be placed in 2009-10, completion in 12th Plan.
22.			2	1985	210		
		Total	**2**		**420**		
Gujarat							
23.	GSECL	Ukai	**1**	**1976**	**120**	**2008-09 (Actual)**	**Unit -1 was taken under s/d on 06.9.2006 for LE works, synchronised on 24.5.2008. Unit running at 100 -105 MW load.**
24.			**2**	**1976**	**120**	**2009-10 (Actual)**	**Unit -2 was taken under s/d for LE on 12th August'08. Synchronised on 24-2- 2010.**
		Total	**2**		**240**		
25.		Gandhinagar	1	1977	120		Order awarded to BHEL on 28 May 2007. BHEL has supplied material at site.
26.			2	1977	120		
		Total	**2**		**240**		
Madhya Pradesh							
27.	MPPGCL	Amarkantak Ext.	1	1977	120	201-12 (Target)	Works on 11 packages out of 12 completed. Order for Turbine package placed on NASL in July 07. Works on U-2 bas been commenced from 26.7.09. Completion schedule in 2010-11.
28.			2	1977	120	2010-11 (Target)	
		Total	**2**		**240**		
West Bengal							
29.	WBPDCL	Bandel	5	1982	210	Likely to slip beyond 11th Plan	Taken up under World Bank programme, 1st stage Bids for BTG packages have been evaluated and report sent to WB for their no objection.
		Total	**1**		**210**		
Bihar							
30.	BSEB	Barauni	6	1983	110	2011-12 (Target)	Unit #6 has been restored by BHEL under Rashtriya Sam Vikas Yojana. LOA has been awarded to BHEL on 15th Feb'10.
31.			7	1985	110	2011-12 (Target)	
		Total	**2**		**220**		
32.	KBUNL	Muzaffarpur	1	1985	110	2011-12 (Target)	Unit #2 has been restored under RSVY. LOA awarded on 15th April 2010.
33.			2	1986	110	2011-12 (Target)	
		Total	**2**		**220**		
TOTAL OF STATE SECTOR (1.0)			**33**		**4524**		

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2.0 CENTRAL SECTOR

2.1 COAL FIRED

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Commis-sioning	Capacity (MW)	Completion Schedule (Actual / Targeted)	Present status / Expected Date of Completion
1.	NTPC	Badarpur	4	1978	210		Scheme for LEP reviewed by CEA. NIT floated in June '08.
2.			5	1981	210		
		Total	**2**		**420**		
3.		Singrauli STPS	1	1982	200		Scheme under finalisation.
4.			2	1982	200		
		Total	**2**		**400**		
5.		Korba STPS	1	1983	200		Scheme under finalisation.
		Total	**1**		**200**		
6.		Ramagundam	1	1983	200		Scheme under finalisation.
		Total	**1**		**200**		
	TOTAL OF (2.1)		**6**		**1220**		

2.2 GAS FIRED

7.	NTPC	Dadri GT	1	1992	131		Scheme finalised.
8.			2	1992	131		
9.			3	1992	131		
		Total	**3**		**393**		
10.		Auraiya GT	1	1989	111.19		Scheme finalised.
11.			2	1989	111.19		
12.			3	1989	111.19		
		Total	**3**		**333.57**		
13.		**Anta GT**	**1**	**1989**	**89**	**2009-10 (Actual)**	**Work completed in Feb.2010.**
14.			**2**	**1989**	**89**		
15.			**3**	**1989**	**89**		
		Total	**3**		**267**		
16.		Kawas GT	1	1992	106		Scheme finalised.
17.			2	1992	106		
18.			3	1992	106		
		Total	**3**		**318**		
19.		Gandhar GT	1	1994	131		Scheme in advance stage of finalisation.
20.			2	1994	131		
		Total	**2**		**262**		
TOTAL OF (2.2)			**14**		**1573.57**		
TOTAL CEN. SECTOR (2.0)			**20**		**2793.57**		
GRAND TOTAL (1.0+2.0) :			**53**		**7318**		

Annexure-6F
(Item No.6.11.1)

STATUS OF UNITS PROGRAMMED FOR R&M WORKS DURING 11TH PLAN

1.0 STATE SECTOR

1.1 COMPLETED UNITS

Status as on 31-03 2010

Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm-issioning	Capacity (MW)	Completion Schedule (Actual / Targeted)	Present Status
Punjab							
1.	**PSEB**	**Ropar**	1	1984	210	**2007-08 (Actual)**	Schemes completed in March'08. (2007-08)
2.			2	1985	210		
3.			3	1988	210		
4.			4	1989	210		
5.			5	1992	210		
6.			6	1993	210		
		Total	**6**		**1260**		
Maharashtra							
7.	**Mahagenco**	**Koradi**	5	1978	200	**2007-08 (Actual)**	Schemes completed in March'08 (2007-08)
8.			6	1982	210		
9.			7	1983	210		
		Total	**3**		**620**		
10.		**Chandrapur**	1	1983	210	**2008-09 (Actual)**	Schemes completed in March'09 (2008-09)
11.			2	1984	210		
12.			3	1985	210		
13.			4	1986	210		
14.			5	1991	500		
15.			6	1992	500		
		Total	**6**		**1840**		
16.		**Parli**	3	1980	210	**2008-09 (Actual)**	Schemes completed in March'09 (2008-09)
17.			4	1985	210		
18.			5	1987	210		
		Total	**3**		**630**		
SUB TOTAL (1.1)			**18**		**4350**		

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Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm-issioning	Capacity (MW)	Completion Schedule (Actual / Targeted)	Present Status
1.2 ON-GOING UNITS							
Uttar Pradesh							
19.	UPRVUNL	Anpara'B	4	1993	500	**2011-12 (Target)**	Scope of work yet to be finalised (Targeted in 2011-12)
20.			5	1994	500		
		Total	**2**		**1000**		
21.		Obra	7	1974	100	**2011-12 (Target)**	BHEL to submit scope of work (Targeted 2011-12)
22.			8	1975	100		
		Total	**2**		**200**		
Delhi							
23.	IPGCL	Rajghat	1	1989	67.5	**2010-11 (Target)**	Works are in progress (Targeted in 2010-11)
24.			2	1989	67.5		
		Total	**2**		**135**		
Jharkhand							
25.	JSEB	Patratu	9	1984	110	**2011-12 (Target)**	Restoration works are in progress (Targeted in 2011-12)
26.			10	1986	110		
		Total	**2**		**220**		
West Bengal							
27.	DPL	Durgapur	6	1985	110	**2011-12 (Target)**	Works are in progress (Targeted in 2011-12).
		Total	**1**		**110**		
SUB TOTAL (1.2)			**9**		**1665**		
TOTAL OF STATE SECTOR (1.0)			**27**		**6015**		
2.0 CENTRAL SECTOR							
2.1 Completed units							
1.	DVC	**Durgapur TPS**	3	1966	130	**2008-09 (Actual)**	
2.			4	1984	210	**2008-09 (Actual)**	
		Total	**2**		**340**		
1.	NTPC	**Vindhyanchal**	1	1987	210	**2009-10 (Actual)**	
2.		**STPS**	2	1987	210		
3.			3	1989	210		
4.			4	1990	210		
5.			5	1990	210		
6.			6	1991	210		
		Total	**6**		**1260**		

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Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm-issioning	Capacity (MW)	Completion Schedule (Actual / Targeted)	Present Status
7.		**Korba**	1	1983	200		
8.		**STPS**	2	1983	200		
9.			3	1984	200	**2009-10 (Actual)**	
10.			4	1987	500		
11.			5	1988	500		
12.			6	1989	500		
		Total	**6**		**2100**		
13.		**Ramagundem**	1	1983	200		
14.		**STPS**	2	1984	200		
15.			3	1984	200		
16.			4	1988	500	**2009-10 (Actual)**	
17.			5	1989	500		
18.			6	1989	500		
		Total	**6**		**2100**		
19.		**Farakka Stg-I**	1	1986	200		
20.		**STPS**	2	1986	200	**2009-10 (Actual)**	
21.			3	1984	200		
		Total	**3**		**600**		
22.		**Tanda TPS**	1	1988	110	**2009-10 (Actual)**	
23.			3	1990	110		
		Tota	**2**		**220**		
24.		**Talcher TPS**	5	1982	110	**2009-10 (Actual)**	
25.		**Stg-II**	6	1983	110		
		Total	**2**		**220**		
26.	NTPC	**Singrauli**	**1**	**1982**	**200**	**2009-10 (Actual)**	
27.		**STPS**	**2**	**1982**	**200**		
28.			**3**	**1983**	**200**		
29.			**4**	**1983**	**200**		
30.			**5**	**1984**	**200**		
31.			**6**	**1986**	**500**		
32.			**7**	**1987**	**500**		
		Total	**7**		**2000**		

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Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm-issioning	Capacity (MW)	Completion Schedule (Actual / Targeted)	Present Status
33.		**Unchahar**	**1**	**1988**	**210**	**2009-10 (Actual)**	
34.		**TPS**	**2**	**1989**	**210**		
		Total	**2**		**420**		
35.		**Rihand Stg - I**	**1**	**1988**	**500**	**2009-10 (Actual)**	
36.		**STPS**	**2**	**1989**	**500**		
		Total	**2**		**1000**		
	Sub Total NTPC		**36**		**9920**		
	Completed in Central Sector		**38**		**10260**		
ON-GOING							
1.		Tanda	2	1989	110	**2011-12 (Target)**	
2.			4	1998	110	**2010-11 (Target)**	Unit taken under s/d on 22.2.2010.
		Total	**2**	**220**			
3.		NCTPP,	1	1992	210	2011-12 (Target)	Scope of work finalised
4.		Dadri	2	1992	210		
5.			3	1993	210		
6.			4	1994	210		
		Total	**4**		**840**		
7.		Farakka Stg-II	4	1992	500	2011-12 (Target)	Scheme under finalisation
8.		STPS	5	1994	500		
		Total	**2**		**1000**		
9.		Kahalgaon	1	1992	210	2011-12 (Target)	Scheme under finalisation by NTPC
10.			2	1994	210		
11.			3	1995	210		
		Total	**3**		**630**		
	NTPC On - Going		**11**		**2690**		
TOTAL CENTRAL SECTOR (2.0)			**49**		**12950**		
TOTAL OF R&M (1.0+2.0)			**76**		**18965**		

Annexure – 6G
(Item No.6.12.3)

LE TARGETS DURING REMAINING PERIOD OF THE 11TH PLAN (2010-11 & 2011-12)

State Sector

A. 2010 – 2011 – Target (4 nos. of Units)

1. Obra TPS – 2 Unit (2x200 MW)
2. Bhatinda TPS – 1 Unit (110 MW)
3. Amarkantak Ext. TPS – Unit 1 & 2 (2x120 MW)

Sub total : 5-units (750 MW)

B. 2011 – 2012 – Target (14 nos. of Units)

1. Obra TPS – 3 Units (3x200 MW)
2. Harduaganj TPS - Unit 7 (110 MW)
3. Parichha TPS - Unit 1&2 (2x110 MW)
4. Bhatinda TPS – Unit 3 (110 MW)
5. Gandhinagar TPS - Unit 1&2 (2x120 MW)
6. Barauni TPS - Unit 6&7 (2x110 MW)
7. Muzaffarpur TPS - Unit 1 &2 (2x110 MW)
8. Bandel TPS - Unit 5 (210 MW)

Sub total : 14 units (1930 MW)

Total State Sector: 19-units (2680 MW)

Central Sector

A. 2010 – 2011 – Target

Nil

B. 2011 – 2012 – Target (17 nos. of Units)

1. Badarpur TPS - unit 4&5 (2x210 MW)
2. Singrauli STPS Unit 1&2 (2x200 MW)
3. Korba STPS Unit 1 (200 MW)
4. Ramagundem STPS Unit1 (200 MW)
5. Dadri CCGT GT Unit 1 to 3 (3x131 MW)
6. Auraiya CCGT GT Unit 1 to 3 (3x111.19 MW)
7. Kawas CCGT GT Unit 1 to 3 (3x106 MW)
8. Gandhar CCGT GT Unit 1&2 (2x131 MW)

Sub total : 17 units (2526 MW)

Total State Sector + Central Sector : 36 units (5206 MW)

Annexure – 6H
(Item No.6.12.3)

R&M TARGETS DURING REMAINING PERIOD OF THE 11TH PLAN (2010-11 & 2011-12)

State Sector

A. 2010-2011 – Target (4 nos. of Units)

1. Patratu TPS Unit 9&10 (2x110 MW)
2. Rajghat TPS Unit 1&2 (2x67.5 MW)

Sub total: 4 – units (355 MW)

B. 2011-2012 – Target (5 nos. of Units)

1 Anpara TPS - Unit 4&5 (2x500 MW)
2 Obra TPS - Unit 7&8 (2x100 MW)
3 Durgapur Projects Ltd. Unit 6 (110 MW)

Sub total: 5 – units (1310 MW)

Total State Sector: 9-units (1665 MW)

Central Sector

A. 2010-2011 – Target (1 no. Unit under NTPC)

1. Tanda TPS Unit- 4 (110 MW)

B. 2011-2012 – Target (10 nos. of Units under NTPC)

1. Tanda TPS Unit 2 (110 MW)
2. Farakka Stage-II Unit 4&5 (2x500 MW)
3. NCTPP Dadri Unit 1 to 4 (4x210 MW)
4. Kahalgaon STPS Unit 1 to 3 (3x210 MW)

Total Central Sector: 11-units (2690 MW)

Total State Sector + Central Sector : 20 units (4355 MW)

Annexure 8A
(Item No. 8.1)

HYDRO POWER STATIONS IN OPERATION FOR WHICH CONSULTANCY SERVICES HAVE BEEN RENDERED BY CEA

Sl. No.	Name of the Power Station	Installed capacity (MW)	Year of Commissioning
NORTHERN REGION			
1.	Baira Siul	3x60=180	1980-81
2.	Salal-I	3x115=345	1987
3.	W.Y. Canal-A	2x8=16	1986
4.	W.Y. Canal-B	2x8-16	1987
5.	W.Y. Canal-C	2x8=16	1989
6.	Giri Bata	2x30=60	1978
7.	Lower Jhelum	3x35=105	1978-79
8.	Upper Sindh-1	2x11=22	1973-74
9.	Western Yamuna Canal	2x8=16	2004
10.	Chenani	5x4.6=23	1971-75
11.	Stakna	2x2=4	1986-87
12.	Kargil	3x1.25=3.75	1995
13.	R.P. Sagar	4x43=172	1968-69
14.	J.Sagar	3x33=99	1972-73
15.	Mahibajaj I	2x25=50	1989
16.	Mahibajaj II	2x45=90	1986
17.	Anoopgarh I	3x1.5=4.5	1987-88
18.	Anoopgarh II	3x1.5=4.5	1987-88
19.	RMC Mangrol	3x2=6	1992
20.	Surat Garh	2x2=4	1992
21.	Ranjit Sagar	4x150=600	2000
22.	Upper Sindh-II	2x35=70	2000-01
23.	Nathpa Jhakri	6x250=1500	2002-03
24.	Tehri Stage-I	4x250=1000	2007-08
25.	Ukai	4x75=300	1974-76
26.	Kadana	4x60=240	1990-96
27.	Ukai LBC	2x2.5=5	1987-88
28.	Gandhi Saar	5x23=115	1960-64
29.	Bargi	2x45=90	1988

Annexure-8B
(Item No.8.8.1)

LIST OF PROJECTS FOR WHICH DETAIL DESIGN & ENGINEERING SERVICES WERE PROVIDED DURING 2009-10

Sl. No.	Name of Project & Scope of Consultancy Services	Works carried out/in progress
1.	**Transmission Project under Prime Minister's Reconstruction Programme in J&K** : Consultancy Services to Power Development Department., Govt. of J&K:	• Checking of Design & drawing of various civil works of different substations & grid stations (eg. control room building, pile foundation, isolator foundation, equipment foundation, transformer foundation, gantry tower foundation, cable trench, fencing, retaining walls, roads, drains, switchyard, mesh fence, water sump etc.) - Lissar, Bandipora & Shopian Bhalessa, Chandak - Kishtwar Ramban . Budgam Bishnah - Amargarh & Alustang, Mir bazaar, Battal Manwal - Siot • Checking of design & drawing of tower foundations for construction of Transmission Lines: - 132 kV D/C Barn-Siot –Kalakote T. Line - 132 kV Ramban- Khellani- Kishtwar T. Line - Hiranagar- Barn - Lassipora-Shopian - Bandipora- Badampora
2.	**Raghunathpur TPS, Phase-I, DVC (2 x 600 MW), Purulia, W.B.**	Design review meeting between DVC, R Infra, TCE, CEA and TPSC office Hyderabad for structural works of RTPS, Phase-I was attended by P. Vasishth, Dy. Director. Meeting for discussion regarding provision of stiffeners in plated girder for TG building and bunker building between DVC, R Infra& TCE & CEA was attended by Shri C.L.L. Das & P. Vasishth, Dy. Director. Comments on Quality Assured Plan (QAP) for fabrication of structural steel work of power house and mill bunker building was sent.

Annexure-8C
(Item No.8.8.2)

LIST OF IMPORTANT ACTIVITIES PERTAINING TO CIVIL WORKS OF H. E. PROJECTS

A Preliminary Comments on DPR of Hydroelectric Projects

1. Kashang Integrated H. E. Project (234 MW) in Himachal Pradesh by HPSEB
2. Revised Cost Estimate of Kameng H.E. Project (600 MW) by NEEPCO (North Eastern Electric Power Corporation Ltd.)
3. Kutehr H.E. Project (3 x 80 MW) in Himachal Pradesh by M/s JSW Energy Limited
4. Tato-II H.E. Project (4 x 175 MW) in Arunachal Pradesh by M/s Tato Hydro Power Private Limited (THPPL)
5. Sankosh H. E. Project (4060 MW) in Bhutan by Tehri Hydro Development Corporation (THDC)
6. Dibbin H.E. Project (2 x 60 MW) in Arunachal Pradesh by M/s KSK Dibbin Hydro Power Private Limited
7. Nafra H.E. Project (2 x 48 MW) in Arunachal Pradesh by M/s Sew Nafra Power Corporation Private Limited
8. Nyamjang Chhu H.E. Project (900 MW) in Arunachal Pradesh by M/s Bhilwara Energy Limited (M/s BEL)
9. Tawang-II H.E. Project (4 x 250 = 1000 MW) in Arunachal Pradesh by M/s NHPC Limited
10. Sainj H. E. Project (2 x 50 = 100 MW) in Himachal Pradesh by Himachal Pradesh Power Corporation Limited (HPPCL)
11. Indira Sagar Polavaram H.E. Project (12 x 80 MW = 960 MW) in Andhra Pradesh by M/s Andhra Pradesh Power Generation Corporation Ltd. (APGENCO)
12. Gongri H.E. Project (3 x 30 MW = 90 MW) in Arunachal Pradesh by M/s Dirang Energy Pvt. Ltd.
13. Tawang-I H.E. Project (3 x 250 = 750 MW) in Arunachal Pradesh by M/s NHPC Limited
14. Mori Hanol H.E. Project (2 x 31.5 MW = 63 MW) in Uttarakhand by M/s Krishna Knitwear Technology Limited (KKTL)
15. Sissiri H.E. Project (3 x 74 MW = 222 MW) in Arunachal Pradesh by M/s Soma Sissiri Hydro Private Limited (SSHPL)

B Checking and Finalization of Quantities of Civil Works for DPR of Hydroelectric Projects

1. Demwe Lower H.E. Project (5 x 342 MW + 1 x 40 MW) in Arunachal Pradesh by Athena Demwe Power Private Ltd.
2. Mangdechhu H.E. Project (4 x 180 = 720 MW) in Bhutan by NHPC Ltd.
3. Dibbin H.E. Project (2 x 60 MW) in Arunachal Pradesh by M/s KSK Dibbin Hydro Power Private Limited
4. Teesta Stage-III H. E. Project (6 x 200 MW = 1200 MW) in Sikkim by M/s Teesta Urja Limited (Additional Quantities of Civil Works)

C Checking & Finalization of Phasing of Cost of Civil Works for DPR of Hydroelectric Projects

1. Lower Siang H.E. Project (9 x 300 = 2700 MW) in Arunachal Pradesh by Jaypee Arunachal Power Ltd.
2. Demwe Lower H.E. Project (5 x 342 MW + 1 x 40 MW) in Arunachal Pradesh by Athena Demwe Power Private Ltd.
3. Dibbin H.E. Project (2 x 60 MW) in Arunachal Pradesh by M/s KSK Dibbin Hydro Power Private Limited

D Finalization of Cost Estimate for Stage-II Activities of Hydroelectric Projects

1. Malari Jhelam H. E. Project (4 x 28.5 MW) in Uttarakhand by M/s THDC
2. Devsari HE Project (3 x 84 = 252 MW) in Uttarakhand by Satlej Jal Vidhyut Nigam Ltd.

ANNEXURE-9A

(Item-9.1.4)

OUTSTANDING DUES PAYABLE TO CENTRAL PUBLIC SECTOR UNDERTAKINGS (CPSUS)-CUMULATIVE AMOUNT

(1/2)

(in Rs. Crores)

Sl. No.	Name of state/SEB/ Utility	NTPC	NHPC	PGCIL	NEEPCO	NPCIL	DVC	NLC	SJVNL	BBMB	THDC	NHDC	TOTAL
1.	Andhra Pradesh					-0.56		80.36					79.80
2.	Arunachal Pradesh				3.66								3.66
3.	Assam				63.36								63.36
4.	Bihar		18.28				3.73						22.01
5.	Gujarat					1.07							1.07
6.	Goa					-0.02							-0.02
7.	HVPNL(HSRB)		0.06			0.71							0.77
8.	HImachal Pradesh		0.37			-1.24				0.40	0.14		-0.33
9.	Jammu & Kashmir		75.83			10.71				6.80	6.22		99.56
10.	Karnataka(KPTCL)					19.42		176.46					195.88
11.	Kerala					0.02		43.32					43.34
12.	Madhya Pradesh					-0.95							-0.95
13.	Maharashtra					-0.80							-0.80
14.	Manipur				3.68								3.68
15.	Meghalaya				48.00								48.00
16.	Mizoram				4.13								4.13
17.	Nagaland				10.22								10.22
18.	Punjab		6.75										6.75
19.	Rajasthan		1.11			12.87				38.37			52.35

(2/2)

Sl. No.	Name of state/SEB/ Utility	NTPC	NHPC	PGCIL	NEEPCO	NPCIL	DVC	NLC	SJVNL	BBMB	THDC	NHDC	TOTAL
20.	Rajasthan Discom		9.17			0.01					1.31		10.49
21.	Sikkim		0.28										0.28
22.	Tamilnadu					0.02		572.44					572.46
23.	Tripura		-0.01		11.06								11.05
24.	Uttar Pradesh		46.55			-0.20							46.35
25.	Uttaranchal		2.99			0.01					0.10		3.11
26.	WBSEB						16.04						16.04
27.	DTL(DVB)	2257.60	118.55			1.84					6.06		2384.35
28.	DNH					-0.09							-0.09
29.	Chattisgarh(CSEB)					-0.13							-0.13
30.	Chandigarh (UT)		0.86			-0.01				135.16			136.01
31.	Daman & DIU					-0.65							-0.65
32.	Pondichery					0.46		17.98					18.44
33.	Jharkhand		0.67				2237.25						2237.92
34.	MEA(PowerNepal)		8.02										8.02
35.	M/s NFL									0.01			0.01
36.	B.S.L. ProjS/Nagar									0.22			0.22
37.	Beas Project talwara									0.03			0.03
38.	HPPC(Har Power Purchase Centre)		5.45									0.00	5.45
	Total	**2257.90**	**294.93**	**0.00**	**144.11**	**42.49**	**2257.02**	**890.56**	**0.00**	**180.99**	**13.83**	**0.00**	**6081.83**

Based on the information received from CPSUs up to 31-03-2010

Annexure-9B

(Item No.9.2)

STATE-WISE ESTIMATED AVERAGE RATES OF ELECTRICITY (1/2)

(Updated upto 31.03.2010)

(Rates in Paise/KWh)

S.No.	Name of Utility	Tariff effective from	Domestic 1KW (100 KWh/ Month)	Domestic 4KW (400 KWh/ Month)	Domestic 10KW (1000 KWh/ Month)	Commercial 2KW (300 KWh/ Month)	Commercial 10KW (1500 KWh/ Month)	Commercial 30KW (4500 KWh/ Month)	Commercial 50KW (7500 KWh/ Month)	Agriculture 2HP (400 KWh/ Month)	Agriculture 5HP (1000 KWh/ Month)	Agriculture 10HP (2000 KWh/ Month)
1.	Andhra Pradesh	1-4-2009	238.50	396.63	492.25	593.50	619.50	623.83	624.70	33.75	30.75	29.75
2.	Assam	1-08-2009	340.00	441.50	475.00	558.33	558.33	564.18	564.18	271.19	271.19	373.65
3.	Bihar	1-09-2008	243.80 U	321.98	395.38	515. 87 U	503.85	500.08	499.33	124. 00 U	124. 00 U	124. 00U
			140.45 R			166. 07 R				74. 00 R	74.00 R	74.00 R
4.	Chhattishgarh	1-07-2009	187.40	230.63	368.90	403.35	460.02	460.20	460.24	110.00	110.00	110.00
5.	Gujarat	1-02-2009	437.83 U	554. 83 U	617. 83 U	660.66	706.50	703.72	703.16	55.00	55.00	55.00
			353.83 R	463. 83 R	526. 53 R							
6.	Haryana	1-09-2001	367.40	422.10	463.44	481.00	481.00	481.00	481.00	25.00	25.00	25.00
7.	H. P.	1-09-2009	221.45	282.61	307.71	486.00	468.72	488.88	487.73	210.38	206.25	204.88
8.	J & K	1-04-2008	129.86	203.09	234.92	242.40	379.73	380.07	380.13	61.00	61.00	61.00
9.	Jharkhand	1-01-2004	161.00 U	163.50	180.00	436. 67 U	436.67	436.67	436.67	52.00	52.00	52.00
			107.00 R			136. 33 R						
10.	Karnataka	1-12-2009	292.43 D	449. 79 D	570. 52 D	688. 63 D	707.53 D	710. 68 D	711. 31 D	0.00	0.00	0.00
			292.43 E	436. 67 E	527. 47 E	683. 38 E	702. 28 E	705. 43 E	706. 06 E			
			281.93 F	418. 29 F	507. 52 F	639. 63 F	654. 33 F	656. 78 F	657. 27 F			
11.	Kerala	1-12-2007	187.00	398.89	517.61	775.83	918.83	952.17	952.17	73.74	73.74	73.74
12.	Madhya Pradesh	6-08-2009	386.20 U	562. 19 U	592. 24 U	601.04	602.45	602.69	602.74	217.50	240.00	247.50
			374.80 R	526. 56 R	555. 85 R	541.75	543.02	543.24	543.28			
13.	Maharashtra	1-06-2008	277.94	445.40	598.72	530.88	596.06	781.58	781.58	133.44	133.44	133.44
14.	Meghalaya	1-10-2008	265.00	352.50	393.00	511.00	544.33	549.89	551.00	167.19	167.19	167.19
15.	Orissa	1-04-2009	135.20	247.00	286.00	384.80	443.04	452.75	454.69	102.00	102.00	102.00
16.	Punjab	1-04-2009	320.20	447.25	483.22	550.10	550.10	550.10	550.10	0.00	0.00	0.00
17.	Rajasthan	1-01-2005	417.50 U	396. 88 U	392. 75 U	556.67	554.00	555.78	556.13	126.50	119.00	116.50
			390.25 R	363. 81 R	358. 53 R							
18.	Tamil Nadu	1-04-2007	120.00	216.25	269.50	602.00	607.60	608.53	608.72	0.00	0.00	0.00
19.	Uttar Pradesh	27-04-08	369.00 U	384. 00 U	393. 00 U	505. 67 U	505. 67 U	505. 67 U	505. 67 U	224. 00 U	224. 00 U	224. 00U
			124.00 R	124. 00 R	124. 00 R	232. 33 R	232. 33 R	232. 33 R	232. 33 R	91. 50 R	91.50 R	91.50 R
20.	Uttarakhand	1-03-2008	230.00	218.75	216.50	375.00	375.00	436.76	436.76	85. 00 U	85.00 U	85.00 U
21.	West Bengal	1-04-2009	272.59 U	434. 66 U	556. 06 U	471. 41 U	624. 11 U	645. 99 U	650. 36 U	164.15	162.68	162.19

(2/2)

S.No.	Name of Utility	Tariff effective from	Domestic 1KW (100 KWh/ Month)	Domestic 4KW (400 KWh/ Month)	Domestic 10KW (1000 KWh/ Month)	Commercial 2KW (300 KWh/ Month)	Commercial 10KW (1500 KWh/ Month)	Commercial 30KW (4500 KWh/ Month)	Commercial 50KW (7500 KWh/ Month)	Agriculture 2HP (400 KWh/ Month)	Agriculture 5HP (1000 KWh/ Month)	Agriculture 10HP (2000 KWh/ Month)
			261.17 R	422. 36 R	551. 14 R	469. 61 R	623. 73 R	645. 86 R	650. 29 R			
22.	Ar. Pradesh	1-04-2009	345.00	345.00	345.00	410.00	410.00	410.00	410.00	265.00	265.00	265.00
23.	Goa	1-04-2002	138.00	186.75	232.50	383.00	413.00	429.67	433.00	118.00	118.00	118.00
24.	Manipur	3-09-2002	262.20	299.70	302.20	302.20	302.20	381.80	381.80	272.20	272.20	272.20
25.	Mizoram	1-06-2006	170.00	360.00	360.00	450.00	450.00	450.00	450.00	105.00	105.00	105.00
26.	Nagaland	1-04-2006	272.00	319.25	337.70	398.00	431.60	437.20	438.32	150.00	150.00	150.00
27.	Sikkim	1-01-2009	105.75	266.06	322.43	335.25	396.45	408.15	410.49	180.00	247.50	326.25
28.	Tripura	1-07-2006	215.00	365.00	365.00	353.33	456.67	456.67	456.67	87.46	87.46	134.92
29.	A & N Islands	1-03-2008	170.00	342.50	401.00	490.00	554.00	564.67	566.80	100.00	100.00	100.00
30.	Chandigarh	1-08-2005	179.00	304.00	304.00	387.00	387.00	387.00	387.00	165.00	165.00	165.00
31.	D & N H	1-08-2008	130.00	172.50	204.00	248.33	265.67	268.56	269.13	55.00	55.00	55.00
32.	Daman & Diu	1-09-2008	130.00	172.50	204.00	248.33	265.67	268.56	269.13	55.00	55.00	55.00
33.	Delhi BYPL/ BRPL/NDPL	7-06-2009	282.45	351.75	439.95	602.00	602.00	551.60	551.60	167.45	167.45	167.45
34.	Delhi NDMC	1-07-2009	159.60	254.10	329.70	463.40	526.40	526.40	526.40	-	-	-
35.	Lakshadweep	1-09-2004	87.50	221.88	268.75	406.67	465.33	475.11	477.07	-	-	-
36.	Puducherry	16-04-2002	55.00	113.75	150.50	264.17	312.83	320.94	322.57	0.00	20.67	19.83
37.	Torrent Power Ltd. (Ahmedabad)	1-02-2009	430.15	493.04	526.68	614.93	676.84	684.08	685.53	396.64	396.64	396.64
38.	Kolkata (CESC)	1-04-2007	279.84	462.48	533.62	450.53	579.26	597.30	600.91	-	-	-
39.	D.V.C. (A) Bihar Area	1-09-2000	-	-	-	-	-	-	-	-	-	-
	(B) West Bengal Area		-	-	-	-	-	-	-	-	-	-
40.	Durgapur Projects Ltd.	1-04-2007	189.00	254.93	264.33	272.43	293.40	294.83	295.12	149. 39^	149.39^	149.39^
41.	Mumbai (B.E.S.T)	1-06-2009	324.01	523.59	773.07	744.28	933.71	1234.64	1234.64	-	-	-
	Mumbai (Reliance Energy)	1-06-2009	303.51	558.34	812.78	891.93	831.66	1237.52	1237.52	150.90	150.90	150.90
	Mumbai (TATA'S)	1-06-2009	231.41	370.01	504.17	548.63	503.89	682.88	682.88	-	-	-

B : Continuous Supply Areas C: Non-Continuous Supply Areas D - Bangalore, Devangere & Other City Municipal Corp. E - Areas under other local bodies F -Areas under Village Panchayats U - Urban R - Rural O : Other A

^ TOD tariff from 23:00 hrs to 06:00 hrs for Durgapur Projects Ltd.,

Tariffs notified have varrying parameters for tariff in respect of various categories of consumers.The above comparision is for certain assumed loads and electricity consumption levels in a month.

Annexure-9C
(Item No. 9.4)
(1/18)

RATE OF SALE OF POWER OF GENERATING STATIONS IN THE COUNTRY FOR THE YEAR 2008-09

Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Northern Region				
Central Sector **Bhakra Beas Management Board**				
Bhakra H P S	Hydro-Hydro	Punjab	1325.00	$
Dehar H P S	Hydro-Hydro	Punjab	990.00	$
Pong H P S	Hydro-Hydro	Punjab	396.00	$
TOTAL (BBMB)				
NHPC LTD.				
Baira Siul H P S s	Hydro-Hydro	Himachal Pradesh	198.00	95
Chamera- I H P S	Hydro-Hydro	Himachal Pradesh	540.00	145
Chamera- II H P S	Hydro-Hydro	Himachal Pradesh	300.00	319
Dhauli Ganga H P S	Hydro-Hydro	Uttarakhand	280.00	210
Dulhasti H P S	Hydro-Hydro	Jammu & Kashmir	390.00	346
Salal H P S	Hydro-Hydro	Jammu & Kashmir	690.00	75
Tanakpur H P S	Hydro-Hydro	Uttarakhand	94.20	129
Uri H P S	Hydro-Hydro	Jammu & Kashmir	480.00	138
TOTAL (NHPC)				**179**
NTPC LTD.				
Anta CCPP	Thermal-Natural Gas	Rajasthan	419.33	293
Auraiya CCPP	Thermal-Natural Gas	Uttar Pradesh	663.36	338
Badarpur TPS	Thermal-Coal	Delhi	705.00	284
Dadri (NCTPP)	Thermal-Coal	Uttar Pradesh	840.00	254
Dadri CCPP	Thermal-Natural Gas	Uttar Pradesh	829.78	351
Faridabad CCPP	Thermal-Natural Gas	Haryana	431.59	304
Rihand STPS	Thermal-Coal	Uttar Pradesh	2000.00	177
Singrauli STPS	Thermal-Coal	Uttar Pradesh	2000.00	132
Tanda TPS	Thermal-Coal	Uttar Pradesh	440.00	272
Unchahar TPS	Thermal-Coal	Uttar Pradesh	1050.00	231
TOTAL (NTPC)				**224**

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Nuclear Power Corp. of India Ltd.				
Narora A.P.S.	Nuclear-Nuclear	Uttar Pradesh	440.00	188
Rajasthan A.P.S. §§	Nuclear-Nuclear	Rajasthan	740.00	271
TOTAL (NPCI)				**253**
Satluj Jal Vidyut Nigam Ltd.				
Nathpa Jhakri H P S	Hydro-Hydro	Himachal Pradesh	1500.00	**228**
Tehri Hydro Electric Development Corporation				
Tehri St-1 HPS	Hydro-Hydro	Uttarakhand	1000.00	**404**
State				
Haryana Power Generation Corporation Ltd.				
Faridabad TPS.	Thermal-Coal	Haryana	110.00	448
Panipat TPS	Thermal-Coal	Haryana	1360.00	313
Yamuna Nagar TPS	Thermal-Coal	Haryana	600.00	302
Sub Total Thermal(HPGCL)				315
Western Yamuna Canal HPS	Hydro-Hydro	Haryana	62.40	106
Sub HydroTotal (HPGCL)				106
TOTAL (HPGCL)				**306**
Himachal Pradesh State Electricity Board				
Giri Power House	Hydro	Himachal Pradesh	60.00	N.A.
Andhra Power House	Hydro	Himachal Pradesh	16.95	N.A.
Gumma Power House	Hydro	Himachal Pradesh	3.00	N.A.
Bhaba Power House/ SanjayPower House	Hydro	Himachal Pradesh	120.00	N.A.
Nogil Power House	Hydro	Himachal Pradesh	2.05	N.A.
Ghanvi Power House	Hydro	Himachal Pradesh	22.50	N.A.
Bassi Power House	Hydro	Himachal Pradesh	60.00	N.A.
Binwa Power House	Hydro	Himachal Pradesh	6.00	N.A.
Gaj Power House	Hydro	Himachal Pradesh	10.50	N.A.
Baner Power House	Hydro	Himachal Pradesh	12.00	N.A.
Chaba Power House	Hydro	Himachal Pradesh	1.75	N.A.
Rukti Power House	Hydro	Himachal Pradesh	1.50	N.A.
Rongton Power House	Hydro	Himachal Pradesh	2.00	N.A.
Thirot Power House	Hydro	Himachal Pradesh	4.50	N.A.
Khauli Power House	Hydro	Himachal Pradesh	12.00	N.A.
Larji Power House	Hydro	Himachal Pradesh	126.00	N.A.
TOTAL (HPSEB)				N.A.

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Indraprastha Power Gen. Comp. Ltd.				
Indraprastha Power Station	Thermal-Coal	Delhi	247.50	356
I. P. Gas Turbine Power Station	Thermal-Gas	Delhi	270	342
Rajghat Power House	Thermal-Coal	Delhi	135	318
TOTAL (I. P. Power Gen. Co. Ltd.)				**338**
Pragati Power Corporation Ltd.				
Pragati CCPP	Thermal-Natural Gas	Delhi	330.40	**225**
Jammu & Kashmir, Power Development Dept.				
Pampore	Thermal-Gas	Jammu & Kashmir	175.00	N.A.
Sub Total Thermal (J&K)				
Lower Jhelum	Hydro	Jammu & Kashmir	105.00	N.A.
Upper Sindh	Hydro	Jammu & Kashmir	127.00	N.A.
Gandharbal	Hydro	Jammu & Kashmir	15.00	N.A.
CHENANI I	Hydro	Jammu & Kashmir	32.80	N.A.
Mohra	Hydro	Jammu & Kashmir	9.00	N.A.
Kargil	Hydro	Jammu & Kashmir	3.75	N.A.
Sewa	Hydro	Jammu & Kashmir	9.00	N.A.
Stakna	Hydro	Jammu & Kashmir	4.00	N.A.
Sub Total Hydro (J&K)				
TOTAL (J&K)				
Punjab State Electricity Board				
G.N.D.T.P. Bathinda	Thermal-Coal	Punjab	440.00	ψ
G.G.S.S.T.P Ropar	Thermal-Coal	Punjab	1260.00	ψ
G.H.T.P Lehra Mohabat	Thermal-Coal	Punjab	420.00	ψ
Sub Total Thermal (PSEB)				ψ
Shanan Hydro Electric Project	Hydro-Hydro	Himachal Pradesh	110.00	ψ
U.B.D.C.Pathankot	Hydro-Hydro	Punjab	91.35	ψ
Anandpur Sahib	Hydro-Hydro	Punjab	134.00	ψ
Mukerian Hydel	Hydro-Hydro	Punjab	207.00	ψ
Micro Hydel(Nidampur +Dodhar +Thuhi +Rohti)	Hydro-Hydro	Punjab	4.90	ψ
Ranjit Sagar Dam (R.S.D).	Hydro-Hydro	Punjab	600.00	ψ
Bhakra Nangal Complex (L. Bank & R. Bank)	Hydro-Hydro	Punjab	684.00	ψ
Beas & Extn.	Hydro-Hydro	Himachal Pradesh	573.00	ψ
Sub Total Hydro (PSEB)				ψ
TOTAL (PSEB)				**279**

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Rajasthan Rajya Vidyut Utp. N. Ltd.				
Kota Thermal Power Station	Thermal-Coal	Rajasthan	1045	N.A.
Suratgarh TPS	Thermal-Coal	Rajasthan	1250	N.A.
Ramgarh Gas TPS	Thermal-Gas	Rajasthan	114	277
Dholpur Gas TPS	Thermal-Gas	Rajasthan	330	N.A.
Sub Total Thermal (RRVUNL)				277
Mahi Hydel Power Station	Hydro-Hydro	Rajasthan	140	N.A.
Mini Micro Hydel Power Station	Hydro-Hydro	Rajasthan	23.85	N.A.
Rana Pratap Sagar Power Stn.	Hydro-Hydro	Rajasthan	172	23
Jawahar Sagar Power Station	Hydro-Hydro	Rajasthan	99	27
Sub Total Hydro (RRVUNL)				24
TOTAL (RRVUNL)				**117**
Uttar Pradesh Jal Vidyut Nigam Limited				
E.Y.Canal	Hydro-Hydro	Uttar Pradesh	5	92
Khara HPS	Hydro-Hydro	Uttar Pradesh	72	92
Matatilla HPS	Hydro-Hydro	Uttar Pradesh	30.6	43
Obra HPS	Hydro-Hydro	Uttar Pradesh	99	62
Rihand HPS	Hydro-Hydro	Uttar Pradesh	300	54
Sheetla HPS	Hydro-Hydro	Uttar Pradesh	3.6	43
U.G.Canal HPS	Hydro-Hydro	Uttar Pradesh	15.6	229
TOTAL (Uttar Pradesh Jal Vidyut Nigam Ltd.)				**70**
Uttar Pradesh Rajya Vidyut Utp. N. Ltd.				
Anpara TPS	Thermal-Coal	Uttar Pradesh	1630	169
Harduaganj TPS	Thermal-Coal	Uttar Pradesh	220	298
Obra TPS	Thermal-Coal	Uttar Pradesh	1372	214
Panki TPS	Thermal-Coal	Uttar Pradesh	210	183
Parichha TPS	Thermal-Coal	Uttar Pradesh	640	307
TOTAL (UPRVUNL)				**202**
Uttarakhand Jal Vidyut Nigam Limited				
Chibro (Yamuna) HPS	Hydro-Hydro	Uttarakhand	240	36
Chilla HPS	Hydro-Hydro	Uttarakhand	144	38
Dhakrani HPS	Hydro-Hydro	Uttarakhand	33.75	39
Dhalipur HPS	Hydro-Hydro	Uttarakhand	51	46

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Khatima HPS	Hydro-Hydro	Uttarakhand	41.4	38
Khodri HPS	Hydro-Hydro	Uttarakhand	120	47
Kulhal HPS	Hydro-Hydro	Uttarakhand	30	40
Maneri Bhali - I HPS	Hydro-Hydro	Uttarakhand	90	65
Maneri Bhali - II HPS	Hydro-Hydro	Uttarakhand	304	273
Ramganga HPS	Hydro-Hydro	Uttarakhand	264	51
TOTAL (Uttarakhand JVNL)				**98**
Private				
Jai Prakash Hydro Power Ltd.				
Baspa -II HEP	Hydro-Hydro	Himachal Pradesh	300	**281**
Jai Prakash Power Venture Ltd.				
Vishnu Prayag HPS	Hydro-Hydro	Uttarakhand	800	**243**
Malana Power Corporation Ltd.				
Malana HPS	Hydro-Hydro	Himachal Pradesh	86	**624**
Western Region				
Central				
NHDC LTD.				
Indira Sagar HPS	Hydro-Hydro	Madhya Pradesh	1000	355
Omkareshwar HPS	Hydro-Hydro	Madhya Pradesh	520	349
TOTAL (NHDC LTD.)				**353**
NTPC LIMITED.				
Gandhar CCPP	Thermal-Natural Gas	Gujarat	657.39	464
Kawas CCPP	Thermal-Natural Gas	Gujarat	656.2	634
Korba STPS	Thermal-Coal	Chhattisgarh	2100	99
Sipat STPS	Thermal-Coal	Chhattisgarh	1000	155
Vindhyachal STPS	Thermal-Coal	Madhya Pradesh	3260	177
TOTAL (NTPC LTD.)				**202**
Nuclear Power Corp. of India Limited				
Kakrapara	Nuclear-Nuclear	Gujarat	440	214
Tarapur	Nuclear-Nuclear	Maharashtra	1400	206
TOTAL (NPCI LTD.)				**207**
Ratnagiri Gas Power Projects Ltd.				
Ratnagiri CCPP I	Thermal-Natural Gas	Maharashtra	740	**325**

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
State				
Chhattisgarh State Power Gen. Corp. Ltd.				
Gangrel HEP	Hydro-Hydro	Chhattisgarh	10	ψ
Hasdeobango HPS	Hydro-Hydro	Chhattisgarh	120	ψ
Mini Hydel	Hydro-Hydro	Chhattisgarh	0.85	ψ
Sikasar HPS	Hydro-Hydro	Chhattisgarh	7	ψ
Sub Total Hy (CSPGCL)				ψ
Korba East V	Thermal-Coal	Chhattisgarh	500	ψ
Korba-II	Thermal-Coal	Chhattisgarh	440	ψ
Korba-West TPS	Thermal-Coal	Chhattisgarh	840	ψ
Co-Gen, Kawardha	Thermal-Bugas	Chhattisgarh	6	ψ
Sub Total Thermal(CSPGCL)			1786	ψ
TOTAL (CSPGCL)				**108**
Gujarat State Electricity Corp. Ltd.				
Dhuvaran CCPP	Thermal-Natural Gas	Gujarat	218.62	513
Dhuvaran TPS	Thermal-Coal	Gujarat	220	643
Gandhi Nagar TPS	Thermal-Coal	Gujarat	870	276
Kutch Lig. TPS	Thermal-Coal	Gujarat	290	243
Sikka Rep. TPS	Thermal-Coal	Gujarat	240	360
Ukai TPS	Thermal-Coal	Gujarat	850	195
Utran CCPP	Thermal-Natural Gas	Gujarat	144	357
Wanakbori TPS	Thermal-Coal	Gujarat	1470	227
Sub Total Thermal(GSECL)				273
kadana HPSs	Hydro-Hydro	Gujarat	240	780
ukai HPS	Hydro-Hydro	Gujarat	305	57
Sub Total Hydro (GSECL)				164
TOTAL (GSECL)				**271**
M. P. Power Generating Corp. Limited				
Bansagar-III + Bansagar-Ii+Tons HPS	Hydro-Hydro	Madhya Pradesh	405	131
Bargi HPS	Hydro-Hydro	Madhya Pradesh	90	25
Gandhi Sagar HPS	Hydro-Hydro	Madhya Pradesh	115	124
Sanjay Gandhi HPS	Hydro-Hydro	Madhya Pradesh	20	101
Madhikhera HPS	Hydro-Hydro	Madhya Pradesh	60	309
Pench HPS	Hydro-Hydro	Madhya Pradesh	160	86

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Jhinna HPS	Hydro-Hydro	Madhya Pradesh	20	382
Rajghat HPS	Hydro-Hydro	Madhya Pradesh	45	189
Sub Total Hydro (MPGCL)				124
Amarkantak TPS	Thermal-Coal	Madhya Pradesh	290	161
Sanjay Gandhi TPS	Thermal-Coal	Madhya Pradesh	1340	159
Satpura TPS	Thermal-Coal	Madhya Pradesh	1142.5	162
Sub Total thermal (MPGCL)				161
TOTAL (MPGCL)				**154**
Maharashtra State Power Gen. Com. Ltd.				
Bhusawal TPS	Thermal-Coal	Maharashtra	475	248
Chandrapur(Maharashtra) S TPS	Thermal-Coal	Maharashtra	2340	177
Khaparkheda TPS - II	Thermal-Coal	Maharashtra	840	203
Koradi TPS	Thermal-Coal	Maharashtra	1040	190
Nasik TPS	Thermal-Coal	Maharashtra	880	259
New Parli TPS	Thermal-Coal	Maharashtra	250	278
Paras Exp.	Thermal-Coal	Maharashtra	250	289
Paras TPS	Thermal-Coal	Maharashtra	55	289
Parli TTPS	Thermal-Coal	Maharashtra	670	278
Uran CCPP	Thermal-Natural Gas	Maharashtra	912	190
Uran Whp	Thermal-Natural Gas	Maharashtra	240	190
SubTotal Thermal (MSPGCL)				211
Koyana	Hydro-Hydro	Maharashtra	1920	42
Small Hydro	Hydro-Hydro	Maharashtra	424	42
SubTotal Hydro (MSPGCL)				42
TOTAL (MSPGCL)				**197**
Sardar Sarovar Narmada N. Ltd.				
S Sarovar RBPH HPS	Hydro-Hydro	Gujarat	1200	205
S Sarovar CH HPS	Hydro-Hydro	Gujarat	250	205
TOTAL Hydro (SSNNL)				**205**
Private				
Ahmedabad Electric Company (Aeco)				
Torr Power Sab.	Thermal-Coal	Gujarat	340	460
Vatwa CCPPp	Thermal-Natural Gas	Gujarat	100	460
TOTAL Hydro (AECO)				**460**

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Goa Energy Private Ltd.				
Goa Energy	Thermal-Gas	Goa	30	**240**
Goa Sponge & Power Ltd.				
Sonvordem Div. -VII	Thermal-Coal	Goa	12	**235**
Essar Power Ltd.				
Essar Power, Hazira	Thermal-Gas	Gujarat	515	**205**
Gujarat Industries Power Com. Ltd.				
Baroda CCPP	Thermal-Natural Gas	Gujarat	160	367
GIPCL. GT IMP	Thermal-Natural Gas	Gujarat	145	420
Surat Lig. TPS	Thermal-Coal	Gujarat	250	203
TOTAL Th. (Guj. Industries Power Co. Ltd.)				**313**
Gujarat Peguthan Energy Corp. Pvt. Ltd.				
Peguthan CCPP	Thermal-Natural Gas	Gujarat	655	**581**
Reliance Infrastructure Ltd.				
Rinfra-Goa	Thermal-N	Goa	48	960
Rinfra-Maharashtra	Thermal-Coal	Maharashtra	500	211.16
TOTAL (Reliance Infrastructure Ltd.)				**267**
Tata Hy.Power Com.Ltd.+Tata Power Corp.				
Licensed Area(In Mumbai City) #	Hydro+Thermal	Maharashtra	1777	**544**
Southern Region				
Central				
Neyveli Lignite Corp. Ltd.				
Neyveli (Exp.) TPS	Thermal-Coal	Tamil Nadu	420	232
Neyveli TPS- I	Thermal-Coal	Tamil Nadu	600	197
Neyveli TPS-II	Thermal-Coal	Tamil Nadu	1470	171
TOTAL (Neyveli Lignite Corp. Ltd.)				**190**
NTPC Limited				
R. Gandhi CCPP (LIQ.)	Thermal-Natural Gas	Kerala	359.58	807
Ramagundem STPS	Thermal-Coal	Andhra Pradesh	2600	178
Simhadri	Thermal-Coal	Andhra Pradesh	1000	221
TOTAL (NTPC Limited.)				**231**

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Nuclear Power Corp. of India Ltd.				
Kaiga	Nuclear-Nuclear	Karnataka	660	297
Madras A.P.S.	Nuclear-Nuclear	Tamil Nadu	440	188
TOTAL (Nuclear Power Corp. of India Ltd.)				**258**
State				
Andhra Pradesh Gas Power Corp. Ltd.				
Gas Turbo Power Station St.-I	Thermal-Gas	Andhra Pradesh	100.00	211
Gas Turbo Power Station St.-II	Thermal-Gas	Andhra Pradesh	272.00	140
TOTAL (A. P. Gas Power Corp. Ltd.)				**162**
Andhra Pradesh Power Gen. Corp. Ltd.				
Vijawada TPS (Dr. NTTPS)	Thermal-Coal	Andhra Pradesh	1260.00	ψ
Rayalaseema TPP-I	Thermal-Coal	Andhra Pradesh	420.00	ψ
Rayalaseema TPP-II	Thermal-Coal	Andhra Pradesh	420.00	ψ
Kothagudem TPS (O&M)	Thermal-Coal	Andhra Pradesh	720.00	ψ
Kothagudem TPS (KTPS-V)	Thermal-Coal	Andhra Pradesh	500.00	ψ
Ramagundem TPS	Thermal-Coal	Andhra Pradesh	62.50	ψ
Sub Total Thermal (A. P. Power Gen. Corp. Ltd.)				ψ
Srisailam Right Bank HES	Hydro-Hydro	Andhra Pradesh	770.00	ψ
Srisailam Lebt Bank H HES	Hydro-Hydro	Andhra Pradesh	900.00	ψ
Nagarjunasagar	Hydro-Hydro	Andhra Pradesh	965.60	ψ
Upper Sileru	Hydro-Hydro	Andhra Pradesh	240.00	ψ
Lower Sileru	Hydro-Hydro	Andhra Pradesh	460.00	ψ
Donkarai	Hydro-Hydro	Andhra Pradesh	25.00	ψ
Penna Ahobilam	Hydro-Hydro	Andhra Pradesh	20.00	ψ
Pochapad	Hydro-Hydro	Andhra Pradesh	27.00	ψ
Singur	Hydro-Hydro	Andhra Pradesh	15.00	ψ
Nizamsagar	Hydro-Hydro	Andhra Pradesh	10.00	ψ
Peddapalli	Hydro-Hydro	Andhra Pradesh	9.16	ψ
Chettipeta	Hydro-Hydro	Andhra Pradesh	1.00	ψ
Paleru	Hydro-Hydro	Andhra Pradesh	2.00	ψ

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Machkund (AP Share)	Hydro-Hydro	Andhra Pradesh	84.00	ψ
Tungabhadra Dam (AP Share)	Hydro-Hydro	Andhra Pradesh	57.60	ψ
Sub Total Hydro (A. P. Power Gen. Corp. Ltd.)				ψ
Total (A. P. Power Gen. Corp. Ltd.)	Th/Hy	Andhra Pradesh		**205**
Karnataka Power Corp. Ltd.				
Bellary TPS	Thermal-Coal	Karnataka	500	321
Raichur TPS	Thermal-Coal	Karnataka	1470	285
Yelhanka (DG)	Thermal-Diesel	Karnataka	127.92	842
Sub Total Thermal (KPCL)				310
Almatti Dph HPS	Hydro-Hydro	Karnataka	290	221
Bhadra HPS	Hydro-Hydro	Karnataka	39.2	13
Gerusuppa HPS	Hydro-Hydro	Karnataka	240	273
Ghat Prabha HPS	Hydro-Hydro	Karnataka	32	68
Jog HPS	Hydro-Hydro	Karnataka	139.2	99
Kadra HPS	Hydro-Hydro	Karnataka	150	151
Kalinadi HPS	Hydro-Hydro	Karnataka	855	36
Kalinadi Supa HPS	Hydro-Hydro	Karnataka	100	36
Kodasali HPS	Hydro-Hydro	Karnataka	120	123
Liganamakki HPS	Hydro-Hydro	Karnataka	55	21
Munirabad HPS	Hydro-Hydro	Karnataka	28	65
Sharavathy HPS	Hydro-Hydro	Karnataka	1035	13
Sivasamundrum HPS	Hydro-Hydro	Karnataka	42	96
Varahi HPS	Hydro-Hydro	Karnataka	460	75
Sub Total Hydro(KPCL)				55
TOTAL (KPCL)				**175**
Kerala State Electricity Board				
Chembukadavu HPS.	Hydro-Hydro	Kerala	6.5	ψ
Idamalayar HPS.	Hydro-Hydro	Kerala	75	ψ
Idukki HPS	Hydro-Hydro	Kerala	780	ψ
Kakkad HPS.	Hydro-Hydro	Kerala	50	ψ
Kallada HPS.	Hydro-Hydro	Kerala	15	ψ
Kuttiyadi HPS.	Hydro-Hydro	Kerala	75	ψ
Kuttiyadi Addl. Extn.	Hydro-Hydro	Kerala	50	ψ
Kuttiyadi Tail Race	Hydro-Hydro	Kerala	2.5	ψ
Lower Periyar HPS	Hydro-Hydro	Kerala	180	ψ
Madhupatty HPS	Hydro-Hydro	Kerala	2	ψ

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Malampuzha HPS.	Hydro-Hydro	Kerala	2.5	ψ
Malankara HPS	Hydro-Hydro	Kerala	10.5	ψ
Nariamanglam HPS	Hydro-Hydro	Kerala	54	ψ
Narimanglam Ext HPS	Hydro-Hydro	Kerala	25	ψ
Pallivasal HPS	Hydro-Hydro	Kerala	37.5	ψ
Panniar HPS	Hydro-Hydro	Kerala	30	ψ
Peppara HPS	Hydro-Hydro	Kerala	3	ψ
Poringalkuttu HPS.	Hydro-Hydro	Kerala	32	ψ
Poringalkuttu LBC HPS	Hydro-Hydro	Kerala	16	ψ
Sabarigiri HPS	Hydro-Hydro	Kerala	300	ψ
Sengulam HPS	Hydro-Hydro	Kerala	48	ψ
Sholayar H HPS	Hydro-Hydro	Kerala	54	ψ
Urmi HPS	Hydro-Hydro	Kerala	6.15	ψ
Sub Total Hydro(KSEB)				ψ
Bramhapuram DG	Thermal-Diesel	Kerala	106.6	ψ
Kozhikode DG	Thermal-Diesel	Kerala	128	ψ
Sub Total Thermal(KSEB)				ψ
TOTAL (KSEB)				**380**
Lakshadweep (Union Territory)				
Miniocy	Thermal-Diesel	Lakshadweep	1.80	ψ
Kavaratti	Thermal-Diesel	Lakshadweep	1.80	ψ
Amini	Thermal-Diesel	Lakshadweep	1.90	ψ
Androtт	Thermal-Diesel	Lakshadweep	2.75	ψ
Kalpeni	Thermal-Diesel	Lakshadweep	0.75	ψ
Agatti	Thermal-Diesel	Lakshadweep	1.30	ψ
Kadmat	Thermal-Diesel	Lakshadweep	1.00	ψ
Kiltan	Thermal-Diesel	Lakshadweep	1.00	ψ
Chetlat	Thermal-Diesel	Lakshadweep	0.43	ψ
Bitra	Thermal-Diesel	Lakshadweep	0.08	ψ
Bangaram	Thermal-Diesel	Lakshadweep	0.12	ψ
TOTAL (Lakshadweep)			12.93	**257**
Puducherry Power Corp. Ltd.				
Karaikal CCPP	Thermal-Natural Gas	Puducherry	32.5	**203**
Tamil Nadu Electricity Board				
Ennore	Thermal-Coal	Tamil Nadu	450.00	N.A.
Mettur	Thermal-Coal	Tamil Nadu	840.00	N.A.

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Tuticorin	Thermal-Coal	Tamil Nadu	1050.00	N.A.
Noth Chennai	Thermal-Coal	Tamil Nadu	630.00	N.A.
Basin Bridge	Thermal-Gas	Tamil Nadu	120.00	N.A.
Kovilkalappal	Thermal-Gas	Tamil Nadu	107.88	N.A.
Valuthur	Thermal-Gas	Tamil Nadu	95.00	N.A.
Kuttalm	Thermal-Gas	Tamil Nadu	101.00	N.A.
Sub Total Thermal (TNEB)				
Pykara	Hydro	Tamil Nadu	69.95	N.A.
Pykara Micro	Hydro	Tamil Nadu	2.00	N.A.
Moyar	Hydro	Tamil Nadu	36.00	N.A.
Maravakandy	Hydro	Tamil Nadu	0.75	N.A.
Kundah-I	Hydro	Tamil Nadu	60.00	N.A.
Kundah-II	Hydro	Tamil Nadu	175.00	N.A.
Kundah-III	Hydro	Tamil Nadu	180.00	N.A.
Kundah-IV	Hydro	Tamil Nadu	100.00	N.A.
Kundah-V	Hydro	Tamil Nadu	40.00	N.A.
Parson Valley	Hydro	Tamil Nadu	30.00	N.A.
Mettur Dam	Hydro	Tamil Nadu	50.00	N.A.
Mettur Tunnel	Hydro	Tamil Nadu	200.00	N.A.
Barriage-I	Hydro	Tamil Nadu	30.00	N.A.
Barriage-II	Hydro	Tamil Nadu	30.00	N.A.
Barriage-III	Hydro	Tamil Nadu	30.00	N.A.
Barriage-IV	Hydro	Tamil Nadu	30.00	N.A.
Bavani Sagar RBC	Hydro	Tamil Nadu	8.00	N.A.
Lower Bhavani Sagar	Hydro	Tamil Nadu	8.00	N.A.
Poonachi Micro	Hydro	Tamil Nadu	1.00	N.A.
Sathanoor	Hydro	Tamil Nadu	7.50	N.A.
Mukurthy	Hydro	Tamil Nadu	0.70	N.A.
Thirumurthy Dam	Hydro	Tamil Nadu	1.95	N.A.
Periyar	Hydro	Tamil Nadu	140.00	N.A.
Vaigali	Hydro	Tamil Nadu	6.00	N.A.
Suruliyar R	Hydro	Tamil Nadu	35.00	N.A.
Papanasam	Hydro	Tamil Nadu	28.00	N.A.
Servalar	Hydro	Tamil Nadu	20.00	N.A.
Sarkarpathy	Hydro	Tamil Nadu	30.00	N.A.
Aliyar	Hydro	Tamil Nadu	60.00	N.A.

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Kadamparai	Hydro	Tamil Nadu	400.00	N.A.
Sholayar-I	Hydro	Tamil Nadu	70.00	N.A.
Sholayar-II	Hydro	Tamil Nadu	25.00	N.A.
Kodayar-I	Hydro	Tamil Nadu	60.00	N.A.
Kodayar-II	Hydro	Tamil Nadu	40.00	N.A.
Lower Aliyar	Hydro	Tamil Nadu	2.50	N.A.
Pykara Ultimate	Hydro	Tamil Nadu	150.00	N.A.
Amaravathy	Hydro	Tamil Nadu	4.00	N.A.
Perunchani	Hydro	Tamil Nadu	1.30	N.A.
Bhavani Kattalai	Hydro	Tamil Nadu	30.00	N.A.
Sub Total Hydro (TNEB)				N.A.
TOTAL (TNEB)				N.A.
Private				
GMR Vasavi Power Pvt. Limited				
B. Bridge D.G	Thermal-Diesel	Tamil Nadu	200	**734**
GVK Industris Limited.				
Jegurupadu CCPP	Thermal-Natural Gas	Andhra Pradesh	455.4	**276**
JSW(Jindal) Energy Limited				
Torangallu TPS	Thermal-Coal	Karnataka	860	**600**
LVS Power Limited.				
LVSPower DG	Thermal-Diesel	Andhra Pradesh	36.8	**226**
Madurai Power Corp. Pvt. Ltd.				
Samayanallur DG	Thermal-Diesel	Tamil Nadu	106	**840**
Reliance Infrastructure Ltd.				
R-Infra-SPS	Thermal-N	Andhra Pradesh	220	**333**
Samalpatti Power Com. Pvt. Ltd.				
Samalpatti DG	Thermal-Diesel	Tamil Nadu	105.7	**792**
Tata Power Corporation (B)				
Belgaum DG	Thermal-Diesel	Karnataka	81.3	**681**
Vemagiri Power Generation				
Vemagiri CCPP	Thermal-Natural Gas	Andhra Pradesh	370	**205**
Eastern Region				
Central				
Damodar Valley Corporation				
Bokaro `B` TPS	Thermal-Coal	Jharkhand	630	ψ

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Chandrapura(Dvc) TPS	Thermal-Coal	Jharkhand	750	ψ
Durgapur TPS	Thermal-Coal	West Bengal	340	ψ
Maithon GT (Liq.)	Thermal-Natural Gas	Jharkhand	90	ψ
Mejia TPS	Thermal-Coal	West Bengal	1340	ψ
Sub Total Thermal (DVC)				ψ
Maithon HPS	Hydro-Hydro	Jharkhand	63.2	ψ
Panchet HPS	Hydro-Hydro	Jharkhand	80	ψ
Tillaya HPS	Hydro-Hydro	Jharkhand	4	ψ
Sub Total Hydro (DVC)				ψ
TOTAL (DVC)				**365**
NHPC Limited				
Rangit HPS	Hydro-Hydro	Sikkim	60	173
Teesta V HPS	Hydro-Hydro	Sikkim	510	166
TOTAL (NHPC LIMITED)				**167**
NTPC Limited.				
Farakka STPS	Thermal-Coal	West Bengal	1600	220
Kahalgaon TPS	Thermal-Coal	Bihar	1840	221
Talcher (Old) TPS	Thermal-Coal	Orissa	460	173
Talcher STPS	Thermal-Coal	Orissa	3000	169
TOTAL (NTPC Limited.)				**191**
State				
Andman & Nic. Island Elect. Deptt. §	Thermal-Diesel	Andman & N. I.	64.65	**392**
Bihar State Electricity Board				
Barauni T P S	Thermal-Coal	Bihar	320.00	**314**
Bihar State Hydro Elec. Power Corp. Ltd.				
E.G. Canal HPS	Hydro-Hydro	Bihar	15	ψ
Kosi HPS	Hydro-Hydro	Bihar	20	ψ
Sone East Canal HPS	Hydro-Hydro	Bihar	3.3	ψ
Sone West Canal HPS	Hydro-Hydro	Bihar	6.6	ψ
TOTAL (BSHEPCL)				**200**
Jharkhand State Electricity Board Ж				
Patratu TPS	Thermal-Coal	Jharkhand	770	N. A.
Sub Total Thermal (JSEB)				N. A.
Subernrekha HPS.	Hydro-Hydro	Jharkhand	130	N. A.
Sub Total Hydro (JSEB)				N. A.
TOTAL (JSEB)	Th+Hy			289

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Orissa Hydro Power Corporation Limited				
Balimela HPS	Hydro-Hydro	Orissa	510	60
Hirakud HPS	Hydro-Hydro	Orissa	347.5	63
Rengali HPS	Hydro-Hydro	Orissa	250	46
Upper Indravati HPS	Hydro-Hydro	Orissa	600	66
Upper Kolab HPS	Hydro-Hydro	Orissa	320	37
TOTAL (OHPCL)			2027.5	**58**
Orissa Power Gen. Cor. Ltd.				
Ib Valley Tps	Thermal-Coal	Orissa	420	**154**
Govt. of Sikkim, Energy & Power Deptt.				
L L H P (Lower Lagyap)	Hydro	Sikkim	12.00	N. A.
J P H	Hydro	Sikkim	2.10	N. A.
Rimbi - I	Hydro	Sikkim	0.60	N. A.
Rothak	Hydro	Sikkim	0.20	N. A.
Rongnichu-Ii	Hydro	Sikkim	2.50	N. A.
Chaten	Hydro	Sikkim	0.10	N. A.
Meyong	Hydro	Sikkim	4.00	N. A.
Rimbi - Ii	Hydro	Sikkim	1.00	N. A.
Uppper Rongichu	Hydro	Sikkim	8.00	N. A.
Kalez	Hydro	Sikkim	2.00	N. A.
Lachung	Hydro	Sikkim	0.20	N. A.
Rabomchu	Hydro	Sikkim	3.00	N. A.
Sub Total Hydro (Govt of Sikkim)				N. A.
D P H (Gangtok DG)	Thermal-Diesel	Sikkim	4.00	N. A.
Sub Total Thermal (Govt of Sikkim)				N. A.
TOTAL (Govt of Sikkim)				N. A.
Tenughat Vidyut Nigam Limited				
Tenughat TPS	Thermal-Coal	Jharkhand	420.00	N. A.
Durgapur Projects Limited				
D.P.L. TPS	Thermal-Coal	West Bengal	701	**247**
West Bengal Power Devlop. Corp. Ltd.				
Kolaghat TPS	Thermal-Coal	West Bengal	1260.00	212
Bakreshwar TPP	Thermal-Coal	West Bengal	840.00	261
Bandel Thermal Power Station	Thermal-Coal	West Bengal	450.00	214

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Santhaldih TPS	Thermal-Coal	West Bengal	480.00	225
Sagardighi TPP	Thermal-Coal	West Bengal	600.00	209
TOTAL (WBPDCL)				**227**
West Bengal State Elecy. Dis. Com. Ltd.				
Jaldhaka H E P	Hydro	West Bengal	35.00	ψ
Ramam H E P	Hydro	West Bengal	51.00	ψ
Teesta Canal Falls	Hydro	West Bengal	67.50	ψ
Purulia Pumped St. Project	Hydro	West Bengal	900.00	ψ
Other Hydel Power Station	Hydro	West Bengal	10.05	ψ
Sub Total Hydro (W.B.S.E.D.C. LTD.)			1063.55	ψ
Rudranagar	Thermal-Diesel	West Bengal	0.50	ψ
Sub Total Thermal (W.B.S.E.D.C. LTD.)			0.50	ψ
TOTAL (W.B.S.E.D.C. LTD.)				354.00
Private				
Calcutta Electric Supply Corp. Ltd. §	Thermal-Coal	West Bengal	975	**391**
Eastern India Powertech Ltd. (DLF)				
Rajrappa	Thermal-Wr	Jharkhand	11	338
Gidi	Thermal-Wr	Jharkhand	11	361
TOTAL (Eastern India Powertech Ltd. (DLF))				**349**
Hindalco Industries Ltd.				
Hirakud Power	Thermal-Coal	Orissa	367.50	215
Tata Power Company (J) Ltd.				
Jojobera TPS	Thermal-Coal	Jharkhand	360	**229**
North Eastern Region				
Central				
NHPC Limited				
Loktak HPS	Hydro-Hydro	Manipur	105	**120**
North Eastern Elect. Power Corp. Ltd.				
Agartala GT	Thermal-Natural Gas	Tripura	84	183
Kathalguri CCPP	Thermal-Natural Gas	Assam	291	197
Sub Total Thermal (NEEPCO)				193

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Doyang HPS	Hydro-Hydro	Nagaland	75	310
Kopili HPS (Kopili+Khandong+Kopili-II)	Hydro-Hydro	Assam	275	89
Ranganadi HPS	Hydro-Hydro	Arunachal Pradesh	405	165
Sub Total Hydro (NEEPCO)				147
TOTAL Hydro (NEEPCO)				**169**
State				
Assam Power Generation Corp. Ltd.				
Karbi Langpi HPS	Hydro-Hydro	Assam	100	176
Sub Total Hydro (APGCL)				176
Lakwa GT	Thermal-Natural Gas	Assam	120	245
Namrup GT	Thermal-Natural Gas	Assam	73	218
Namrup ST	Thermal-Natural Gas	Assam	24	218
Namrup WHP	Thermal-Natural Gas	Assam	22	218
Sub Total Thermal (APGCL)				232
TOTAL (APGCL)				**223**
Dept. of Power Govt. of Arunachal Pradesh				
Mini Micro Hydel(54 Stations)	Hydro-Mmh	Arunachal Pradesh	33.71	274
DG Sets (124 Sets)	Thermal-Diesel	Arunachal Pradesh	25	N. A.
TOTAL (Arunachal Pradesh)	Hy+Th			**274**
Deptt. of Power Govt. of Nagaland				
Diesel Stand by Generator Set	Thermal-Diesel	Nagaland	0.7	ψ
Sub Total Thermal (Nagaland)				ψ
Likimro HEP	Hydro-Hydro	Nagaland	24	ψ
Duilumroi-I	Hydro-Hydro	Nagaland	0.54	ψ
Duilumroi-II	Hydro-Hydro	Nagaland	0.20	ψ
Telangsao MHP	Hydro-Hydro	Nagaland	0.60	ψ
Sub Total Hydro (Nagaland)				ψ
TOTAL (Nagaland)				**270**
Manipur Electricity Department				
Leimakhong DG	Thermal-Diesel	Manipur	36	N.A.
Meghalaya State Electricity Board				
Umiam St -I, II, III, Umiam Umtru IV & Umtru	Hydro-Hydro	Meghalaya	185.2	**376**

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Name of Utility/Power Station	Energy Source-Coal/Gas/ Naptha/LSHS/ Diesel/Hydro	State where the unit is located	Installed Capacity (MW)	Rate of Sale of Power (Paise/Kwh)
Mizoram Power and Electricity Deptt.				
Tuipui	Hydro-Hydro	Mizoram	0.5	ψ
Maicharm -I	Hydro-Hydro	Mizoram	2	ψ
Teirei	Hydro-Hydro	Mizoram	3	ψ
Tuipangli	Hydro-Hydro	Mizoram	3	ψ
Kautiabung	Hydro-Hydro	Mizoram	3	ψ
Lamsial	Hydro-Hydro	Mizoram	0.5	ψ
Sub Total Hydro (MP&ED)				ψ
Bairai Dg	Thermal-Diesel	Mizoram	22.92	ψ
Lengpui	Thermal-Diesel	Mizoram	0.5	ψ
Sub Total Thermal (MP&ED)			23.42	ψ
TOTAL (MP&ED)				**256**
Tripura State Electricity Corp. Ltd.				
Baramura GT	Thermal-Natural Gas	Tripura	37.5	ψ
Rokhia GT	Thermal-Natural Gas	Tripura	90	ψ
Sub Total Thermal (TSECL)				ψ
GumtI HPS.	Hydro-Hydro	Tripura	15	ψ
Sub Total Hydro (TSECL)				ψ
TOTAL (TSECL)				**183**
Private				
Eastern India Powertech Ltd. (DLF)				
Adamtilla	Thermal-Natural Gas	Assam	9	221
Banskandi	Thermal-Natural Gas	Assam	15.5	241
TOTAL (Eastern India Powertech Ltd.)				**234**

LIG: Lignite; MMH; Mini Micro Hydel; N: Nathpa; N.A.: Not Available; & WR: Washery Rejects.

§ : Utility wise data given

$: The energy generated by BBMB at its various project stations is transmitted to partner state constituents in the agreed ratio against which the expenditure is borne by them.

 # : Station Trombay TPS (1330 MW), Khopoli Hydro (72 MW), Bhivpuri Hydro (75 MW) & Bhira Hydro (300 MW) supplying power to licensed area of TPC in Mumbai city.

§§ : Rajasthan A. P. S. Unit No. 1 is not generating.

ψ : Pooled rate of sale of power is given by the utility

ж: Jharkhand State Electricity Board is single entity, stationwise energy sold, revenue earned and rate of sale of power is not available.

Annexure-10A
(Item 10.2)

ALL INDIA/SECTOR-WISE/ORGANISATION-WISE GENERATION TARGET/ACTUAL GENERATION FOR THE YEAR 2009-10 (1/4)

THERMAL			
SECTOR/ORGANISATION	**PLF %**	**TARGET (MU)**	**ACTUAL (MU)**
CENTRAL SECTOR			
N.T.P.C.	90.6	210292.00	218837.22
NEYVELI CORP.	80.9	16445.00	17657.36
D.V.C.	54.2	20620.00	14680.43
N.E.E.P.C.O		2286.00	2406.57
RGPPL		9600.00	8284.73
KBUNL	23.9	577.00	460.95
NSPCL	79.5	1328.24	2411.40
TOTAL CENTRAL SECTOR		**261148.24**	**264738.66**
STATE SECTOR			
HPGCL	82.0	14502.22	14945.83
IPGPCL	32.6	5373	5049.72
J&KPDC		0	12.54
PSEB	88.4	18109	20291.46
RRVUNL	82.8	23855.47	22329.49
UPRVUNL	64.2	22963	22901.63
CSPGCL	85.3	12440	13292.09
GMDCL	63.7	1368	1394
GSECL	72.5	28521	28004.2
GSEGL		1149.09	1113.51
MAHAGENCO	69.8	51153	46852.77
MPPGCL	62.3	18156	16007.18
APGENCO	86.6	27247.97	26532.81
KPCL	76.8	14473.6	13753.55
KSEB		734.7	591.62
LAKSH		0	26.72
PPCL		257.6	225.47
TNEB	76.4	24337	22214.28
A&N ADM		0	74.37
BSEB	9.6	360	264.15
DPL	47.2	3832	2862.34
JSEB	16.2	2505	1133.15
OPGC	80.5	3265.92	2961.21
SIKKIM		0	0.09
TVNL	55.6	2230	2045.32
WBPDC	59.0	24487.8	21105.72

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THERMAL			
SECTOR/ORGANISATION	**PLF %**	**TARGET (MU)**	**ACTUAL (MU)**
APGPCL	50.1	1347.6	1311.09
MIZORAM		0	0.55
MPDC		0	0.27
TRIPURA		523.5	615.6
TOTAL STATE SECTOR	70.9	**303192.47**	**287912.73**
PRIVATE SECTOR			
PVT.UTILITY			
CESC	82.7	8261	7826.45
RIL (DAHANU)	102.3	4200	4481.91
TATA PCL	71.4	10524.72	10168.66
TOR. POW. (AECO)	95.2	3952.32	4090.52
TOTAL PVT. SEC. UTILITY	82.4	**26938.04**	**26567.54**
PVT.IPPs			
ABAN POWR		865	681.08
ADANI POWER LTD.	89.0	974.16	1612.5
BELLARY		120	145.52
BSES(C)		800	563.72
BSES(P)		1583	1527.46
DLF ASSAM		0	80.35
DPSCLTD		0	171.33
ESSAR		2000	1711.32
GAUTAMI POWER LTD.		1804.03	3079.79
GIPCL	83.5	3294.5	2892.91
GMR ENERG		0	364.48
GTE CORP		5152.22	4590.62
GVKP&IL		3215	3294.3
JSW ENERGY LTD	81.0	3542.2	4725.9
JPL	93.2	7090.5	8161.59
KONASEEMA EPS		1730.16	863.62
LANCO KORAPALLI		2704	3132.71
LANCO AMARKANTAK POWER PVT. LTD.		1813.8	1529.67
LVS POWER		0	195.75
MADURAI P		724	456.27
NDPL		197	0
PENNA		403	339.84
PPNPGCL		2259	2251.86
REL		330.79	321.14
RPG		0	69.8
ROSA POWER SUPPLY CO. LTD.		0	148.69
RAJ WEST POWER LTD. (JSW)	41.7	1582	214.26

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THERMAL			
SECTOR/ORGANISATION	**PLF %**	**TARGET (MU)**	**ACTUAL (MU)**
SAMALPATI		722	480.67
SPGL		1495	1546.86
ST-CMSECP	81.9	1809	1793.12
SUR.CH.PL		0	134.6
TATA PCL (BELGAUM)		346	386.89
TATA PCL (JOJOBERA)	74.4	2000	2344.91
TOR. POW. (SUGEN)		4166	6610.77
VASAVI		1418	1149.07
VEMAGIRI		2300	2993.79
TOTAL PVT. SEC. IPP		**56440.36**	**60567.16**
PVT. IPPS IMPORT			
GIPCL		320.47	347.17
ICCL		240	284.53
NALCO		200	104.72
TOTAL PVT. SEC. IMP.		**760.47**	**736.42**
TOTAL IPP & IMPORT	**84.8**	**57200.83**	**61303.6**
TOTAL PVT. SECTOR	**83.5**	**84138.8**	**87871.1**
NUCLEAR			
KAIGA	55.8	3070	3224.85
KAKRAPARA	27.7	998	1067.99
MADRAS A.P.S.	53.1	1870	2046.07
NARORA A.P.S.	21.2	1378	817.24
RAJASTHAN A.P.S.	51.0	4932	3506.24
TARAPUR	65.2	6752	7991.29
TOTAL NUCLEAR	**51.1**	**19000**	**18653.68**
HYDRO			
CENTRAL SECTOR			
BBMB		10500	9374.54
DVC		325	197.54
NEEPCO.		3001	2150.2
NHDC		3488	3075.16
NHPC		16675	16943.4
SJVNL		6400	7017.55
THDC		2850	2115.68
TOTAL CENTRAL SECTOR		**43239**	**40874.07**
STATE SECTOR			
HPSEB		1612	1772.2
J&KPDC		3346	3425.5
PSEB		3752	3500.0

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THERMAL			
SECTOR/ORGANISATION	**PLF %**	**TARGET (MU)**	**ACTUAL (MU)**
RRVUNL		898	353.6
UJVNL		4570	4080.3
UPJVNL		1380	941.3
CSPGCL		310	279.9
GSECL		979	454.0
MAHAGENCO		3848	4233.0
MPPGCL		2500	1762.2
SSNNL		3483	2500.8
APGENCO		9012	5887.7
KPCL		11843	12335.4
KSEB		6769	6651.3
TNEB		4700	5612.2
JSEB		152	115.7
OHPC		6041	3919.9
WBSEDCL		948	1114.0
APGPCL		450	400.4
MEGEB		530	533.5
SMALL HYDRO PLANTS(UPTO 25MW CAPACITY)		0	453.3
TOTAL STATE SECTOR		**67123**	**60326.2**
PRIVATE SECTOR UTILITY			
BHANDARDHARA HPS		58	54.6
BHIRA HPS		893	350.1
BHIRA PSU HPS		0	543.5
BHIVPURI HPS		307	300.7
BUDHIL HPS		40	0.0
KHOPOLI HPS		250	260.4
SMALL HYDRO PLANTS(UPTO 25MW CAPACITY)		0	23.1
TOTAL PRIVATE SECTOR UTILITIES		**1548**	**1532.3**
PVT.IPPs			
ALLAIN DUHANGAN HPS		150	0.0
BASPA HPS		1213	1303.1
MALANA HPS		350	302.0
MALANA-II HPS		70	0.0
VISHNU PRAYAG HPS		1775	1976.3
SMALL HYDRO PLANTS(UPTO 25MW CAPACITY)		0	342.1
TOTAL PVT SEC. IPPs		**3558**	**3923.5**
TOTAL PVT. SECTOR		**5106**	**5455.8**

Annexure-10B
(Item No.10.4)

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/ UTS INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

(1/7)

(As on 31.03.2010)

State	Ownership Sector	Modewise breakup							Grand Total
		Thermal			Total Thermal	Nuclear	Hydro (Renewable)	RES ** (MNRE)	
		Coal	Gas	Diesel					
NORTHERN REGION									
Delhi	State	135.00	600.40	0.00	735.40	0.00	0.00	0.00	735.40
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	2467.96	207.61	0.00	2675.57	122.08	581.62	0.00	3379.27
	Sub-Total	**2602.96**	**808.01**	**0.00**	**3410.97**	**122.08**	**581.62**	**0.00**	**4114.67**
Haryana	State	2615.00	0.00	3.92	2618.92	0.00	884.51	68.70	3572.13
	Private	0.00	0.00	0.00	0.00	0.00	0.00	7.80	7.80
	Central	402.99	535.29	0.00	938.28	109.16	443.17	0.00	1490.61
	Sub-Total	**3017.99**	**535.29**	**3.92**	**3557.20**	**109.16**	**1327.68**	**76.50**	**5070.54**
Himachal	State	0.00	0.00	0.13	0.13	0.00	393.60	275.83	669.56
	Private	0.00	0.00	0.00	0.00	0.00	386.00	0.00	386.00
	Central	118.30	61.88	0.00	180.18	34.08	760.34	0.00	974.60
	Sub-Total	**118.30**	**61.88**	**0.13**	**180.31**	**34.08**	**1539.94**	**275.83**	**2030.16**
Jammu & Kashmir	State	0.00	175.00	8.94	183.94	0.00	780.00	129.33	1093.27
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	263.70	129.14	0.00	392.84	77.00	700.53	0.00	1170.37
	Sub-Total	**263.70**	**304.14**	**8.94**	**576.78**	**77.00**	**1480.53**	**129.33**	**2263.64**
Punjab	State	2630.00	0.00	0.00	2630.00	0.00	2230.23	220.65	5080.88
	Private	0.00	0.00	0.00	0.00	0.00	0.00	58.25	58.25
	Central	578.19	263.92	0.00	842.11	208.04	732.66	0.00	1782.81
	Sub-Total	**3208.19**	**263.92**	**0.00**	**3472.11**	**208.04**	**2962.89**	**278.90**	**6921.94**
Rajasthan	State	3365.00	443.80	0.00	3808.80	0.00	987.96	30.25	4827.01
	Private	135.00	0.00	0.00	135.00	0.00	0.00	895.9	1030.90
	Central	649.48	221.23	0.00	870.71	573.00	466.84	0.00	1910.55
	Sub-Total	**4149.48**	**665.03**	**0.00**	**4814.51**	**573.00**	**1454.80**	**926.15**	**7768.46**
Uttar Pradesh	State	4072.00	0.00	0.00	4072.00	0.00	524.10	25.10	4621.20
	Private	300.00	0.00	0.00	300.00	0.00	0.00	562.6	862.60
	Central	2540.84	549.97	0.00	3090.81	335.72	1073.32	0.00	4499.85
	Sub-Total	**6912.84**	**549.97**	**0.00**	**7462.81**	**335.72**	**1597.42**	**587.70**	**9983.65**
Uttranchal	State	0.00	0.00	0.00	0.00	0.00	1252.15	132.92	1385.07
	Private	0.00	0.00	0.00	0.00	0.00	400.00	0.00	400.00
	Central	261.26	69.35	0.00	330.61	22.28	267.03	0.00	619.92
	Sub-Total	**261.26**	**69.35**	**0.00**	**330.61**	**22.28**	**1919.18**	**132.92**	**2404.99**

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State	Ownership Sector	Modewise breakup							Grand Total
		Thermal			Total Thermal	Nuclear	Hydro (Renewable)	RES ** (MNRE)	
		Coal	Gas	Diesel					
Chandigarh	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	27.09	15.32	0.00	42.41	8.84	46.74	0.00	97.99
	Sub-Total	**27.09**	**15.32**	**0.00**	**42.41**	**8.84**	**46.74**	**0.00**	**97.99**
Central - Unallocated		713.19	290.35	0.00	1003.54	129.80	399.95	0.00	1533.29
Total Northern Region	State	12817.00	1219.20	12.99	14049.19	0.00	7052.55	882.78	21984.52
	Private	435.00	0.00	0.00	435.00	0.00	786.00	1524.55	2745.55
	Central	8023.00	2344.06	0.00	10367.06	1620.00	5472.20	0.00	17459.26
	Total	**21275.00**	**3563.26**	**12.99**	**24851.25**	**1620.00**	**13310.75**	**2407.33**	**42189.33**
WESTERN REGION									
Goa	State	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
	Private	0.00	48.00	0.00	48.00	0.00	0.00	30.00	78.00
	Central	277.03	0.00	0.00	277.03	25.80	0.00	0.00	302.83
	Sub-Total	**277.03**	**48.00**	**0.00**	**325.03**	**25.80**	**0.00**	**30.05**	**380.88**
Daman & Diu	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	19.04	4.20	0.00	23.24	7.38	0.00	0.00	30.62
	Sub-Total	**19.04**	**4.20**	**0.00**	**23.24**	**7.38**	**0.00**	**0.00**	**30.62**
Gujarat	State *	4190.00	892.72	17.28	5100.00	0.00	772.00	29.90	5901.90
	Private	1310.00	2577.50	0.20	3887.70	0.00	0.00	1626.01	5513.71
	Central	1508.89	424.27	0.00	1933.16	559.32	0.00	0.00	2492.48
	Sub-Total	**7008.89**	**3894.49**	**17.48**	**10920.86**	**559.32**	**772.00**	**1655.91**	**13908.09**
Madhya Pradesh	State	2807.50	0.00	0.00	2807.50	0.00	1703.66	71.76	4582.92
	Private	0.00	0.00	0.00	0.00	0.00	0.00	216.10	216.10
	Central	1474.60	257.18	0.00	1731.78	273.24	1520.00	0.00	3525.02
	Sub-Total	**4282.10**	**257.18**	**0.00**	**4539.28**	**273.24**	**3223.66**	**287.86**	**8324.04**
Chhatisgarh	State	2060.00	0.00	0.00	2060.00	0.00	120.00	19.05	2199.05
	Private	1600.00	0.00	0.00	1600.00	0.00	0.00	199.90	1799.90
	Central	723.00	0.00	0.00	723.00	47.52	0.00	0.00	770.52
	Sub-Total	**4383.00**	**0.00**	**0.00**	**4383.00**	**47.52**	**120.00**	**218.95**	**4769.47**
Maharastra	State	7300.00	912.00	0.00	8212.00	0.00	2884.84	233.72	11330.56
	Private	1900.00	180.00	0.00	2080.00	0.00	447.00	2204.25	4731.25
	Central	2003.05	2623.93	0.00	4626.98	690.14	0.00	0.00	5317.12
	Sub-Total	**11203.05**	**3715.93**	**0.00**	**14918.98**	**690.14**	**3331.84**	**2437.97**	**21378.93**

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State	Ownership Sector	Modewise breakup							Grand Total
		Thermal			Total Thermal	Nuclear	Hydro (Renewable)	RES ** (MNRE)	
		Coal	Gas	Diesel					
Dadra & Nagar Haveli	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	22.04	27.10	0.00	49.14	8.46	0.00	0.00	57.60
	Sub-Total	**22.04**	**27.10**	**0.00**	**49.14**	**8.46**	**0.00**	**0.00**	**57.60**
Central - Unallocated		950.35	196.91	0.00	1147.26	228.14	0.00	0.00	1375.40
Total western Region	State	16357.50	1804.72	17.28	18179.50	0.00	5480.50	354.48	24014.48
	Private	4810.00	2805.50	0.20	7615.70	0.00	447.00	4276.26	12338.96
	Central	6978.00	3533.59	0.00	10511.59	1840.00	1520.00	0.00	13871.59
	Total	**28145.50**	**8143.81**	**17.48**	**36306.79**	**1840.00**	**7447.50**	**4630.74**	**50225.03**
SOUTHERN REGION									
Andhra Pradesh	State	3882.50	0.00	0.00	3882.50	0.00	3617.53	188.43	7688.46
	Private	0.00	2580.40	36.80	2617.20	0.00	0.00	512.08	3129.28
	Central	2377.38	0.00	0.00	2377.38	214.28	0.00	0.00	2591.66
	Sub-Total	**6259.88**	**2580.40**	**36.80**	**8877.08**	**214.28**	**3617.53**	**700.51**	**13409.40**
Karnataka	State	1970.00	0.00	127.92	2097.92	0.00	3599.80	527.15	6224.87
	Private	860.00	220.00	106.50	1186.50	0.00	0.00	1706.94	2893.44
	Central	1072.67	0.00	0.00	1072.67	195.36	0.00	0.00	1268.03
	Sub-Total	**3902.67**	**220.00**	**234.42**	**4357.09**	**195.36**	**3599.80**	**2234.09**	**10386.34**
Kerala	State	0.00	0.00	234.60	234.60	0.00	1781.50	138.76	2154.86
	Private	0.00	174.00	21.84	195.84	0.00	0.00	0.00	195.84
	Central	765.38	359.58	0.00	1124.96	78.10	0.00	0.00	1203.06
	Sub-Total	**765.38**	**533.58**	**256.44**	**1555.40**	**78.10**	**1781.50**	**138.76**	**3553.76**
Tamil Nadu	State	2970.00	523.20	0.00	3493.20	0.00	2108.20	85.55	5686.95
	Private	250.00	503.10	411.66	1164.76	0.00	0.00	4779.96	5944.72
	Central	2299.81	0.00	0.00	2299.81	478.50	0.00	0.00	2778.31
	Sub-Total	**5519.81**	**1026.30**	**411.66**	**6957.77**	**478.50**	**2108.20**	**4865.51**	**14409.98**
NLC	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	100.17	0.00	0.00	100.17	0.00	0.00	0.00	100.17
	Sub-Total	**100.17**	**0.00**	**0.00**	**100.17**	**0.00**	**0.00**	**0.00**	**100.17**
Pondicherry	State	0.00	32.50	0.00	32.50	0.00	0.00	0.00	32.50
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	207.01	0.00	0.00	207.01	16.28	0.00	0.00	223.29
	Sub-Total	**207.01**	**32.50**	**0.00**	**239.51**	**16.28**	**0.00**	**0.00**	**255.79**
Central - Unallocated		1067.58	0.00	0.00	1067.58	117.48	0.00	0.00	1185.06
Total Southern Region	State	8822.50	555.70	362.52	9740.72	0.00	11107.03	939.89	21787.64
	Private	1110.00	3477.50	576.80	5164.30	0.00	0.00	6998.98	12163.28
	Central	7890.00	359.58	0.00	8249.58	1100.00	0.00	0.00	9349.58
	Total	**17822.50**	**4392.78**	**939.32**	**23154.60**	**1100.00**	**11107.03**	**7938.87**	**43300.50**

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State	Ownership Sector	Modewise breakup							Grand Total
		Thermal			Total Thermal	Nuclear	Hydro (Renewable)	RES ** (MNRE)	
		Coal	Gas	Diesel					
EASTERN REGION									
Bihar	State	530.00	0.00	0.00	530.00	0.00	0.00	54.60	584.60
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	1131.70	0.00	0.00	1131.70	0.00	129.43	0.00	1261.13
	Sub-Total	**1661.70**	**0.00**	**0.00**	**1661.70**	**0.00**	**129.43**	**54.60**	**1845.73**
Jharkhand	State	1190.00	0.00	0.00	1190.00	0.00	130.00	4.05	1324.05
	Private	360.00	0.00	0.00	360.00	0.00	0.00	0.00	360.00
	Central	187.88	0.00	0.00	187.88	0.00	70.93	0.00	258.81
	Sub-Total	**1737.88**	**0.00**	**0.00**	**1737.88**	**0.00**	**200.93**	**4.05**	**1942.86**
West Bengal	State	4780.00	100.00	12.06	4892.06	0.00	977.00	144.50	6013.56
	Private	1341.38	0.00	0.14	1341.52	0.00	0.00	20.20	1361.72
	Central	634.96	0.00	0.00	634.96	0.00	139.30	0.00	774.26
	Sub-Total	**6756.34**	**100.00**	**12.20**	**6868.54**	**0.00**	**1116.30**	**164.70**	**8149.54**
DVC	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	3563.10	90.00	0.00	3653.10	0.00	193.26	0.00	3846.36
	Sub-Total	**3563.10**	**90.00**	**0.00**	**3653.10**	**0.00**	**193.26**	**0.00**	**3846.36**
Orissa	State	420.00	0.00	0.00	420.00	0.00	2061.92	64.30	2546.22
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	1408.10	0.00	0.00	1408.10	0.00	105.01	0.00	1513.11
	Sub-Total	**1828.10**	**0.00**	**0.00**	**1828.10**	**0.00**	**2166.93**	**64.30**	**4059.33**
Sikkim	State	0.00	0.00	5.00	5.00	0.00	0.00	47.11	52.11
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	68.10	0.00	0.00	68.10	0.00	75.27	0.00	143.37
	Sub-Total	**68.10**	**0.00**	**5.00**	**73.10**	**0.00**	**75.27**	**47.11**	**195.48**
Central - Unallocated		1280.16	0.00	0.00	1280.16	0.00	0.00	0.00	1280.16
Total Eastern Region	State	6920.00	100.00	17.06	7037.06	0.00	3168.92	314.56	10520.54
	Private	1701.38	0.00	0.14	1701.52	0.00	0.00	20.20	1721.72
	Central	8274.00	90.00	0.00	8364.00	0.00	713.20	0.00	9077.20
	Total	**16895.38**	**190.00**	**17.20**	**17102.58**	**0.00**	**3882.12**	**334.76**	**21319.46**
NORTH-EASTERN REGION									
Assam	State	60.00	239.00	20.69	319.69	0.00	100.00	27.11	446.80
	Private	0.00	24.50	0.00	24.50	0.00	0.00	0.00	24.50
	Central	0.00	177.82	0.00	177.82	0.00	329.72	0.00	507.54
	Sub-Total	**60.00**	**441.32**	**20.69**	**522.01**	**0.00**	**429.72**	**27.11**	**978.84**
Arunachal Pradesh	State	0.00	0.00	15.88	15.88	0.00	0.00	67.42	83.30
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	21.05	0.00	21.05	0.00	97.57	0.00	118.62
	Sub-Total	**0.00**	**21.05**	**15.88**	**36.93**	**0.00**	**97.57**	**67.42**	**201.92**
Meghalaya	State	0.00	0.00	2.05	2.05	0.00	156.00	31.03	189.08
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	25.96	0.00	25.96	0.00	74.58	0.00	100.54
	Sub-Total	**0.00**	**25.96**	**2.05**	**28.01**	**0.00**	**230.58**	**31.03**	**289.62**

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State	Ownership Sector	Modewise breakup							Grand Total
		Thermal			Total Thermal	Nuclear	Hydro (Renewable)	RES ** (MNRE)	
		Coal	Gas	Diesel					
Tripura	State	0.00	127.50	4.85	132.35	0.00	0.00	16.01	148.36
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	33.34	0.00	33.34	0.00	62.37	0.00	95.71
	Sub-Total	**0.00**	**160.84**	**4.85**	**165.69**	**0.00**	**62.37**	**16.01**	**244.07**
Manipur	State	0.00	0.00	45.41	45.41	0.00	0.00	5.45	50.86
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	25.96	0.00	25.96	0.00	80.98	0.00	106.94
	Sub-Total	**0.00**	**25.96**	**45.41**	**71.37**	**0.00**	**80.98**	**5.45**	**157.80**
Nagaland	State	0.00	0.00	2.00	2.00	0.00	0.00	28.67	30.67
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	19.19	0.00	19.19	0.00	53.32	0.00	72.51
	Sub-Total	**0.00**	**19.19**	**2.00**	**21.19**	**0.00**	**53.32**	**28.67**	**103.18**
Mizoram	State	0.00	0.00	51.86	51.86	0.00	0.00	28.47	80.33
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	16.28	0.00	16.28	0.00	34.31	0.00	50.59
	Sub-Total	**0.00**	**16.28**	**51.86**	**68.14**	**0.00**	**34.31**	**28.47**	**130.92**
Central - Unallocated		0.00	55.40	0.00	55.40	0.00	127.15	0.00	182.55
Total North-Eastern Region	State	60.00	366.50	142.74	569.24	0.00	256.00	204.16	1029.40
	Private	0.00	24.50	0.00	24.50	0.00	0.00	0.00	24.50
	Central	0.00	375.00	0.00	375.00	0.00	860.00	0.00	1235.00
	Total	**60.00**	**766.00**	**142.74**	**968.74**	**0.00**	**1116.00**	**204.16**	**2288.90**
INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE ISLANDS									
Andaman & Nicobar	State	0.00	0.00	40.05	40.05	0.00	0.00	5.25	45.30
	Private	0.00	0.00	20.00	20.00	0.00	0.00	0.00	20.00
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total	**0.00**	**0.00**	**60.05**	**60.05**	**0.00**	**0.00**	**5.25**	**65.30**
lakshadweep	State	0.00	0.00	9.97	9.97	0.00	0.00	0.00	9.97
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total	**0.00**	**0.00**	**9.97**	**9.97**	**0.00**	**0.00**	**0.00**	**9.97**
Total Islands	State	0.00	0.00	50.02	50.02	0.00	0.00	5.25	55.27
	Private	0.00	0.00	20.00	20.00	0.00	0.00	0.00	20.00
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.00**	**0.00**	**70.02**	**70.02**	**0.00**	**0.00**	**5.25**	**75.27**

ALL INDIA INSTALLED CAPACITY (IN MW) OF POWER STATIONS LOCATED IN THE REGIONS OF MAIN LAND AND ISLANDS (UTILITIES)

(As on 31.03.2010)

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Region	Ownership Sector	Modewise breakup							Grand Total
		Thermal			Total Thermal	Nuclear	Hydro (Renewable)	RES ** (MNRE)	
		Coal	Gas	Diesel					
Northern Region	State	12817.00	1219.20	12.99	14049.19	0.00	7052.55	882.78	21984.52
	Private	435.00	0.00	0.00	435.00	0.00	786.00	1524.55	2745.55
	Central	8023.00	2344.06	0.00	10367.06	1620.00	5472.20	0.00	17459.26
	Sub Total	**21275.00**	**3563.26**	**12.99**	**24851.25**	**1620.00**	**13310.75**	**2407.33**	**42189.33**
Western Region	State	16357.50	1804.72	17.28	18179.50	0.00	5480.50	354.48	24014.48
	Private	4810.00	2805.50	0.20	7615.70	0.00	447.00	4276.26	12338.96
	Central	6978.00	3533.59	0.00	10511.59	1840.00	1520.00	0.00	13871.59
	Sub Total	**28145.50**	**8143.81**	**17.48**	**36306.79**	**1840.00**	**7447.50**	**4630.74**	**50225.03**
Southern Region	State	8822.50	555.70	362.52	9740.72	0.00	11107.03	939.89	21787.64
	Private	1110.00	3477.50	576.80	5164.30	0.00	0.00	6998.98	12163.28
	Central	7890.00	359.58	0.00	8249.58	1100.00	0.00	0.00	9349.58
	Sub Total	**17822.50**	**4392.78**	**939.32**	**23154.60**	**1100.00**	**11107.03**	**7938.87**	**43300.50**
Eastern Region	State	6920.00	100.00	17.06	7037.06	0.00	3168.92	314.56	10520.54
	Private	1701.38	0.00	0.14	1701.52	0.00	0.00	20.20	1721.72
	Central	8274.00	90.00	0.00	8364.00	0.00	713.20	0.00	9077.20
	Sub Total	**16895.38**	**190.00**	**17.20**	**17102.58**	**0.00**	**3882.12**	**334.76**	**21319.46**
North Eastern Region	State	60.00	366.50	142.74	569.24	0.00	256.00	204.16	1029.40
	Private	0.00	24.50	0.00	24.50	0.00	0.00	0.00	24.50
	Central	0.00	375.00	0.00	375.00	0.00	860.00	0.00	1235.00
	Sub Total	**60.00**	**766.00**	**142.74**	**968.74**	**0.00**	**1116.00**	**204.16**	**2288.90**
Islands	State	0.00	0.00	50.02	50.02	0.00	0.00	5.25	55.27
	Private	0.00	0.00	20.00	20.00	0.00	0.00	0.00	20.00
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub Total	**0.00**	**0.00**	**70.02**	**70.02**	**0.00**	**0.00**	**5.25**	**75.27**

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ALL INDIA	State	44977.00	4046.12	602.61	49625.73	0.00	27065.00	2701.12	79391.85
	Private	8056.38	6307.50	597.14	14961.02	0.00	1233.00	12819.99	29014.01
	Central	31165.00	6702.23	0.00	37867.23	4560.00	8565.40	0.00	50992.63
Grand Total		**84198.38**	**17055.85**	**1199.75**	**102453.98**	**4560.00**	**36863.40**	**15521.11**	**159398.49**

Renewable Energy Sources (RES) includes SHP, BG, BP, U&I,Solar and Wind Energy

Abbre-viation *SHP=Small Hydro Project, BG=Biomass Gasifier, BP=Biomass Power, U&I=Urban & Industrial Waste Power, RES=Renewable Energy Sources*

Note :

i) The installed capacity figures are reconciled and indicates latest upration/deration capacity.

ii) The generation stations with installed capacity less than or equal to 25 MW(Hydro) are indicated under RES.

iii) The Shares of Sipat TPS(NTPC) are proposed shares.

iv) The proportionate distribution of shares in respect of Bhilai TPP (J V of Bhilai Steel and NTPC) has been done as per tentative allocation communicated by IRP Div.viz 220 MW for NTPC out of 500 MW of Unit I & II and the remaining 280 MW to SAIL- Chhattisgarh (State Sector).

v) The installed capacity figures in respect of RES is based on statement dated 31.01.10 received on 06.04.10 from Ministry of Renewable Energy(MNRE) where cumulative Grid interactive power installed capacity has been indicated as 15786.07 MW Reconciliation of installed capacity of Hydro capacity resulted in transfer of 135 MW from conventional to SHP-RES and retrieval of installed capacity of 67.20 from SHP-RES to conventional Hydro has resulted in net addition of 67.8 MW to SHP under RES. Also 30 MW of capacity in the nature of Waste Heat Recovery Power Plant at Goa Energy Private Limited under U&I category of RES Out of this installed capacity due to wind - (302.25 MW) and small hydro (60.51 MW) appearing in captive capacity has been deducted to arrive at installed capacity of utilities in respect of RES. (15786.07-362.76+67.8+30=15521.11)

vi) Figures at second place of decimal may not tally due to rounding off.

Annexure-11A
(Item No.11.3)

(1/3)

50000 MW H.E. INITIATIVE

LOW TARIFF HE SCHEMES UNDER SURVEY & INVESTIGATION / PREPARATION OF DPR IN NORTH-EASTERN REGION

Sl. No.	Name of Scheme	State	River	Type	Basin	Agency	I.C. (MW)	Original Schedule for DPR	Revised Schedule for DPR	Status / Remarks
A. Schemes for which DPRs have been prepared										
1.	Talong (Londa)	Arunachal Pradesh	Kameng	STO	Kameng	GMR Ltd.	300	-	-	Project was initially allotted as Talong for 160 MW to NEEPCO. DPR submitted as Londa for 225 MW by M/s. GMR in Oct., '08 which was returned to the Developer in Dec., 2008.
2.	Badao	Arunachal Pradesh	Kameng	ROR	Kameng	Coastal Projects Pvt. Ltd.	120	-	-	PFR was initially prepared by NEEPCO for 60 MW. PFR by Coastal Projects Pvt. Ltd. for 70 MW submitted to state Government and likely to be cleared by February, 2010.
3.	Dibbin	Arunachal Pradesh	Bichom	ROR	Kameng	KSK Electricity Financing India Ltd.	100	-	-	Project allotted for IC=125 MW which has been revised to 120 MW. DPR cleared by CEA on 4.12.09.
4.	Demwe	Arunachal Pradesh	Lohit	STO	Lohit	Athena Energy Ventures Pvt. Ltd.	3000	-	-	Project allotted as Demwe with IC=3000 MW.Being developed as two schemes namely Demwe Lower (1750 MW) and Demwe Upper (1800 MW). DPR for Demwe Lower submitted in Aug, 2009 and Concurrence accorded on 20.11.09.
5.	Mawhu	Meghalaya	Umiew	ROR	Barak	NEEPCO	120	-	-	DPR is under preparation by NEEPCO for 85 MW.
6.	Tato-II	Arunachal Pradesh	Siyom	ROR	Siang	Reliance Energy Ltd.	700	-	-	DPR submitted in May, 09 returned by CEA on 04.09.09 due to inadequate geological investigations, exploring possibility of relocation of dam site, making provision of desilting chamber & review of high cost/ tariff of project. Revised DPR likely by Mar.,2010.
						Total	**4340**			

(2/3)

Sl. No.	Name of Scheme	State	River	Type	Basin	Agency	I.C. (MW)	Original Schedule for DPR	Revised Schedule for DPR	Status / Remarks
B. Schemes under Survey & Investigation										
CENTRAL SECTOR										
	NIL									
STATE SECTOR										
7.	Nong kolait	Meghalaya	Umangi	ROR	Barak	MeSEB	120	6/07	3/11	Survey & Investigation in progress
8.	Selim	Meghalaya	Barak	STO	Barak	MeSEB	170	3/09	3/11	S&I in Progress
						TOTAL STATE SECTOR	**290**			
IPP										
9.	Umduna	Meghalaya	Barak	ROR	Barak	Eta Star Infrastructure Ltd	57	3/09	3/10	S&I completed, DPR likely by Mar., 2010.
10.	Hirong	Arunachal Pradesh	Siyom	ROR	Siang	Jai Prakash Associates Ltd.	500	3/08	9/09	Under S&I, DPR likely to be completed by April, 2010.
11.	Hutong	Arunachal Pradesh	Lohit	STO	Lohit	Mountain Falls Ltd.	3000	3'09	12/09	State Govt. wants ROR instead of Storage scheme. Scheme split in two projects viz. Hutang-I (588 MW) & Hutong-II (1250 MW). Hutong-II (1250 MW) allotted to Mountain Falls Ltd. in Nov.'06. DPR schedule to be submitted by 04/'10. Progress behind schedule. Delayed explanation is being called for by State Government.
12.	Kalai	Arunachal Pradesh	Lohit	STO	Lohit	Mountain Falls Ltd.	2600	3'09	2/10	State Govt. wants ROR instead of Storage scheme. Scheme split in two projects viz. Kalai-I (1450 MW) & Kalai-II (1200MW). Kalai-I (1450 MW) allotted to Mountain Falls Ltd. in Nov.'06 .DPR likely by 07/'10. Progress behind schedule. Delayed explanation is being called for by State Government. Kalai-II (1200 MW) allotted to Reliance Power Ltd. in Mar.'09 .DPR likely by 12/'11.

(3/3)

Sl. No.	Name of Scheme	State	River	Type	Basin	Agency	I.C. (MW)	Original Schedule for DPR	Revised Schedule for DPR	Status / Remarks
13.	Naying	Arunachal Pradesh	Siyom	ROR	Siang	D.S. Construc-tions Ltd.	1000	3/08	7/09	DPR schedule to be completed by March, 2010. Project is far behind schedule. State Government has served show cause notice to the developer.
						TOTAL IPP	**7157**			
						Total I.C. (MW)	**7447**			
C. Low Tariff HE Schemes Work held up (NER)										
14.	Kameng-II (Bhareli-II)	Arunachal Pradesh	Kameng	ROR	Kameng	Mountain Falls (India) Ltd.	600	-	-	DPR likely by Mar./'10. Progress behind schedule. Delayed explanation is being called for by State Government.
15.	Kameng Dam	Arunachal Pradesh	Kameng	-	Kameng	KSK Electricity India Ltd.	600	-	-	Project allotted for 600 MW. S&I in progress, Capacity has been reduced to 480 MW. DPR likely by Nov.,2010.
16.	Etalin	Arunachal Pradesh	Dibang	ROR	Dibang	Yet to be decided	4000	-	-	DPR likely by Mar., 2012. MOEF accorded clearance in Nov.'09 for preconstruction activities as per the provisions of EIA Notification, 2006.
17.	Attunli	Arunachal Pradesh	Dibang	ROR	Dibang	Yet to be decided	500	-	-	DPR likely by Mar., 2012. MOEF accorded clearance in Nov.'09 for preconstruction activities as per the provisions of EIA Notification, 2006.
						TOTAL	**5700**			
						GRAND TOTAL	**17487**			

Annexure-11B
(Item No.11.5)

HYDRO PROJECTS IN NORTH-EASTERN REGION IDENTIFIED FOR BENEFITS DURING 12TH PLAN

Sl.No.	Name of scheme	Type	State	Agency	Installed Capacity (IC)	Benefit in 12th Plan	Schedule of Commissioning
1.	**Pare**	ROR	Ar. P	NEEPCO	110	**110**	2012-13
2.	**Demwe Lower**	ROR	Ar. P	Athena Demwe	1630	**1630**	2016-17
3.	**Dibbin**	ROR	Ar. P	KSK Dibbin Hydro Power Pvt. Ltd.	120	**120**	2014-15
4.	**Siang Lower**	STO	Ar. P	Jaiprakash Associates Ltd.	2700	**1200**	2015-16 & 2017-18
5.	**Loktak D/S**	ROR	Manipur	NHPC	66	**66**	2016-17
6.	**Nyamjunchhu St-I**	ROR	Ar. P	Bhilwara Energy Ltd	98	**98**	2014-15
7.	**Nyamjunchhu St-II**	ROR	Ar. P	Bhilwara Energy Ltd	97	**97**	2014-15
8.	**Nyamjunchhu St-III**	ROR	Ar. P	Bhilwara Energy Ltd	95	**95**	2014-15
9.	**Tawang-I**	ROR	Ar. P	NHPC	750	**750**	2017-18
10.	**Tawang-II**	ROR	Ar. P	NHPC	750	**750**	2017-18
11.	**Londa(Talong)**	ROR	Ar. P	GMR Energy Ltd.	160	**160**	2014-15
12.	**Nafra**		Ar. P	SEW	96	**96**	2015-16
13.	**Tato-II**	ROR	Ar. P	Reliance Enegy Ltd.	700	**700**	2016-17
14.	**Lower Kopili**	ROR	Assam	Assam GENCO	150	**150**	2014-15
15.	**Dardu**	ROR	Ar. P	KVK	60	**60**	2013-14
16.	**Mago Chhu**	ROR	Ar. P	SEW	96	**96**	2016-17
17.	**Par**	ROR	Ar. P	KVK	55	**55**	2013-14
18.	**Rego**	ROR	Ar. P	TUFF Energy	70	**70**	2016-17
19.	**Saskang Rong**	ROR	Ar. P	Patel Engineering	30	**30**	2015-16
20.	**Dinchang**	ROR	Ar. P	KSK	90	**90**	2015-16
21.	**Nyukcha Rong Chhu**	ROR	Ar. P	SEW	96	**96**	2015-16
				TOTAL	8019	**6519**	

ANNEXURE -12A
(Item No.12.2)

TOURS / TRAININGS ABROAD OF CEA OFFICERS DURING THE YEAR 2009-10

(1/3)

S.No.	Name (S/Shri)	Designation	Name of the Programme	Venue	Duration
1.	V. Ramakrishna	Member (PS)	To attend 5th Meeting of SAARC Working Group on Energy	Bhutan	27.04.2009 to 01.05.2009
2.	Gurdial Singh	Member (Hydro)	To attend meetings of Empowered Joint Group for Hydro Projects and Punatsangchhu Hydro-Electric Project Authority (PHPA)	Bhutan	22.08.2009 to 23.8.2009
3.	Gurdial Singh	Member (Hydro)	Sankosh HE Project	Bhutan	09.01.2010 to 11.01.2010
4.	Ms. Sangeeta Verma	Economic Adviser	Participated in the IEA/OECD Meeting	Paris	28.04.2009 to 29.04.2009
5.	P.S. Aggarwal	CE (HE&RM)	Witnessing the model test of Pelton Runner of Loharinag Pala HE Project (4x150MW)	Heidenheim, Germany	11.05.2009 to 16.06.2009
6.	A.K. Gupta	CE(TRM)	Workshop on "Renovating Asia's Coal Fired Power Plant to Improve Efficiency"	Manila (Philippines)	15.05.2009
7.	Y.P. Taneja	CE (HE&TD)	To participate in pre-bid meeting, disucussions for Contract Package MEM-I including site visit for Punatsangchhu Hydro-Electric Project Stage-I	Bhutan	18.08.2009 to 23.08.2009
8.	Tanmoy Das	CE (HP&I)	To attend meetings of Empowered Joint Group for Hydro Projects and Punatsangchhu Hydro-Electric Project Authority (PHPA)	Bhutan	21.08.2009 to 24.08.2009
9.	Amarjeet Singh	CE (C&E)	Major Economic Forum (MEF) High Efficiency and Low Emission Coal Technology	Japan	15.09.2009
10.	A.S. Bakshi	CE (IRP)	Study tour to Power plants and manufacturing units for Energy Efficiency R&M Programme under USAID ECO-Asia Clean Development Climate Programme	Germany, Czech and Poland	23.09.2009 to 01.10.2009
11.	Ms. Padmaja Mehta	Economic Adviser	Mid-career training course		04.01.2010 to 12.02.2010
12.	Tanmoy Das	CE (HP&I)	Sankosh HE Project	Bhutan	09.01.2010 to 11.01.2010
13.	J.S. Bawa	Director (HP&I)	3rd Meeting of Joint Expert Level Mechanism (ELM) for Indo-China Co-operation on Water Resources	Beijing, China	21.04.2009 to 24.04.2009
14.	R.K. Verma	Director (DP&D)	Asia Pacific Partnership(APP) on"Clean Development and Climate"-Distribution and demand side management programme	USA	27.04.2009 to 02.05.2009

(2/3)

S.No.	Name (S/Shri)	Designation	Name of the Programme	Venue	Duration
15.	S.Biswas	Director (DLMF)	Asia Pacific Partnership(APP) on"Clean Development and Climate"-Distribution and demand side management programme Climate"	USA	27.04.2009 to 02.05.2009
16.	Mrs. Anjuli Chandra	Director (HRD)	Asia Pacific Partnership(APP) on"Clean Development and Climate"-Distribution and demand side management programme Climate"	USA	27.04.2009 to 02.05.2009
17.	S.Mandilwar	Director (IRP)	Indo-Germany Energy Programme (IGEN) for study cum familiarization tour and interchange of best practices with power plant operators under IGEN.	Germany,	03.05.2009 to 16.05.2009
18.	P.K. Pahwa	Director (SP&PA)	Presentation of DPR of Punatsangchhu-II Project and review of earlier comprehensive planning transmission system with RGoB	Bhutan	08.05.2009 to 13.05.2009
19.	Moti Lal	Director (HE&TD)	Preparation of detailed Project Report (DPR) for Punatsangchhu HE Project Stage-II (6x165MW)	Bhutan	08.05.2009 to 13.05.2009
20.	P.C. Kureel	Director (HETD)	To participate in pre-bid meeting, discussions for Contract Package MEM-I including site visit for Punatsangchhu Hydro-Electric Project Stage-I	Bhutan	18.08.2009 to 23.08.2009
21.	Sanjay Srivastava	Director (HETD)	To participate in pre-bid meeting, discussions for Contract Package MEM-I including site visit for Punatsangchhu Hydro-Electric Project Stage-I	Bhutan	18.08.2009 to 23.08.2009
22.	Bhai Lal	Director (TPM)	Study tour to Power plants and manufacturing units for Energy Efficiency R&M Programme under USAID ECO-Asia Clean Development Climate Programme	Germany, Czech and Poland	23.09.2009 to 01.10.2009
23.	R. Saha	Director (SP&PA)	Sankosh HE Project	Bhutan	09.01.2010 to 11.01.2010
24.	Anis Ahmad	Dy. Director (TRM)	Indo-Germany Energy Programme (IGEN) for study cum familiarization tour and interchange of best practices with power plant operators under IGEN	Germany	03.05.2009 to 16.05.2009
25.	S.Rawat	Dy. Director (C&E)	Visited under IGEN Programme	Germany	14.06.2009 to 27.06.2009
26.	N.K. Gupta	Dy.Director (HE&RM)	Inspection of Run Out Test of turbine shaft for Myntdu (Leshka) HE Project Stage-I Extension (1x42MW)	Italy	03.09.2009 to 04.09.2009

(3/3)

S.No.	Name (S/Shri)	Designation	Name of the Programme	Venue	Duration
27.	K.B. Jagtap	Dy. Director (GM)	Indo-Germany Energy Programme (IGEN) for study cum familiarization tour and interchange of best practices with power plant operators under IGEN	Germany	06.09.2009 to 19.09.2009
28.	Ishan Sharan	Dy.Director(IRP)	Indo-Germany Energy Programme (IGEN) for study cum familiarization tour and interchange of best practices with power plant operators under IGEN	Germany	06.09.2009 to 19.09.2009
29.	Ishan Sharan	Dy.Director	Course on "Chevening Fellowship for Climate Change and Energy for the year 2009-10.	University of Birmimngham, U.K.	11.01.2010 to 01.04.2010
30.	Sovaran Singh	Asstt. Director-I (DLMF)	Indo-Germany Energy Programme (IGEN) for study cum familiarization tour and interchange of best practices with power plant operators under IGEN	Germany	14.06.2009 to 27.06.2009
31.	Sunit Kumar Gupta	Asstt. Director-II (TETD)	Indo-Germany Energy Programme (IGEN) for study cum familiarization tour and interchange of best practices with power plant operators under IGEN	Germany	14.06.2009 to 27.06.2009
32.	R.K. Mittal	Asstt. Director-II (TPI)	Indo-Germany Energy Programme (IGEN) for study cum familiarization tour and interchange of best practices with power plant operators under IGEN	Germany	06.09.2009 to 19.09.2009