



ANNUAL REPORT 2012-13



**GOVERNMENT OF INDIA
CENTRAL ELECTRICITY AUTHORITY
MINISTRY OF POWER**



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MINISTRY OF POWER
CENTRAL ELECTRICITY AUTHORITY
JULY 2013**

CENTRAL ELECTRICITY AUTHORITY

Sewa Bhawan, R.K. Puram

New Delhi – 110066

CEA Website: www.ce.nic.in

Sub ordinate Offices:

Regional Power Committees:

1. Member Secretary, Northern Regional Power Committee, 18-A, Shaheed Jeet Singh Marg, 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, Meghalaya State Housing Finance Co-operative Society Ltd. Building Nongrim Hills, Shillong – 793003.

Regional Power Survey Offices:

1. Dy. Director, Regional Power Survey Office (North), 2nd Floor, Sewa Bhawan, R.K. Puram, New Delhi – 110066.
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), Post 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 Jeet 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), Block-IV, Floor-III, Shastri Bhawan, Chennai – 600006.
5. Superintending Engineer, Regional Inspectorial Organisation (North-East), Meghalaya State Housing Finance Co-operative Society Ltd. Building, Nongrim Hills, Shillong – 793003.

THE AUTHORITY



Sh. A.S. Bakshi
Chairperson & Member (Planning)



Dr. Jai Pal Singh
Member (E & C)



Sh. Ravinder
Member (PS)



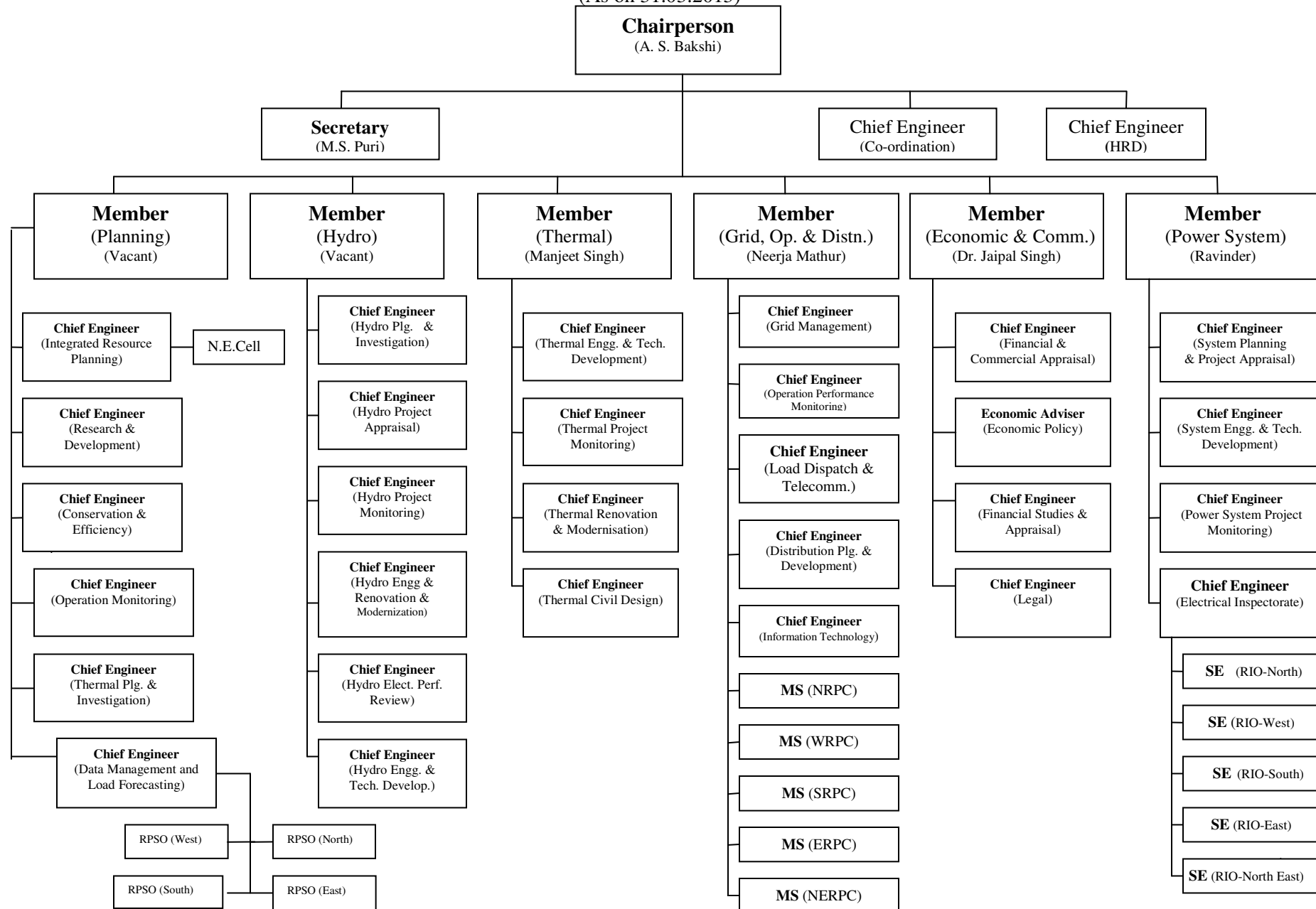
Sh. Manjit Singh
Member (Thermal)



Mrs. Neerja Mathur
Member (GO&D)

Organisation Chart of CEA

(As on 31.03.2013)



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From the Chairperson



The Power Sector in India has been registering quantum jump in addition of power generation capacity during 2012-13, we achieved a capacity addition of 23,467 MW, as against 20,502 MW in the previous year. The gross power generation by various utilities being 912 Billion kWh as against the previous year power generation of 877 Billion kWh.

As in the previous year the generation capacity addition has been mostly in respect of Thermal Projects. The capacity addition of 23,467 MW during the year comprised 19,928 MW Thermal, 501 MW Hydro and 3,038 MW Renewable Energy Sources thus raising the Installed Capacity of the country as on 31.03.2012 to 2, 23,344 MW.

Although thrust is being accorded to maximize generation from other conventional and non-conventional sources, coal based generation will continue to be the main stay of electricity generation as gas availability is not all that encouraging for new capacity. Coal based generation is likely to fuel and support the targeted GDP growth envisaged by the Government in years to come.

Central Electricity Authority (CEA) plays a pivotal role in optimal utilisation of available coal for the power sector. It also rationalise transportation of coal through Rail transport network. In addition to management of coal supply/ movement, CEA rationalises the Gas supply to Gas based power stations in a gas scarce scenario. In order to meet the coal requirement of increasing capacity addition, domestic coal availability/ supply has become a big challenge for all stake- holders. For the year 2012-13, CEA estimated a coal requirement of 500 Million Tonne (MT). Out of this, requirement of domestic coal was estimated as 476 MT. Against this requirement; the availability of domestic coal was ascertained around 407 MT. During the year 2012-13, against a import target of 46 MT coal, the power utilities had imported around 31.6 Million Tonne of coal. In addition to above 31.7 MT coal was imported by thermal power stations designed on imported coal. The production and supply of gas have not been keeping pace with the growing demand of gas in the country including power sector. Even the gas allocations committed for power stations were not fulfilled. Supply of gas to gas based power plants has been 40 MMSCMD as against requirement of about 90.7 MMSCMD.

Mundra UMPP one of the four UMPPs of 4000 MW capacity each awarded to private sector companies through tariff based competitive bidding has been fully commissioned with an installed capacity of 5 units of 800 MW each. One unit of 660 MW at another UMPP namely sasan was also synchronized during the year. Many more Ultra Mega Power Plants are proposed to be taken up in future. CEA has been playing a proactive role in development of UMPP's in respect of selection of sites, preparation of technical documents/ studies, tie-up of inputs and the bidding process.

One of the functions of CEA is to give concurrence to hydro projects. During the years 2012-13, CEA had appraised and accorded concurrence to 6 hydro generation schemes aggregating to 2516 MW capacity with an estimated financial cost of Rs. 16,687 crores.

Besides, the statutory obligations, CEA rendered engineering and consultancy to the utilities in India and in neighboring countries. During the year 2012-13, CEA rendered design and engineering of 3380 MW approx. of Hydro Projects including projects of NTPC, Meghalaya SEB, SJVNL as well as Punatsangchhu Stg. I of 6x200MW and Stg. II of 6x170 MW in Bhutan and review consultancy for Salma project (3x14 MW) in Afghanistan.

CEA is actively involved in planning and development of transmission system in the country, which includes evolving long term and short term Transmission Plans. At present, except southern region all the four regions are inter-connected in synchronous mode and are operating in parallel. With the addition of 2000 MW capacity through 765 kV operation of the Agra – Gwalior 2 x S/C line that were earlier operating at 400 kV, total transmission capacity of inter-regional transmission system as on 31.03.2013 increased to 29750 MW.

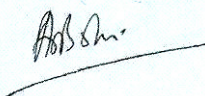
Based on the recommendations of CEA, Ministry of Power on 25.03.2013 established the National Power Committee under the Chairperson, CEA to discuss and resolve issues referred to NPC requiring consultation among one or more RPCs, concerning inter-alia inter-regional implication or any other issue affecting more than one region or all regions. Two Grid disturbances took place in the country on 30th & 31st July, 2012 which resulted into collapse of the Northern Regional Grid on 30th July, 2012 and Northern, Eastern and North-Eastern Regions on subsequent day. Ministry of Power constituted an Enquiry Committee under chairmanship of Chairperson, CEA to investigate the reasons which led to the above grid disturbances and to suggest remedial measures to prevent recurrence of such event in future. Enquiry Committee submitted its report on 16th August, 2012 containing several recommendations to prevent the future recurrence. Actions already initiated for implementation of recommendations of the Committee.

The applications/requests being received under Right to Information Act, are being dealt promptly by the CPIO, the Public Information Officers, Assistant Public Information Officers and the Appellate Authority already notified for all the offices at Headquarter and Sub-ordinate offices. During the year 2012-13, 240 requests /applications under Right to Information Act were received and all have been disposed off. Further, 14 applicants made Appeal to the Appellate Authority, CEA which have also been decided.

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 around 86%. This year, Hindi correspondence percentage in Region “A” is 81.18, in Region “B” is 72.84 and in Region “C” 51.99 respectively. In CEA, all officers and employees are trained in Hindi Language and all typists are trained in Hindi Typing. In CEA Hindi Fortnight was organized from 14.09.2012 to 29.09.2012 and prize distribution ceremony was held on 15.10.2012. An inspection of the office by the Parliamentary Committee on OL was done on 12.11.2012 in which the members of the Committee appreciated the efforts of CEA in propagation of Hindi and gave valuable suggestions for achieving the targets laid down by the Deptt. of Official Language.

The officers/officials were deputed for various service refresher training programmes, technical courses, workshops, seminars, conferences etc. The programmes organized are for enhancing the technical, financial, managerial and interpersonal skills. Six (6) training institutes /centers were visited and accorded recognition/renewal of recognition during the year 2012-13.

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 especially the officers and 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.



(A.S. Bakshi)
Chairperson, CEA

Date: July, 2013

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 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) 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-sec. (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 section 55;
 - 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 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 31.03.2013 was 844 against sanctioned strength of 1622 leaving 778 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	365	123	488	204	64	268
CPES GROUP-B	-	-	-	-	-	-
Non CPES Group						
Group-A	55	-	55	33	-	33
Group-B	469	62	531	229	23	252
Group-C	266	77	343	87	43	130
Group-D	142	63	205	115	46	161
Total	1297	325	1622	668	176	844

For filling up the 268 vacant posts in CPES Group – A, CEA has requested UPSC

- To recommend candidates through Engineering service Exam – 2013 for filling up of 109 posts of AD Gr.II in CEA.
- to recommend candidates through ESE-2012 & 2013 to fill Up 54 posts of AD Gr.-I in CEA

- Moreover, CEA has hired 21 retired (CEA employees) technical as well as non technical as consultant to cope-up with the shortage of staff.

1.4.1 Representation of women in CEA

CEA had a total of 154 women employees as on 31.03.2013. 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	488	268	19	7.09
CPES GROUP-B	-	-	-	-
Non CPES Group				
Group-A	55	33	5	15.15
Group-B	531	252	86	34.12
Group-C	343	130	31	23.85
Group-D	205	161	13	8.07
Total	1622	844	154	18.24

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 31.03.2013 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 Phy. H. Govt. employees in position
	Sanctioned	Filled				
CPES GROUP-A	488	268	41	12	09	-
CPES GROUP-B	-	-	-	-	-	-
Non CPES Group						
Group-A	55	33	-	-	-	-
Group-B	531	252	31	7	1	4
Group-C	343	130	24	7	4	0
Group-D	205	161	57	3	5	0
Total	1622	844	153	29	19	4

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. A.S. Bakshi., Chairperson (w.e.f. 29.02.2012)	Nuclear Power Corp. Ltd.	Director
2.	Sh. A.S. Bakshi., Chairperson (w.e.f. 03.01.2012)	N.H.P.C.	Director
3.	Sh. M.S. Puri, Chief Engineer (w.e.f. 17.01.2012)	Haryana Power Generation Corpn. Ltd. (HPGCL)	Director
4.	Sh. A.K.Rampal, Chief Engineer (w.e.f. 31.12.2011)	Haryana Vidyut Prasaran Nigam. Ltd. (HVPNL)	Director

1.6 Annual Budget

During the year 2012-13, against an allocation of `19.08 Crores (reduced to `6.53 Crores in the RE 2012-13) under Plan head,

an expenditure of `5.36 Crores has been booked upto 31-03-2013. An expenditure of `4.10 Crores was booked under Plan head during 2011-12.

On the Non-Plan side, during the year 2012-13 an expenditure of `66.59 Crores was incurred against an allocation of `78.80 Crores (`77.62 Crores after imposing 10% mandatory cut by Ministry of Finance), whereas during the year 2011-12, an expenditure of `67.18 Crores was incurred.

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 2012-13, CEA rendered consultancy services worth 3.20 Crores and an amount of 3.27 Crores was recovered during the year (upto 31-03-2013).

RPCs received revenue of 9.96 Crores from their constituents during the year 2012-13.

1.7 Progressive use of Hindi in Official Work of CEA

In CEA this year Hindi correspondence percentage remained around 86%. This year Hindi correspondence percentage in region "A" is 81.18%, in region "B" 72.84% and in region "C" 51.99 respectively.

In CEA the OLIC meetings are held regularly and in regular intervals under the Chairmanship of Chairperson, CEA. Prompt action is 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 field is discussed and action is taken accordingly.

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 have been awarded to those 8 Divisions/Sections where maximum correspondence is made in Hindi with Regions "A" & "B". Apart from above, CEA is running 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 – First Prize – Rs. 60,000/-, Second Prize – Rs. 40,000/- Third Prize – Rs. 25,000/- and one consolation prize of Rs. 10,000/- only. Altogether Rs. 1, 35,000/- has been earmarked for this scheme.

Internal OL inspections of various sections are done by the Hindi officers from time to time so that the shortcomings, if any can be reviewed. An inspection of the office by the Parliamentary Committee on OL was done on 12.11.2012 in which the members of the Committee appreciated the efforts of CEA in propagation of Hindi and gave valuable suggestions for achieving the targets laid down by the Deptt. of Official Language.

Hindi Books are regularly purchased for library of CEA as per the targets laid down by the Official Language Department, E-Books are also purchased as per the directions of the Department of Official Language.

During the year, four Hindi workshops were also organized in which about 200 employees participated. A Unicode based one day computer training programme was also organized on 7.2.2013 in which 20 CEA officials participated.

Now in CEA all Officers and employees are trained in Hindi Language and newly recruited officers/employees are being trained in Hindi Language Courses /Shorthand /Typing classes organized by CHD, Department of OL from time to time.

In CEA Hindi Fortnight was organized from 14.09.2012 to 29.09.2012 and prize distribution ceremony was held on 15.10.2012. During the Fortnight four competitions were held namely General Essay, Noting Drafting, G.K. Test and Hindi dictation competition only for MTS officials in which most of the officers and employees had participated. The winners of these competitions were given the cash award.

Chairperson, CEA distributed the Prizes and appreciation letter to the winners and the function concluded with cultural programme.

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 provisions of Rules. The representation of physically challenged employees in all categories of CEA is given at below:-

Group	Total employees as on 31.03.2013	Physically Challenged Employees				Percentage of Physically Challenged
		VH	HH	OH	Total	
Group A	301	-	1	-	1	0.33
Group B	252	-	-	4	4	1.58
Group C	130	-	-	-	-	-
Group D	161	-	-	-	-	-
Total	844	-	1	4	5	0.59

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 are 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.

1.8.3 Associations /Unions in CEA

The Drawing Staff Associations- Recognized for three years under CCS (RSA) Rules, 1993.

1.8.4 Pension Cases

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

203 (approx.) pension revision cases were settled subsequent to revision of

Pay /Pay Scale due to 6th Pay Commission. In addition, 45 regular superannuation cases, 5 VRS cases, and 3 death cases have been settled during the year 2012-13 and necessary payment of retirement benefits have been released.

1.8.4.2 Transfer of Capitalized Value of Pensionary Benefits

25 cases of Capitalised Value/1/3 restoration of Pension were settled.

1.8.4.3 Pro-rata pension (CAT /Court Cases).

3 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.

3 representations for grant of pro-rata and other pensionary benefits to ex-employees are under process. Out of these one case dismissed in default due to non-appearing of the applicant/advocate, one case is under process in Ministry of Power to consider the claim of the applicant for finding him eligible for pro-rata pensionary benefits and one case where Judgement was passed has been settled and payment released as directed by Hon"ble CAT and case sent to PAO, CEA for release of payment/PPO.

1.9 Vigilance Activities /Disciplinary Cases in CEA

The Vigilance Division, CEA is headed by Chief Vigilance Officer (CVO) and is nodal point in Vigilance set up of Authority and its Subordinate Offices. The Division 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.

As part of preventive vigilance, the Vigilance Division facilitates in 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 2012 was observed in Central Electricity Authority and its Subordinate offices from 29th October to 3rd November, 2012. The Vigilance Awareness Week was celebrated to highlight the theme "Transparency in Public Procurement".

Complaints other than anonymous/pseudonymous were taken up for investigation promptly and after completion of investigations, reports submitted to the prescribed authority. As on 01.04.2012 one case of disciplinary action was pending under CEA's disciplinary jurisdiction. One case was added during the period. Out of them one case has been finalized. Thus at present (as on 31.3.2013) one case is pending finalization. Prescribed periodical Returns were sent to the Ministry of Power in time.

1.9 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 are also available on sale for general public.

During the year 2012-13 the following publications have been brought out:

1. Tariff & Duty and Average Rates of Electricity Supply in India – March, 2011.
2. Review of Performance of Hydro Power Stations 2010-11.

3. General Review 2012 and Growth of Electricity 1947-2012.
4. Review of Performance of Thermal Power Stations 2010-11.
5. 18th Electricity Power Survey of India.
6. Report on Minimisation of Water Requirement in Coal Based Thermal Power Stations.
7. General Guidelines for 765/400/220/132 kV Sub-Station and Switch yard of Thermal / Hydro Power Projects.
8. Annual Report for the Year 2011-12 (English Version).

1.10 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 Bhim Rai, Chief Engineer (Electrical Inspectorate) is functioning as Director (Grievances). 11 Nos. of grievance cases were received in the financial year 2012-13 and out of which 6 cases have been settled.

1.11 Right to Information Act, 2005

Under the Right to Information Act, Chief Engineer (Coordination) also acts as Nodal Officer for RTI matters relating to power sector. During the year 2012-13, 240 requests/ applications were received under the Act which has been disposed off. Further 14 applicants filed the appeal to the appellate authority, CEA which have also been decided.

1.12.1 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, Chief Engineer (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.

1.13 Parliament Questions, Parliament Assurances, VIP references

Work relating to answering of Parliament Questions, Parliamentary Assurance, VIP reference and compilation and updating material for Consultative Committee and Standing Committee on Energy, compilation and processing of material for presentations such as power sector reform and Pvt. Sector participation including action taken reports, notes for Estimates Committee and Ministers meeting on power scenario etc. were 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

Material 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/Standing 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 2012-13 there were four Parliament Sessions and dealt with the Admitted version of Questions as follows:

S. No.	Particulars	Starred Question	Unstarred Question
1.	Budget Session 2012-13	37	273
2.	Monsoon 2012-13	25	202
3.	Winter Session 2012-13	22	228
4.	Budget Session 2013-14	15	132

- (B) During the year following references were dealt:

- (a) No. of Consultative Committees 6
 (b) No. of Standing Committees 15
 (c) VIP / PMO references 82
 (d) Calling Attention mention, 14
 No day yet named motion etc.
 (e) Assurances 21

1.14 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
- 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 Region are brought out for overall review of the power situation in the country.

1.14.1 Material on various issues prepared & sent to Ministry of Power.

1. Material for Economic Survey 2012-13
2. Annual Report 2012--13
3. Major Achievements in Power Sector
4. Integrated Energy Policy
5. Estimates Committee
6. Monitorable targets for the year 2012-13 and their Achievements.
7. Power Ministers' Conference
8. Material for various speeches for use by MOS (Power).
9. International Cooperation
10. Quarterly Review of Infrastructure Sector for the year 2012-13.

1.15 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 has been interconnected through wired as well as wireless LAN. The important statistics/data/information of CEA is up-linked on the bilingual website of Central Electricity Authority (www.cea.nic.in) for global access. The bilingual (English & Hindi) cum WCAG (Web Content Accessibility Guidelines) 2.0 compliant 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. An ISO 27001:2005 certified Data Center for collecting and scrutinizing online data from various power sector utilities /organizations has been set up at Sewa Bhawan building.

IT Division has developed and made available intranet facility for all the officers and officials of CEA at head quarters for the purpose of viewing reports like biometric attendance reports, circulars etc.

All the Divisions and Sections of CEA have been equipped with IT facilities i.e. Computers, Printers, UPS, Internet facility etc. All the Computers at CEA office, Sewa Bhawan and West Block-II are interconnected through 34Mbps RF link using wired as well as wireless LAN. The important statistics /data /information of CEA is uploaded on the bilingual (English & Hindi) website of Central Electricity Authority (www.cea.nic.in) for global access. The WCAG (Web Content Accessibility Guidelines) 2.0 compliant

website has been designed, developed and maintained in-house by IT Division, CEA. Lotus Notes has been provided for internal/external mailing facilities. An ISO 27001:2005 certified Data Center, which consists of 14 Rack Servers, for collecting and scrutinizing online data from various power sector utilities /organizations has been set up at Sewa Bhawan building.

IT Division has developed and made available intranet facility for all the officers and officials of CEA at head quarters for the purpose of viewing reports generated by various divisions in addition to Biometric Attendance Reports, Circulars, Office Orders etc.

1.15.1 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.
- DAS servers (3 Nos.)
- Workstations (5 Nos.)
- 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.
- One Server for BBAMS (Biometric Based Attendance Management System)

The hardware facilities consist of 14 Rack Servers, Router, Firewall, Core-Switch etc. and various office automation equipments like Multifunctional Printers, Plotters, Workstations, etc.

1.15.2 Software facilities

The following system and application software 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
- Apache webserver
- MySQL database
- SQL Server
- SUSE Linux Operating System

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 5/6/8)
- Graphic Packages – (AutoCAD, Civil 3D 2011)
- 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.
- Vigilance Management System (developed in-house)
- CompDDO package for payroll management.

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).
- Caesar 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 2009 with 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.

System Software like Red Hat Linux, Oracle, Windows Server, Web-Sphere, Proxy Server Software, Tivoli Storage Manager are being used for maintaining the Data-Center and Internet connectivity in CEA.

Application Software like MS Office, Information Management System (IMS), Office (Inventory/Complaint /Bill) Management Software, CompDDO, BBAMS Software, Vigilance Management Software is available to facilitate daily official works in CEA.

Apart from these, there are a few Scientific Application Software like AutoCAD, STAAD. Pro, i-Tower, Power System Analysis Package (PSAP), Integrated System Planning Model (ISPLAN) etc.

1.15.3 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 made use for internet communications, data transfer between CEA and MoP, budgetary allocation and monitoring and sanction /grant of loans /advances to CEA personnel.

1.15.4 Up-gradation of I.T. facilities in CEA

Government 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. The scheme envisages providing 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 to database. To achieve the above, the 14 Nos. of servers of various types along with firewall and intrusion detection system has been installed at Data Centre in Sewa Bhawan office.

This setup facilitates in (a) a centralized and online database for analyzing the data of Indian power sector (b) project monitoring (c) interlinking various database 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, commissioning of servers, system software & LAN and development of application software has already been completed. Entry of daily generation data into IMS application 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 headquarter. Similar training sessions were arranged for RPCs, RIOs, TRANSCOs and DISOMs 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.

The study by the consultant to recommend further up-gradation of IT facilities in CEA in Phase-II has also been

initiated with the approval of Ministry of Power 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.

The Information Management System (IMS), currently implemented in CEA in 2011, provides for internet connectivity at all the Desktop Computers through Wired Line as well as Wireless Network. The Data related to Power Sector are being collected from the utilities online through CEA website. These Data are stored in a centralized Database Server for analyzing, monitoring and reporting purposes.

To upgrade the existing IMS and IT facilities in CEA, IMS Phase-II was proposed and a consultant was hired for the same. The major works to be done under IMS Phase-II as highlighted in the Report of the Consultant are Upgradation of IT Infrastructures (like upgradation in Desktop Computers, Multifunctional Printers, Operating Systems etc.), Construction of Data Recovery Site and implementation of Business Intelligence (BI). The approval of the Scheme is under process.

1.15.4.1 Other works

A committee was constituted by MoP/CEA for preparing guidelines on clearance from security angle when Power Sector equipment is procured from overseas. The task of preparing list of critical equipment and electronic products, sensitive from security point of view, used in Indian Power Sector had also been assigned to the Committee. Chief Engineer (IT) had been Member /Convener of these Committees. The proceedings of the Committee have been coordinated by IT Division, CEA. The report of the Committee has been submitted to MoP

1.16 ISO 9001:2008 Quality Management System Certification (QMS)

In order to improve quality of services rendered and competency of the personnel of CEA, the Quality Management System (QMS) as per ISO 9001:2000 was adopted by CEA in February-March 2004 which was subsequently renewed in 2007 and 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 respectively. Latest renewal audit was conducted by BIS from 12.03.2013 to 26.04.2013.

The renewal of Quality Certificate under ISO is in the process of issuance.

1.17 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	23.04.2012	Project Review Committee (PRC) for review of Scheme of 'Computerisation of Power & Telecommunication Co-ordination Committee (PTCC) Process' Scheme
2	26.04.2012	"Group to examine Replacement of old Gas Turbine Stations with New Gas Turbine Stations"
3	30.04.2012	Negotiation Committee for deciding on the methodology as well as charges payable to M/s Vayamtech regarding changes /new developments (Major changes) to be carried out by them as per the requirements of different Divisions of CEA
4	23.05.2012	Committee to examine the issue of amendment in the CEA Regulation to replace dry type transformer for indoor use by dry type / K-Class fluid transformer
5	29.05.2012	Committee to prepare the Guidelines mandating clearance from "security angle" wherever sensitive equipment is procured overseas
6	30.05.2012	Committee to resolve the issues of payment to EPIS by CEA
7	19.07.2012	Constitution of a Committee to look into the issues regarding Quality of coal, GCV etc.
8	20.07.2012	Committee to define the hybrid energy sources
9	26 .07.2012	Task Force Regarding Peaking Power Plants and Creation of Adequate System Reserves
10	31.07.2012	Committee to standardize specifications and terms & conditions of imported Coal
11	22.08.2012	Standing Committee to shortlist candidates for the post of Consultant in PPMP
12	23.08.2012	Steering Committee to facilitate the consultancy project for the Review of Institutional Capacity and Implementation of Capacity Strengthening Interventions at CEA
13	07.09.2012	Standing committee to look in to issue to streamline the transportation of heavy equipment to power plant site
14	29.11.2012	Committee to look in to issue to streamline the implementation of IMS phase-I in CEA
15	28 .03.2013	Task Force for "Pilot Project on testing of Primary Frequency Response from Generating Unit under Free Governor Mode Operation (FGMO) of Thermal Units

CHAPTER – 2

PLANNING FOR POWER DEVELOPMENT

2. Power Planning

Council on Power Sector, under the Chairmanship of Secretary, MoP.

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 National Electricity Plan.
- ii) An agreement was signed between CEA & DERC for rendering consultancy to DERC in respect of preparation of most optimal sourcing plan for Delhi. The draft report prepared in CEA was submitted to DERC in February 2013.

(b) Ms. Neerja Mathur, Chief Engineer(IRP) has been nominated as Member Secretary to the working Group on Integrated strategy for bulk transport of energy and related commodities of National Transport Development Policy Committee.

(c) Shri Ramesh Kumar, Chief Engineer (I/C) (IRP) has represented Ministry of Power on Thematic area of energy Security in Bhutan Climate Summit.

2.1.2 Reports brought out

- a) National Electricity Plan covering review of 11th Plan & 12th Plan in detail and perspective 13th Plan has been prepared approved by Central Govt. The plan is in process of Gazette Notification.

(d) Chief Engineer (IRP) has been nominated as Secretary to the Advisory Group of MoP under the chairmanship of Hon'ble Minister of State for Power(Independent Charge)

(e) Chief Engineer (IRP) has represented CEA in the Task force on peaking and reserve power requirement under the chairmanship of Chairman, CEA.

2.1.3 Capacity addition during 2012-13

Record capacity addition was achieved during the year 2012-13. Against a capacity addition target of 17,956.3 MW, capacity addition achieved was 20,622.8 MW during 2012-13.

(f) Shri Ramesh Kumar, Chief Engineer (I/c), IRP has been nominated in the Sub-committee to examine Application for allocation of Coal Blocks to Government Companies /Corporations under 'Auction by Competitive Bidding of Coal Mines Rule, 2012'

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

- (a) Ms. Neerja Mathur, Chief Engineer(IRP) has been nominated as Member Secretary for the Sectoral Innovation

(g) Shri V.K.Singh, Director (IRP), CEA has been nominated as Member of the Sub-Group for "National gas Pipeline-Gas Vision 2030" to represent Ministry of Power.

2.2 Electricity Demand

Under existing system, electricity demand of the country is projected periodically, normally once in five years, for short and long time frames. 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 DMLF Division CEA by obtaining inputs from four Nos. Regional Power Survey offices which coordinate with various organization/utilities. The electricity demand forecast is 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 centers to load centers. 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 18th Electric Power Survey Committee (EPSC) and published in December, 2011. The report was finalized in December, 2011 and printed in January, 2013.

2.3 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’.

2.3.1 All India Electricity Statistics – General Review

In General Review-2012 Nation wide electricity statistics relating to Generation, Transmission, Distribution, Consumption and Trading are included along with important information relating to growth of the Indian Electricity Sector, organizational structure of Electricity Supply Industry in India and reforms carried out by Utilities are incorporated. The General Review incorporates important statistics/data on installed capacity, electric energy generation and utilization of electric energy along with the transmission and distribution losses, per capita consumption. 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. The various Chapters /Tables of the publication indicates the above information State-wise /Sector-wise /Category-wise /Mode-wise etc. In addition, the information on captive generation by about 3800 Nos. HV /EHV industries is also compiled indicating installed generating capacity and generation

by such captive plants. General Review – 2012 containing data for the year 2010-12 was prepared.

2.3.2 Growth of Electricity Sector in India

A Publication titled “Growth of Electricity Sector in India from 1947-2012” was prepared in June, 2012 containing data for 2010-11 and provisional/estimated data for 2011-12 in respect of Indian Electricity Sector. The data for these publications has been sourced from various Utilities and Non-utilities and various National & International sources.

This publication illustrates the growth of vital development indicators like installed generating capacity, electrical energy production, transmission and distribution network, captive power plants in industries 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 publication contains charts indicating state of basin wise and region wise Hydro Electric Potential development in the country. The booklet contains maps and charts presenting a panoramic view of the growth of Indian Electricity Sector.

2.4 Standing Committee on Derating, Up-rating and Retirement of Installed Capacity of Stations

A Standing Committee is constituted under the chairmanship of Member (Planning) for considering the proposals of de-rating, up-rating & retirement of electricity generating units.

The Committee considers the performance of the units, analyses the

performance data and the overall generation throughout the life of the plant/unit and carries out detailed scrutiny of technical parameters of proposed units. Keeping in view the technical merits of the proposals received from various generating companies the committee makes recommendations for the approval of the Chairperson/Authority for deration, upration or retirement of the units. During the year 2012-13 various proposals of deration, retirement of the generating units were considered by committee and recommendations for retirement of 6 Nos. thermal generating units with aggregate capacity of 466.5 MW were recommended for retirement.

2.5 Implementation of initiative of Working Group III on National Mission on Enhance 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). Working Group –III under NMEEE had interalia recommended retirement of old and inefficient Thermal Units. As a follow up of the recommendations of working group –III of NMEEE regarding retirement of old and inefficient thermal generating units, CEA has undertaken an exercise of identification of thermal units for phased retirement during 11th & 12th Plan period. The installed capacity so identified is 5000 MW (approx.) out of this an aggregate capacity of 3076 MW has been identified for retirement and 30+3 during 11th Plan a total of 2398MW has been approved for retirement during 11th plan .

The list of thermal generating units considered by the standing committee during 2012-13 (1st year of the 12th Plan) is given below:

Sl. No.	Name of the Station & unit nos.	Installed capacity (MW)	Utility/Agency
1.	DPL Unit No.1	30	DPL/West Bengal
2.	DPL Unit No.2	30	DPL/West Bengal
3.	OBRA TPS Unit No -6	94	UPRVNL
4.	NASIK TPS Unit No.1	125	MAHAGENCO
5.	NASIK TPS Unit No.2	125	MAHAGENCO
6.	SATPURA TPS Unit No .3	62.5	MPPGCL

2.6 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. 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 had 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 DM audit and other provisions as per amendments in DM Act and guidelines of NDMA issued from time to time

The 2nd meeting of the committee held in December, 2011. Based on the inputs/suggestions of members of committee the document was revised and updated in June, 2012.

All the utilities in Power Sector associated with generation, transmission & distribution and load dispatch of electricity are required to conduct mock drills to ensure the effectiveness in handling the crisis/emergent situations. The reports of the utilities indicating the details of mock drills undertaken are analysed and quarterly reports submitted to Ministry of Power in accordance with the directions given during the meeting taken by Secretary (Security), Cabinet Secretariat.

Nomination to Committee/ Membership:

Shri Major Singh, Chief Engineer, DMLF Division, CEA is acting as Member of Technical Core Group formed by National Disaster Management Authority (NDMA) for drafting guidelines for infrastructure sectors like power generation, transmission and distribution.

2.7 Research & Development in Power Sector

2.7.1 R&D activities in Power Sector:

a) The Central Power Research Institute (CPRI) is the nodal agency for Research & Development in the power sector. Over the years, the Institute has contributed in research in a number of areas and had also helped to fund utilities and academia for their research in the power related fields. To help conduct the R&D proposals infrastructural facilities have been created at Central Power Research Institute, Bangalore and also the facilities at CPRI have been strengthened. Further CPSUs like Bharat Heavy Electricals Ltd. (BHEL), and CPSUs of Ministry of Power like NTPC Ltd., Power Grid Corporation of India Ltd. (PGCIL), NHPC etc. also carry out R&D activities towards development of technology in areas of their commercial/business interests. Other research Institutions like Electrical Research & Development Association (ERDA), Indian Institute of Technology (IITs), Council of Scientific and Industrial Research (CSIR), Centre for Development of Advanced Computing (C-DAC), etc. also carry out research towards finding solutions to problem areas in the power sector.

b) The recently adopted Integrated Energy Policy (IEP) has suggested that a number of academic institutions should be developed as centers of excellence in energy of R&D.

c) The R&D initiatives in the power sector are expected to be further strengthened with the setting up of National Energy Fund (NEF) for Energy R&D as envisaged under the Integrated Energy Policy.

d) Even though R&D in the power Sector is being done by a number of organizations, the Government, (Ministry of Power) supplemented the efforts of other

organizations in the area of R&D through three central schemes namely, the National Perspective Plan (NPP), Research Scheme on Power (RSOP) & Research Contingency Scheme. The Ministry of Power (MoP), under its plan scheme “National Perspective Plan (NPP) for R&D in Indian Power Sector” is promoting research concerning the development of New project/ Process Development. Ministry of Power appointed Standing Committee on research & Development (SCRD) under chairmanship of Chairperson CEA to prepare the National Perspective Plan (NPP) for R&D in Indian Power Sector with an R & D road map for 15 yrs.(upto 2016-17). The NPP covers the vision of R&D, areas of research, fund requirement likely benefits, policy and HRD challenges faced by the Power Sector.

The NPP schemes are intended to promote innovation by sharing experience and expertise, forge Industry Institute co-operation, strengthen R&D infrastructure and develop and sustain man power for R&D in power sector. Towards achieving the above objectives, the MoP provides partial financial support to New Product /Process Development projects taken up by Indian Industry, academia in all sectors, for research projects relevant to Power Sector. The Research Scheme on Power (RSOP) is intended for Research Initiatives at utility level, involving academia and the industry. Research contingency (RC) scheme on power constitute small R&D schemes being carried out by CPRI, Bangalore. CPRI, Bangalore is the Nodal agency for coordinating all the above three R&D schemes.

e) Recently, R&D Conclave 2012 was organized by CEA & CPRI to create awareness about the necessity of R&D efforts in the various areas of the power sector. Many issues including R&D needs of

the power sector, R&D funding, manpower requirements, training, networking and collaboration for successful R&D were discussed. Based on the discussions during the conclave, R&D proposals for the 12th Plan are expected to be submitted by different organization to be taken up for consideration.

f) Working Group on Power for 12th Plan also suggested various R&D activities which may be taken up in the XIIth Plan Period.

2.7.2 National Perspective Plan (NPP) for Research & Development in the Power Sector

Ministry of Power appointed Standing Committee on Research & Development (SCRD) under Chairmanship of Chairperson CEA to prepare the National Perspective Plan (NPP) for R & D in Indian Power Sector with a road map for 15 yrs. Accordingly National Perspective Plan on R&D has been prepared in 2002, for a period of 15 years (up to 2016-2017) with a vision to promote research & development in power sector to cater to the need of rapidly changing technology and resources in the country.

(a) The objectives of NPP are as under;

- (i) To promote innovation by sharing the expertise and experience;
- (ii) To forge industry-institute cooperation;
- (iii) To strengthen R & D infrastructure;
- (iv) To strengthen the National Innovation capability;
- (v) Develop and sustain man power for R & D in power sector;

(b) The major thrust areas for R&D under NPP are:

- (i) Thermal Power Generation;
- (ii) Hydro Power generation;
- (iii) Transmission;

(iv) Distribution;

(v) Conservation & Efficiency;

(vi) Environmental;

(vii) Renewable Energy Sources;

(viii) Nuclear Power generation;

2.7.3 Project Proposals-Implementation & monitoring

Towards achieving the above objectives, Ministry of Power (MoP) provides partial support to New Product /Process Development projects taken up by Indian Industry in all Sectors, Academia etc. under Research & Development projects relevant to Power Sector need.

These R&D projects mainly aim at development of new product or a process (including development of process equipment) with practical implementation. The project is targeted to get result in significant benefits in terms of raising the technological level of the industry concerned, strengthening the network, energy and material savings/ recovery and import substitution etc.

The partial financial support by MoP primarily covers prototype development, cost of process equipment development, testing and evaluation of products, user trials, demonstration of technologies and process, import substitution, etc. Part of the financial support to the project has to be from Industry's resources and beneficiary organizations.

With this background Research project proposals in major thrust areas are invited relevant to power sector applications. Projects describing advanced prototypes, systems, tools and techniques are encouraged.

While formulating the National Perspective Plan (R&D) projects, it is

important to critically review the growth of power sector, assess the existing R&D infrastructure in the country and identify the crucial R&D needs for the power sector.

Central Power Research Institute is the nodal agency to co-ordinate NPP Proposals. The grants from MoP are disbursed through CPRI. On receipt of Proposals Standing Committee on Research & Development after thorough examination through various Task Force Committee recommends for their approval to MoP as per laid down procedures. The status of Implementation is reviewed on regular intervals by various Task Force Committees. Chief Engineer of concerned division in CEA is the Convener of Task Force with members drawn from various Government/Private organizations.

2.7.4 NPP schemes under implementation are as under:

Status of ongoing NPP Projects

HYDRO

- (i) Development of Silt Erosion Resistant Material for Turbines of Hydro generators – NML, Jamshedpur.
- (ii) Development of Silt Erosion Resistant Nano-composite Coatings by Physical Vapour Deposition for Hydro Turbine Components – IIT – Roorkee.
- (iii) Tunneling in water charge zones under high hydro static pressure – NHPC, Faridabad.

DISTRIBUTION

- (iv)
 - (a) National Effort to develop technology for Custom Power Devices (STATCOM) C-DAC, Trivandrum.
 - (b) National Effort to develop Technology for Custom Power Devices (Static Compensator STATCOM) - Development of 2.5 MVar for

Bhilai Steel Plant - BHEL, Hyderabad.

- (v) Development of High Temperature Superconducting (HTS) 630 kVA Distribution Transformers for application in Distribution System – EMCO, Mumbai.
- (vi) Development of DVR based voltage source stabilizers for process industry C-DAC, Thiruvananthapuram, TNEB and CIT-Coimbatore.
- (vii) Design and Development of High Temperature Superconducting Fault Current Limiter (FCL) - Crompton Greaves, Mumbai.

TRANSMISSION

- (viii) To develop a prototype of 132 KV Optical Current Transformer for use in the 132 KV system – ERDA, Vadodara.
- (ix) Improvement in reliability, safety and long terms performance of power and converter transformers through improvements in quality of transformer oil CPRI, Bangalore.

Renewable and distributed generations

- (x) A Study on Stability & Reliability of the power system with large Penetration of Wind Power – CPRI, Bangalore, TNEB and University of Saskatchewan, Canada.
- (xi) Integrated sustainable Power generation from short rotation forestry “enhanced bio-mass” in rural and semi urban areas within clean Development mechanism (CO2 mitigation) – R&D initiative for Nation Biomass action Plan. Project Implementing Organization, Aligarh Muslim University.

Status of various NPP project is annexed at **Annexure-2A.**

2.7.5 Details of Status of Patent applications under NPP Projects for the year.

Sl.No.	(Patent Granted)		Patent Number
1	Radio Based Centralized Control System For Electrical Loads		247111
Sl. No.	(Patent Applications under Process)	Patent Application No	Filing month and year
1	A modular rod type resistive superconductor fault current limiter equipment and assembly under NPP project	3024/MUM/2011	25.10.2011
2	A modular plate type resistive superconductor fault current limiter equipment and assembly under NPP project	3025/MUM/2011	25.10.2011

2.7.6 Research Schemes on Power (RSOP)

Apart from NPP, there is other scheme such as Research Scheme on Power (RSOP) under which MOP provides grant to R&D Schemes of less than 50 lakhs. These schemes are coordinated by CPRI .At present around 27 nos. of such proposals are being implemented by CPRI, IITs and other Governmental / non Governmental agencies .As when such proposals and their status reports on implementation are received ,CEA examines the same critically in terms of their technical & financial viability.

2.7.7 Other R&D initiatives and HRD in CEA (MoU with IIT, Delhi)

CEA, being a Statutory Authority in the Power Sector and the technical arm of Ministry of Power, has been given the mandate to promote research in matters affecting the generation transmission, distribution and trading of electricity.

It may be appreciated that India is a fast growing economy and power has to grow at a faster pace to sustain the growth of various core sector .It is the need of hour that many grey areas of generation, transmission, distribution and trading of

power may be explored and addressed through R & D initiatives in these fields, which may yield sizable benefits to the power sector.

In the light of above, an MoU was signed between MoP / CEA & IIT Delhi to develop:

- (i) R&D Project in Power Sector; and
- (ii) Human Resource Development relevant to the need of Power Sector. Uptill now 11 officers of CEA have been awarded M Tech degree and one officer has been awarded Ph. D from IIT, Delhi. Besides, other few officers of CEA are pursuing M.Tech /P. hd Programmes. As the agreement has since been expired, the MoU has been revised to further strengthen R&D in CEA and also impart R&D initiative relevant to the need of Power Sector .The MoU revised is likely to be signed between IIT, Delhi & CEA shortly.

2.8 Energy Conservation & Efficiency Improvement

2.8.1 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 GIZ 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 GIZ was signed in November, 2006. Under Phase-I of this programme, the work of mapping of 85 units at 47 nos. thermal power stations all over the country was completed in association with GIZ. Guidelines for Auditing of Pulverised Coal/Lignite fired TPS were prepared and circulated among power generating companies.

Under Phase II of Indo German Energy Programme (IGEN Programme) (October, 2009 – September, 2013) the following activities are proposed:-

- (a) To support 15 Thermal Power Generating Utilities of various States in capacity building using Ebsilon Professional Software (a diagnostic tools) and providing 40 such diagnostic tools to 15 utilities;
- (b) To introduce the model power plant concept in 2 thermal power units;
- (c) Human resource development to improve knowledge on critical areas such as boiler, turbine, auxiliaries and C&I;
- (d) Introduction of energy efficiency measures in 4 thermal power generating units;

30 numbers life time license of Ebsilon Professional Software alongwith dedicated laptops have been provided to different thermal power generating companies in various states. To support human resource development for enhancing the expertise of officers of thermal generating utilities, 38 engineers under two

batches from various state power generating companies and CEA were sent to Germany for two week study-cum-familiarisation tour during 2012-13. Two weeks in house training on Ebsilon Professional Software was also imparted by M/s Steage to 100 engineers from different state thermal power generating companies and CEA at Bhikaji Cama Place, New Delhi.

2.8.2 Excellence Enhancement Centre for Indian Power Sector

In order to deal with the complex operational problem arising from the operating power stations and to deal with the enhancement of efficiency at the operating power stations, it is proposed that a common platform should be made available where latest state of the art technologies, problems and remedial actions can be shared effectively among power utilities and professionals. Under the Indo-German Energy Forum an “Excellence Enhancement Centre for Indian Power Sector” (EEC) has been therefore; set up in order to initiate a mind-setting process towards a spirit to excellence and leadership.

EEC has already been registered as society under Societies Registration Act XXI 1860 applicable to NCT with the following objectives:

- a) Provide a common platform to share best practices in all areas of power sector and providing broad based expertise.
- b) To raise awareness for the need of excellence.
- c) Provides a platform for interaction amongst the power industries and power plant operators for technological development.
- d) Provide common solutions and joint action plans for mitigating problems associated with power sector in

- consultation with top experts of power sector.
- e) Disseminate the best practices at the power stations.
 - f) Translate, print, publish and circulate appropriate material for dissemination of useful knowledge through magazines, pamphlets or other printed mode for the development and advancement of excellence in power sector.

The following are the ex-officio Members of the Governing Body of the EEC:

- (i) Chairperson, CEA – Ex-Officio President
- (ii) Member (Planning), CEA – Ex-Officio Vice-President
- (iii) Director General, BEE – Member
- (iv) Chief Engineer (C&E), CEA – Member Secretary
- (v) Secretary, CBIP – Member and Treasurer

EEC was officially launched by Minister of States for Power on February 2, 2012 at New Delhi. The EEC has organized one National Workshop in New Delhi and Regional Workshops at Kolkata and Bangalore on the subject of Efficiency improvement of thermal power stations and PAT Scheme.

EEC has already short listed the following topics for which technical proposals, are being finalized to be taken up shortly:

1. Compendium of best practices in coal based thermal power stations.
2. Combustion optimization for coal based plants.
3. Condenser Performance Monitoring.
4. Best Practices in Water Management in thermal power project.

5. Preparation of Technical guidelines for Indian Power Plant similar to VGB Guidelines.

A two day Workshop was organized by EEC and VGB /KWS Germany at New Delhi and Bangalore .The training was imparted to power plant personnel covered topics like combustion optimization, best O&M practices in Supercritical boilers, flame scanning and dust monitoring etc by expert from VGB, Germany and its member organizations. Several senior officers of various state utilities, Private utilities, manufacturers etc participated in the workshop

2.8.3 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 Di-oxide (CO₂).

Central Electricity Authority (CEA), accordingly took up in cooperation with GIZ-CDM India, to compile a CO₂ database for all Grid connected Power stations in the country. The objective of the database is to facilitate the consistent and accurate quantification of CO₂ emissions baseline by CDM project developers in the Indian Power sector. The database along with a User's Guide is available on CEA website www.cea.nic.in. The latest version 8.0 contains the data upto 2011-12.

2.8.4 Environment aspects of electricity generation

The Division collected and compiled the monthly environmental data related to various emissions for the year 2012-13 for thermal power stations that are in operation.

Those power stations where stack emissions exceeded the norms were requested to take remedial measures and draw up action plan so that such emissions are brought down within the prescribed norms.

2.9 Performance Awards in Power Sector

2.9.1 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/lignite based Thermal Power Station.

2.9.2 Awards for the Year 2011 - 12

Based upon the data /inputs furnished by various power utilities, the national awards for power utilities for meritorious performance during the year 2011-12 were finalised by Hon'ble Minister of State for Power. The lists of Awardees are given at enclosed **Annexure-2B.**

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

An environment management award for coal /lignite based thermal power stations was introduced to promote best strategy and management of environmental issues by coal/lignite based thermal power stations. Applications for Environment Management Award 2011-12 were invited from TPSs requesting them to furnish information on various environmental parameters such as CO₂ emission, SPM emissions at stack, Fly Ash Utilisation and Effluent Discharge etc. In all, 25 TPSs submitted the requisite information which was scrutinized and evaluated as per the Award Assessment Criteria laid down.

2.9.4 National Energy Conservation Awards 2011.

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 establishment in achieving excellence in efficient use of energy and its conservation. The awards were given away for the first time in December, 14, 1991, which is now celebrated as National Energy Conservation

Day throughout the country. Chief Engineer (C&E), CEA is a member of Technical Sub-Committee to assist the Award Committee in the finalization of awards. During the year 2012 proposals received from seven industrial sectors viz. Aluminium, Automobile, Chemical, Chlor-Alkali, Dairy, Thermal Power Stations and Fertiliser sectors were evaluated by CEA.

2.10 Fuel Management and Analysis

Central Electricity Authority (CEA) plays a pivotal role in optimal utilisation of available coal for the power sector. It also rationalise transportation of coal through Rail transport network. In addition to management of coal supply/ movement, CEA rationalises the Gas supply to Gas based power station in a gas scarce scenario. In order to meet the coal requirement of increasing capacity addition, domestic coal availability/ supply has become a big challenge for all stake- holders.

2.10.1 Monitoring Mechanism in place

2.10.1.1 Estimation of coal requirement

For the year 2012-13, CEA estimated a coal requirement of 500 Million Tonne (MT). Out of this, requirement of domestic coal was estimated as 476 MT. Against this requirement; the availability of domestic coal was ascertained around 407 MT.

The coal stock position of all the power stations in the country which are either linked to CIL or SCCL are being monitored by Central Electricity Authority on a daily basis. Other power stations were monitored on monthly basis. Such power stations were either based on imported coal or having dedicated coal block. During the year 2012-13, Ninety Three (93) power stations were monitored on a daily basis. Apart from above, six power stations

(Maqsoodpur, Khambarkhera, Barkhera Kundarki, Utraula, Ramagundem-B) which were having capacity less than 100 MW were not monitored on daily basis. These plants being smaller capacity were kept on monitoring on monthly basis. As on 31st March 2013, coal stock at 21 power stations was Critical i.e. having coal stock less than 7 days and amongst these 14 were Super Critical i.e. having coal stock less than 4 days. All India coal stock position as on 31st March 2013 was 19.6 Million Tonne equivalent to 13 days of consumption against the normative level of 22 Million Tons. In order to bridge the gap between demand and availability of coal, Power Utilities were persuaded to import coal as per the assigned targets. Main reasons for the critical coal stock at various thermal power stations was inadequate availability of domestic coal from Coal India Limited or less /no import by some of the power utilities. During the year 2012-13, CIL have supplied around 344.3 MT against a target of 347 MT i.e. 99%.

Based on the Daily Coal Stock Report and interaction with the concerned power utilities, the critical issues were addressed and discussed in the various Committees, The various Committees which review and monitor coal supply and related infrastructural constraints are as follows:-

- Infrastructure Constraints Review Committee, headed by the Secretary (Coordination), Cabinet Secretariat.
- Inter-ministerial group constituted by the Infrastructure Constraints Review Committee under the aegis of Joint Secretary, Ministry of Coal comprising representatives from Ministry of Railways, Ministry of Power, CEA and Coal India Limited.

2.10.2 Coal Scenario for the Power Sector during 2011-12

2.10.2.1 Coal Availability during the year

For the year 2012-13, coal based generation target was 653.2 BU and accordingly the requirement of coal for the year was estimated to be 500 Million Tonne (MT). This requirement was inclusive of

coal required for building the coal stock at power stations to normative level. Ministry of Coal /Coal India Limited had committed to supply 347 Million Tonne coal, in addition to this, 35 MT of coal was assessed from SCCL and 25 MT from captive mines (Bengal Emta, Kemta, ICML, Panem, DVC Emta and Raigarh).

Figures in MT

S. No	Description	2012-13
1.1	Coal requirement for plants designed on domestic Coal	476
1.2	Coal requirement for plants designed on imported coal	24
1.3	Total	500
2.	Coal Availability from domestic sources	
2.1	From CIL Sources	347
2.2	From SCCL	35
2.3	From captive Mines	25
2.4	Total coal availability from domestic sources	407
3.	Shortfall of domestic coal (1.1 – 2.4)	69
4.1	Coal to be imported to meet the shortfall for plants designed on domestic coal	46
4.2	Coal requirement for plants designed on imported coal	24

2.10.2.2 Comparative Coal Supply Position for the years 2010-11, 2011-12, 2012-13

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

STATUS	YEAR		
	2010-11	2011-12	2012-13
Demand	445.0	475.0	500
Availability#	388.0	402.0	407
Receipt (domestic coal)	354.9	373.6	405.1
Receipt (Imported coal)	30.8	44.9	63.2
Total Receipt *(including Imported Coal)	385.7	418.7	468.2
Opening Stock (includes Imported coal)	14.6	16.0	15.6
Consumption * (includes Imported coal)	386.6	416.5	457.8
Closing Stock@ (includes Imported coal)	16.0	15.6	20.7

@Includes coal stocks of power plants less than 100MW, power plants based on captive block & imported coal based.

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

2.10.2.3 Source-wise Receipt of Coal during the year 2012-13

During the year 2012-13, source wise break up of coal receipt at the power stations is given below:

(Million Tonne)

	Committed /Assured Quantity (MT)	Actual Receipts (MT)	% Receipts
CIL*	347	344.3	99
SCCL	35	38	108
Captive Mines			
Bengal Emta	3.7	3.1	84
ICML	2.7	3.0	111
Panem	7.2	6.9	96
Berrmo	0.4	0	0
Jindal	5.5	5.2	95
Kemta	2.5	2.4	96
DVC Emta	3.0	2.0	67
Sub Total	25.0	22.6	90.4
Import	70	63.3	90
Others	0	5.3	
Total	477	473.5	99

* Target in case of CIL

2.10.2.4 Import of the coal during the year 2012-13

During the year 2012-13, against a import target of 46 MT coal, the power utilities had imported around 31.6 Million

Tonne of coal. In addition to above 31.7 MT coal was imported by thermal power stations designed on imported coal. Utility-wise details of annual targets of imported coal and coal received are detailed below:

IMPORT OF COAL DURING THE YEAR 2012-13				
Sl.No.	Board/Utility	Target	Total import (including at port)	Fig in MT Receipt
	1	2	3	4
(A)	Power plants designed in domestic coal			
1	HPGCL	2.000	0.791	40
2	RVUNL	2.000	1.180	59
3	UPRVUNL	1.000	0.000	0
4	MPGCL	0.800	0.360	45
5	Torrent AEC	0.500	0.591	118
6	GSECL	1.500	0.570	38
7	MAHA GENCO	3.500	3.036	87
8	Reliance	0.600	0.801	134
9	AP GENCO	1.600	1.734	108

10	TNEB	2.000	3.596	180
11	KPCL	1.500	1.641	109
12	DVC	3.000	1.202	40
13	CESC	0.500	0.425	85
14	WBPDC	1.000	1.114	111
15	NTPC	16.000	9.125	57
16	NTPC(JV) Indra Gandhi	1.000	1.188	119
17	Reliance ROSA	0.900	2.085	232
18	NTPC SAIL POWER Co	0.400	0.354	84
19	TATA (MAITHONRB)	0.500	0.058	12
20	CLP	1.000	0.539	54
21	LANCO (Anpara)	0.900	0.296	33
22	LACO (Pathadi)	0.400	0.015	4
23	CSEB	0.200	0.000	0
24	BAJAJ HINDU.	0.300	0.005	2
25	TVNL	0.200	0.000	0
26	VEDANTA (Star.)	1.000	0.208	21
27	VEDANTA (Balco)	0.300	0.000	0
28	NTPC (JV) VELLUR	0.400	0.055	14
29	ADANI(Tirora)	1.000	0.591	59
	Sub Total	46.000	31.560	69
(B)	Power plants designed on imported coal			
30	TROMBAY	2.800	2.869	102
31	JSW ENERGY	6.300	7.158	114
32	ADANI POWER	5.000	11.012	220
33	UDUPPI	3.800	2.668	70
34	MUNDRA UMPP	2.600	5.231	201
35	ESSAR SALAYA	2.700	1.834	68
36	SIMAPURI	0.500	0.571	114
37	THAMNA PATNAM	0.300	0.317	106
	Sub Total	24.000	31.660	132
	TOTAL	70.000	63.220	90

2.10.2.5 Generation Loss

During the year 2012-13, Power Utilities reported a generation loss of 15.8 BU due to shortage of coal. Out of this, 1.3 BU reported by Farakka STPS and Kahalgaon STPS. Generation loss at Farakka and Kahalgaon STPS which was attributed to delay in development of linked coal mines of these pit-head power plants.

2.10.2.6 Specific Coal Consumption

Specific coal consumption of power plants designed on domestic coal during the year 2012-13 was 0.72 kg /kWh as compared to 0.73 kg /kWh during the year 2011-12. This improvement was basically due to increase in consumption of imported coal. Similarly, specific coal consumption of power plants designed on imported coal during the year 2012-13 was 0.46 kg /kWh as compared to 0.47 kg /kWh during the previous year i.e. 2011-12.

2.10.2.7 Coal Quality Issues

It was observed that supply of oversized /uncrushed coal alongwith boulders, stones, lumpy coal and extraneous matter continued to be supplied by most of the coal companies. Coal supply from BCCL, CCL was matter of concern. Apart from this, supply of sticky / muddy coal during rainy season especially from WCL was a big jolt for linked power stations. This had resulted in frequent break downs of coal handling system of respective Power Stations. It had also resulted in higher detention of railway rakes leading to heavy demurrage charges paid by Power Utilities. CEA had forwarded the details of the complaints about coal quality received from power utilities from time to time to Ministry of Coal, Ministry of Power, Ministry of Railways and Coal India Limited for addressing the issues.

2.10.2.8 Achievement

1. With all out effort and rigorous interaction with Ministry of Coal , Railways, Coal India Limited and Power Utilities by CEA all time high coal stock i.e. 19.6 MT could be built up on all India basis against 14.3 MT as compared to previous year.
2. A report on Pooling of price of imported coal with domestic coal was conceived and prepared by CEA. The report was widely welcomed in the Power Sector. The report was under consideration with the Government.

2.10.2.9 Estimated Coal Requirement for the year 2013-14

For the year 2013-14, CEA has estimated the total coal requirement for the year as 548 MT comprising of

515 MT domestic coals for power stations designed on domestic coal and 32 MT for the power stations designed on imported coal. The total coal availability from domestic sources is expected to be around 441 MT resulting in a shortfall of 75 MT of domestic coal. The Power Utilities, therefore, were advised to import around 50 MT to meet the shortfall.

2.11.1 Gas supply to Gas based Power Stations

Out of total 2, 23, 343 MW installed generating capacity in the country as on 31st March 2013, the gas /liquid (excluding DG stations) fuel based power generating capacity was 20,110 MW (about 11%). CEA monitored the supply of gas to 55 gas based power stations totaling to a capacity of 18,363MW (excluding liquid fuel based power plants) using gas as the primary fuel. Apart from this, monthly fuel consumption data for liquid fuel based GT stations and annual fuel consumption for DG (10 MW and above) stations was compiled. Report on Annual Secondary Fuel Oil Consumption (SFOC) for Coal /Lignite based thermal power stations was also compiled.

2.11.2 Gas Requirement and Supply Position

The production and supply of gas have not been keeping pace with the growing demand of gas in the country including power sector. Even the gas allocations committed for power stations were not fulfilled. Supply of gas to gas based power plants has been 40 MMScMD as against requirement of about 90 MMScMD.

Sl. No.	Years	Capacity at the end of year (MW)	Gas Required* (MMSCMD)	Aver. 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	15,769.27	78.09	55.45	22.64
11	2010-11	16,639.77	81.42	59.31	22.11
12	2011-12	16,926.27	81.78	55.98	25.80
13	2012-13	18,362.27	90.7	40.0	50.7

* 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 for installed capacity as last day of year.
MMSCMD – Million Standard Cubic Metres per Day

2.12 Generation Loss due to shortage of Gas

There had been a perpetual shortage of gas resulting in loss of power generation from gas based power-generating stations. The gas-based power stations also had provision for the use of alternate fuels such as naphtha, HSD, etc. Accordingly, generation of power from these generating stations was augmented by use of such fuels. High cost of liquid fuels results in higher

cost of electricity generation. Thus, the actual generation by using such fuels was according to the requirement and acceptance of higher tariff to be paid by the beneficiaries. Loss of generation due to shortage of gas as reported to CEA by the generating entities was the gap between the gas actually supplied and the feasible operation of power plants at 90% PLF and same was as under:

S. No.	Year	Generation Loss during the year (BU)
		As reported to CEA by Gas Based Power Stations
1	2004-05	7.03
2	2005-06	7.69
3	2006-07	8.06
4	2007-08	9.34
5	2008-09	11.99
6	2009-10	3.24
7	2010-11	6.39
8	2011-12	10.01
9	2012-13	33.7

CHAPTER – 3

POWER SYSTEMS PLANNING AND DEVELOPMENT

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 power system studies. This also involves formulation of specific schemes, evolving a phased implementation plan in consultation with the Central and State transmission utilities and their implantation, issues pertaining to development of national power grid in the country and issues relating to trans-national electricity interconnections. Transmission planning studies are being conducted to identify evacuation system from generation projects and to strengthen the transmission system in various regions.

3.2 Inter regional transmission system in India – National Grid.

A national 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 31-03-2013 was 29750 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 that increased to 14050 MW by the end of 10th Plan.

During 11th Plan (2007-12), 13900 MW of inter-regional transmission capacity has been added, taking the total inter-

regional transmission capacity (at 132 kV and above level) to 27750 MW (excluding the Bursur-Lower Sileru HVDC Monopole which is not in operation and including the Gaya- Balia 765kV S/C line which was commissioned with contingency arrangement at 400 kV).]

During the first year of the 12th plan, viz., 2012-13, another 2000 MW capacity was added through 765 kV operation of the Agra-Gwalior 2 x S/C lines that were earlier operated at 400 kV.

Details of the existing inter-regional transmission capacity added up to 31.03.2013 are given at **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 inter state transmission system for evacuation of generation and system strengthening schemes and some of the major state transmission schemes are firmed up through discussion in the meetings of the Regional Standing Committee of power system planning.

3.3.2 Standing Committee Meetings were held during 2012-13 :

Northern Region:

- 31st meeting of the Standing Committee on Power System Planning of Northern Region held on 02.01.2013 at Gurgaon, Haryana.

Eastern Region:

- Meeting of the Standing Committee on Power System Planning in Eastern Region held on 05.01.2013 at Gurgaon, Haryana.

Western Region:

- 34th Meeting of the Standing Committee on Power System Planning in Western Region on 09.05.2012 at New Delhi
- 35th Meeting of the Standing Committee on Power System Planning in Western Region held on 03.01.2013 at Gurgaon, Haryana.

Southern Region:

- 34th Meeting of the Standing Committee on Power System Planning in Southern Region held on 16.04.2012 in Hyderabad, Andhra Pradesh.
- 35th Meeting of the Standing Committee on Power System Planning in Southern Region held on 04.01.2013 at Gurgaon, Haryana.

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

3.4 Empowered Committee on Transmission

3.4.1 Brief Introduction:

Promotion of competition in the electricity industry in India is one of the key components of the Electricity Act, 2003. As per the provisions under Section 63 of the Electricity Act, 2003 and the National Electricity Policy, Ministry of Power on 13.04.2006 issued “Guidelines for Encouraging Competition in Development of Transmission Projects” and “Tariff Based Competitive Bidding Guidelines for Transmission Services” to facilitate private sector participation in the transmission by identifying projects for implementation through tariff based competitive bidding (TBCB).

As envisaged in the Guidelines, Ministry of Power had constituted an Empowered Committee under the chairmanship of Member, CERC with Member (Power Systems), CEA as Member Secretary. The Committee, which has representatives from Ministry of Power, CEA, CTU (i.e Power Grid Corporation of India Ltd.), Planning Commission and two experts in power sector, is entrusted with the responsibility of identifying transmission projects for development through TBCB. Since 06.01.2011, all the ISTS transmission schemes are to be implemented through Tariff based Competitive Bidding as given in the Tariff Policy.

3.4.2 Status of the schemes identified by the Empowered Committee on Transmission for implementation through TBCB:

At present, there are eight notified schemes that are under implementation by the Transmission Service Providers. In addition, there are ten notified schemes for

which the bidding process is in progress. These schemes are given at **Annexure – 3C.**

3.4.3 Following meetings of the Empowered Committee on Transmission were held during 2012-13:

- 29th Meeting was held on 15.06.2012 at CERC, New Delhi.
- 30th Meeting was held on 31.10.2012 at CERC, New Delhi.
- 31st Meeting was held on 18.02.2013 at CERC, New Delhi.

The transmission schemes and relevant issues taken up in these meetings are given at **Annexure – 3D.**

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

Following is the list of DPRs / FRs of hydropower projects examined for processing of clearance by CEA

Northern Region:

Himachal Pradesh - 4 nos.

- (i) Chhatru HEP (108 MW)
- (ii) Seli HEP (400 MW)
- (iii) Miyar HEP (120 MW)
- (iv) Revised Cost Estimates of Rampur HEP (412 MW)

Uttarakhand - 5 nos.

- (i) Devsari HEP (252 MW)
- (ii) Lakhwar Vyasi MPP (300 MW)
- (iii) Kotli Behi Stage-1A HEP (195 MW)
- (iv) Tuini Plasu HEP (72 MW)
- (v) Revised Cost Estimates of Vishnu Prayag Pipalkoti HEP (444 MW)

Jammu and Kashmir - 5 nos.

- (i) Ratle H.E Project (850 MW)
- (ii) Kirthai-I HEP (400 MW)

- (iii) Kwar HEP (560 MW)
- (iv) Kiru HEP (660 MW)
- (v) RCE of Uri-II HEP (44 MW)

Southern Region:

Karnataka – 1 no.

- (i) Sivasamudram Run-of-River Project (SRPP) in Cauvery Basin

Eastern Region: - 5nos.

- (i) Kholongchhu HEP (3x200 MW) in Bhutan by M/s SJVN Ltd.
- (ii) Bunakha HEP (180 MW) in Bhutan by M/s THDC Ltd.
- (iii) Amochhu Reservoir HEP (4x135 MW) in Bhutan by M/s NTPC
- (iv) Chamkharchhu-I HEP (4x192.5 MW) in Bhutan by M/s. NHPC Ltd.
- (v) Wangchhu HEP (4x142.5 MW) in Bhutan by M/s. SJVN Ltd.

North Eastern Region: - 8 nos.

- (i) Shwezaye (880 MW) HE P
- (ii) Tagurshit (74 MW) HEP
- (iii) Demwe Upper (1080 MW) HEP.
- (iv) Dikhu (182 MW) HEP
- (v) Nyukcharong Chu (96 MW) HEP
- (vi) Sissiri (100 MW) HEP
- (vii) Kynshi-I (270 MW) HEP
- (viii) Lower Kopili (120 MW) HEP

3.6 Examination and appraisal of Transmission Schemes for approval under Section 68 of Electricity Act, 2003 during 2012-13.

A list of transmission proposals examined for approval under Section 68 is given below:

Northern Region:

- Northern Regional System Strengthening Scheme-XXVII
- Northern Regional System Strengthening Scheme-XXX

- Strengthening Scheme in Northern Region
- Transmission System associated with Sorang HEP
- Transmission System associated with Tehri PSP
- Transmission System associated with Unchahar TPS
- Augmentation of Transformers in Northern Region- Part A
- Static Var Compensator (SVCs) at Nalagarh & Lucknow in Northern Region
- 220 kV Baira Suil- Sarna D/c line
- Augmentation of Transformers in Northern Region- Part B

Eastern Region:

- JAS Infrastructure & Power Ltd. JIPL STPP (2x660 MW) and its associated transmission system.
- Eastern Region Strengthening Scheme - III
- Transmission system for phase-I generation project in Jharkhand and West Bengal.
- Transmission system for transfer of power from generation project in Sikkim to NR/WR-Part A & Part B by PGCIL.
- 400 kV D/C Teesta-III-Kishenganj (Now Karandighi) Transmission line by M/s. TPTL.

Western Region:

- Dedicated transmission line of M/s DB Power Limited: DBPL generation switchyard to 765/400 kV Raigarh (near Kotra) Pooling Station 400 kV D/c (Quad) line.
- Dedicated transmission line of M/s Visa Power Limited: Visa Power Limited generation switchyard to 765/400 kV Raigarh (near Kotra) Pooling Station 400 kV D/c (Quad) line.

- Dedicated transmission line of M/s TRN Energy Limited: TRN generation switchyard to 765/400 kV Raigarh (Tamnar) Pooling Station 400 kV D/c line.
- Dedicated transmission line of M/s ACB (India) Limited: ACB Kasaipalli (Chakabura) TPS - 765/400 kV Bharari (Bilaspur) Pooling Station 400 kV D/c line.
- Dedicated transmission line of M/s NTPC: Lara STPP Stage-I - Make Up Water Pump House (located outside plant near Saradih barrage) 66 kV 2xS/c line.
- Dedicated transmission line of M/s BALCO Limited: BALCO TPS to 765/400 kV Dharamjaygarh Pooling Station 400 kV D/c and interim arrangement by LILO of circuit one of Korba-Birsinghpur 400 kV D/c line at BALCO TPS.
- Dedicated transmission line of M/s NTPC: Solapur STPP to Make Up Water Pump House (located outside plant near Ujjaini dam) 132 kV 2xS/c line.
- Dedicated transmission line of M/s NTPC; Mauda Stage-I TPS to Make Up Water Pump House (located outside plant near Ghosi Khurd dam) 132 kV 2xS/c line.
- Installation of Reactors (Part-II) in Western Region.
- Installation of transformer and procurement of spare converter transformer at Bhadrawati HVDC back to back station.
- Dedicated transmission line of M/s Vandana Vidyut Limited: Vandana Vidhyut TPS to 765/400 kV Dharamjaygarh Pooling Station 400 kV D/c and interim arrangement by LILO of one circuit of Korba-Birsinghpur 400 kV D/c transmission line at Vandana Vidyut Limited TPS.
- Dedicated transmission line of M/s RKM Powergen Limited: RKM TPS to 765 /400 kV Raigarh (near Kotra) Pooling Station 400 kV (Quad) D/c line and

interim arrangement by LILO of both circuits of Raigarh-Raipur 400 kV D/c line at RKM Powergen TPS.

- Dedicated transmission line of M/s Jhabua Power Limited: Jhabua TPS to Jabalpur Pooling Station 400 kV D/c (high capacity) line and interim arrangement by termination of Jhabua Power TPS - Jabalpur PS 400 kV D/c at Jabalpur (existing) 400 kV S/s through a 400 kV D/c line between an intermediate point on the dedicated line and Jabalpur (existing) 400 kV S/s.
- Transmission system associated with Chhattisgarh UMPP (6x660 MW)

Southern Region:

- PGCIL's schemes of System Strengthening in SR-XVIII, SR-XIX, and SR-XX.
- Transmission system for System Strengthening in SR for import of power from Eastern Region.
- Transmission system required for evacuation of power from Kudgi TPS (3x800 MW in phase-I) of NTPC Ltd.
- Transmission system for connectivity for NCC power project Ltd.
- Common transmission system associated with ISGS projects in Vemagiri area of AP-Part -B

3.7 Examination and appraisal of Transmission Schemes for approval under Section 164 of Electricity Act, 2003 during 2012-13.

Northern Region:

- Laying of 400 kV D/c line from Sravanthi CCGT generation switchyard to LILO point of one circuit of 400 kV Kashipur-Roorkee D/c line in

Uttarakhand by M/s Sravanthi Infratech Pvt. Ltd.

Eastern Region:

Transmission System associated with following generating stations:

- Monnet Power Co. Ltd.(MPCL) TPS (2x525 MW)
- Navbharat Power Pvt. Ltd. (NPPL) TPS (2x525 MW)
- KVK Nilachal TPP.
- Teesta-III HEP-Kishenganj 400 kV D/C (Quad) Transmission line
- Jindal TPS (2x600 MW)

Western Region:

- Transmission scheme for System Strengthening common for WR and NR of M/s Jabalpur Transmission Company Limited.
- Transmission scheme for System Strengthening for WR of M/s Bhopal Dhule Transmission Company Limited.
- Dedicated Transmission Line of M/s Athena Chhattisgarh Power Ltd.
- Dedicated Transmission line of M/s Jindal Power Limited.
- Dedicated Transmission Line of M/s Jhabua Power Ltd.

Southern Region:

- IL&FS Tamil Nadu Power Company Ltd's (ITPCL) scheme - 400kV D/C quad moose line from ITPCL TPP in Cuddalore to 765/400kV Pooling Station of POWERGRID.
- M/s POWERGRID Vemagiri Transmission Limited (POWERGRID VTL) scheme to establish the transmission system for 'Transmission system associated with IPPs of Vemagiri Area Package-A'

- M/s POWERGRID NM Transmission Ltd's (PGNMTL) scheme to establish 'Transmission system associated with IPPs of Nagapattinam/ Cuddalore Area – Package A'

3.8 Cross-Border power exchange

3.8.1 India-Bangladesh Grid connectivity

In order to facilitate cross-border power exchange between India and Bangladesh, an electrical interconnection between India and Bangladesh through a ± 500 MW HVDC asynchronous link at Bheramara (Western Part, Bangladesh) and Baharampur (India) – Bheramara (Bangladesh) 400 kV D/C line along with establishment of 400 kV switching-station at Baharampur (India) by looping in and looping out of Farakka-Jeerat 400 kV Single circuit line is being developed. The project is targeted for completion by July, 2013. The Indian portion of the line will be funded by PGCIL and the portion within Bangladesh would be funded by Govt. of Bangladesh.

3.8.2 India-Bhutan agreement

The Royal Govt. of Bhutan has set the target of development of over 10,000 MW by 2020 and Govt. of India has committed to assist in this target. The hydro-electric projects will require construction of numerous infrastructures (both lines and substation) for export of surplus power in India after meeting the internal requirement of Bhutan. In this context, MoU between CEA and RGoB was inked on 22-12-2009 in Delhi appointing CEA as consultant for the preparation of National Transmission Grid Master Plan (NTGMP) for Bhutan.. The final NTGMP report prepared by CEA was submitted on 08.05.2012.

3.8.3 India-Nepal Power Exchange

3.8.3.1 India-Nepal Power Exchange Committee (PEC) Meeting

The 10th Meeting of Indo-Nepal Power Exchange Committee (PEC) was held on 14-15th December, 2011 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). Various issues relating to cross-border power exchange were resolved as following:

- (i) In regard to cross border exchange between NEA and BSEB, LC amount is enhanced from INR 10.5 crs. to INR 15 crs. for payment by NEA to BSEB.
- (ii) The power exchange tariff from July, 2011 to March, 2012 and from April, 2012 to March, 2013 are revised to INR 4.65/kWh and INR 4.91/kWh respectively as base level tariff (33 kV) till next PEC to be held in 2013. The existing methodology for power exchange for 11 kV and 132 kV (i.e. 7.5% additional at 11 kV and 7.5% rebate at 132 kV) would be continued.

3.8.3.2 Regarding establishment of the 400 kV Dhalkebar-Muzaffarpur 400 kV D/C cross border link, Power Sale Agreement (PSA) between NEA and PTC has been signed for import of 150 MW for 25 years. All formalities with Implementation and Transmission Service Agreement (ITSA), Share Holder Agreement (SHA) etc. have been completed.

3.8.3.3 Under the bilateral power exchange mechanism, Nepal is able to import 50 MW (excluding free power from Tanakpur hydro-electric project) from BSEB, UPPCL and UPCL and beyond 50 MW NEA is to import power from India on commercial basis. For additional power beyond 50 MW,

short term and medium term system strengthening measures in India and Nepal grids as recommended by the technical experts of the two countries were agreed by the both sides. The short term system strengthening works was executed by PGCIL and the works were handed over to the concerned utilities. Implementation of the medium term strengthening works as recommended by CEA has been undertaken by MEA. MEA has entrusted the job to WAPCOS for preparation of DPR and implementation of the works.

3.9 Miscellaneous works

3.9.1 Technical Appraisal and vetting of PGCIL projects costing more than Rs 1000 crore

1. System Strengthening-XVIII in Southern Regional Grid – Estimated cost Rs.1203.65 cr. including IDC of Rs.75.38 cr. at 4th quarter 2011 Price level.
2. System strengthening XIX in Southern Regional Grid–Estimated cost Rs. 1794.11 cr. including IDC of Rs. 107.44 cr. at 4th quarter 2011 Price level.
3. Transmission System associated with Mauda Stage-II (2x660 MW) –Estimated cost Rs. 1505.49 cr. including IDC cost of Rs. 87.78 cr. at Feb. 2012 Price level.
4. Common system associated with East Coast Energy Pvt. Ltd. & NCC Power Projects Ltd. LToA Generation Projects in Sri Kakolam Area – Part-B – Estimated cost Rs. 2314.55 cr.including IDC of Rs. 148.24 cr. at April, 2012 Price level.
5. ERSS-V – Estimated cost Rs. 1290.93 cr. including IDC of Rs. 72.76 cr. at April 2012 Price level.

3.9.2 Advice to CERC on different transmission related issues was provided.

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

3.10.1 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 12th 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:

- System studies for finalizing the transmission strengthening scheme of HVPN in 12th Plan, keeping in view various Generation projects in Jhajjar Complex and injection of power from M/s APL's Mundra TPP.
- System studies for evolving 12th & 13th Plan Transmission system of Delhi Transco Ltd. as a part of consultancy work of DERC.
- System studies including stability studies for finalizing the power evacuation system for Lalitpur (3x660MW) STPS in Uttar Pradesh.

3.10.2 Short Term Planning Studies

- Load flow studies of HVPN transmission system for immediate evacuation of power from generations available in Jhajjar Complex network.
- Load flow studies for evacuation of power from karcham Wangtoo and Nathpa Jhakri Complex. .

3.11 Examination of EFC/PIB Memos

- EFC for 220 kV Alusteng-Leh transmission system in J&K.

3.12 Consultancy services and assistance to various utilities

(i) Power Development Department, Govt. of J&K

Power Development Department, Govt. of J&K: 220kV and 132kV Transmission System covered under Prime Minister's Reconstruction Plan which includes number of Transmission Lines at 220kV and 132 kV voltage levels and 220kV and 132kV Sub-stations (16 nos.)

(ii) Damodar Valley Corporation

Damodar Valley Corporation: Design of 220kV, 132 kV Transmission Line Towers.

(iii) BSEB, Govt of Bihar

BSEB, Govt. of Bihar: Consultancy services to BSEB for rehabilitation of 220kV D/C Ganga Crossing Transmission Line at Fatuah near Patna.

(iv) Assistance to CPRI

The following SFC/ EFC proposals of CPRI under 12th Plan were examined and comments/recommendations were informed to Min. of Power:-

1. Upgradation of Short circuit Test Facilities including Addition of 2500 MVA Short Circuit Generator for Rs. 640 crore.
2. Establishment of new facilities for Rs. 475.32 crore.
3. Augmentation Projects of CPRI for Rs. 124 crores.
4. Research & Development Schemes of CPRI for Rs. 80 crores.
5. Research scheme on Power for Rs. 50 crore

6. Infrastructure improvement for Business Development and Protection for Rs. 43 crore
7. Augmentation of test facilities at STDS, CPRI, Bhopal for Rs. 17 crore
8. Augmentation of Power Systems lab like RTDS, setting of Custom power Drives & Control, Electronics lab etc. for Rs. 15 cores
9. Augmentation & Modernisation of Diagnostics, Cables, Capacitors, Temperature rise, Environmental test facility for Rs. 13 crore.
10. Collaborative research on Advanced Technologies for adoption & absorption in Indian Power Sector.
11. Establishment of tower testing station at UHVRL, CPRI, Hyderabad
12. Refurbishment of High Power facilities at Bangalore.
13. Upgradation of High Voltage/Ultra High Voltage Test facilities.

(v) Vetting of 132/33 kV Substation of MES at Udhampur

Vetting of Single Line Diagram, Electrical Layout Plan & Section Drawings for 132/33 kV Substation of MES at Udhampur.

(vi) Transmission Syatem for Mangdechhu HEP, Bhutan

- (a) Associated with the preparation of the Final Technical specification which was submitted to Bhutan Power Corporation.
- (b) Associated with the evaluation of Technical Bid in respect of the Construction of the Transmission lines.

(vii) India-Nepal Power Transmission Inter Connection Strengthening:

WAPCOS Ltd. (A Govt. of India Undertaking) approached CEA for its

association in providing consultancy services to Ministry of External Affairs(MEA), Govt. of India, in the form of Project Manager- cum- Consultant(PMC) for strengthening of India-Nepal Power Transmission Inter-connection. CEA officers along with WAPCOS Ltd. Officers visited the site Raxaul, Bihar, on Indian side of the proposed India-Nepal Transmission line. CEA has been associated with WAPCOS Ltd. in the preparation of Detailed Project Report (Project Plan) which was submitted to MEA, Govt. of India in March, 2013.

3.12.1 Representation / Nomination in the Committees

- (a) A Committee under the Chairmanship of Chief Engineer(SETD), was constituted to investigate causes of failure and to suggest remedial measures to avert/minimize the failure in respect of the following:-
 - i) Transmission line towers of 220kV & above Voltage Class
 - ii) Various substation equipment of 220kV and above Voltage Class
- (b) SETD officers are represented in

- i) Various Committees of CBIP pertaining to transmission lines & substations.
- ii) Technical committees of BIS pertaining to transmission lines (Conductor, earth-wire, insulator & hardware and transmission line towers) and substations (surge arrester, switchgear, transformer, HVDC, power electronics, high voltage engineering, battery etc.)
- (c) CE (SETD) represents CEA on Electro-technical Division Council and Indian National Committee-International Electro-technical Commission.

3.13 Analysis of causes of failure of transmission line towers & substation equipment.

3.13.1 Transmission Line towers:

As a part of activity of Standing Committee to assess the causes of failure of various Transmission Line Towers of 220kV and above voltage levels, investigations in respect of the following lines were carried out and remedial measures suggested. Standing committee of Experts headed by CE (SETD), CEA, has finalized report for the same.

Sl.No.	Names of the Transmission Lines	Date of Failure
(i)	400 kV D/C Siliguri-New Purnea	06.04.2012
(ii)	765 kV Sasaram-Gaya, location no. 65/2	11-12.04.2012
(iii)	765 kV Gaya-Balia, location no. 39/1	11-12.04.2012
(iv)	765 kV Sasaram-Gaya, location no. 207	11-12.04.2012
(v)	220kV Allahabad-Phoolpur, location no. 33	11-12.04.2012
(vi)	400 kV D/C Baripada-Mendhasal, location no. 592&593	13.04.2012
(vii)	400 kV D/C Bongaigaon-Siliguri, location no. 235&238	03.05.2012
(viii)	400 kV D/C Siliguri-New Purnea, location no. 597&598	03.05.2012
(ix)	400 kV D/C Baripada-Mendhasal, location no. 599&603	18.05.2012
(x)	400 kV D/C Kahalgaon-Farakka, location no. 138&141, Trans. Line no.2 (Ckt. 3 &4)	11.06.2012
(xi)	400 kV D/C Maithan-Durgapur, location no. 97	02.07..2012

3.13.2 Substation Equipment

As a part of activity of Standing Committee to Assess the causes of failure of various substation equipment of 220kV and above voltage class, investigation in respect of the following utilities was carried out and recommendations sent to the concerned utility:

- (a) Failure of 100 MVA, 220/66/11kV Power Transformer at Rohini, Delhi of DTL.
- (b) Failure of 20MVA single phase 11/220/ $\sqrt{3}$ kV Generator Transformer of Kopili HPS of NEEPCO.
- (c) Failure of 125 MVA, 220/132kV Power Transformer at 220/132/33 KV Substation Bhatapara, Raipur of Chhattisgarh State Power Transmission Corporation Ltd.(CSPTL).
- (d) Failure of 1 no. 'Y' Phase CVT in 230kV Neyveli feeder t 230 kV Substation at Cuddalore of Tamilnadu Transmission Corporation Ltd.
- (e) Failure of 1 no. 230 kV CVT at 230 kV Substation, Trichy of Tamilnadu Transmission Corporation Ltd.
- (f) Failure of 1 no. 220 kV SF6 CT at 400/200/132 kV Substation, Meramundali, of Orissa Power Transmission Corporation Ltd.
- (g) Failure of following equipment of MSETCL.
 - (i) 220kV CTs at 220kV Warora S/s.
 - (ii) 220kV LA at 220kV Wardha S/s.
 - (iii) 220kV CCs at 220kV Butibori TS/s.
 - (iv) 400 kV LA at 400 kV Chandrapur S/s.
 - (v) 400 kV CT at 500 kV Chandrapur HVDC.

- (h) Failure of 400 kV, 16.67 MVAR Y-phase and B-phase bus reactor of CGL make at 400 kV Amreli Substation, GETCO.
- (i) Failure of 400 kV B-phase LA of 400/110 kV auto transformer at 400 kV Alamathy substation of Tamil Nadu on 17.06.2012.
- (j) Failure of 220/33 kV, 100 MVA transformer installed at 220 kV Substation of Delhi Transco. Ltd., at Indraprastha, Delhi.
- (k) Failure of 1 no. B phase CVT at 230 kV substation at Villupuram of Tamil Nadu on 08.08.2012 and 15.10.2012.

3.14 Technology Improvement Programme in Power System.

After completion of training at Chicago, USA, following Pilot Project was taken up with State Power Utilities in the following area:

Residual Life Assessment (RLA) of Substation Equipment

Construction of any transmission system requires huge investment and the cost of EHV Substation equipment contributes a major portion of cost of the transmission system. As the transmission lines and substations grow old, there is a need for condition monitoring of substation equipment material to assess their residual life and ensure timely action to prevent catastrophic failures. A pilot project on "Residual Life Assessment of substation Equipment" was taken up with MSEB (now MSETCL).

The following diagnostic tools were procured and installed in 220/33 kV Mudsighi - 400 / 220kV Kolhapur - II

Substation of MSETCL at Kolhapur and are being used.

- 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 diagnostic tools, which were being used in MSETCL, are at present being utilized by GETCO, Ahmedabad.

- i) On line Dissolved Gas Analyzer for Transformer.
- ii) Partial Discharge Measuring Equipment for Transformer.
- iii) Frequency Response Analyzer for Transformer.

3.15 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

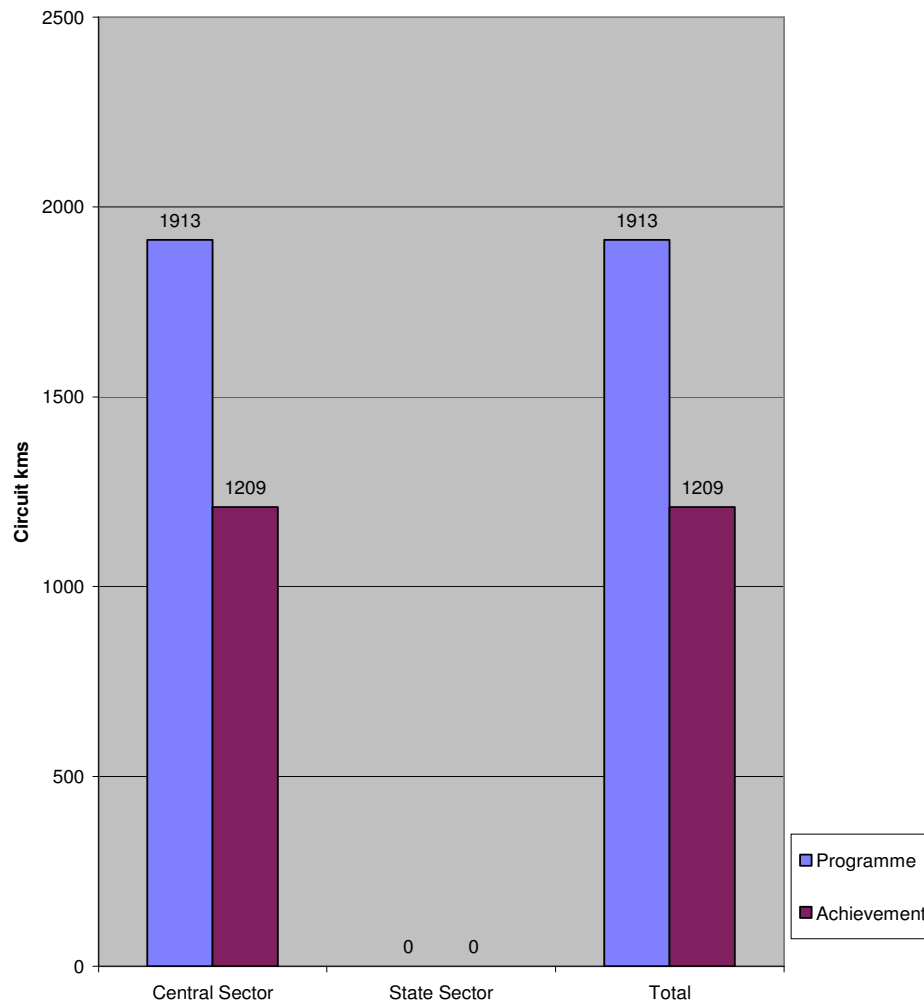
Generating Stations as well as to strengthen the power system network in the country.

For the year 2012-13, an RFD programme for commissioning of 17,426 Ckm of transmission lines comprising of 1913 Ckm of 765 kV, 10,016 Ckm of 400 kV and 5,054 Ckm of 220 kV transmission lines was envisaged. 98% of this target has been met by commissioning 17,107 Ckm of transmission lines, whose break-up is 1209 Ckm of 765 kV, 11,361 Ckm of 400 kV and 4,537 Ckm of 220 kV. Details of achievement are given in **Annexure- 3E.**

In respect of transformation capacity for the year 2012-13, RFD programme was to add 31,669 MVA of transformation capacity comprising of 9,500 MVA at 765 kV, 8,370 MVA at 400 kV and 13,799 MVA at 220 kV. Against this target, achievement is 63,665 MVA capacity comprising of 24,000 MVA at 765 kV, 16,795 MVA at 400 kV and 19,120 MVA at 220 kV. Details of achievement are given in **Annexure- 3F.**

Voltage-wise/ Sector-wise actual achievement vis-à-vis RFD programme for the year 2012-13 in respect of transmission lines and Sub Stations are given in Charts I to III and IV to VI respectively.

Chart I
Programme/Achievement of 765 kV
Transmission lines in 2012-13



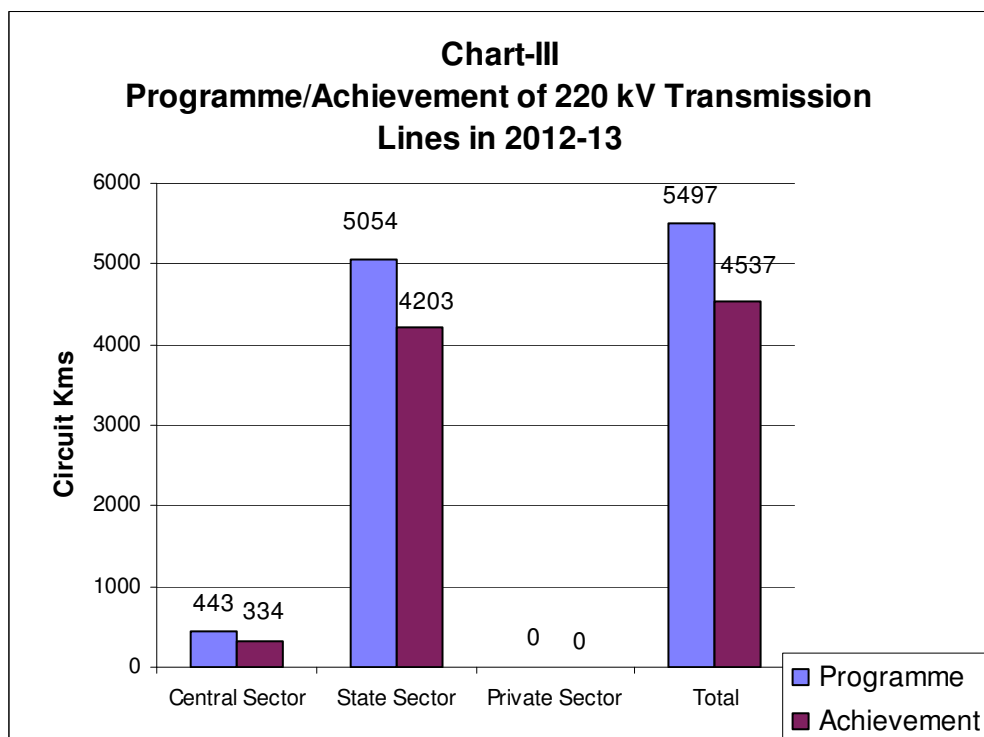
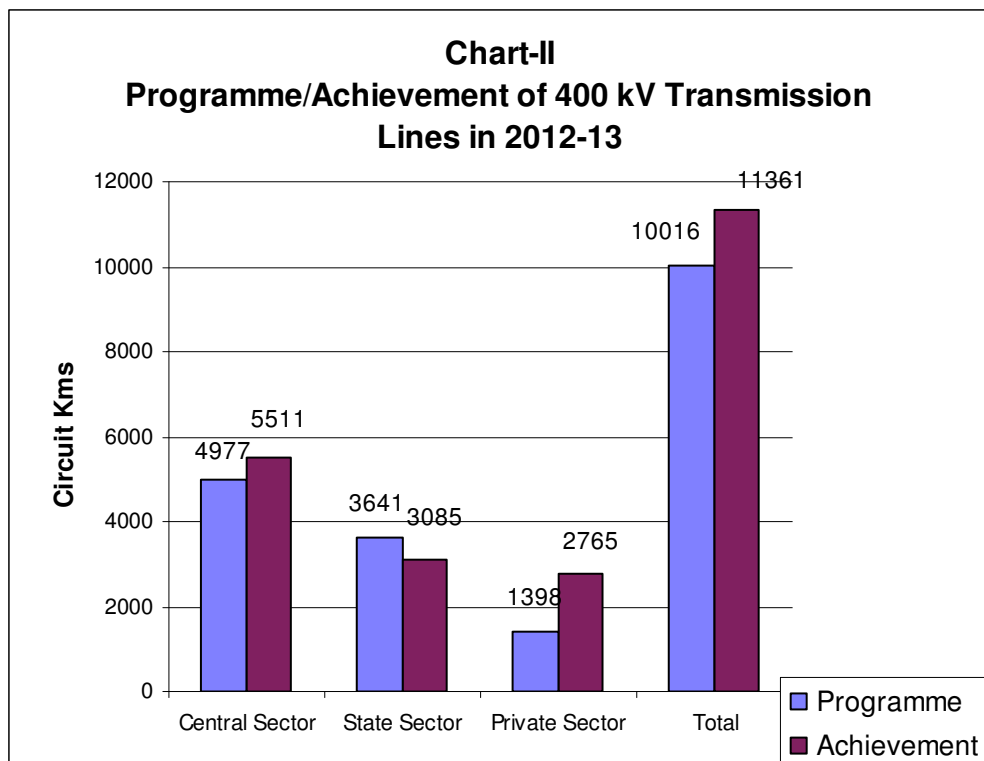
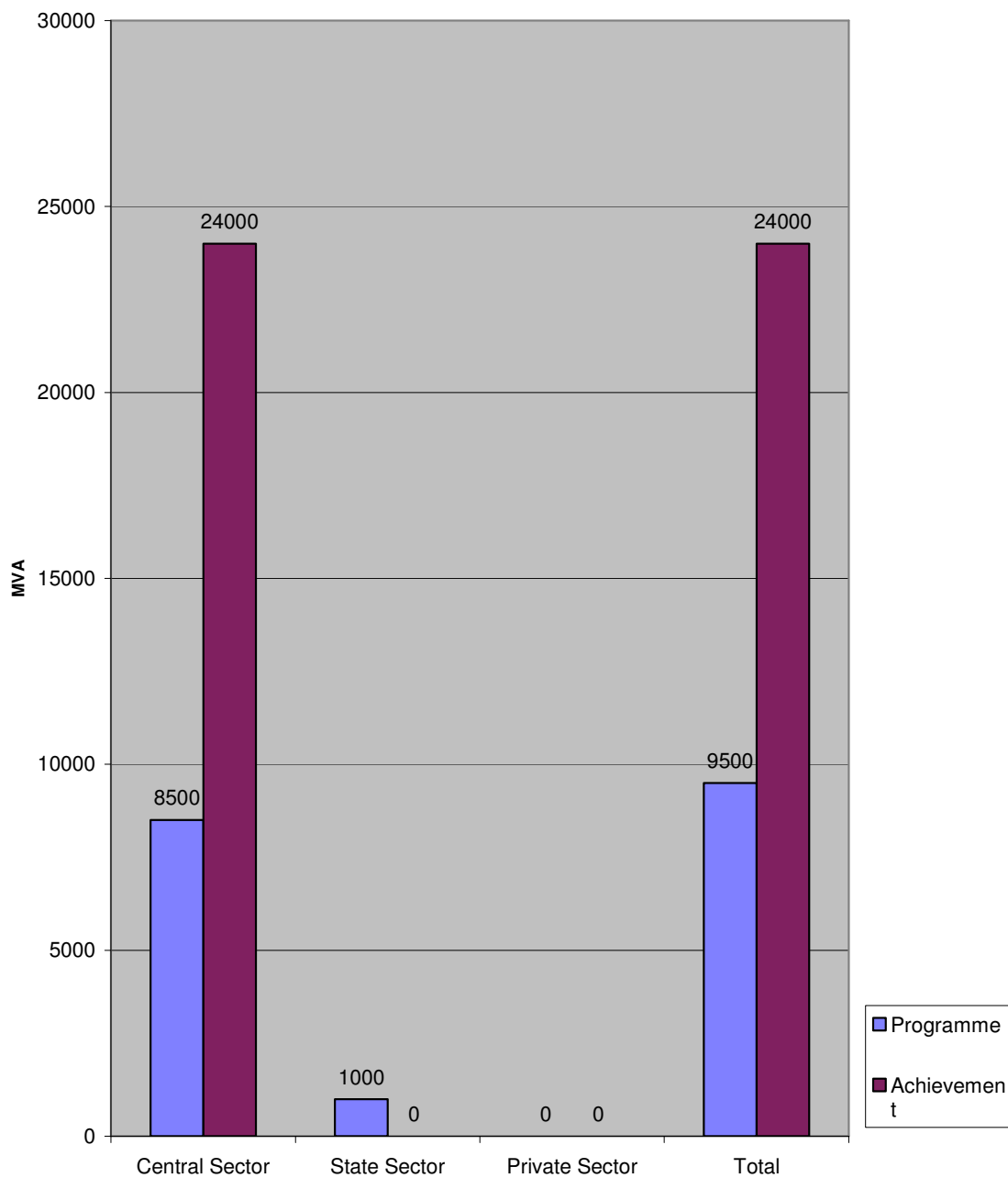
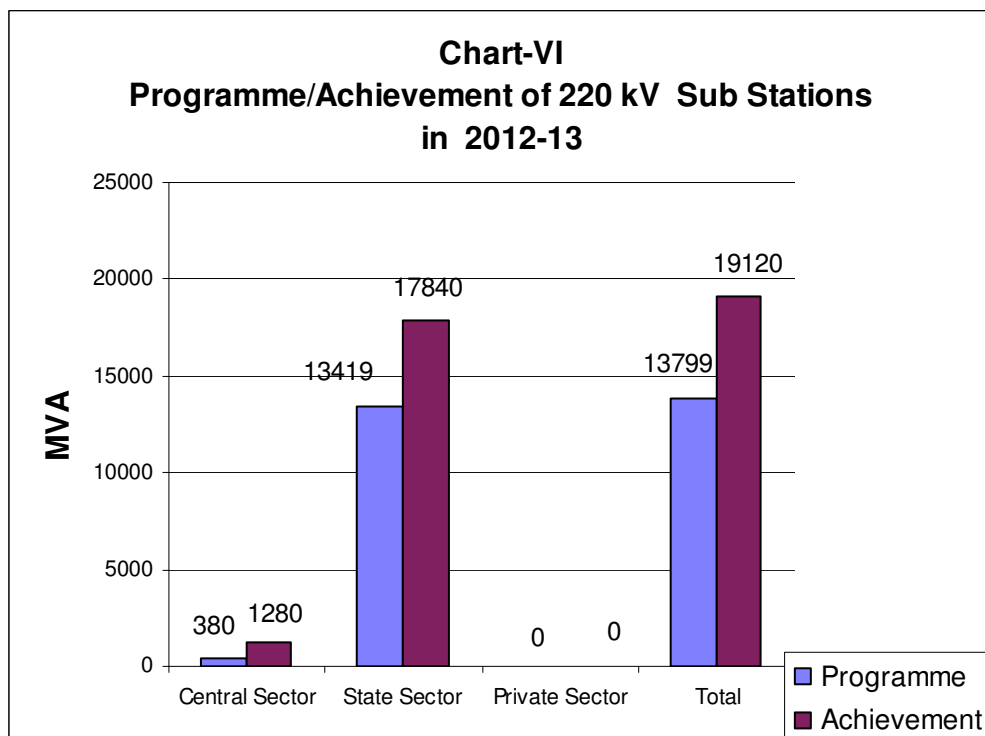
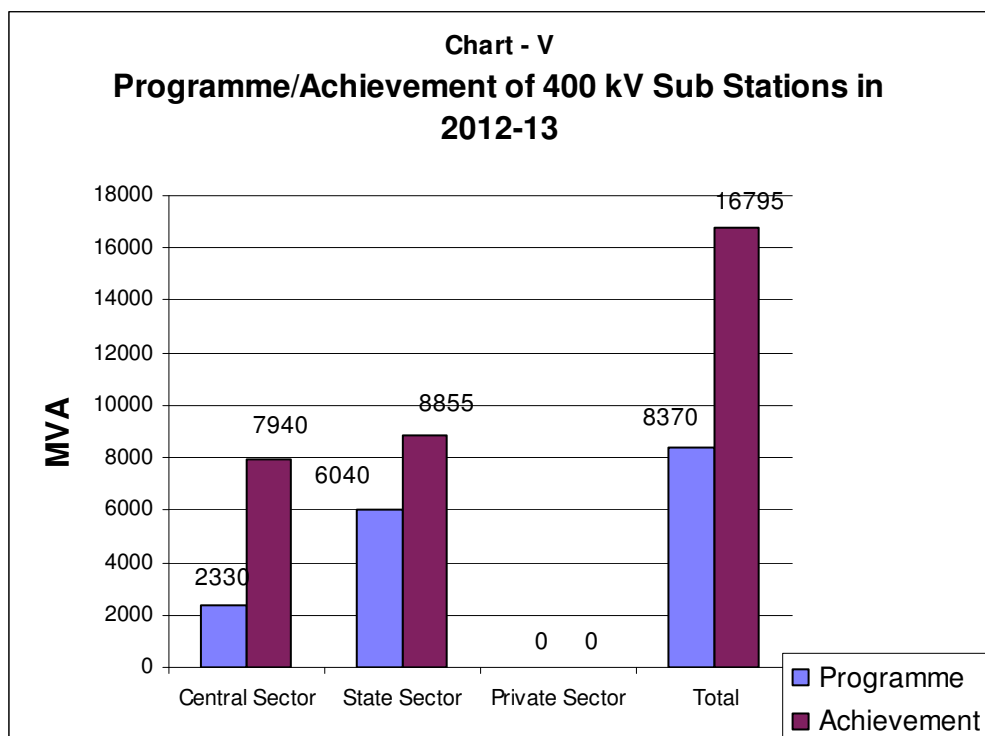


Chart -IV
Programme/Achievement of 765 kV Sub Stations
in 2012-13





3.16 Inspection of Electrical Installations

The Indian Electricity Act, 2003 stipulates statutory inspection of electrical installations by Central and State Electrical Inspectors in respect of installations within their respective jurisdictions. The Chief Electrical Inspector and Electrical Inspectors appointed by the Central Government under section 162 of EA 2003 discharge the functions described in 'The Qualifications, Powers and Functions of Chief Electrical Inspector and Electrical Inspectors Rules, 2006' as per the procedures provided in Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010. The Chief Engineer of Electrical Inspectorate Division, CEA, New Delhi (Headquarter) is appointed as Chief Electrical Inspector and is assisted by the officers of Electrical Inspectorate Division and the officers from five Regional Inspectorial Organizations (RIO's) at New Delhi, Chennai, Shillong, Mumbai & Kolkata appointed as Electrical Inspectors 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 Regulation 30 of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010.
- (b) Inspection of new electrical installations under Regulations 43 & 32 of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010 for according approval for energisation of electrical installation of voltage exceeding 650 V & generating plants of capacity exceeding 10 kW respectively.

- (c) Inspection of Electrical installations in Cinema house and issue of no objection certificates for grant of annual license to the cinema house under the respective Cinematography Act in force in the Union Territories.
- (d) Inquiry 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 received regarding erection/alteration of building under overhead lines involving infringement of Regulations 60, 61 & 63 of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010.
- (f) Issue of Electrical Contractor licenses and competency certificates to Supervisors and wireman through the Licensing Board in respect of Union Territory of Puducherry.

2. RESUME OF INSPECTION WORK DONE

The Electrical Inspectorate Division and its five Regional Inspectorial Organisations inspected a number of installations comprising of **230547 Eq. MV** during 2012-13, the region wise break up of which is given below:

RIO	Eq. MV installations (Nos.)	
	2011-12	2012-13
N Delhi	55113	40928
Chennai	61399	55031
Mumbai	109766	55353
Shillong	21071	24423
Kolkata	51206	54812
Total	298555	230547

3. MAJOR ACHIEVEMENT IN TERMS OF INSPECTION DURING THE YEAR 2011-12 (Important installations inspected)

3.1 New Electrical Installations under Regulation 43 & 32 of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010.

- a) Substations: **765kV Substations** of PGCIL at Gwalior, Satna, Bilaspur, Gaya, Sasaram, Fatehpur, Agra, Nagafgarh, Bhiwani; **400kV Substations** at Kanpur, Hissar, Sikar, Manesar, Jaipur, Amritsar, Raipur, Raigarh, Surat, Bilaspur, Patna, Malda, Bolangir, Keonjhor, Misa, Silchar, Bongaigaon, Madurai, Palaghat, etc.
- b) Transmission Lines of PGCIL:- **765kV lines:** Sasan-Satna, Sasaram-Fatehpur, Nellore-Gooty; **400kV lines:** Mundra-Wardha, Sholapur-Kolhapur, Raipur-Varda, Andal-Jamshedpur, Nabinagar-Sasaram, Pallatana-Silchar, Silchar-Byrnihat lines etc.
- c) Generating Units:- **NTPC:** Vindychal (500MW, Unit-12), Mauda (500MW, unit-1), Barh Stage-I & II, Simhadri (500MW, Unit-IV), Ramagundam (500MW, Unit-7); **NHPC:** 3x33MW TLDP-III; **NPCIL:** Kudunkulam, Kalpakkam, **IPPs:** Sasan (660MW),

Mundra (800MW), Korba West (600MW), Kamalanga (350MW), GMR EMCO (300 MW), ESSAR Mahan (600 MW), Vandana (2x135 MW), Pallatana (386MW), etc.

- d) Steel Plants: Vizag, Bokaro, IISCO, Rourkela, Bhilai, Durgapur.
- e) Refineries: Panipat, Manglore (MRPL & OMPL), Paradip.

3.2 Periodical Inspections (under Regulation 30 of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010)

Extra emphasis was laid on Periodical inspection of large plants in Power and Petrochemical Sector under Regulation 30 of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010. Important projects covered are:

- a) Generating plants: Jharsuguda, Mundra, Nepanagar, Kaiga, Kalpakkam, Ramagundam, etc.
- b) Substations: Baripada, Dimapur, karakudi, Udumalpet, Warrangal, sriperambadur and electrical installations of SAIL, GAIL, IOCL, BPCL, ONGC, NALCO, AIR, CPWD etc.

CHAPTER – 4

GRID MANAGEMENT

4.1 Organizational Structure in Grid Operation and Management

The Indian Power system for planning and operational purposes is divided into five regional grids. The Grid Management Division of CEA co-ordinates all matters of grid operation and management between the five Regions and monitors the Grid operation in the country in co-ordination with five Regional Power Committees established in various regions of the country. This Division prepares the all-India monthly power supply positions; assists the Committees constituted by CEA/MoP to enquire into the causes of major grid disturbances, if any, and recommend measures to avoid such incidents in future; 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. The anticipated Power Supply Position for the next year known as Load Generation Balance Report is prepared every year by this Division of CEA. The Grid Management Division also prepares Regulations on technical standards pertaining to operation and connectivity of grid. Having representation in different Sub-Committees of all RPCs, GM Division has vital role in co-ordination of activities in different RPCs.

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 Central Electricity Authority (CEA). Regional Power Committee operates through a number of Sub-Committees, viz. Operation Sub Committee (OCC), Commercial Sub Committee (CC), Protection Sub Committee (PCC), System Studies Sub Committee and Technical Coordination Sub Committee (TCC). 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 generally meets on quarterly basis and discusses all commercial issues viz. energy accounting related matters, matters pertaining to special energy meters (SEMs), settlement of dues etc. The Protection Sub Committee discusses the incidents of tripping of generating units and transmission elements in the past, recommends remedial measures to avoid such trippings, monitors implementation thereof 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 generally on quarterly basis 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 a Member of all the five Regional Power Committees and guides

the Committees to arrive at amicable solution in case of disputes between Members of the Committees through unbiased decisions.

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 comprising 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 2012-13 was 998114 Million Units (MUs) as against 937199 MUs during the previous year, registering an increase of 6.5%. The total energy availability in the country during the 2012-13 was 911209 MUs as against 857886 MUs during the previous

year, registering an increase of 6.2%. The energy shortage during the year 2012-13, therefore, increased from 79313 MUs to 86905 MUs with percentage shortage increase from 8.5% to 8.7%. The peak demand during the year 2012-13 was 135453 Mega Watt (MW) as against 130006 MW during the previous year, registering an increase of 4.2 %. The peak demand met during the aforesaid period was 123294 MW as against 116191 MW during the previous year, registering an increase of 6.1%. The peak shortage thereby decreased from 13815 MW (10.6%) to 12159 MW (9.0%). An overview of power supply position in terms of energy and peak demand for the period from 1998-99 to 2012-13 is presented in **Exhibit-I** and **Exhibit-II** respectively. The State/ Region-wise power supply position during the year 2012-13 is enclosed at **Annexure-4A**.

Exhibit-I

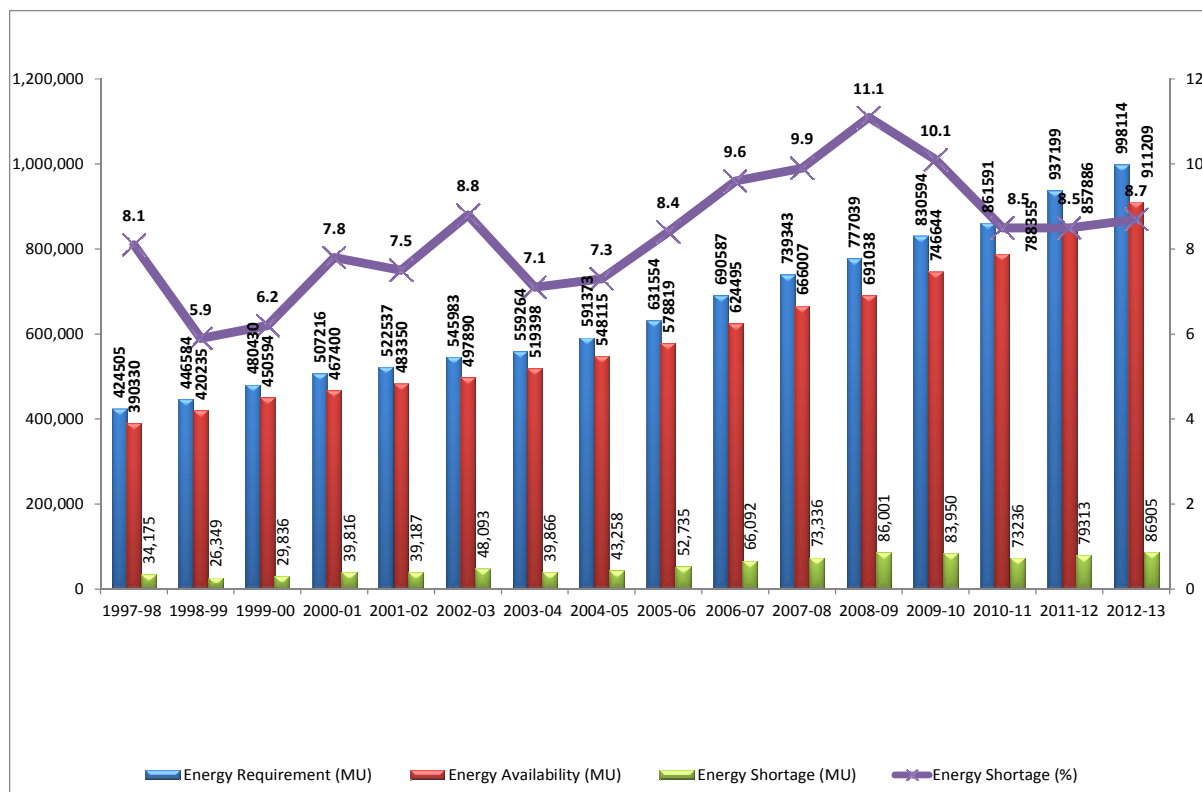
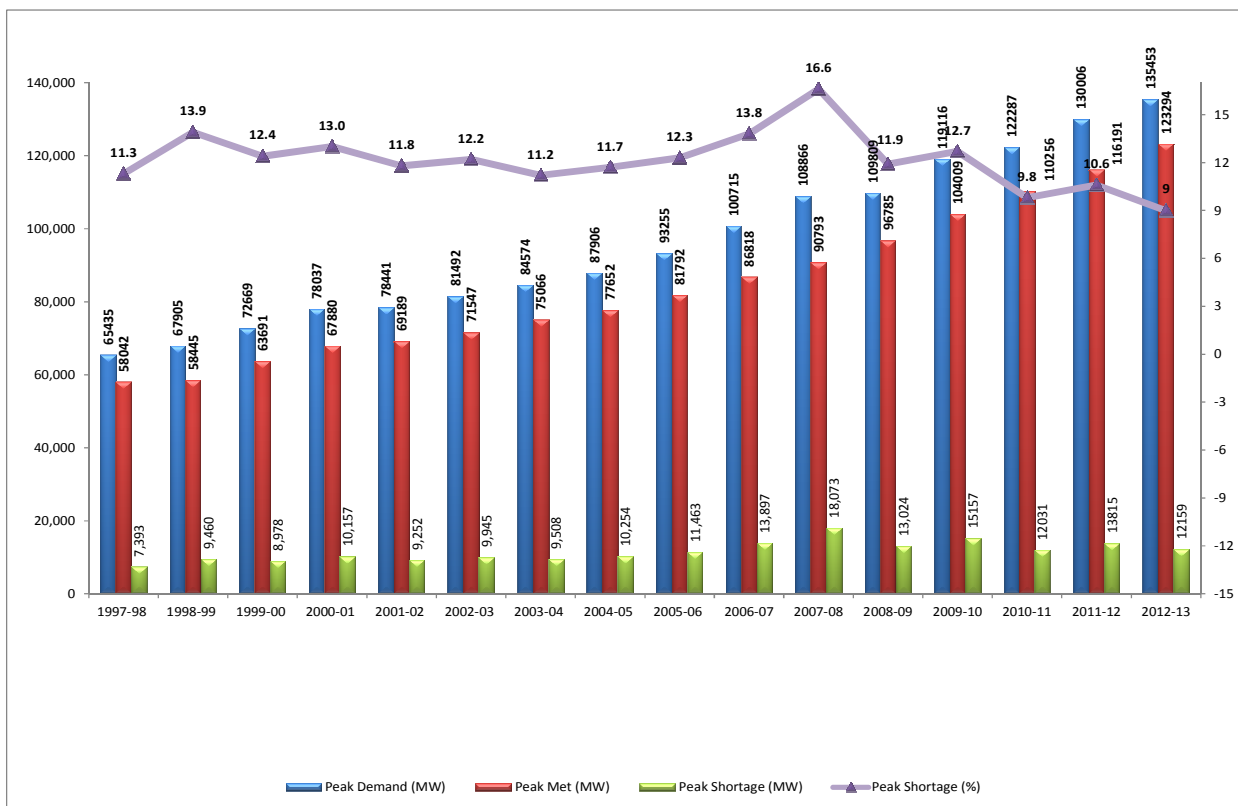


Exhibit-II



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

The Northern, Eastern, Western & North-Eastern Regional Grids are operating in synchronism with each other and form a large grid popularly known as NEW Grid. The NEW Grid having peak load of 99227 MW is connected asynchronously with Southern Region having peak load of 37599 MW. Open Access is a key provision in the Electricity Act, 2003 for utilisation of power available in surplus areas by needy states/utilities in deficit areas, besides bringing about competition and enhance efficiency. The inter-regional energy exchanges, which included the long-term, medium-term and short-term open access transactions, were 44,139.6 MU during the year 2012-13, as compared to 41634.9 MU during the previous year, showing a growth

of 6.02%. 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 2011-12 and 2012-13 are given in **Table – I**. The inter-regional transfer of power takes place through Long Term Access/Medium & Short Term Open Access (LTA/MOTA/STOA) from surplus region to power deficit region as well as bilateral transactions and transactions effected through power exchanges (collective transactions). The total Inter-Regional transmission of power (excluding that through Power exchanges) during the year 2012-13 was 44139.6 MU which includes imports of 22000.5 MU by Northern Region, 9543.4 MU by Western Region, 6138.4 MU by Southern Region, 4194.7 MU by Eastern Region and 2262.6 MU by North-Eastern Region.

Inter-Regional Exchanges for the year 2010-11 & 2011-12

(Fig. in MU)

Region		2011-12	2012-13
From	To		
i) Northern	Western	1735.8	3034.9
	Southern	1129.4	267.5
	Eastern	1024.6	2122.8
	North-Eastern	18.5	216.8
Sub Total		3908.3	5642.0
ii) Western	Northern	8228.9	6060
	Southern	4551.1	2258.2
	Eastern	1275.4	2063
	North-Eastern	791	68.4
Sub Total		14846.4	10449.6
iii) Southern	Northern	924.9	51.2
	Western	228.6	8.8
	Southern	244.2	-
	North-Eastern	1265.2	0.2
Sub Total		2662.9	60.2
iv) Eastern	Northern	12091.0	15886.4
	Western	3451.4	6499.7
	Southern	2472.8	3612.7
	North-Eastern	1616.4	1977.2
		19631.6	27976.0
v) N-Eastern	Northern	23.4	2.9
	Western	15.3	-
	Southern	543.7	-
	Eastern	3.3	8.9
Sub Total		585.7	11.8
Total		41634.9	44139.6

Note: Total import/export figures exclude sale/purchase through power exchange.

During 2012-13, Eastern Region was the biggest exporter with export of 27976.0 MU to other four regions. Chhattisgarh in Western Region, DVC in Eastern Region, Karnataka in Southern Region and Himachal Pradesh in Northern Region were the biggest exporters of energy during 2012-13. Total inter-regional exchange (excluding that through Power exchanges) contributed about 4.8% of the gross generation in the country.

4.3.1 Allocation of unallocated power.

Govt. of India (GOI) has set up Central Generating Stations (CGS) through

GOI Undertakings, viz. NTPC Ltd., NHPC Ltd, SJVNL Ltd., Neyveli Lignite Corp. (NLC) Nuclear Power Corporation (NPC) etc. Except for few stations dedicated to the respective home states, output of CGS is allocated to various states. Normally, 85% power is allocated as firm allocation (including home state share). The allocation of remaining 15% unallocated power of CGSs, kept at the disposal of Central Government, is revised from time to time, generally keeping in view factors like emergent and seasonal nature of the requirement, relative power supply position, utilization of existing generation and other power sources, operational and payment

performance of the States/UTs of the region. CEA keeps a close watch on the power supply position and recommends to the Ministry of Power revision in the quantum of allocation from the unallocated quota when considered necessary. CEA also coordinates implementation of the allocation through the Regional Power Committees.

4.4 Operation of Regional Grids

4.4.1 Northern Regional Grid

The Northern Grid faced energy shortage of 9.2 % and peaking shortage of 8.9% during the year 2012-13 as compared to energy and peak shortages of 6.4 % and 7.8 % respectively during previous year 2011-12. Frequency of NEW grid remained more than 85 % percent of time in the CERC recommended band (**Till 16th September, 2012: 49.5 Hz to 50.2 Hz and from 17th September, 2012 onwards: 49.7 Hz to 50.2 Hz**) during 2012-13. Northern Region was the biggest importer of power, importing 22,000 MUs from other regions in the country during the year 2012-13. Power was transferred from Eastern Region to Northern Region over a number of transmission links including HVDC back-to-back station at Sasaram, Muzaffarpur-Gorahpur 400 kV D/C line with TCSC, Patna – Balia 400 kV D/C line, Biharsharif – Balia 400 kV D/C line, Barh-Balia 400KV D/C line, Sasaram-Balia 400KV D/C line, Gaya-Fatehpur 765KV S/C line, and Sasaram-Sahupuri 220KV S/C line. Northern Region is also connected to Western Region through several transmission lines at different voltage levels including Agra – Gwalior 765 kV line 1&2, Kankroli-Zerda 400kV D/C Line, Bhinmal-Zerda 400kV D/C Line, Kota-Ujjain 220KV D/C line, Auraiya-Malanpur 220KV D/C line and HVDC back to back link at Vindhyachal. With the commissioning of several 765 and 400 kV transmission lines during 2012-13, the stability of the

combined grid has improved and this has also facilitated higher exchange of power from the surplus areas to deficit areas.

4.4.2 Western Regional Grid

The Western Grid faced an energy shortage of 3.3% and a peaking shortage of 1.5% during the year 2012-13 as compared to energy and peak shortages of 11.4% and 13.8% respectively during the previous year 2011-12. This region had least power shortage in the country during 2012-13 and it was net exporter during this period, due to a large quantum of capacity addition especially in private sector.

4.4.3 Southern Regional Grid

The Southern Grid faced an energy shortage of 15.5% and a peaking shortage of 18.5% during the year 2012-13 compared to energy and peak shortages of 8.8% and 14.4% respectively during year 2011-12. Southern Region faced highest power shortage in the country, mainly due to transmission constraint in certain areas. Southern region was net importer of power due to shortage of power in the region. Frequency of Southern grid - connected asynchronously with the NEW Grid - remained more than 90 percent of time in the CERC recommended band, during the year. The Talcher Stage-II Super Thermal Power Station (4X500 MW) of NTPC in Eastern Region is dedicated power station for the Southern Region except for 200 MW allocation to the home state of Orissa in ER. The power from this station and surplus power from ER flows to Southern Region over upgraded Talcher-Kolar HVDC bipole link and HVDC back-to-back link at Gazuwaka and Balimela-Upper Sileru 220kV S/C. It is connected with Western Region through 1000MW HVDC back to back link at Chandrapur.

4.4.3 Eastern Regional Grid

The Eastern Grid faced an energy shortage of 4.6% and a peaking shortage of 7.4% during the year 2012-13 as compared to energy and peak shortages of 4.7% and 4.8% respectively during previous year 2011-12. The Eastern Region was the highest exporter of power among all Regions, exporting more than 27,976 MUs to all other regions during 2012-13. Eastern Region is the only Region connected directly to all other Regions. It is connected to Northern Region through transmission system mentioned above. Eastern Region is connected with Western Region through 220 kV Korba – Budhipadar T/C lines, Raipur- Rourkela 400 kV D/C lines and Ranchi- Sipat 400 kV D/C line, to Southern Region through Talcher - Kolar HVDC bipole 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 faced an energy shortage of 7.3% and a peaking shortage of 6.7% during the year 2012-13 as compared to energy and peak shortages of 9.5% and 7.2% respectively during the previous year 2011-12. 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 transfer of power to the other Regions has to be wheeled through the Eastern Regional Grid. Due to high shortage, North-Eastern Region was net importer of energy . The net import during the year was 2262.6 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 Regulations for Technical Standards for Connectivity to the Grid

In accordance with Section 73 of the Electricity Act, 2003, CEA notified Regulations on Technical Standards for Grid Connectivity in the year 2007. It also notified Central Electricity Authority (Grid Standards) Regulations, 2010.

Due to the great thrust on the development of Green Energy sources and their grid connectivity, the existing regulations on CEA (Technical Standards for Connectivity to the Grid) regulations needed to be reviewed for applicability to the renewable energy sources. In view of it, CEA initiated the process of amending the said regulations. To accommodate the Renewable Energy Sources (RES) seeking connectivity at the voltage level 33 KV and above, draft amendment to the existing regulations has been prepared. For RES seeking connectivity at the voltage level below 33 kV, separate draft regulations have been framed. These regulations are in the process of Gazette Notification.

4.6 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 proposal 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 is likely to be completed during the year 2013-14.

4.7 Formation of National Power Committee (NPC)

Four Regions of the country i.e. Northern Region, Western Region, Eastern

Region and North East Region are now operating in synchronism and Southern Region is also expected to be synchronized with other regions by the end of 12th Plan resulting into a single National Grid. The planning of generation and transmission capacity addition shall also be at national level. With the development of Ultra Mega Power Projects (UMPPs) and Independent Power Projects (IPPs) generating stations may be located in one region and beneficiaries may be in other regions, coordination and consultation among RPCs shall be required to agree on matters concerning the stability and smooth operation of the National grid, operational planning, protection planning and coordination, preparation of energy accounts, transmission accounts etc. Keeping in view the ever growing complexity of Power System, synchronous mode of operation of the entire grid of the country and to evolve a common approach to issues related to reliability and security of the grid, CEA, initiated the proposal for formation of forum of RPCs proposed to be named as National Power Committee (NPC). Ministry of Power accepted the proposal and has vide its order dated 25th March, 2013 established the NPC. Secretariat of NPC is provided by Grid Management Division, CEA & Chief Engineer (Grid Management) is the Member Secretary of NPC. Chairperson CEA is Chairperson of NPC and Member Secretaries of RPCs, Chairperson of RPCs, Chairperson, TCCs & Member (GO&D) are Members of NPC.

Following functions have been assigned to NPC:

- (i) NPC shall resolve issue among RPCs; and
- (ii) Discuss and resolve issues referred to NPC requiring consultation among one

or more RPCs, concerning inter-alia inter-regional implication or any other issue affecting more than one region or all regions.

Decisions taken in NPC shall be considered concurred by respective RPCs for implementation.

4.8 Grid Disturbances of 30th & 31st July, 2012

Two Grid disturbances took place in the country on 30th & 31st July, 2012 which resulted into collapse of the Northern Regional Grid on 30th July, 2012 and Northern, Eastern and North-Eastern Regions on subsequent day. Ministry of Power constituted an Enquiry Committee under chairmanship of Chairperson, CEA to investigate the reasons which led to the above grid disturbances and to suggest remedial measures to prevent recurrence of such event in future.

Enquiry Committee submitted its report on 16th August, 2012 containing several recommendations to prevent the future recurrence. Actions were initiated for implementation of recommendations of the Committee immediately thereafter and the same was in progress as on 31st March, 2013. The implementation of recommendation was being monitored by CEA /MoP on regular basis.

4.9 Formation of Task Force for Power System Analysis under Contingencies

In pursuance of recommendation of the Enquiry Committee constituted by Ministry of Power after the grid disturbance on 30-31 July, 2012, Ministry of Power vide its order dated 13th December, 2012 formed a Task Force under the chairmanship of Sh. V. Ramakrishna, Retd. Member (Power System), CEA. Director (GM) is Member

Secretary of Task Force. Representatives of POSOCO, CTU, ABB India, Tata Power Delhi Distribution Ltd, Electrical Engineering Deptt., IIT (K) and Electrical Engineering Deptt., IIT (B) are members of Task Force.

Terms of reference of Task Force include power system analysis under various contingencies, detailed analysis of the present grid conditions and anticipated scenarios which might lead to any disturbance in future, and suggest long term measures for improvement in grid security.

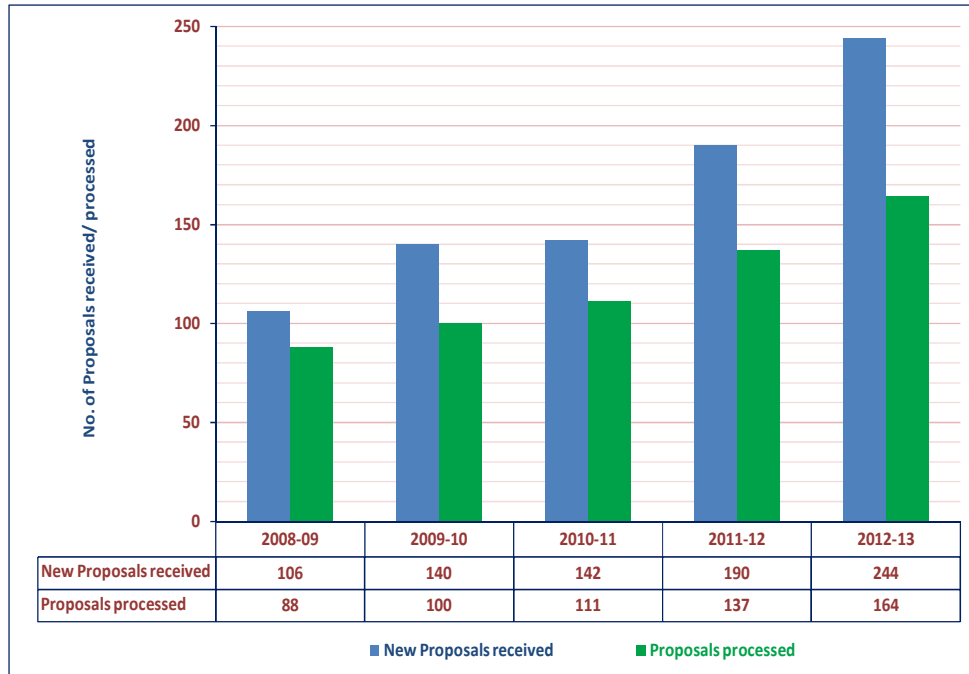
4.10 Power & Telecommunication Co-ordination Committee (PTCC)

CEA continued to follow up cases for expeditious PTCC clearance of EHT transmission lines of voltages 220 kV and above through discussions/follow-up 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.

To achieve the objectives of PTCC, during the financial year 2012-13, two Central PTCC meetings viz. 95th Central PTCC meeting on 6th July 2012 at Jabalpur and 96th Central PTCC Meeting on 24th January 2013 at Ahmadabad were held. The meetings were attended by the senior officers of power sector i.e. CEA, Central State Power Utilities, Bharat Sanchar Nigam Ltd. (BSNL), Railways and Defence. In the meetings, many contentious and important issues which are in the interest of Power as well as communication sector were discussed and decisions were taken on these.

During the financial year 2012-13, 244 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 financial years is given below:

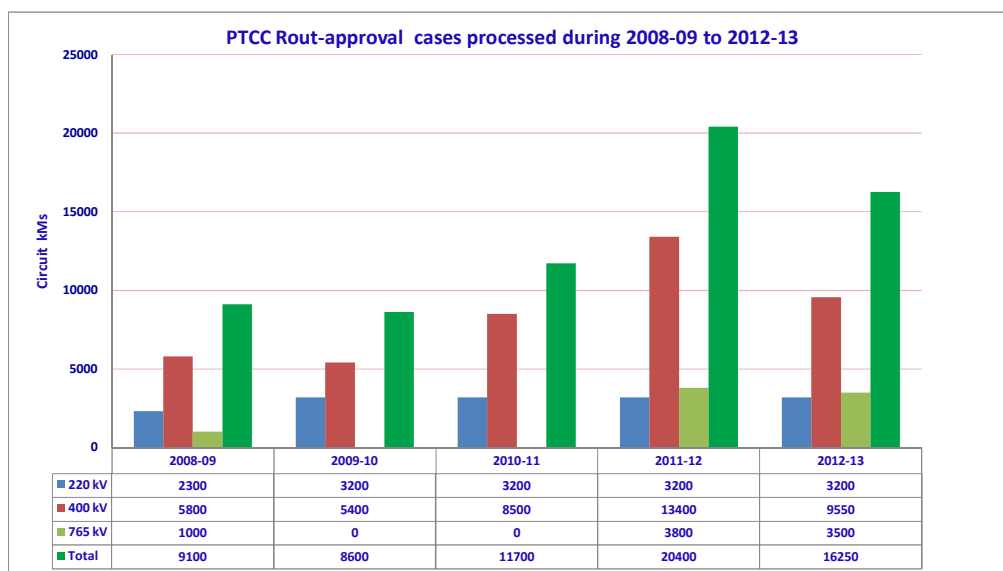


During 2012-13, 164 PTCC Route Approval (RA) proposals, after analysis computation of Induced Voltage (IV) likely to be developed on the communication/

railway circuits in proximity to the EHT lines in case of single line to earth fault current conditions were forwarded to BSNL to issue the necessary PTCC route approvals

to enable Power Utilities to commission their lines on schedule. It included about 3200 circuit kMs of 220 kV lines, about 9550 Circuit kMs of 400 kV lines and 3500 Circuit kMs of 765 kV lines.

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:



In comparison with last year

- The number of proposals received for PTCC Route Approval have increased from 190 to 244 an increase of 26%.
- No. of proposals processed for IV computation and issued by CEA have increased from 137 to 164 an increase of 22%.

4.10.1 Computerization of PTCC

In order to cut down the processing time of PTCC route approval, the Ministry of Power (MoP) had sanctioned the scheme of Computerization of PTCC Process. The scheme envisages the appointment of Consultant and System Integrator/Developer. The Consultant has already been appointed. The award of contract to the System Integrator /Developer is under process.

4.11 Establishment of Load Despatch & Telecommunication Facilities for Power Sector

Unified Load Dispatch Scheme Monitoring Group (USMG) for Phase-II of ULDC scheme has been working on various

aspects of Operation & Maintenance (O&M) of the system. CEA has been providing technical input for this, as and when required.

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

CEA coordinated and followed up with Wireless Planning and Coordination (WPC) Wing of Department of Telecommunications (DoT) to achieve timely frequency allocation for PLCC links of new power transmission lines and VHF/UHF /Microwave systems of power utilities.

CEA intervened for early frequency allocation in respect of PLCC links of POWERGRID-NER, ER, WR, NR-I & II, Jaiprakash Power Ventures Limited, Essar power, Torrent Power, Gujarat State Electricity Corporation Limited, LANCO Power, Paradeep Phosphates Ltd, Korba West Power Company Limited, Rosa Power Supply Company Limited, Jindal Power Limited for their new power lines.

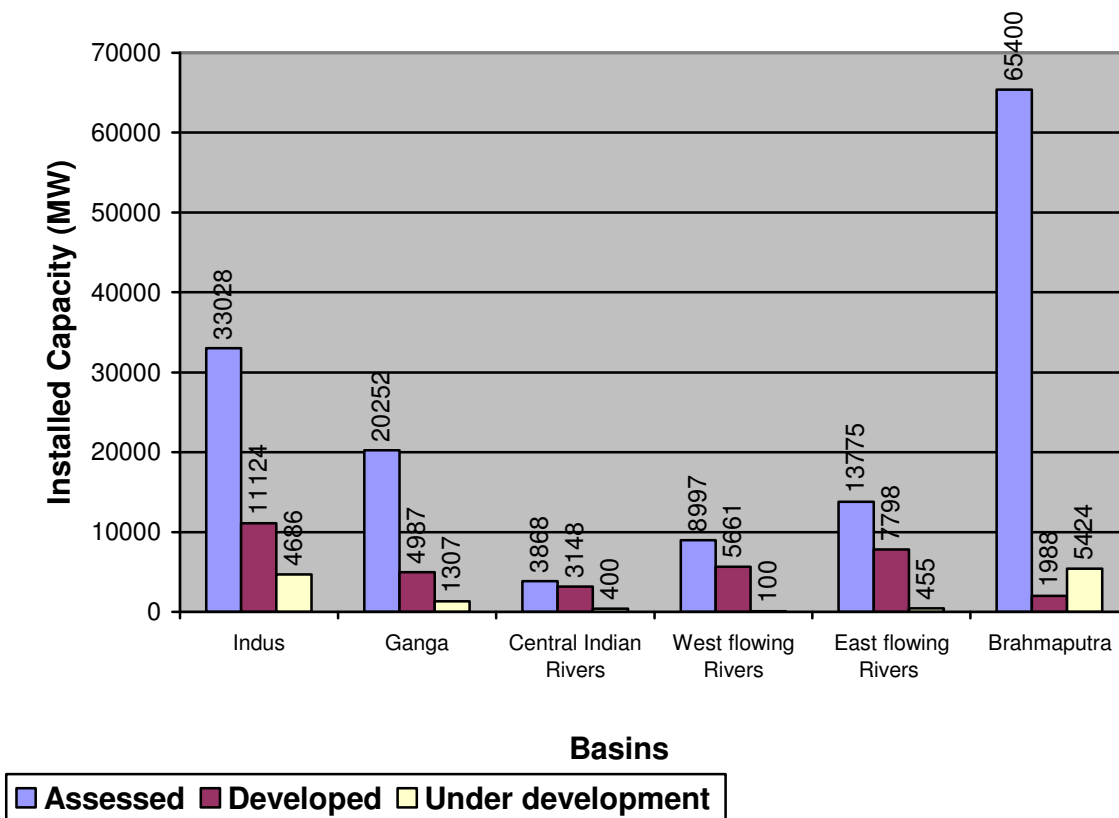
CHAPTER – 5 HYDRO POWER DEVELOPMENT

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 31.03.2013, the hydro-electric schemes in operation account for only 23.88% and those under execution for 8.51% of the total potential in terms of installed capacity. Thus, the bulk of the potential (67.60%) remains to be developed.

**BASINWISE STATUS OF H.E. POTENTIAL DEVELOPMENT
(As on 31.03.2013)**



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, 9 Nos. Pumped Storage Projects having total installed capacity of

4785.60 MW (Above 25 MW) are under operation and 2 Pumped Storage project (1080 MW) are under 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/ river-streams have been identified.

5.2 50,000 MW Hydro-Electric initiative

5.3 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, and quality control by vetting conceptual planning, assessment of power benefits and 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 installation of 47,930 MW. The details of these projects are given at **Annexure – 5A.** As a follow up of preparation of PFRs, it has been decided to take up implementation/preparation of DPRs of these schemes for execution in the near future. Out of 162 schemes (47930 MW), DPRs of 37 schemes (20427 MW) have already been prepared and 27 schemes (8386 MW) are under Survey & Investigation for

preparation of DPRs. Further, the work of preparation of DPRs of remaining 98 schemes (19117 MW) is held up due to proposed change in Agency /Allotment by State Govt., issues related to Environment & Forest Clearance and local agitation.

5.3 Construction Monitoring of Hydro Projects

Hydro Project Monitoring Division is performing the duties of monitoring of the hydro power projects in pursuance of 73 (f) of Electricity Act, 2003. The progress of each project is monitored continuously through frequent site visits, interaction with the developers, critical study of monthly progress reports. Chairperson, CEA holds review meeting with the developers and other stakeholders to sort out the critical issues.

5.4 Hydro additions during 2012-13:

Hydro capacity addition targets for the year 2012-13 was 802 MW and the capacity achieved was 501 MW. Project-wise details are given at **Annexure-5B.**

5.4.1 Hydro capacity programme during 2013- 14

Hydro Capacity Addition Monitorable Targets for the Year 2013-14 is 1198 MW (914 MW in Central Sector, 85 MW in State Sector, and 199 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 Project Planning & Optimization Studies

- During the year, preparation of Chapter on Reservoir simulation studies for Ujh Multi Purpose Project (3x62 MW), J&K considering ecological releases and revised power potential studies for Kirthai-II H.E Project in J&K have been completed.
- Power Potential Studies were carried out for Suntaley H.E Project (2x20 MW) in Sikkim.
- Power Potential Studies of Noa Dehing Dam (71 MW) in Arunachal Pradesh were examined for inclusion in DPR being prepared by Brahmaputra Board.

5.6 Studies & Other Activities Related to Hydro Power Planning

• Indus Water Treaty (IWT) Matters

- i) Preparation of Rejoinder to Pakistan's objection to Counter Memorial prepared by India with *release* to the Court of Arbitration for Kishenganga H.E. Project.
- ii) Examined adequacy of Pondage of Nimoo Bazgo, Sawalkote, Miyar, Kiru, Kwar, Ratle, Lower Kalnai, Kirthai-I and New Ganderbal H.E Projects in J&K and Chhatru, Sach Khas and Raoli Dugli H.E Projects in Himachal Pradesh, as per IWT.

• Revision of Design Energy

Proposal for review of design energy of Koteswar Hydro Electric Project (400 MW) in Uttarakhand by THDC was examined and approval of the Authority accorded for design energy of 1155 MU.

• Issues of importance in North Eastern Region

Work on various issues of importance in North Eastern Region relating to Mitigating downstream impact of H.E Projects especially Subansiri Lower H.E Project in Arunachal Pradesh, major issues in development of H.E Projects in Arunachal Pradesh, Prioritization of Storage Projects in Arunachal Pradesh, diversion of Brahmaputra, Viability Gap funding of Tuivai HE Project.

- Preparation of SFC Memo on Proposal for Basinwise Review of H.E Potential in the country, after approval of the Authority.
- Examination of PIB Memorandum for Ex-post facto approval for formation of Joint Venture Company (JVC) among NHPC, JKSPDC & PTC and infusion of equity beyond Rs. 500 Crs. by NHPC in JVC (M/s CVPPPL) and investment approval for construction of Pakaldul H.E Project (1000 MW).
- Work on various RTI references, PMO/VIP references especially regarding NE Region and J&K, Parliament questions, Standing Committee, Consultative Committee and Demand of Grant references.

5.7 Capacity Addition during the 12th Plan

A list of 45 Hydro Electric Schemes (10897 MW) has been identified for setting up of new hydro power project during 12th plan in the country. The details of these projects are given at **Annexure-5D.**

5.8 Co-operation with Neighboring Countries in Hydro Power

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. During the year, following works were handled:

- CEA, being the Nodal agency for the Task Force constituted for submission of Interim Report, DPR of Tamanthi & Shwezaye Projects in Myanmar, Task Force Meetings were organized for timely submission of Interim Reports and Detailed Reports of Tamanthi & Shwezaye Projects. Presently, Task Force **TOR** has further been enhanced to monitor the concurrence of the schemes by CEA.
- DPR for Tamanthi (1200 MW) submitted by NHPC has been accorded concurrence by CEA. DPR for Shwezaye (880 MW) submitted by NHPC is under examination.
- Matters on Tipaimukh HE Project in Manipur, relating to meetings of sub Group under Indo-Bangladesh Joint River Commission.
- Power Potential Studies for different Scenarios of Irrigation and Navigation were carried out for Sapta Kosi High Dam Project in Nepal, in connection with preparation of DPR by Joint Project Office (SKSKI-Saptkoshi and Sunkoshi investigation).
- Chief Engineer (HP&I) attended the 10th Empowered Joint Group (EJG) meeting at New Delhi.
- Director (HP&I) visited Bhutan in connection with sharing of cost of Bunakha HEP. Sharing of cost of Bunakha HEP by downstream projects namely Chukha, Tala and Wangchu was finalized.

Draft Implementation Agreements for Sankosh and Amochu HE Projects in Bhutan were examined.

5.8.1 International Cooperation

- The matters relating to Co-operation with the countries like Romania, Zimbabwe, Russia, China, Ukraine, Australia, Kazakhstan and Kyrgyzstan have been dealt.

5.9 Hydro Power Plants Performance & Operation Monitoring

- ❖ Performance of 620 units in 177 Hydro Stations having capacity above 25 MW with aggregate Installed Capacity of 38990.40 MW was analyzed in respect of their outages & generation and report on the review of performance of HE stations for the year 2011-12 was finalized.
- ❖ Mid term review of generation performance of hydro electric stations of the country for the year 2012-13 was carried out in Dec., 2012 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 2012-13.
- ❖ Month-wise/station-wise generation targets in respect of hydro power Stations having capacity above 25 MW for year 2013-14 were drawn in consultation with various utilities and fixed at 122263 MU which was about 0.18 % more than generation targets for the year 2012-13.
- ❖ 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 Baspa-II (3x100 MW) of Jaiprakash Power Ventures Ltd., Pong (6x66 MW), of BBMB and Nathpa Jhakri HEP (6x250 MW) of SJVNL

were recommended for National Award for best performance under “National Award for the year 2011-12 for Meritorious Performance in Power Sector”.

5.10 Hydro Generation Performance during year 2012-13

The region wise summary of Hydro Generation performance in the country is as follow.

Region	Target MU	Generation MU	Deviation (+/-)	
			MU	(%)
Northern	60243	62549.87	2306.87	3.83
Western	15159	17665.00	2506	16.53
Southern	32362	21144.61	-11217.39	-34.66
Eastern	10081	8449.73	-1631.27	-16.18
N-Eastern	4200	3911.08	-288.92	-6.88
All India	122045	113720.29	-8324.71	-6.82

Against target of 122045 MU, the actual energy generation during the year 2012-13 was 113720.29 MU which is 6.82 % less than the target. Hydro Generation is more than the target in Northern and Western Region in the country.

5.11 Renovation and Modernization of Hydro Electric Power Projects

5.11.1 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 generating capacity of 9653 MW in Phase-1. The total cost of these R&M schemes was estimated as Rs.1493 Crores with expected benefit of 2531 MW

5.11.2 R&M Phase-II Programme

The hydro policy of Govt. of India, declared in 1998, accorded priority to renovation & modernization of Hydro Power Plants. 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.

5.12 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 the National Committee. The left out schemes were those which were either under implementation or were yet to be taken up for implementation. This Perspective Plan was for R&M during IX, X and XI Plans with 117 schemes having an aggregate installed capacity of 19370 MW with

benefits of 7755 MW at an estimated cost of Rs.4654 Crores.

5.12.1 8th, 9th 10th & 11th Plan Achievements

Under the hydro R&M programme, 65 (15 in Central Sector and 50 in State Sector) hydro electric schemes (13 upto the VIII Plan, 20 in the IX Plan and 32 in the X Plan) with an installed capacity of 10511 MW at a cost of Rs.1,726 Crores were completed by the end of the X Plan (i.e. by 31.03.2007) & have accrued a benefit of 2351 MW through Life Extension, Up-rating and Restoration. During 11th Plan, 18 schemes (4 in central sector & 14 in state sector) with an installed capacity of 4821.20 MW at a cost of about Rs. 295 Crores. were completed upto March, 2012 and accrued a benefit of 735 MW through Life Extension, Up-rating and Restoration.

5.12.1.1 Achievement during the year 2012-13

Rengali Hydro R&M scheme of OHPC, Nagarjuna Sagar of APGENCO and Idamalayar of KSEB having an aggregate installed capacity of about 940.60 MW have been completed during the year 2012-13 at an actual cost of Rs.62.17 Crores and accrued benefit of 50 MW through Life Extension.

5.12.1.2 Programme for the year 2013-14

For the year 2013-14, it is programmed to complete following 8 schemes having an installed capacity of 2054.70 MW. On completion of these schemes, there will be a benefit of 129.70

MW through Up-rating, Restoration and Life Extension and at an estimated cost of about Rs.513.86 Crores.

S. No.	Name of Scheme	Agency	I.C. in MW
1.	Bassi	HPSEB	(4x16.5)
2.	Chenani	J&KPDC	5x4.66
3.	Lower Jhelum	J&KPDC	3x35
4.	Pathri	UJVNL	3x6.8
5.	Srisailam RB	APGENCO	7x110
6.	Nagjhari	KPCL	6x135
7.	Sabirigiri	KSEB	6x50
8.	Kopili	OHPC	2x50+2x50

5.12.2 12th Plan Programme

During 12th Plan, a total of 45 hydro R&M schemes (5 in Central Sector and 40 in State Sector) having an installed capacity of about 7645 MW and which will accrue benefit of about 3449 MW through uprating, life extension and restoration are planned for completion at an estimated cost of about Rs.4917 Crores. One scheme of MeECL namely Umium St.III (Kyrdekulai) and one scheme of TANGEDCO namely Moyar PH is programmed to be taken up in 12th Plan and will accrue benefit of 66 MW (6 MW uprating & 60 MW-LE) during 13th Plan. Out of the 45 schemes programmed for completion during 12th Plan, 3 schemes in State sector with an installed capacity of about 941 MW have been completed till December, 2012 and have accrued a benefit of 50 MW through Life Extension. Plan-wise summary of R&M of H.E. Projects starting from 9th Plan is given below:

Summary of Hydro R&M Schemes (As on 31.03.2013)

I Hydro R&M schemes completed up to 11th Plan:

Sl.No	Plan Period	No. of Projects			Installed Capacity (MW)	Estimated Cost (Rs. in Crs.)	Actual Expenditure (Rs. in Crs)	Benefit (MW)
		Central Sector	State Sector	Total				
1.	9 th Plan Schemes completed	8	12	20	4892.10	597.84	570.16	1093.03 [339.00(U) + 331.03(Res.) + 423.00(LE)]
2.	10 th Plan Schemes completed	5	27	32	4336.60	1016.31	1028.97	829.08 [123.40(U) + 701.25 (LE) + 4.43(Res.)]
3.	11 th Plan Schemes completed	4	14	18	4821.20	412.83	294.84	735 [12 (U) + 15 (LE) + 708 (Res.)]

II Candidate Hydro R&M schemes for 12th Plan:

Sl. No	Plan Period	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)	5	40	45	7645	4917	1044	3449 [192(U) + 3242(LE) + 15(Res.)]
	Revised							
b)	Completed	-	3	3	940.60	95.35	62.17	50 [50 (LE)]
c)	Under implementation	3	16	19	5002	2102	969	1643 [133.00(U) + 1495.10(LE) + 15.0(Res.)]
d)	Under Tendering	2	16	18	1353	2510	13	1401 [53.80(U) + 1347.35(LE)]
e)	Under DPR Finalisation	-	3	3	250	159	-	255 [5.25(U) + 249.75(LE)]
f)	Under RLA Studies	-	2	2	10	49.94	-	100.00 [100.00(LE)]

Abbreviations: MW – Mega Watt; Res. – Restoration; U – Up-rating; LE – Life Extension

5.13 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.

5.14 Techno-Economic Appraisal / Concurrence of Hydro Schemes:

During the year 2012-13 (01.04.2012 to 31.03.2013), CEA had appraised and accorded concurrence to 06 Nos. Hydro Generation schemes aggregating to 2516 MW capacity with an estimated financial investment of Rs. 16687.37 Crores.

5.14.1 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, CWC & GSI before the proposals were considered by CEA for its concurrence. Review meetings were convened from time to time by Member (H) 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 2012-13, Six (06) hydro generation schemes aggregating to 2516 MW capacity were appraised / accorded concurrence and net reduction in estimated cost achieved for these projects worked out to Rs 661.64 Crores (about 4.70%) in hard cost and Rs. 155.78 Crores (about 4.53%) in Soft cost as detailed in **Annexure-5E.**

CHAPTER – 6

THERMAL POWER DEVELOPMENT

6.1 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 Ultra Mega Power Projects (UMPP) 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 are identified by CEA in consultation with the State Government.

Initially following nine (9) Ultra Mega Power Projects (UMPP) 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- 5 x 800 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

Out of above nine (9) UMPPs, Four UMPPs namely Sasan in M.P, Mundra in Gujarat, Krishnapatnam in Andhra Pradesh and Tilaiya in Jharkhand have been awarded and transferred to the developers selected through tariff based competitive bidding. For the Mundra UMPP all the Five Units of 800 MW each have been commissioned. Construction work of Sasan UMPP is in advanced stage and one Unit of 660 MW has been synchronized on 9.3.2013. All the six units of 660 MW each of Sasan UMPP are expected to be commissioned in 12th Plan. For Tilaiya UMPP, land acquisition and preliminary works are under progress. Five units of 660 MW of Tilaiya UMPP are scheduled for commissioning during the 12th Plan and one unit of 660 MW in 13th Plan. For Krishnapatnam UMPP, the developer has stopped the construction. The procurers had issued termination notice. The matter is subjudice. The salient features and commissioning schedule of the UMPPs already awarded are enclosed at **Annexure- 6A.**

Bidding process for selection of developers for the UMPPs in Odisha & Chhattisgarh had been initiated. In the meanwhile, the Standard Bidding Documents (SBDs) were taken up for review. The bidding process is held up for want of revised SBDs. For Cheyyur UMPP in Tamil Nadu, site has been finalized and the project will be taken up for bidding as soon as revised SBDs are issued. In regard to UMPPs in Maharashtra and Karnataka the

alternate sites are yet to be firmed up as the work at original site could not be taken up due to resistance by local people.

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 Odisha
- ii) Second UMPP in Gujarat- 4000 MW-
- iii) Second UMPP in Andhra Pradesh -4000 MW
- iv) Second UMPP of 4000 MW in Jharkhand
- v) Second UMPP of 4000 MW in Tamilnadu
- vi) UMPP in Bihar – 4000 MW

The sites for the two additional UMPPs in Odisha, Second UMPP in Andhra Pradesh and Jharkhand and one UMPP in Bihar have been finalized and the site related studies have been taken up by the consultants appointed by the SPVs. In regard to Second UMPPs in Gujarat and Tamil Nadu the selection of sites is under process.

6.2 Selection of sites for Thermal Power Projects

1. In the context of the need to set up additional thermal power stations to meet the power requirements of the country, CEA had in September, 2001 constituted a committee under the Chairmanship of Member (Thermal) and 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 from time to time, the sites tentatively identified by the State agencies. 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.

2. 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 were 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 had 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 36000 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. Final reports of the study have been submitted by CMPDI in December 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 & additional water availability. Final report of the study has been submitted in March 2011.
 - vi) Study awarded to CMPDI in June 2011 for Identification of potential sites for coal based power plants in the states of Karnataka (Coastal) and Uttar Pradesh. Final reports of the study for the states of Karnataka and Uttar Pradesh have been submitted by CMPDI in November 2012 and March 2013 respectively. CMPDI has identified 2 nos. of coastal sites in Karnataka viz (1) Divigi village in Uttar Kannda district. (2) Honavar town in Uttar Kannda district and 7 following sites in Uttar Pradesh (1) Sonik village in Unnao district. (2) Shahganj settlement in Jaunpur district. (3) Sandila town in Hardoi district. (4) Pihani in Hardoi district. (5) Haliyapur village in Sultanpur district. (6) Pure Kalhans/ Amaniganj in Faizabad district. (7) Harringtonganj in Faizabad district. The reports have been sent to the State Govts. for necessary action for development of the identified sites.
 - vii) Study awarded to CMPDI in February 2012 for Identification of potential sites for coal based power plants in the state of Punjab. Draft Report of the study has been submitted by CMPDI in August 2012.
3. The Site Selection Committee has visited and finalized reports on the new sites in the following States:
- i) Nine 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
 - xii) Three sites in Uttar Pradesh
 - xiii) Three sites in Bihar
- Based on the report of CMPDI, NRSA and site visits by the teams of the Site Selection Committee, a large shelf of potential sites has been created. Many sites from this shelf were identified for benefits during the 11th plan and beyond. The sites for some of the Ultra Mega Power Projects (UMPPs) have been identified from the shelf of sites created under the scheme.

6.2.1 Status of ongoing studies by CMPDI

Study awarded to CMPDI in February, 2012 for Identification of potential sites for coal based power plants in the state of Punjab is under progress. Draft Report of the study has been submitted by CMPDI in August 2012. A joint visit to Punjab by a

team of officers from CEA, CMPDI, PSPCL, State Irrigation Department along with revenue officials was held from 05.02.2013 to 08.02.2013. The final report is expected to be submitted by CMPDI shortly.

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 were issued for Case I and Case II bidding. Many utilities in states like Haryana, Punjab, Madhya Pradesh, Uttar Pradesh, Chhattisgarh, Maharashtra, Karnataka, etc. have already invited or propose to invite 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 33,160 MW are enclosed as **Annexure-6B**. This will facilitate significant capacity addition in private sector. Many State Utilities / Discoms have also contracted procurement of power from the IPPs through Case -I bidding. The Government has also set up Special Purpose Vehicles 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 has come up and is expected to come up through IPPs. The Government is committed to carry this process forward. 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 helping the independent power producers to overcome various challenges in the way of project implementation. The private sector contributed 2670 MW (Thermal- 1970 MW & Hydro- 700 MW) to generation capacity during period 2002-07 whereas during 11th Plan period 2007-12 capacity of 23,012 MW (Thermal- 21,720 MW & Hydro- 1292 MW) was commissioned in private sector. Further during the first year of the 12th plan, capacity of 11,257 MW (Thermal- 11187 MW & Hydro- 70 MW) has already been commissioned upto 31.3.2013 in the Private sector. The private sector is likely to contribute substantial generating capacity in the 12th Plan period (2012-17), considering that new capacity of 62,245 MW (Thermal- 59,030 MW & Hydro- 3215 MW) is under construction in private sector.

In addition a large no. of IPPs have applied for coal linkage totaling to more

than 3,50,000 MW . They are in simultaneous coordination with states for acquiring land, water, and other inputs. Min. 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 has carried out the exercise of prioritization of projects for 12th Plan and recommended to MoP to consider recommending to Min. of Coal for consideration for grant of new LoAs for prioritised projects for commissioning during 13th Plan. Based on the prioritization done by CEA Min. of Power has recommended IPP projects to Min. of Coal for consideration of coal linkage.

6.4 Construction Monitoring of Thermal Power Projects

A capacity of 88536.6 MW (Thermal: 72339.6 MW + Hydro: 10897 MW + Nuclear: 5300 MW) was originally targeted for capacity addition during 12th Plan period.

As against the 12th Plan thermal capacity addition target of 72339.6 MW, a capacity of 20121.8 MW has been commissioned till March, 2013. Thermal capacity of 20121.8 achieved during the 12th Plan also includes an additional capacity of 3802.5 MW which was not included in the 12th Plan target.

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 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:

- Detailed schedules were drawn up for equipment supplies and project milestones commitments from project authorities and equipment suppliers/executing agencies for on-going projects.
- Participated in various review meetings held in Ministry of Power, Ministry Heavy Industries and Planning Commission etc.
- Thermal projects visited to assess the progress of various activities at site including Gas based projects.
- Review meetings were held with various implementing agencies including suppliers to review the progress of work and finalizing the completion schedule to match the commissioning of the thermal plant.

6.5 Thermal Capacity Addition Programme

6.5.1 Capacity addition achieved during 2012-13.

During the year 2012-13, a thermal capacity of 13374.3 MW was added against a target of 15154.3 MW. An additional capacity of 3802.5 MW (capacity which was

not included in planned target) and 2945 MW (included in 12th Plan, but commissioning preponed) has also been added during the same period. The details of the projects programmed /commissioned during the year 2012-13 and additional units commissioned during the year 2012-13 are given at **Annexure-6C**. Some of the main reasons identified for the delays include non-readiness of power evacuation system, balance of plants and non-subsequential supply of equipment, slow civil works along with interfacing problems with equipment erection, Law and Order problems, contractual dispute between project developer and contractor and their sub vendors, delay in land acquisition etc.

6.5.2 Thermal Capacity Addition Target during 2013 - 14

During the year 2013-14, a thermal capacity of 15234.3 MW has been targeted. Quarter-wise breakup of the targeted capacity addition is as under:

Year 2013-14	Capacity (MW)
1 st Quarter	3425
2 nd quarter	4049.3
3 rd Quarter	4085
4 th Quarter	3630
Total	15234.3

The details of the projects are given at **Annexure-6D**.

6.5.3 Monitoring by the Central Electricity Authority

The Central Electricity Authority (CEA) has a nodal officer associated with each on going project which continuously monitors the progress at site through frequent visits and continuous interaction. The respective Nodal Officer is responsible for submitting a report on the progress of each of the on going power project on

monthly basis highlighting the critical areas where corrective actions are required. The Chairperson, CEA reviews monthly progress of the on going projects with the nodal officers. The CEA also holds quarterly review meeting with the developers and other stakeholders.

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.

A number of 660/ 800MW Units are operational in the country and many more number of supercritical units of 660/800 MW are under construction for likely commissioning in 11th Plan and 12th Plan. Though, initial supercritical units were designed with steam parameters of 247 kg/cm², 537/565 deg C, higher steam parameters of 247 kg/cm², 565/593 deg C are being adopted for new supercritical units.

As a result of efforts being made to encourage international manufacturers to set up manufacturing facilities for supercritical units in India so as to create indigenous manufacturing capability, several joint venture companies have been/are being set up between international manufacturers and Indian companies for manufacturing supercritical boilers/turbo-generator in the country. 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). Another bulk order for 9 nos. 800 MW units for NTPC with similar conditions have also

been approved. CEA has been actively associated in the whole process and the progress of phased manufacturing program would be monitored by a Committee under CEA.

6.6.2 Standard Technical Features for Supercritical Units of 660/800 MW

Preparation of document on standard technical features for supercritical units has been undertaken. A Committee comprising NTPC, BHEL, power utilities, power equipment manufacturers and consultants has been set up for the preparation of document. The draft Standard Technical Features for Supercritical Units of 660/800 MW were prepared and comments were sought on it from manufacturers and utilities. The document is under review for the comments received from some of the members.

6.7 Important Activities

Following activities were also undertaken:

a) A Group has been constituted by CEA with Members from BHEL, NTPC & CIMFR for studying the range of blending of imported coal with domestic coal. The report has been finalized and sent to all concerned.

b) CEA had set up a Committee to examine the issue of dry cooling system for condenser cooling in thermal power plants. The report of the Committee, including for minimization of plant consumptive water requirement, finalized and sent to Utilities in the power sector.

c) CEA is associated with "Advisory Committee for Project Safety Review for Nuclear stations".

d) A group has been constituted by CEA with members from NTPC, BHEL, PGCIL, ABB etc. to formulate basic design parameters and features for 765/ 400/ 220/ 132 kV switchyard for Thermal / Hydro power projects and sub-stations. The document was finalized, printed and was under issue.

e) CEA has been associated with the work of development of geothermal energy for generating the electricity and other non-electrical utilisation in the country.

f) Officers of this Division were represented on the following Committees:

i. CEA was associated with the 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).

ii. A Committee has been set up by Ministry of Power (MoP) under the Chairmanship of Member (Thermal), CEA and comprising members from power utilities CISF & NIC for development of Infrastructure protection plan in thermal power sector. The report has been finalized and sent to MoP.

iii. An officer from TETD Division, as member of MoEF delegation participated in UNFCCC climate change talks in Bonn, Germany and Bangkok, Thailand.

iv. CEA has been associated with the committee set up by HPGCL for recommending most suitable option for early and reliable repair of HIP turbine rotor of 300MW unit-2 of DCRTTP Yamunanagar. The report finalized.

v. An Officer from TETD Division was nominated to Steering Committee being set

up by Confederation of Indian Industry (CII) for organizing Power Plant Summit 2013.

vi. CEA has been associated with the Committee set up by Min. of Railways, RDSO for evolving “Indian Railways Electrical Code”

vii. An officer from TETD Division was nominated as a member of auditing team for auditing of R&D activities undertaken by CPRI during last five years.

viii. A Committee under the chairmanship of CE (TETD) with members from NIOH, NTPC, CPCB, Factory Inspectors & Utilities was constituted to workout the methodology for working of the Standing Committee on Occupational Health & Safety of the Coal Fired Thermal Power Plants. The report finalized & submitted to Standing Committee.

ix. CE (TETD) is a member of Standing Committee on Occupational Health & Safety of Thermal Power Plants constituted by MoP

x. CE (TETD) is a member of the water tube boiler sub-committee constituted by Central Boiler Board.

xi. CE (TETD) is a member of Central Boiler Board.

xii. CE (TETD) is a member of Standing Committee under CEA for monitoring & imposition of Liquidity Damages (LD) for Phased Manufacturing Programme (PMP) under the bulk tender –I (660 MW).

xiii. CE(TETD) is a member of Standing Committee under CEA for monitoring & imposition of Liquidity Damages (LD) for Phased manufacturing Programme (PMP) under the bulk tender –II (800 MW) .

xiv. Director (TETD) is a member of task force for “Pilot project on testing of Primary Frequency Response from Generating Units

under Free Governor Mode Operation (FGMO) of Thermal Units.

Visits:

xv. Officers from TETD visited Harduaganj TPS in connection with failure of stator of BHEL make generator of 250MW Unit # 8.

xvi Officers from TETD visited Parichha TPS in connection with failure of 400/16.5kV, 315MVA, M/s Alstom make 3-phase generator transformer of 250MW Unit # 6.

Officers from TETD visited Mundra 4000MW UMPP of Tata Power in connection with failure of 4 no. transformers (2 no. GTs and 2 no. UTs) and 4620 MW Adani TPS regarding problem of slagging in the boiler.

6.8 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.

6.8.1 National Perspective R & M Plan

Based on the discussions held with Ministry of Power, various utilities, PFC and BHEL, CEA have prepared a document on

“National Perspective Plan for Renovation & Modernisation and Life Extension and uprating (LE&U) of thermal power stations up to 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. The revised guidelines for R&M of coal

based thermal power station were also issued.

6.8.2 LE/ R&M Programme during 12th Plan (2012 - 2017):

Break up of units identified for LE /R&M works during 12th plan state /central sector wise is furnished as under:-

Particulars	LE/R&M works identified during 12 th Plan No. of units & capacity (MW)		Total (State Sector + Central Sector)
	State Sector	Central Sector	
LE	38 (6820)	32 (5246)	70 (12066)
R&M	20 (4150)	45 (13151)	65 (17301)
Total	58 (10970)	77 (18397)	135 (29367)

6.8.3 Plan wise LE / R&M achievements:

S. No.	Five Year Plan	Year	No. of TPS / No. of Units	Capacity (MW)	Additional Generation Achieved MU/ Annum*	Equivalent MW**
1	7 th Plan & 2 Annual Plans	85-86 to 89-90 & 90-91, 91-92	34 / 163	13570	10000	2000
2	8 th Plan (R&M) (LEP)	92-93 to 96-97	44 / 198 43/(194) 1 /(4)	20869 (20569) (300)	5085	763
3	9 th Plan (R&M) (LEP)	97-98 to 2001-02	37 / 152 29/ (127) 8/ (25)	18991 (17306) (1685)	14500	2200
4	10 th Plan (R&M) (LEP)	2002-03 to 2006-07	9/25 5/(14) 4/(11)	3445 (2460) (985)	2000	300
5	11 th Plan (R&M) (LEP)	2007-08 to 2011-12	21/72 15/(59) 6/(13)	16146 (14855) (1291)	5400	820

6.9 Achievement of R&M/LE Programme during the 12th Plan upto 31st March 2013:

LE Programme:

Central Sector (1 No. unit)

Kawas CCPP, GT-2 (106 MW)
Synchronised on 21.01.2013

State Sector (1 No. Unit)

Bathinda TPS Unit – 3 (110 MW) -
Synchronised on 05.08.2012.

Sub total (LE) - 2 Unit (216 MW)

R&M Programme:

Central Sector (1 No. unit)

Tanda TPS Unit – 2 (110 MW) –
Synchronised on 15.09.2012

State Sector (5 Nos. of units)

1. DPL TPS Unit – 6 (110 MW) -
Synchronised on 07.05.2012.
2. Patratu TPS Unit – 10 (110 MW) -
Synchronised on 24.05.2012.
3. Anpara'A TPS Unit – 1 to 3
(3x210 MW) scheme completed on
31.3.2013.

Sub total (R&M) - 6 Units (960 MW)

Total (LE and R&M) - 8 Units (1176 MW)

6.10 LE and R&M Targets during 2013 – 14 of 12th Plan

Details of State / Central Sector wise
LE /R&M works to be executed during
2013-14 of 12th 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	6	660	3	343	9	1003
2	R&M works	4	1210	0	0	4	1210
	TOTAL	10	1870	3	343	13	2213

Unit-wise and Sector details of LE and R&M works to be executed during the year 2013-14 are furnished in **Annexure-6E.**

6.11 External Co-operation for Energy Efficiency R&M of Thermal Power Stations

To demonstrate the Energy Efficiency R&M programme in thermal power stations in India, a few pilot R&M projects have been financed by some external funding agencies such as KfW Development Bank-Germany, World Bank, European Union (EU) and METI (Ministry

of Economy, Trade and Industry), Japan. The details of the above programme are as follows:-

6.11.1 Energy Efficiency R&M Programme funded by KfW Bank-Germany

Under Energy Efficiency R&M Programme, KfW Development Bank-Germany has provided a soft loan of Euro 90 million for implementation of Energy

Efficiency R&M of two units of 210MW viz Nasik Unit- 3 of MAHAGENCO and one Unit of Kolaghat TPS of WBDCL. In addition to the above, KfW Bank has also provided a grant of Euro 1.3 million for preparation of feasibility reports /DPR to identify & finalize the scope of works for R&M/LE for the following seven units at three thermal power stations through a consultant:-

- i) Nasik TPS, U-3 (210MW) of Mahagenco.
- ii) Kolaghat TPS, U-1, 2 & 3 (3x210MW) of WBDCL.
- iii) Bokaro 'B' TPS, U-1, 2 & 3 (3x210MW) of DVC.

M/s Evonik Energy Services GmbH, Germany was selected as Consultant through ICB route to prepare feasibility study / DPRs for the above seven (07) units. The implementation of R&M/LE works based on the Detailed Project Report (DPRs) would be taken up by the concerned utilities. The present status of the programme is as under:-

i) Nasik TPS

The final DPR for Unit-3 (210 MW) was prepared by the consultant, and same has been accepted by MAHAGENCO and MERC. As per the DPR the estimated cost of the R&M works is ₹ 481.46 crores (62 millions Euro). The approval of tender document by MAHAGENCO Board and signing of the loan agreement with KfW is in process.

ii) Kolaghat TPS

The DPRs for Unit-1, 2 & 3 (3x210 MW) of Kolaghat TPS, WBDCL were prepared. As per the DPR the estimated cost of the R&M works for unit-3 is ₹ 567 crores (90 million Euro). WBDCL has requested KfW for

enhancement of the fund to meet capital expenditure.

iii) Bokaro 'B' TPS

The revised DPRs for Unit-1, 2 & 3 (3x210 MW) of Bokaro 'B' TPS were prepared. The comments/ acceptance of DVC is awaited.

6.11.2 Development of the Tendering Procedures and Model Contract for the R&M of Fossil Fuel Based Power Plants in India.” Funded by KfW Bank/Germany.

The Sub-Group-I on “ Efficiency Enhancement in Fossil Based Power Plants” constituted under the Indo-German Energy Forum, in its first meeting held on 12.03.2008 identified the Development of Standard Documents for R&M Projects was envisaged to be done in two phases as under.

Phase-I Task

The objective of Phase-I activity is an assessment of tendering procedures currently being followed by public utilities in India and a review of documents used for standard R&M projects as well as the documents which have already been developed for projects financed particularly by World Bank. The report on Phase-I activity submitted in September 2009.

Phase-II Task

The main objective of Phase-II activity is the preparation of the model documents/templates for R&M Projects in consultation with task force, power utilities & financing agencies. MoP has nominated CEA as “Project Executing Agency”. M/s Lahmeyer submitted the draft model Feasibility Report incorporating which has been sent to members of Task Force, KfW, IGEF and stakeholders for consultation.

6.11.3 “Coal-Fired Generation Rehabilitation Project-India” funded by World Bank.

The World Bank has financed the “Coal-Fired Generation Rehabilitation Project-India” for demonstrating Energy Efficiency Rehabilitation & Modernization (EE R&M) at coal fired generating units through rehabilitation of 640 MW of capacity across three States-West Bengal, Haryana and Maharashtra. The above project has two components:-

Component - 1. Energy Efficiency R&M at Pilot Projects

This component would fund Energy Efficient R&M of 640 MW capacity comprising Bandel TPS Unit-5 (210 MW) of WBPDC, Koradi TPS Unit-6 (210 MW) of Mahagenco and Panipat TPS Unit-3&4 (2x110 MW) of HPGCL. The World Bank has earmarked US \$ 180 million of IBRD loan and US \$ 37.9 million of GEF grants for the Component-1.

Component - 2. Technical Assistance to CEA and Utilities

The Technical Assistance component of the project is aimed at providing support in implementation of EE R&M pilots, developing a pipeline of EE R&M interventions, addressing barriers to EE R&M projects and strengthening institutional capacities of implementing agencies for improved operation and maintenance practices. The World Bank has earmarked USD 7.5 millions GEF Grant for the Component -2.

6.11.4 World Bank funded EE R&M Pilot Projects

i) Bandel TPS, (Unit-5,210 MW)

Total cost of the project is around Rs. 652 crores (based on the bidding). Fund allocation for the Bandel TPS is around

US \$ 59 million (Loan) and Grant US \$ 12.45 million. Cumulative expenditure incurred is Rs. 54.62 Crore. The R&M project consists of four major packages BTG, Electrical, AHP & CHP.

ii) Koradi TPS, (Unit-6,210 MW)

Total estimated cost of the project is ₹ 486 Cr. Fund allocation for the Koradi TPS is around US \$ 59 million (Loan) and Grant US \$ 12.45 million. The R&M project consists of four major packages BTG, Electrical, BOP & CHP.

iii) Rapid Social Assessment Consultant for three plants Chandrapur TPS (Unit 1&2,2x210 MW), Bhusawal TPS (Unit-2, 210 MW) and Parli TPS (Unit-3, 210 MW)

Contract was signed on 29-07-2011 with M/s Harshal Gramin Vikas Bahu Sanstha for contract price of ₹13.52 lacs. The final report was submitted by the consultant on 11.01.2013 to Bhusawal TPS.

iv) Appointment of Design Consultant and Environment and Due Diligent (EADD) Consultant for Chandrapur TPS, U-1&2, Bhusawal TPS, U-2, Parli TPS, U-3

The above consultants have been appointed. For Chandrapur TPS and Bhusawal TPS DPR under preparation. EADD report of Chandrapur, Bhusawal and Parli TPS is under finalization.

v) Panipat TPS (Unit-3&4, 2x110 MW)

The unit 3 &4 of Panipat TPS was initially identified for R&M under World Bank Programme and a DPR was prepared. In the financial sensitivity analysis of change in station heat rate R&M of these

units were not financially viable. Therefore, HPGCL has requested World Bank to consider foreclosure of the Loan agreement. HPGCL has shown interest to carry out assessment of O&M Practices under World Bank fund. Accordingly EOIs have been evaluated and short listing of consultants have been sent to World Bank for their approval.

The World Bank is providing technical assistance of US \$ 1.1 million as a part of GEF grant to CEA under “Coal Fired Generation Rehabilitation Project-India” for addressing the barriers to Energy Efficient R&M of coal fired generating units in India. The project is being implemented by CEA through appointment of consultants for carrying out studies.

6.11.5 Technical Assistance to CEA

Various consultants for carrying out the studies have been appointed and the present status is as under:

Sl. No.	Consultancy services	Status as on (31.03.2013)
1.	Implementation Support Consultancy (ISC)	M/s ABPS Infrastructure was appointed as ISC on 28.10.2010 for assisting CEA in implementing the project.
2.	Study on Reduction of Barriers to R&M intervention in thermal power station in India.	M/s Mercados Energy Market India has been appointed as a consultant w.e.f. 24.04.2012. M/s Mercados visited various power utilities/entities for stake holder consultation during July-September, 2012 and submitted two draft guidelines i.e. ‘Risk identification & mitigation measures in R&M projects’ and ‘Early identification of potential technical surprises & way of addressing them’. These guidelines have been discussed in the 2 nd Task Force meeting held on 21-12-2012. The Draft Report on Study of International Best Practices in R&M and Draft report on study of Identifying the Potential Reduction in GHG Emission and possible framework for monetizing the GHG reduction. The reports have been sent to members of the task force for their comments.
3.	Study on Developing Markets for implementation of R&M in thermal power stations in India	M/s Mercados Energy Market India has been appointed as a consultant w.e.f. 14.05.2012. They have submitted the draft report on “Estimation of R&M potential in India during XII and XIII Five Year Plan” in January 2013. The Draft report on study on Developing Market of Implementation of R&M scheme in thermal power stations in India has been submitted on 6 th March’ 13 and sent to members of the task force for their comments.

4.	Review of Experience from Pilot R&M projects	M/s WAPCOS Ltd. has been appointed as a consultant w.e.f. 23-07-2012. M/s WAPCOS submitted inception report on 06-09-2012 and started consultation with utilities for collection of inputs on procurement experience in R&M projects. WAPCOS experts have visited the Panipat TPS in October'12, Amarkantak TPS & Koradi TPS in March '13 for review of R&M experiences.
5.	Review of Institutional Capacity and capacity strengthening interventions in CEA	M/s KPMG has been appointed as consultant w.e.f. 16-07-2012. M/s KPMG submitted inception report 30-08-2012. A workshop has been held in CEA in October'12 to have discussions with officers of CEA. They are carrying out the stakeholder consultation to prepare a report on 'Customer Expectation Survey'.

6.12.1 Japan-India co-operation for study on Efficiency and Environmental Improvement of Coal Fired Stations

The 2nd Phase MoU between CEA and JCOAL has been signed on 11.06.2012 for carrying out detail diagnostic study for energy efficiency oriented R&M activities in three nos. of units.

Durgapur TPS unit no.4 (210 MW LMZ Unit) and one unit each from Badarpur TPS and Unchahar TPS, 210 MW each were selected for studies during the 2nd phase. A draft report was submitted in the 2nd week of March, 2013. A workshop was held on 27.11.2012 on "Project on Efficiency and Environmental Improvement of Coal Fired Power Stations – Towards sustainable, stable and low carbon supply of electricity.

6.12.2 Japan International Co-operation Agency (JICA) Study on Renovation & Modernization /Complete Replacement of State Sector old inefficient coal based thermal power station in India.

A study on Renovation & modernization complete replacement of state sector old inefficient coal based thermal power stations in India was assigned to

JICA by Government of India in respect of the following state sector power stations:

- Obra A TPS Unit No. 1 to 8 (U.P) – complete replacement.
- Satpura TPS Unit No. 1 to 5 (M.P) – complete replacement.
- Bhusawal TPS Unit No. 2 & 3 (Maharashtra) – complete replacement.
- Parli TPS Unit No. 3 to 5 (Maharashtra) – complete replacement or R&M.

JICA had conducted site visit during the period of March-April 2012 in above all the TPSs and the Final Report was submitted on 21.06.2012 by JICA.

6.13 Fly Ash Generation & Utilization

6.13.1 Monitoring by CEA

Central Electricity Authority is monitoring fly ash generation and its utilization at coal/ lignite based thermal power stations in the country since 1996. Data on fly ash generation and utilization is obtained from thermal power stations on half yearly and yearly basis. The said data is analyzed and reports bringing out the status of fly ash generation and its utilization in the country are prepared and submitted to Ministry of Power and Ministry of Environment and Forests. The said report is

also uploaded on web site of CEA for bringing the information in public domain.

6.13.2 MOE & F's Notifications on Fly Ash Utilization

For addressing the problem of pollution caused by fly ash being generated at coal/lignite based thermal power stations in the country and for reducing the requirement of land for disposal of fly ash in case of new projects or expansion units, a notification on fly ash utilization dated 14th September, 1999 was issued by MoEF in 1999 which was subsequently amended in 2003 vide notification dated 27th August, 2003 and again in 2009 vide notification dated 3rd November, 2009 stipulating targets for thermal power stations for achieving 100 % utilization of fly ash within 4/5 years in a phased manner from the date of notification/ commissioning and also prescribing the use of fly ash and fly ash based building products in various construction activity, mine filling etc. within specified radius of any thermal power station.

As per the latest amendment dated 3rd November, 2009, all coal and, or lignite based thermal power stations and, or expansion units in operation before the date of said notification are required to achieve the target of 100% fly ash utilization in five years from the date of issue of notification and the new coal and, or lignite based thermal power stations and, or expansion units commissioned after the date of issue of notification have to achieve 100 % ash utilization within 4 years from the date of commissioning.

6.13.3 Fly Ash as a Resource Material

Traditionally, fly ash (which includes bottom ash also as per MoEF's Notification) generated at coal/lignite based

thermal power stations was being treated as a waste material and was being disposed off in ash ponds being created for the said purpose. However, fly ash has now been recognized as a 'resource material' and 'useful commodity' capable of being utilized in many civil construction activities in an eco-friendly manner. Fly ash has pozzolanic properties and it is used in manufacturing of Portland Pozzolona Cement as well as part replacement of cement in concrete.

6.13.4 Important Areas of Ash Utilization

The important areas in which ash is being presently utilized are as under:

- In manufacturing of Portland Pozzolana cement;
- As a part replacement of cement in concrete;
- In making fly ash based building products like bricks, blocks, tiles, road blocks, Kerb Stones etc;
- In the construction of roads, flyovers, embankments, raising of ash dykes etc.;
- In construction of Roller Compacted Concrete Dams in Hydropower Sector;
- In reclamation of low lying areas and raising of ground level;
- Backfilling/ stowing of mines;
- In agriculture and waste land development

6.13.5 Status of Ash Generation & Utilization for the Year 2010-11 and 1st Half of the Year 2011-12

During 2012-13, data on fly ash generation and utilization for the year 2011-12 and half yearly data for the 1st half of the year 2012-13 (April to September, 2012) were obtained from coal/lignite based thermal power stations. The data was analyzed for ascertaining the present status of ash utilization at thermal power stations

in the country and compliance of MoEF's notification. A brief of the same is given below:

(A) A Brief Summary

As per data for the year 2011-12 and half yearly data for 1st half of the year 2012-13 received from coal/lignite based thermal power stations, the present status of fly ash generation & utilization is given in the table below:

Description	2011-12	1 st Half of 2012-13 (April-Sept.)
Nos. of Coal/Lignite based Thermal Power Stations from which data was received	124	126
Data received for an installed capacity (MW)	105925	112325
Coal consumed (Million tons)	437.41	229.9
Ash contain (%)	33.24	33.25
Fly Ash Generation (Million tons)	145.42	76.45
Fly Ash Utilization (Million tons)	85.05	43.86
Percentage Fly Ash utilization	58.48	57.38

It may be seen from above that about 58 % of total ash produced at coal/lignite based thermal power stations has been gainfully utilized in various modes of fly ash utilization during 2011-12 and 1st half of 2012-13

(B) Modes of Ash Utilization during 2011-12

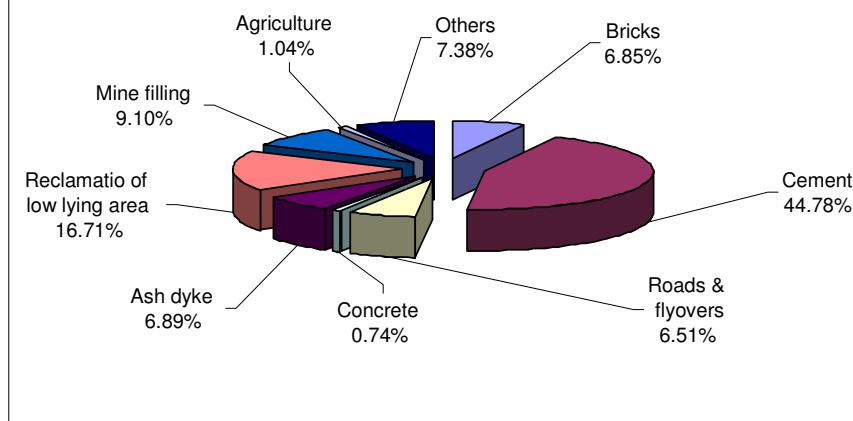
The major modes in which ash was utilized during the year 2011-12 and 1st half of year of 2012-13 are given in table below:

MAJOR MODES OF FLY ASH UTILIZATION DURING THE YEAR 2011-12 AND 1ST HALF OF YEAR OF 2012-13

Sl. No.	Modes of utilization	2011-12		1 st Half of the year 2012-13	
		Utilization (Million-ton)	Utilization in %	Utilization (Million-ton)	Utilization in Percentage
(1)	(2)	(3)	(4)	(5)	(6)
1	Cement	38.08	44.78	19.13	43.62
2	Reclamation of low lying area	14.21	16.71	5.12	11.67
3	Roads & Flyovers	5.54	6.51	2.63	6.00
4	Mine filling	7.74	9.10	4.21	9.60
5	Ash dyke raising	5.86	6.89	3.88	8.84
6	Bricks & Tiles	5.83	6.85	4.18	9.53
7	Agriculture	0.88	1.04	1.27	2.90
8	Part replacement of cement in concrete	0.63	0.74	0.47	1.07
9	Others	6.28	7.38	2.97	6.77
Total		85.05	100	43.86	100

The utilization of fly ash in various modes in percentage during 2011-12 in the form of a Pie diagram is given below:

MODE OF FLY ASH UTILIZATION DURING 2011-12

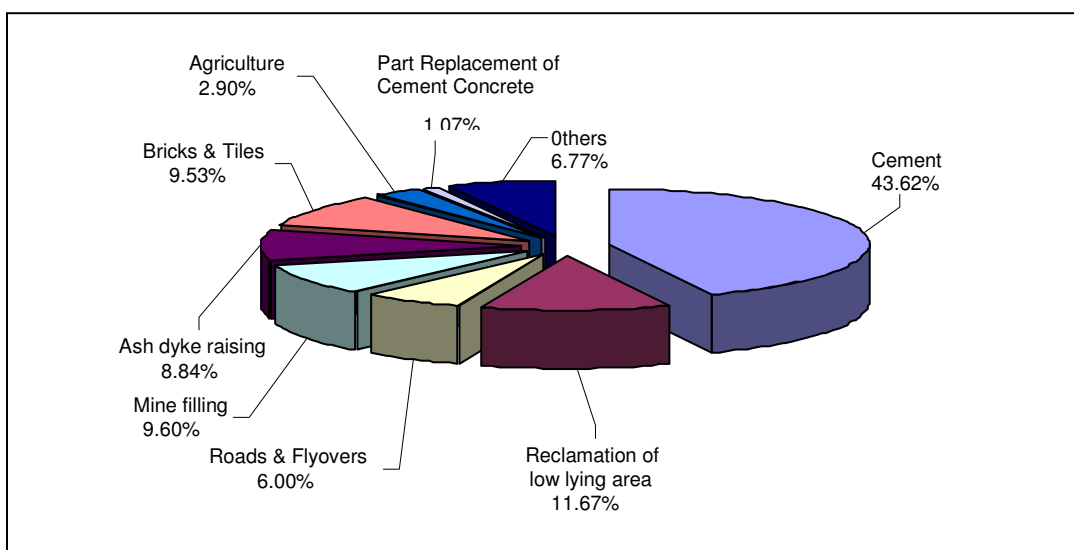


The maximum utilization of fly ash during 2011-12 to the extent of 44.78% has been in Cement sector, followed by 16.71% in reclamation of low lying area, 9.10% in mine filling etc. The utilization of fly ash in the construction of Roads & Embankment was 6.51% and in making of fly ash based building products like bricks, tiles etc was 6.85%.

(C) Modes of Fly Ash Utilization during 1st Half of 2012-13

The utilization of fly ash in various modes in percentage during 1st Half of 2012-13 in the form of a Pie diagram is given below:

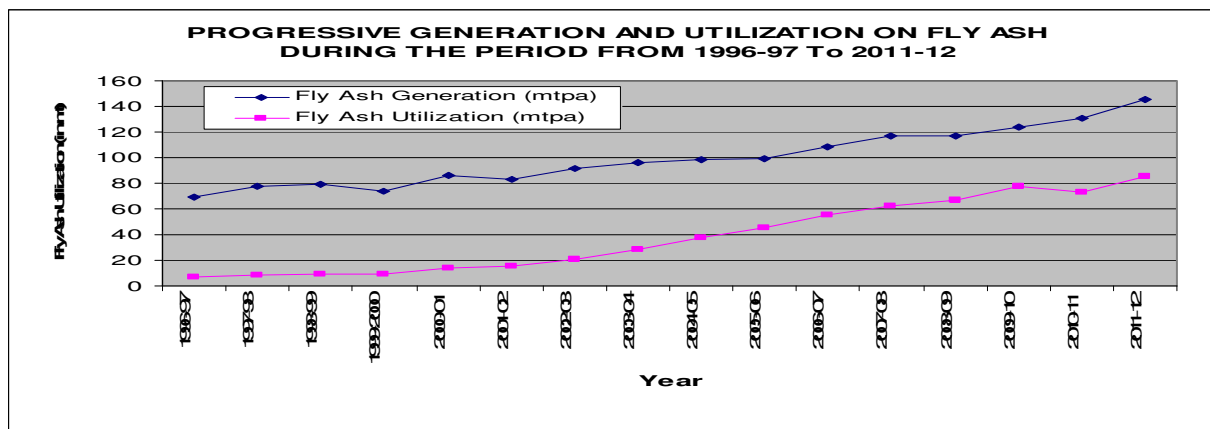
FLY ASH UTILIZATION IN VARIOUS MODES DURING 1ST HALF OF 2012-13 (In Percentage)



The maximum utilization of fly ash during 1st Half of the year 2012-13 to the extent of 43.62% has been in Cement sector, followed by 11.67% in reclamation of low lying area, 9.60% in mine filling etc. The utilization of fly ash in making of fly ash based building products like bricks, tiles etc was 9.53% and in Roads & Flyovers was 6.00%.

6.13.6 Progressive Fly Ash Generation & Utilization during the Period From 1996-97 To 2011-12

The fly ash utilization has increased from 6.64 million ton in 1996-97 to a level of 85.05 million ton in 2011-12. A graph showing progressive ash generation and its utilization for the period from 1996-97 to 2011-12 is given below.



It may be seen from above graph that utilization of fly ash in terms of quantity has been increasing over the years except that there was a dip in fly ash utilization during year 2010-11 and it has now picked up during 2011-12.

6.13.7 Conclusion

Overall utilization of fly ash during 2011-12 and the first half of 2012-13 has been about 58.48% and 57.38% respectively against

55.79% during 2010-11 and thus show an improvement. However, the utilization level in terms of percentage is hovering around 36-60% for the last few years. A lot of efforts are required by all concerned to achieve the target of 100% utilization of fly ash in accordance with MoEF's Notification of 3rd November, 2009.

CHAPTER – 7

DISTRIBUTION AND RURAL ELECTRIFICATION

7.1 India Smart Grid Task Force (ISGTF) and India Smart Grid Forum (ISGF)

For the systemic growth of the Smart Grid in the country, India Smart Grid Task Force (ISGTF) was set up under the aegis of the Ministry of Power. ISGTF is an Inter-Ministerial Group and is serving as Government's focal point for activities related to smart grid in India and to evolve the road map for implementation of smart grids in our country. Shri Sam Pitroda, Adviser to Prime Minister on Public Information Infrastructure and Innovation is leading the India Smart Grid Task Force. Members of Smart Grid Task Force have been selected from concerned Ministries (Home, Defence, Communications & IT, New and Renewable Energy, Environment and Forest and Finance etc.) and organizations (Planning Commission, Department of Science and Technology, CERC, CEA, CPRI, BEE, NTPC, PGCIL, BIS, PFC & REC etc.).

Under the India Smart Grid Task Force, a Committee has been constituted by MoP vide letter No. 20/13(4)2009-APDRP dated 26.12.2012 under the chairmanship of Chairperson, CEA comprising representatives from Forum of Regulators (FOR), Regulatory Commissions, Govt. utilities, private utilities & meters manufacturers to finalize the functional requirement specifications of low cost single phase smart meters. Three meetings of the Committee have been held in this regard. Committee members had been requested to offer their comments on the functional requirement specifications of single phase smart meter framed by the earlier Committee. After taking into account the

comments of all the Committee members, a draft report of the Committee has been prepared and circulated to all Committee members. Forum of Regulators has been requested to obtain comments from those Regulatory Commissions who have not commented so far.

7.2 CONTINUATION OF RESTRUCTURED ACCELERATED POWER DEVELOPMENT PROGRAMME (R-APDRP) IN THE 11th PLAN

Ministry of Power, Govt. of India, as a part of Reforms in the Power Sector, launched the Restructured Accelerated Power Development and Reforms Programme (R-APDRP) as a Central Sector Scheme (CSS) in the 11th Five year Plan to assist the States for improvement of distribution sector and to encourage energy audit and accounting through IT intervention and to reduce the AT&C losses upto 15%. The programme size of the R-APDRP scheme is Rs. 51,577 Crore. The focus of R-APDRP Scheme is on actual demonstrable performance by utilities in terms of sustained AT&C loss reduction. Projects under the scheme are being taken up in two Parts. Part-A includes the projects for IT applications for energy accounting / auditing, GIS, consumer indexing, SCADA & IT based consumer service centers etc and Part-B includes regular distribution strengthening projects including separation of agricultural feeders from domestic and industrial ones and High Voltage Distribution System (HVDS) etc. The RAPDRP is under various stages of implementation in the states.

A Steering Committee under chairmanship of Secretary (Power) and comprising representatives of Ministry of Finance, Planning Commission, Central Electricity Authority, Power Finance Corporation, Rural Electrification Corporation, selected State Governments (on one year rotation basis) has been constituted for sanction of the projects, including modification or revision of estimates; monitor and review the implementation of the Scheme. Various meetings of the steering Committee were held during 2012-13.

EFC Memo of R-APDRP for 12th plan was examined and comments were sent to MOP and attended EFC meeting of R-APDRP held in Finance Ministry on 26.03.2013.

7.2.1 Present Status of R-APDRP

- ◆ Under Part-A of R-APDRP, 1402 projects at an estimated cost of Rs 5243.16 Crores have been approved for 29 States/UTs (Chandigarh and Puducherry) and Rs 2043.33 Crores have been disbursed till date.
- ◆ Part-A SCADA projects for 65 towns of 16 states have also been sanctioned at an estimated cost of Rs 1470.44 Crores and Rs 412.03 Crores have been disbursed.
- ◆ Under Part-B of R-APDRP, 1171 projects at an estimated cost of Rs 28428.99 Crores have been approved for 22 States and Rs 4265.71 Crores have been disbursed.

7.2.2 EVALUATION OF R-APDRP WORKS IN VARIOUS STATES BY CEA

As directed by Member (Energy), Planning Commission, evaluation of the progress of R-APDRP works in the states of Karnataka, Tamilnadu, Puducherry, Madhya Pradesh, Maharastra, Rajasthan & Punjab

were taken up by CEA and the Reports for the said states were submitted to MoP.

7.2.3 ASSOCIATION WITH THE CENTRAL TEAM CONSTITUTED BY MHA FOR ON-THE-SPOT ASSESSMENT OF DAMAGE CAUSED BY NATURAL DISASTERS IN VARIOUS STATES

- ❖ CEA officers were associated as a Member of the Central Team constituted under Team Leader JS(MHA) for on-the-spot assessment of Damages caused by natural calamities in various states and attended various Inter-Ministerial Group (IMG) meetings held in MHA to finalize the recommendations of the Central Team regarding Calamity Relief Fund(CRF) / National Calamity Contingency Funds (NCCF)
- ❖ Report of the power sector damages as a member of Central Team constituted for the State of Gujarat & Karnataka for on-the-spot assessment of the damages caused by drought were submitted to MHA.
- ❖ Examination of 17 scheme reports for permanent restoration of works due to earth quake in Sikkim.

7.2.4 WORKS RELATED TO MNRE

CEA officers were associated with MNRE for inspection of Solar Thermal Projects in Rajasthan and participated in various meetings held at MNRE to discuss various issues related to implementation of Projects under JNNSM. Chief Engineer(I/c), DPD is a member of the Committee for preparation of Guidelines for setting up of 750 MW grid connected Solar PV Projects under JNNSM Phase-II with VGF support from NCEF.

7.3 Works related to Union Territories

DP&D Division of CEA is the nodal Division to the Union Territories viz Andaman & Nicobar Islands, Lakshadweep Islands, Dadra & Nagar Haveli, Daman & Diu, Pondicherry, Chandigarh & Delhi including NDMC for –

- Technical clearance of Diesel Generation, Transmission & Distribution Schemes of UTs,
- Technical assistance in project/ DPR/ tender specification formulation etc
- Preparation of technical specification for procurement of equipment, vetting of NITs/ acceptance of tenders etc.
- Advise to UT Administration on specific technical, organizational and staff matters as and when referred to etc.
- Technical Assistance to NDMC for supply to VVIP areas and National Capital Region Planning Board (NCRPB)

The following main works regarding UTs were completed during 2012-13.

7.3.1 UT of Andaman & Nicobar Islands

1. Attended Monitoring Committee meeting on 13-6-2012 under chairmanship of Chief Secretary, A&N Administration to review the progress of Tsunami Reconstruction / Revival works of power supply infrastructures in various Islands of A&N.
2. Examined VIP reference from Hon'ble Lt. Governor of A&N reg. steps taken by A&N Administration for reliable supply in the Islands and comments were furnished to MOP.
3. Matter regarding 20 MW Power plant at Bambooflat- Revision of heat rate of SPCL Power Plant at Bambooflat from existing 2010 kCal/kwh to 2090 kCal/kwh due to increase in fuel

consumption because of use of different grade of fuel supplied by M/s IOCL was examined and comments were furnished.

4. The matter regarding compensation of the losses of HSD oil due to transportation /evaporation handling temperature variation in 20 MW Power plant at Bambooflat was examined and comments were furnished.
5. The following Power development Schemes of UT of A&N were accorded Technical clearance -
 - Scheme for augmentation of DG capacity by 5x250 KW along with associated T&D system at Neil Island.
 - Scheme for augmentation of DG capacity by 3x250 KVA capacity with T&D system at Long Island.
 - Scheme for installation of 1x1000 KW standby DG set along with switching station at Mayabander.

7.3.2 UT of Dadra & Nagar Haveli

1. The following schemes of UT of Dadra & Nagar Haveli were accorded technical clearance -
 - Scheme for Integrated Solution, Asset Management, Meter Data Acquisition System (MDAS) and Network Analysis software for Electricity Deptt of UT.
 - Scheme for augmentation of 220/66 KV Khadoli S/S from 2x160 MVA to 3x160 MVA.
 - Scheme for installation of 3 MW Grid connected Solar PV Power Plant in UT.
 - Scheme for establishment of 220 KV switching station at New Kharadpada to providing 220 KV Power supply to M/s Reliance Industries Ltd.

- Proposals for providing 66 KV Power Supply arrangement to M/s Yashasvi Yarns Limited, M/s Kalpana Industries Ltd. & M/s Sanatan Textiles Pvt. Ltd.
- 2. Scheme for establishment of 220/66 KV, 2x160 MVA S/S at Wagchipa in UT of D&NH is under examination.
- 3. Revised Cost Estimates (RCE) for the scheme for establishment of 66/11 KV, 2x20 MVA S/S at Waghdhara in UT of D&NH was examined and comments were furnished to UT.s.

7.3.3 UT of Daman & Diu

1. The following schemes of UT of Daman & Diu were accorded technical clearance –
 - Scheme for establishment of 220/66 KV, 1x160+2x50 MVA S/S at Ringanwada.
 - Scheme for augmentation of 220/66 KV Magarwada S/S from 250 MVA to 310 MVA.
2. The following schemes of UT were examined and comments were furnished-
 - Scheme for Normal Development Works in UT of Daman & Diu during 2012-13
 - Scheme for ND&SC and P&S during 2012-13 in UT of Daman & Diu
 - Scheme for installation of roof top Solar PV system at Secretariat Building and OI DC office at Daman
 - Scheme for the replacement of old 4 numbers of 10 MVA Power Transformers at various substations
 - Revised Scheme for augmentation of existing ACSR Panther Conductor of 66 KV Magarwada –Verkund and Magarwada- Kachigam line by Hi-TACSR 160 sq mm conductor in UT of Daman & Diu.

3. Scheme for construction of 220 KV Multi circuit tower line from 220 KV Magarwada S/S to M/s Well known Polysters Ltd along with existing 66 KV line including 220 KV Bays at both ends in UT of Daman & Diu is under examination.

7.3.4 UT of Lakshadweep

The proposal of UT of Lakshadweep Administration for up-gradation of Electrical section to Sub division at Kelpani & Chetlat Islands of UT of Lakshadweep was examined and approved.

7.3.5 UT of Puducherry

- The proposal of Puducherry Administration for restructuring /up-gradation of various posts in Electricity Deptt of Puducherry was examined and approved.
- The Proposal of Government of Pondicherry regarding creation of 43 posts for the 230 kV Thondamantham Auto Sub-Station at Thondamantham, Puducherry was examined and comments were furnished.

7.3.6 Delhi/ NDMC / NCRPB

Consultancy to DERC

Presentation on the Smart Grid, Demand Side Management (DSM) & Renewable Energy for consultancy of DERC by CEA was made in DERC and material for distribution sector is under preparation.

NCRPB

Material on Distribution Sector for preparation of Regional Plan 2031 for NCR area was furnished.

CONDUCTION OF MOCK TEST EXERCISE AT PARLIAMENT HOUSE

To test the reliability of power supply to Parliament House before commencement of each Parliament Session, Mock test exercises at CPWD 11 KV Parliament House S/S were organized by CPWD in presence of officers of CEA, CPWD & NDMC before the Monsoon, Winter and Budget Sessions of Parliament and the reports of the Mock Test Exercise were sent to MOP, CPWD & NDMC.

7.4 Rural Electrification

7.4.1 Status of Rural Electrification in the Country

As per data furnished by States, during 2012-13 (Upto 31st March, 2013), 2827 number of inhabited villages have been electrified and 4,35,890 pump sets have been energized. Cumulatively, 5,60,266 inhabited villages constituting 94.4 % out of a total of 5,93,732 inhabited villages (2001 Census) have been electrified in the country and 1.89 Crores pump sets have been energized in the country. From the data collected from the states, it is observed that:

- 13 States namely Andhra Pradesh, Delhi, Goa, Gujarat, Himachal Pradesh, Karnataka, Haryana, Kerala, Maharastra, Punjab, Sikkim, Tamilnadu & West Bengal have almost achieved 100% (more than 99%) village electrification and all UTs except Andaman & Nicobar islands have also achieved 100% village electrification.
- 6 States namely Assam, Jammu & Kashmir, Madhya Pradesh, Chhattisgarh, Rajasthan & Uttarakhand have achieved more than

the National Average of village electrification (94.3%).

- 10 States namely Arunachal Pradesh, Bihar, Jharkhand, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Tripura and Uttar Pradesh are lagging behind the National Average of village electrification:

The charts showing the Plan wise and State wise progress of village electrification and pump sets energisation as on 31.03.2013 are given at the end of this chapter.

7.4.2 Continuation of Rajiv Gandhi Grameen Vidyutikaran yojna in 11th plan – Scheme of Rural Electricity Infrastructure and Household Electrification.

Central Government approved continuation of “Rajiv Gandhi Grameen Vidyutikaran Yojna – Scheme of Rural Electricity Infrastructure and Household Electrification” in the 11th Plan for attaining the goal of providing access to electricity to all households, electrification of about 1.15 lakhs unelectrified villages and electricity connections to 2.34 crores BPL households. The approval was accorded for capital subsidy of Rs 28000 crores during the 11th Plan Period. Finance Ministry & Planning Commission have also approved Phase-II of RGGVY with a capital subsidy of Rs 6,000 Crore.

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 was a provision of subsidy of Rs. 540 crores for DDG under the scheme. REC is the nodal

agency for implementation of RGGVY in the country. Meetings of monitoring Committee were taken by Secretary (Power) at regular intervals to sanction and review the implementation of RGGVY.

7.4.2.1 Status of RGGVY

Under Rajiv Gandhi Grameen Vidyutikaran Yojna (RGGVY), 107083 number of unelectrified villages and 2.285 crore households including 2.072 crore BPL households have been electrified upto 31/3/2013 and Rs 29392.14 crores have been released to the states.

7.4.2.2 DDG project under RGGVY:

Under RGGVY, there is a provision of capital subsidy of Rs 540 Crores for DDG projects. Decentralized distribution-cum-generation (DDG) projects are for those villages/ hamlets where grid connectivity is either not feasible or not cost effective. These projects may be based on conventional or renewable or non-conventional sources such as biomass, bio fuel, bio gas, mini hydro, geo-thermal and solar etc.

7.4.2.3 Status of DDG project sanctioned under RGGVY:

Under DDG Projects of RGGVY, 276 DPR's covering 647 un-electrified villages/ hamlets and 25741 BPL households in seven states (Chhattisgarh, West Bengal, Uttarakhand, Andhra Pradesh, Madhya Pradesh, Bihar & Uttar Pradesh) at an estimated cost of Rs.178.63 crores have been sanctioned and 23 projects have been commissioned.

(a) Works completed regarding RGGVY during the year

- Failure of distribution transformers in the states of UP, Bihar and Jharkhand was raised in the standing committee meeting of Ministry of power. Accordingly teams of this Division visited the states and carried out on the spot assessment of the situation. Report submitted to MoP for taking corrective action.
- Furnishing the note on feeder segregation & rural electrification for all households electrification on Niranter Grammen Viduy Aapoorti Youjana
- As decided in the 44th Monitoring Committee meeting of RGGVY Project wise requirement/ justification of the proposed additional infrastructure of supplementary proposal of 8 districts of Mizoram submitted by Govt of Mizoram at an Est. cost of Rs 181.18 Crores were examined and recommendations were furnished to REC.
- EFC Momo for continuation of RGGVY in 12th plan was examined and comments were furnished.
- Attended EFC meeting for continuation of RGGVY during 12th plan held in Finance Ministry on 22.03.2013.
- A Team of CEA, TERI & REC visited the first commissioned DDG project at Vishakapatnam district, AP and submitted its report to Implementation Support Group (ISG). A Team of CEA, TERI & REC also visited Bihar to discuss the 84 new biomass based DDG project submitted by Govt of Bihar and submitted its report to ISG

7.5 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 report to various Govt. Departments/Ministries was taken up.

7.5.1 Collection of Data regarding Reliability Index:

As per National Electricity Policy (NEP) Clause 5.13.1, the Appropriate Commission should regulate utilities based on pre-determined indices on quality of power supply and the parameters should include, amongst others, frequency and duration of interruption also. The Clause 5.13.2 of NEP also stipulate that “Reliability Index (RI) of supply of power to consumers should be indicated by the distribution licensee. A road map for declaration of RI for all cities and towns upto the District Headquarter towns as also for rural areas, should be drawn by up SERCs. The data of RI should be compiled and published by CEA”.

Accordingly, the matter was taken up with all the SERCs to furnish the data of Reliability Index for all the distribution licensees under their jurisdiction covering all cities and towns up to the District Headquarter towns as also for rural areas for last 5 years to enable CEA to publish the data accordingly. The data received from some of the utilities is under analysis & compilation.

7.5.2 Miscellaneous

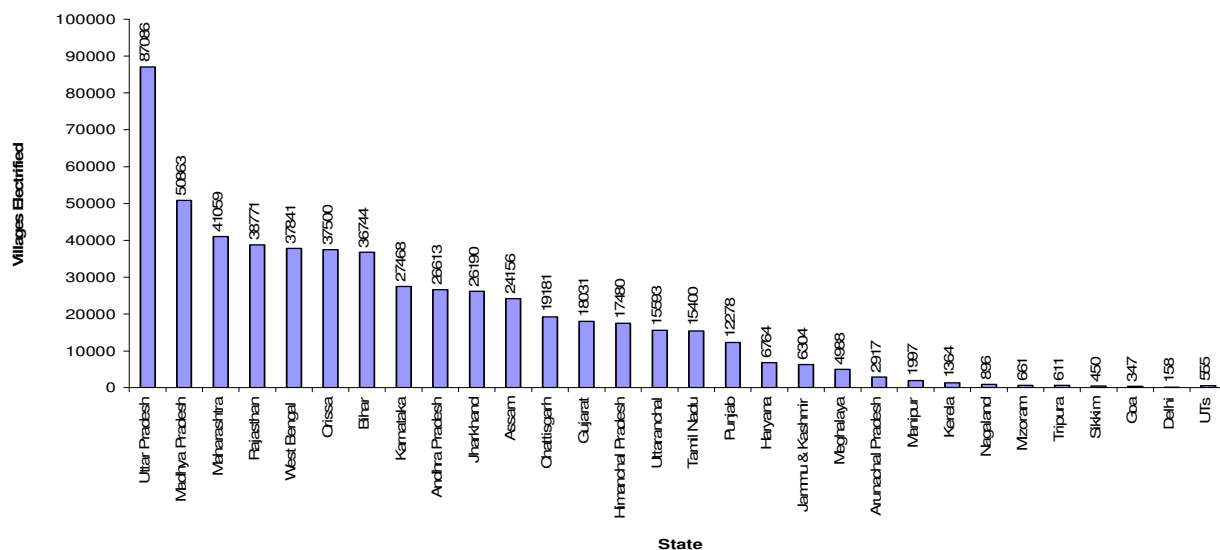
- Prepared comments /material for Standing Committee on Energy, Consultative committee on Power and

National Conference of Chief Ministers /Chief Secretaries, Action taken by Government on the recommendations contained in the Thirteen Report of Committee on Estimates etc. regarding AT&C losses, rural electrification and other distribution related issues.

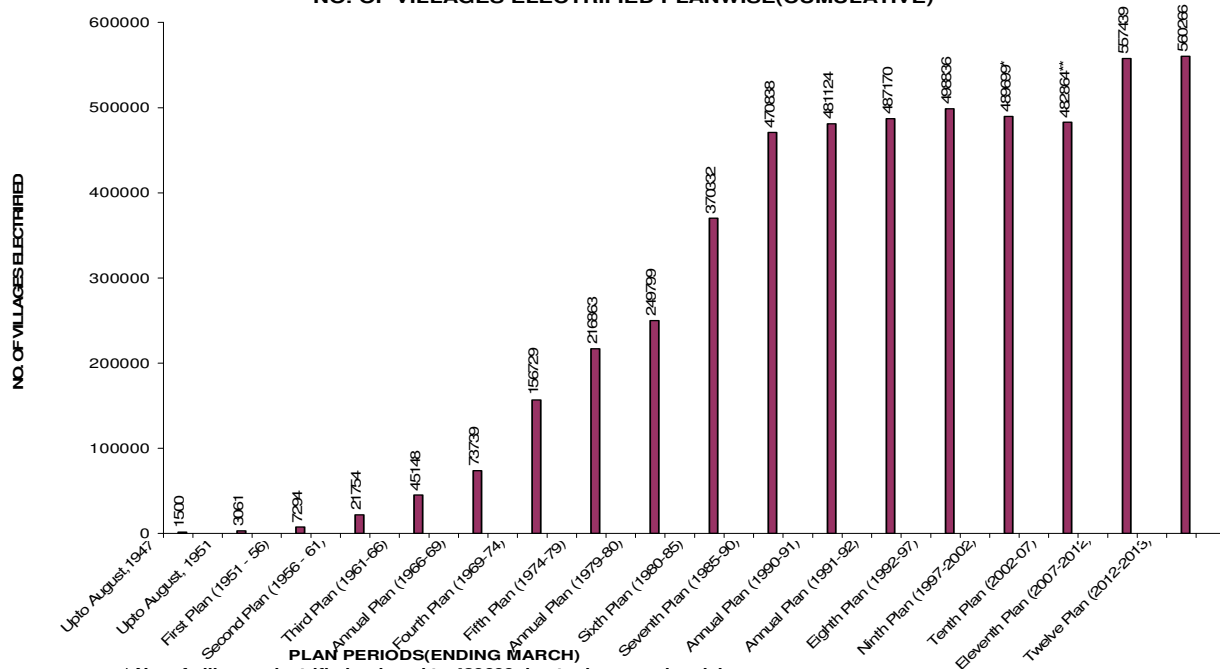
- Furnished material for framing reply to Parliament Questions, VIP references, Annual Report of MOP etc.
- Material furnished for various speech/questionnaire/ news item for Hon’ble Minister of Power/ MOS (P)/ Secretary (P) and Chairman, CEA.
- Material prepared for RFD of CEA and MoP for 12th Plan period.
- Officers of DP&D division attended various meetings in BIS as a member under various technical committees.
- Attended various meetings taken by Secretary (Power) to review the Quarterly Performance of REC and RGGVY, Steering Committee meetings of R-APDRP taken by Secretary (Power), Smart Grid Task Force, Smart Grid Forum etc. during the year.
- Preparation of Detailed agenda note for Power Ministers conference.
- Examination /furnishing of the material regarding RTI /Redressal of Grievance representation retained from internet (CPGRAMS) addressed to Ministry of Power.
- Material for Task Force for review of Disaster Management Act 2005.
- Comments on the issue raised in the Standing Committee reg. burning of small capacity transformers under RGGVY.

- Material on achievement during 11th Plan regarding distribution sector
- Material on the India Electricity Equipment Industrial Mission Plan 2012.
- Material for 7th Meeting of India EU Energy Panel- reg.
- Comments on DDOS attack on the websites by anonymous group- Information sought by NTPC.
- TEDA Consultative paper on “Order on issue related to Tamilnadu Solar Energy Policy 2012”.
- Comments/views on important issues raised by Administrator, UT of Dadra & Nagar Haveli during wrap up meeting held on 13-6-2012 Annual Plan (2012-13) Dadra & Nagar Haveli.
- Comments on Smart grid projects in DMIC region.
- Comments on the reference received from MOS (P) reg. Introduction of new technological products which would help in reduce Aggregate Technical & Commercial (AT&C) Losses.
- Material furnished or North East News Letter of MoP.
- VIP reference from Shri Prakash Javadekar, Member of Parliament reg. INSULECT an international patented product providing electric insulation which prevents thefts, leakages and accidents.
- Comments sent on the matter raised under Rule 377 by Shri Pradeep Kumar Singh, Hon’ble MP regarding need to initiate enquiry for the execution of works under RGGVY in Araria Parliamentary Constituency. Bihar.
- Material furnished for publication entitled “Compendium of Environment statistics India – 2012” Issue.
- Comments sent regarding VIP Reference received from Sh. P.C Gaddigoudar, Hon’ble MP (LS) regarding request to consider “Social Welfare & Rural Development Deptt. & its Undertakings” as implementing agencies for village electrification through DDG under RGGVY in the 11th Plan.
- Information furnished for the meeting of Consultative Committee of M/o Agriculture on “Bringing Green Revolution to Eastern India”.
- Furnished material for review of achievement of quarterly monitor-able targets for 2012-13.
- Material furnished for special mention raised by hon’able MPs in Lok Sabha.

Villages electrified statewise(as on 31st March,2013)

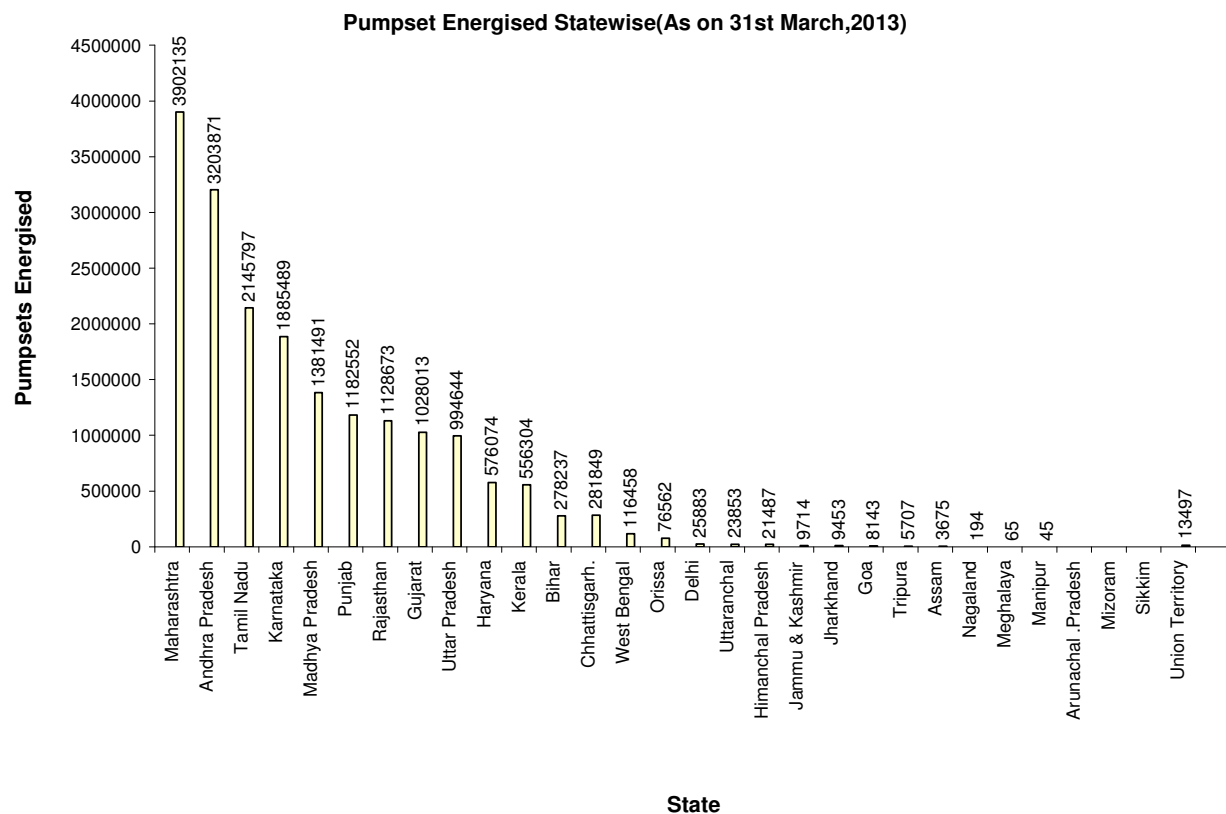
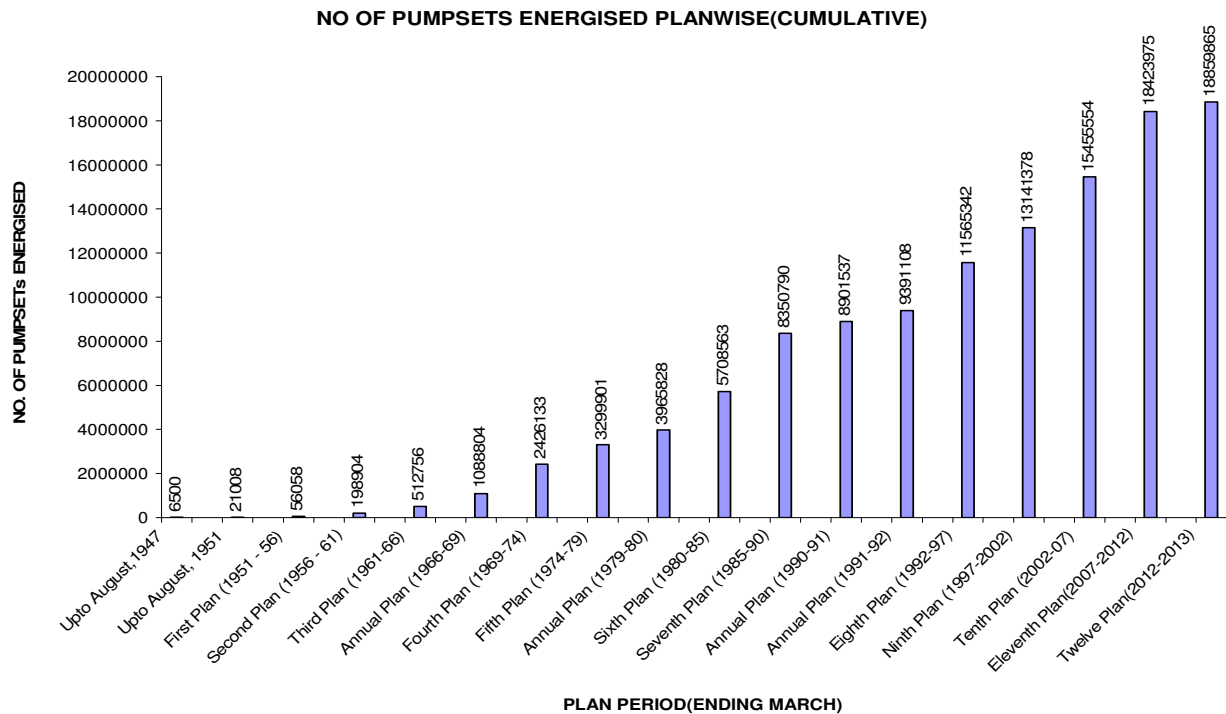


NO. OF VILLAGES ELECTRIFIED PLANWISE(CUMULATIVE)



* No. of villages electrified reduced to 489699 due to downward revision of data by U.P. as per the Definition notified in Oct., 1997

**No. of villages electrified reduced due to revision of data by States as per 2001 census.



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 six (76) hydro electric projects in India and neighbouring countries having aggregate installed capacity of over 15801 MW (details as per Annexure-8A) were completely designed and engineered by this organisation during this period are in successful commercial operation. The design consultancy of hydro electric projects include 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.

During the year 2012-2013, works pertaining to design and engineering of

electro-mechanical works of following HE Projects were carried out:

Sl. No	Name of the H.E. Project/ State	Executing Agency	Capacity
A. Full Consultancy			
1.	Punatsangchhu Stg. I Bhutan	PHPA	6x200 MW
2.	Punatsangchhu Stg. II Bhutan	PHPA	6x170 MW
B. Review Consultancy			
4.	Rampur HEP, H.P.	SJVNL	6x68.67MW

8.2 Programme and Achievement During 2012-13

During 2012-13, HE&RM Division continued consultancy services for design and engineering of electrical and mechanical works of eight (8) nos. hydro electric projects with aggregate installed capacity of about 2970 MW including large hydro power projects such as Tapovan Vishnugad (4x130 MW), Punatsangchu St.I (6x200 MW) and Punatsangchu St.II (6x170 MW). Out of these, five (5) projects are in India and three (3) projects are in neighboring countries. The Hydro Power Projects for which design & engineering services were rendered by HE&RM division during 2012-13 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.	Tapovan Vishnugad	Uttarakhand /NTPC	4x130
North Eastern Region			
2.	Myntdu Leshka	Meghalaya/MeSEB	2x42
3.	Myntdu Leshka(Extn.)	Meghalaya/MeSEB	1x42
4.	Ganol	Meghalaya/MeSEB	3x7.5
5.	New Umtru *	Meghalaya/MeSEB	2x20
Neighbouring Countries			
6.	Punatsangchu St.I	Bhutan/PHPA	6x200
7.	Punatsangchu St.II	Bhutan/PHPA	6x170
8.	Salma *	Afghanistan/WAPCOS	3x14
		Total	2970.5

* Review Consultancy

Some of the major works completed during the year 2012-13 under consultancy services are as given below:-

Technical specifications for 420 kV & 245 kV GIS equipments were prepared for Punatsangchu-II HE Project. Techno commercial bids for Turbine, Generator, Transformer, EOT crane, 11 kV Bus duct, Unit protection, BF valve etc. were evaluated for Ganol H.E. Project. In addition to the above, manufacturer's drawings were examined and commented upon for Myntdu H.E.Project (2x42 +1x42 MW), Tapovan Vishnugad H.E.Project (4x130 MW), Salma H.E.Project (3x14 MW) and New Umtru H.E. Project (2x20 MW). Civil construction drawings of Tapovan Vishnugad H.E.Project and New Umtru H.E. Project were examined and comments sent. During the year, layout drawings of Power house, Switchyard etc. were also finalized for the Tapovan Vishnugad H.E.Project (4x130 MW).

8.3 Scrutiny / Examination of DPRs of new HE Projects & revised cost estimates of updated DPRs.

- a) The chapters on electro-mechanical equipment, related drawings and the quantities of 45 no. DPRs of H.E Projects aggregating to 26100.05 MW including clarifications/ drawings/ documents etc. as received from time to time were examined and commented upon. Also, bill of quantities in the revised cost estimates of 10 nos. of DPR of HEPs aggregating to 5117 MW were examined and commented. The list of these Hydro Electric Projects is given below: -
- b) Preparation of electromechanical chapter, drawings and related bill of quantity for following projects were under progress:
 - i) Ujh Multipurpose Project, (3x62 MW), J&K
 - ii) Kirthai-II HEP, (6x140+2x35+2x10 MW), J&K

S. No.	Project Name	State/ Executing Agency	Capacity (MW)
Hydro Projects (India)			
1	Luhri	H. P.	4x 193.75
2	Nandprayag Langasu	Uttarakhand	4x25
3	Heo	Ar. P.	3x80
4	Demwe Upper	Ar. P.	4x257.5 +1x50
5	Jelam Tamak	Uttarakhand	3x36
6	Shontong Karcham	H.P.	3x150
7	Kirthai - II	J&K	6x165
8	Kirthai - I	J&K	4x95+1x10
9	Tato-I	Ar. P.	3x62
10	Naying	Ar. P	4x250
11	Chango Yangthag	H.P.	3x46.67
12	Miyar	H.P.	3x40
13	Ratle	J&K	4x205+1x30
14	Gongri	Ar. P	2x72
15	Hirong	Ar. P	4x125
16	Indra Sagar (Polavararam)	Ar. P	12x80
17	Seli	H.P.	4x100
18	Ken Betwa Link Project	MP	(2x30+ 3x6)
19	Hutong-II	Ar. P	6x 200
20	Sissri	Ar. P	2x50
21	Shivsamudram	Karnatka	3x100+3x15
22	Dikhu	Nagaland	3x62
23	Chhatru	H.P.	3x42
24	Etalain	Ar. P	10x307+ 1x19.6+ 1x7.4
25	Siyom	Ar. P	6x166.67
26	Tagurshit	Ar. P	3x24.67
27	Sach Khas	H.P.	3x86.67
28	New Ganderbal	J&K	3x31
29	Dagmara	Bihar	17x7.65
30	Kalai-II	Ar. P	6x190+1x60
31	Pakaldul	J&K	4x250
32	Kwar	J&K	4x140
33	Kynshi	Meghalaya	2x135
34	Kiru	J&K	4x165
35	Bowala Nand Prayag	Uttarakhand	4x75

36	Tiuni Plasu	Uttarakhand	3x24
37	Lower Kopli	Assam	2x55+1x5+ 2x2.5
38	Nyukcharong Chu	Ar. P	3x32

Examination/ comments on Bill of Quantities in Revised cost estimates of following Projects:

1.	Chutak	J&K	4x11
2	Kameng	Ar. P	4x 150
3	Teesta Low Dam	West Bangal	4x 33
4	Subansiri Lower	Ar. P	8x250
5	Parbati-II	H.P.	4x200
6	Uri-II	J&K	4x 60
7.	Vishnugad Pipalkoti	Uttrakhand	4x111
8	Rampur	H.P.	6x68.67
9.	Koteshwar	Uttrakhand	4x100
10.	Nimmo Bazgo	J&K	3x15

8.4 Proposals for Foreign Assistance/Bilateral Co-operation for HE Projects

Various proposals regarding the foreign assistance/bilateral cooperation in the field of hydro power development as received from Ministry of Power were examined and commented upon. List of various proposal for which comments were sent are given in Appendix-II.

Hydro Projects (Foreign)			
S.No.	Project Name	State/ Executing Agency	Capacity (MW)
1	Shwezaye	Myanmar	8x110
2	Tamanthi	Myanmar	6x200
3	Kholgonchu	Bhutan	4x150
4	Sankosh	Bhutan	8x312.5 + 3x20
5	Bunakha	Bhutan	3x60
6	Amochhu Reservoir	Bhutan	4x135
7	Chamkhar chhu-I	Bhutan	4x 192.5

List of Foreign Assistance /Bilateral Co-operation Proposals Examined & Commented upon during the year 2012-2013.	
S. No.	Subject
1.	India – Ukraine working group on trade & economic cooperation held during 12-13 April, 2012 in Kyiv, Ukraine
2.	Follow up on Protocol of 7 th meeting of the India- Australia Joint working group on Energy and Minerals.
3.	11 th meeting of Foreign Ministers of the Russia, India and Republic of China (RIC) held in Moscow on 13.04.2012- Joint Communiqué.
4.	Visit of Kenya Delegation from the Inspectorate of State corporations, office of the Prime Minister on the study visit.
5.	17 th India-Bulgaria Joint commission meeting –draft agenda
6.	Strategy Paper for CIS Countries India-CIS Roadmap.
7.	First Meeting of Joint Working group (JWG) between India & Iran
8.	17 th Session of India- Bulgaria JCESTC at New Delhi on 15 th Oct., 2012.
9.	Foreign officer consultation with Poland held on 6 th Nov., 2012
10.	High level business forum organised by Canada- India Business council on No. 5-6, 2012 at New Delhi
11.	Draft protocol of Joint Working group (JWG) on Energy conveyed by the Russian side
12.	India-Canada Foreign office consultation on 18 th Oct. 2012 in Ottawa
13.	Foreign office consultations with Switzerland and Romania from Dec. 14-17, 2012

14.	Meeting of Hon'ble Minister of State for Power (I/C) with hon'ble Australian Minister Martin Ferguson for Resources, Energy and tourism on Dec. 4 th , 2012.
15.	7 th Meeting of India- Tajikistan Joint Commission (I-JCM) on Trade, Economic, Scientific and Technical Cooperation.
16.	8 th India- Sri Lanka Joint Commission Meeting on 22.01.2013
17.	Bilateral Cooperation with Colombia, Chile, Suriname and Trinidad & Tobago in the power sector
18.	Meeting of India- Zimbabwe Joint Trade Committee

8.5 Scrutiny of Innovative Proposals /Schemes for Hydro Power generation

The following innovative proposals were examined from feasibility point of view and commented upon:

1. Experimental Investigation into turbine blade vibration using smart material submitted by Deptt. Of Civil Engineering, IIT Delhi.
2. Proposal on 'Smart Fluid displacement system & methods and innovative application' submitted by Shri S. Udhayam Marthandam.

8.6 Other Miscellaneous Works

1. Participation in panel meeting of BIS for amendments in draft Indian standards IS 4720, IS 9120, IS 12800, IS 12837, IS 5496, IS 7418 etc. as and when required.

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 Hisar Thermal Power Project (2x600 MW).
- b. Review consultancy for Raghunathpur Thermal Power Project (2x600 MW).
- c. Review consultancy for Yamunanagar Extn. TPP (1x 660MW).

8.8 Design and Consultancy Assignments (Civil Aspects) for Thermal/ Hydro/ Power Transmission Projects during 2012-13

TCD Division of CEA carried out the following specific works in respect of thermal/hydro/power transmission projects during 2012-13

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

(a) Raghunathpur Thermal Power Project (2x600MW) by Damodar Valley Corporation (DVC)

The issues of lesser reinforcement and quality of concrete of Natural Draft Cooling Tower shell of Unit-I (28th to 32nd lift) and related test reports/ documents were examined and necessary advice was furnished to DVC.

(b) Hissar Thermal Power Station (2*600 MW), HPGCL (Haryana)

The issue of failure of concrete lining of Raw Water Reservoir was examined, analysed and necessary advice was furnished to HPGCL.

(c) Punatsangchhu-I Hydro Electric Project (6 X 200 MW), Bhutan

Structural Designs and drawings of:

- (i) 200 /40 /10 tonnes capacity EOT Cranes, 380 tonnes capacity Lifting Beam & 250 tonnes capacity Test Cradle for Power House;
- (ii) 200/30 tonnes capacity EOT Crane for Butterfly Valve House;
- (iii) 10 tonnes capacity EOT Crane for GIS Hall were examined and approved for construction;

8.8.2 Transmission Line & Sub-Station Projects

- (a) Strengthening of Transmission System in the state of Jammu & Kashmir under Hon'ble Prime Minister's Reconstruction Programme

The designs/ drawings of foundations and other civil works of the following sub-stations and transmission lines as received from EPC Contractors/ Project Authorities were examined and approved for construction.

(i) Sub-Stations

- 220/132/33 kV Amargarh
- 220/132/33 kV Alusteng

(ii) Transmission Lines

- 220 kV D/C Wagoora-Budgam-Zainakote Transmission Line
- 132 kV D/C Badampora-Bandipora Line
- 132 kV D/C Ramban-Khelani-Kishtwar Line
- 132 kV D/C Thathri- Bhalessa Line

**(b) 66KV D/C Transmission Line in
Leh, J&K by NHPC**

The design and drawings of special foundations with 2 to 2.5 m level difference between the pits from centre point of 66 KV D/C towers were prepared & finalized and issued to NHPC for construction.

**(c) 400 kV D/C Transmission Lines
for evacuation of power from
Mangdechhu Hydro-Electric
Project, Bhutan**

Technical specifications pertaining to Transmission Line tower foundations and protection works were finalized in consultation with WAPCOS and the Project Authorities.

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

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

(in paise / unit)

Year	Average Cost of Supply	Average Realisation	Gap
2008-09	340.00	263.00	77.00
2009-10	355.00	268.00	87.00
2010-11	378.00	301.00	77.00

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

9.1.2 Aggregate Losses

Various power utilities in the country have been suffering losses over the years without subsidy. The power utilities incurred losses (without accounting for subsidy) for the period 2008-09 to 2010-11 are indicated below:-Aggregate Losses (without subsidy) of Power Utilities.

Year	Losses (Rs. Crores)
2008-09	53691
2009-10	64497
2010-11	61998

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

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

The average cost of supply for utilities selling directly to consumers increased from 340 paise/unit in the year 2008-09 to 355 paise/ unit in 2009-10 and to 378 paise/unit in 2010-11. The average realization from sale of power has gradually increased from 263 paise/unit in the year 2008-09 to 268 paise/unit in 2009-10 and to 301 paise/unit in 2010-11. 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:-

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 credit worthiness 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 of dues (launched on 5th March, 2001) 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 CPUs and the Railways. All State Government 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 been issued

bonds amounting to Rs.31, 581 crore. 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 crore 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 outstanding dues payable by various Power Utilities to Central Public Sector Undertakings (CPSUs) based upon the information received in CEA from these CPSUs upto 31.03.2013 is Rs.16109.19 Crores. Details of outstanding dues payable by power utilities to CPSUs is given in **Annexure-9A**.

9.2 Electricity Tariff & Duty of electricity supply in India

In-fulfillment of its obligation under Section 73(i) & (j) of the Electricity Act, 2003, CEA brings out a publication titled “Tariff & Duty of electricity supply in India”. The latest edition (March 2012) contains information on retail electricity tariff applicable in various States/Utilities effective during the year 2011-12. Average rates of electricity supply presented in this edition have been worked on the basis of the tariff orders issued by the State the State Electricity Regulatory Commissions and subsequent tariff notifications issued by the concerned SEBs/ Power Department/ 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 rate 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 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/ Min. of Commerce /Trade and Industrial associations during the year on which CEA's comments/recommendations were sent to MoP /concerned departments.

- (i) Trade Policy Review of India-WTO Secretariat Report-Draft Chapter II, Trade Policies by Sector.
- (ii) Trade and Trade Related measures of India, to be included in the WTO's Trade Monitoring Report.
- (iii) Study on determination of State-wise cost of transmission including technical and non-technical losses.
- (iv) 9th Session of India-China Joint Group on Economic Relations, Science and Technology, (JWG)
- (v) India-United States Dialogue on Energy Issues.
- (vi) Expansion of India-MERCOSUR Preferential Trade Agreement(PTA) – comments on wish list.

- (vii) India-Australia Foreign Trade Agreement (FTA) Negotiations.
- (viii) 6th Session of India-Russia Trade and Investment Forum in New Delhi.
- (ix) Israeli Request List of Industrial Products sent to India for Free Trade Agreement.
- (x) Strategy Paper for CIS Countries – India-CIS Road Map 2020.
- (xi) Meeting of India-Africa Business Council (IABC.)
- (xii) Categorization of Airport Sector under Industrial Category for power tariff.
- (xiii) Zero duty benefits for Mega and Ultra Mega Power Projects – under Notification No. 12/1202-Customs.
- (xiv) Indian Electrical Equipment Industry Mission Plan 2012-2020.
- (xv) Imposition of Additional Custom Duty on Imported Coal – Representation of M/s. HPGCL and TANGEDCO.

9.4 Revision of Standard Bidding Documents (SBDs) for Case-1 and Case-2

Ministry of Power constituted a Drafting Committee to review and revise the Standard Bidding Documents (SBDs) for Case-I and Case-II bidding process and Guidelines for determination of Tariff by bidding process for procurement of power by distribution licensees. Officers of E&C wing, CEA were associated in deliberations of this committee.

9.5 Nomination of officers to the following Committees:

- (a) To promote private participation in Development of Transmission projects, Government of India has issued guidelines for selection of Transmission Service Provider through Tariff based Competitive bidding route.

Bid Evaluation Committees (BEC) constituted for new transmission schemes for following eight number of new schemes notified by MoP for implementation under

tariff based competitive bidding route. An officer of E&C Wing, CEA was nominated in these committees. These projects are:

- (i) Baira Suil HEP – Sarna 220 kV line.
- (ii) ATS of Unchahar TPS.
- (iii) Transmission system for the connectivity for NCC Power Projects Ltd (1320 MW)
- (iv) Transmission System required for evacuation of power from Kudgi TPS (3x800 MW in Phase-I) of NTPC Limited.
- (v) Transmission System for Patran 400 kV S/S.
- (vi) Part ATS of RAPP U-7&8 in Rajasthan.
- (vii) Eastern Region System Strengthening Scheme-VI.
- (viii) Eastern Region System Strengthening Scheme-VII.

b) Ministry of Power constituted a Drafting Committee to review and revise the Standard Bidding Documents (SBDs) for Case-I and Case-II bidding process and Guidelines for determination of Tariff by bidding process for procurement of power by distribution licensees. An officer of E&C Wing, CEA was nominated in the Committee.

c) Based on the recommendation of the Working Group on Power for the 12th Plan period, a Task Force to deliberate upon various aspects associated with setting up of peaking power plants and creation of adequate system reserves was constituted by CEA. An officer of E&C Wing, CEA was nominated in the Committee.

d) A team of CEA officers was constituted to carry out the Techno-Financial Audit of repair and maintenance work carried out in 2012 in Sikidri Hydro Power Plant (2x65 MW) Ranchi through BHEL awarded by Jharkhand State Electricity Board (JSEB) at a cost of Rs. 23.45 crores. An officer of E&C Wing, CEA was nominated in the team.

9.6 Economic Analysis of Policy Issues

Central Electricity Authority (CEA) has been regularly providing analytical inputs on various policy issues referred to by the Ministry of Power such as material on power sector performances for inclusion in the Economic Survey 2012-13, material for the President's Address to both the Houses of the Parliament during the Budget Session for 2012-13 and material for Standing Committee on Energy as and when required.

9.7 Analysis of Tariff Orders

The Economic Policy Division of CEA examined the information received from State Regulatory Commissions on tariff related issues like power purchase cost, cost of supply, employees cost, repair and maintenance expenses, administrative and general expenses, average rate of electricity and revenue gap etc.

9.8 Reforms Monitoring Unit

Under Section 3 of the Electricity Act 2003, the National Electricity and Tariff Policies are notified by the Central Government in consultation with the State Governments and the Central Electricity Authority. In this regard, a 'Reforms Monitoring Unit' has been set up in the Economic Policy Division under the direction of Ministry of Power, to monitor the status of implementation of various provisions of the Electricity Act, 2003, the National Electricity Policy (NEP) 2005 and the National Tariff Policy (NTP) 2006.

9.9 Monitoring of National Electricity Policy 2005

Updates on some important points of NEP implementation by States are listed below:

- Ring-fencing of SLDCs: Barring Himachal Pradesh and Tripura, no other State has as yet, reported ring-fencing of

their load despatch centre, which continues to be under the supervision of the state transmission utilities.

- **Energy Audits:** 13 States have reported that studies are in progress to delineate power losses. Others have issued directions for conducting energy audits. None has reported results of the completed energy audits.
- **Metering:** 11KV feeders have been totally metered in 13 States, but none has reported complete metering of distribution transformers. Individual consumer metering is complete in 20 States out of 29 States barring agricultural /rural / BPL consumers.
- **Specification of long-term trajectory for reduction of AT&C losses by SERCs:** Most SERCs have specified the three-yearly/ five-yearly trajectories of AT&C / transmission & distribution/ distribution losses.
- **Third party testing mechanisms:** have been put in place by 12 States so far.

Implementation of SCADA system for distribution utilities: Only Gujarat and Delhi have largely implemented SCADA in distribution, although some work still remains to be done and 21 States have partially implemented, others have proposed to implement it under the R-APDRP scheme.

9.10 Monitoring of National Tariff Policy (NTP) – 2006

Based on the information provided by the States, the progress on actionable points contained in the NTP is indicated below:

(i) Procurement of Power

As per the NTP, all future requirement of power should be procured competitively by distribution licensees. Procurement of power through competitive bidding has been started in 12 States (Bihar, Chhattisgarh,

Delhi, Gujarat, Haryana, Jammu & Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan and Uttar Pradesh). Process has also been initiated in the States of Andhra Pradesh and Kerala. Procurement of power through competitive bidding has not been started in the 12 States and 3 States have not furnished the information.

(ii) Operating Norms

Operating norms have been notified in 17 States (Andhra Pradesh, Assam, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand and West Bengal) whereas they are not notified in the 05 State (Arunachal Pradesh, Jammu & Kashmir, Kerala, Punjab and Sikkim). Status has not been reported by the remaining States.

(iii) Multi Year Tariff (MYT)

The MYT framework is to be adopted by the Appropriate Commission for any tariffs to be determined from April 1, 2006. MYT tariff for distribution has been introduced in 15 States (Andhra Pradesh, Assam, Chhattisgarh, Delhi, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu and West Bengal). MYT has not been introduced in 09 States (Arunachal Pradesh, Goa, Haryana, Nagaland, Punjab, Sikkim, Tripura, Uttar Pradesh and Uttarakhand). Status has not been reported by the remaining three states.

(iv) Benefits under CDM

Tariff fixation for all electricity projects (generation, transmission and distribution) that result in lower Green House Gas (GHG) emissions than the relevant base line should take into account the benefits obtained from the Clean Development Mechanism (CDM) into consideration, in a manner so as to

provide adequate incentive to the project developers. The CDM benefit mechanism has been formulated in the States of Andhra Pradesh, Gujarat, Himachal Pradesh, Rajasthan and West Bengal.

(v) Availability Based Tariff (ABT)

A two-part tariff structure should be adopted for all long term contracts to facilitate Merit Order dispatch. Availability Based Tariff (ABT) is to be introduced at State level by April 2006. ABT has been introduced in 11 States (Assam, Chhattisgarh[under mock trial], Delhi, Goa, Gujarat, Nagaland, Orissa, Rajasthan, Tripura, Uttar Pradesh, and West Bengal).

(vi) ABT Compatible Metering

ABT compatible metering is in place in 11 States (Andhra Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Madhya Pradesh and Maharashtra). ABT compatible metering is not in place in 13 States (Jammu & Kashmir, Karnataka, Kerala, Manipur, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal). Status has not been reported by the remaining States.

(vii) Time of Day (ToD) Tariff for peak and off peak hours

According to National Electricity Policy, the Availability Based Tariff (ABT) is to be introduced at State level by April 2006. This framework would be extended to generating stations (including grid connected captive plants of capacities as determined by the SERC). The Appropriate Commission may also introduce differential rates of fixed charges for peak and off peak hours for better management of loads. ToD tariff has been introduced in 11 States (Assam, Bihar, Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Nagaland, Tripura and Uttarakhand). ToD tariff has not been introduced in 14 States (Andhra

Pradesh, Arunachal Pradesh, Delhi, Goa, Haryana, Jammu & Kashmir, Madhya Pradesh, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal). Status has not been reported by the remaining States.

(viii) Renewable Purchase Obligation (RPO)

RPO has been notified in all the States except Arunachal Pradesh and Sikkim whereas status has not been reported by the States of Maharashtra, Manipur and Mizoram.

(ix) Fixation of Solar RPO

RPO is yet to be fixed in Arunachal Pradesh and Sikkim whereas status has not been reported by the States of Maharashtra, Manipur and Mizoram.

(x) Key Performance Indicator (KPI) for Transmission

The NTP lays emphasis that financial incentives and disincentives should be implemented for the CTU and the STU around the KPI of these organisations. KPI has been specified in the States of Andhra Pradesh, Assam, Delhi, Gujarat, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttarakhand and West Bengal. KPI has not been specified in 11 States (Arunachal Pradesh, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Punjab, Rajasthan, Sikkim, Tripura and Uttar Pradesh). Status has not been reported by the remaining States.

(xi) Scrutiny of Financial & Technical data

A system of independent scrutiny of financial and technical data submitted by the licensees has to be instituted by the SERCs. The responses received so far shows that it is being done in the States of Bihar, Goa, Gujarat, Haryana, Himachal Pradesh,

Madhya Pradesh, Punjab, Tamil Nadu and Uttar Pradesh. Whereas it is not being done in 16 States (Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Delhi, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Nagaland, Orissa, Rajasthan, Sikkim, Tripura, Uttarakhand and West Bengal[carrying only financial scrutiny]).

(xii) Linkage of Tariff to Cost of Service

For achieving the objective that tariff progressively reflects the cost of supply, tariff to all consumers should be within $\pm 20\%$ of the average cost of supply by the end of year 2010-11. Tariff is within $\pm 20\%$ range in the States of Bihar, Goa, Haryana, Himachal Pradesh and Punjab.

(xiii) Grant of Subsidy Committed by the State Government

To ensure financial viability of the utilities, as per information available with CEA, 13 States (Andhra Pradesh, Chhattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Madhya Pradesh, Punjab, Rajasthan, Tripura, Uttar Pradesh, and West Bengal) have released subsidy in advance to the utilities.

(xiv) PPA with the Generating Companies

The State Governments may make such assignment of existing PPA with generating companies to the successor distribution companies so that retail tariffs are uniform in the State for different category of consumers and thereafter retail tariffs would reflect the related efficiency of the discoms. 12 States viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Manipur, Nagaland, Rajasthan, Tripura and Uttar Pradesh have entered into PPA with the generating companies.

9.11 National Electricity Fund

The creation of 'National Electricity Fund' (NEF) for transmission and

distribution reforms was announced in the Finance Minister's Budget Speech of 2008-09 and sanctioned in March, 2012, as the NEF to provide interest subsidy on loans disbursed to State power utilities and distribution companies in the public and private sectors for non-RGGVY and non-R-APDRP distribution projects. The subsidy amounting to Rs.8,466/- crores is spread over 14 years for loans amounting Rs.25,000/- crores to be sanctioned during 2012-13 and 2013-14. The REC would operate as the nodal agency under the guidance of a Steering Committee of the NEF, which sanctions eligible proposals for subsidy and monitors the progress of utilization of funds and compliance of conditionality. As of February 2013, REC has put up eligible proposals worth over Rs.11,000/- crores, received from 8 States/ 11 Discoms, for the approval of the Steering Committee

The mode of operation is as follows:

- The borrowers - state power utilities and departments, distribution companies and other private players submit proposals to financial institutions constituting the lenders, who refer the proposals to the nodal agency (REC) for evaluating eligibility under the scheme.
- The Steering Committee accords sanction after baseline parameters are determined and intimate REC of the sanction.
- The lenders sanction the proposal after due diligence and appraisal and disburse the funds to the borrowers.
- Fund utilization, project monitoring and evaluation are carried out by the lenders, with documents received from borrowers and submitted to the nodal agency after disbursement.
- REC categorizes the proposal to ascertain quantum of subsidy and if approved, releases it to the lender for onward release to the borrowers or adjustment in their account.

The criteria for financial assistance include categorization of States into special category and focused states versus others, preconditions for eligibility linked to reform measures taken by the States and criteria for assigning marks based on reform measures. The amount of interest subsidy is linked to the progress achieved in reforms-linked parameters.

9.12 Open Access

Status of implementation of open access as reported by SERCs

Based on information from the State Electricity Regulatory Commissions, the position of implementation of open access in the 29 States is as follows:

- 20 out of 23 reporting States have determined and/or notified transmission charges. Goa, Nagaland, Arunachal Pradesh and Sikkim are yet to comply.
- Open Access to bulk consumers of 1 MW and above has been allowed in 17 out of the reporting States. In Goa and Tripura, there have been no applications, while in Arunachal Pradesh and Nagaland, open access has not been made available.
- Cross subsidy surcharge has been determined and/ or notified by 16 States.

9.13 Expenditure in the power sector

The expenditure in the power sector is growing steadily over the years. Private investment in power sector is also increasing.

Investment Expenditure in power, all-India

(Rupees in crore)

Sector/ Segment	2009-10	2010-11	2011-12
Centre	36962.54	36772.57	39965.23
Thermal	20488.20	18758.48	15921.23
Hydro	5384.48	5698.03	5896.52
Trans	10957.30	12267.01	18082.04
Dist	132.56	49.05	65.44
State	52403.17	56457.18	54081.64
Thermal	22572.76	21554.37	21703.39
Hydro	1223.23	2061.68	1366.15
Trans	11025.64	13941.08	16315.18
Dist	17581.54	18900.05	14696.92
Private	43406.17	72372.89	69529.21
Thermal	32037.89	60773.77	62032.38
Hydro	5516.57	5855.04	3436.49
Trans	2965.328	3602.18	2294.07
Dist	2886.38	2141.90	1766.27
Grand Total	132771.90	165602.60	163576.10
Thermal	75098.85	101086.60	99657.00
Hydro	12124.28	13614.75	10699.16
Trans	24948.27	29810.27	36691.29
Dist	20600.48	21091.00	16528.63

Note:

- Data for 2010-11 and 2011-12 are provisional;
- Excludes investment in captive power & nuclear plants, non-conventional & renewable energy plants;
- Investment in state transmission is estimated, not actual;
- Incomplete data on private investment.
- Data on private transmission expenditure based on material furnished to the Expert Committee on Private Investment.
- Distribution figures in Central Sector is for the UTs of Chandigarh, Puducherry and A&N Island.

9.13 The Electricity Act, 2003 and follow-up:**9.14.1 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 license required for sale from captive units.
- Deletions of the provision for “Elimination” of cross subsidies. The provision for reduction of cross subsidies would continue.
- Definition of theft expanded to cover use of tampered meters and use for unauthorized purpose. Theft made explicitly cognizable offence and non-bailable.

9.14.2 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 22.03.2006
- (ii) Procedures for Transaction of Business – notified on 22.8.2006.
- (iii) Technical Standards for Connectivity to the Grid – notified on 09.03.2007.
- (iv) Furnishing of Statistics, Returns & Information - notified on 19.04.2007.
- (v) Grid Standards for Operation & Maintenance of Transmission Lines – notified on 26.06.2010.
- (vi) Amendment to the regulations on “Installation & Operation of Meters”- notified on 26.06.2010
- (vii) Measures relating to Safety & Electric Supply- notified on 24.09.2010.
- (viii) Technical Standards for Construction of Electric Plants and Electric Lines- notified- English Version on 20.08.2010 & Hindi Version on 07.09.2010.
- (ix) Safety Requirement for Construction, Operation & Maintenance of Electrical Plants & Electric lines - notified on 14.02.2011.

9.15 Status of Power Sector Reforms**9.15.1 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, all the

States except Jharkhand & Kerala have reorganized their SEBs.

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 (20th State- apart from the 19 States where SEBs have been reorganised) 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 viz. Chandigarh, Puducherry, Lakshadweep, Andaman & Nicobar Island, Daman & Diu and Dadra & Nagar Haveli, which are having their own Power Department.

9.15 Constitution of Electricity Regulatory Commissions (ERCs)

All the States have constituted their respective State Electricity Regulatory Commission (SERC). The States of Manipur & Mizoram have constituted a Joint ERC. All the SERCs are functional.

A separate Joint Electricity Regulatory Commission (JERC) has been constituted by the Central Government for Union Territories including the State of Goa. The nomenclature of JERC for UTs has been changed to “JERC for Goa and Union Territories”.

9.16.1 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, Uttarakhand, West Bengal and Delhi have set up Special Courts for expeditious disposal of cases relating to the theft of electricity.

9.16.2 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.

9.17 Assistance to Ministry of Power Comments furnished on the following references received from Ministry of Power:

- Draft Cabinet Note on the proposal of the Government of Tamil Nadu for setting up a Petroleum, Chemical and Petrochemical
- Case No. 71/2011-OPTCL V/s. GRIDCO & Ors. filed before OERC
- India Australia FTA negotiations.
- Electricity (Measures relating to Safety and Electric Supply) Order, 2011
- Reference from UT of Lakshadweep regarding exemption for the Electricity Department from their obligations under the Electricity Act, 2003.
- Regarding furnishing updated information on number of theft cases and revenue realized during the last 3 years.
- Received from Shri O. Ibobi Singh, Chief Minister, Manipur regarding matters

connected with Power Sector Reforms in Manipur and other related issues.

- Regarding Arbitration case No. Bi 5/2007 NHPC Vs. HPSEB & Ors. in High Court of Himachal Pradesh at Shimla.
- Reference from Forum of Regulator regarding interpretation of Section 51 of Electricity Act, 2003.
- Reference from UT of Lakshdweep regarding exemption for the Electricity Department from their obligations under the Electricity Act, 2003.
- Regarding conversion of M/s. Uttarakhand Energy Generation Pvt. Ltd., a Private Limited Company to a Limited Liability Partnership (LLP).
- Forum of Regulators – interpretation of Section-51 of the Electricity Act, 2003.
- Restructuring /upgradation of various posts as a result of study on the restructuring of the Electricity Deptt. of Puducherry.
- Constitution of 'Reform Monitoring Unit (RMU)' to monitor the progress of various provisions of the Electricity Act, 2003.
- Recognition of Training Institute of Power Sector by CEA.
- Letter from Shri Parshottam Khodabhai Rupala, MP, Rajya Sabha regarding levying of fees for Testing and Inspection of Electrical Installation.
- Task Force constituted on direction of Cabinet Committee on Security to review the issue connected with National Security System.
- Empanelment of Retailer/Advocate in Central Electricity Authority for High Court of Bihar at Patna.

- CEA (Measures relating to safety and Electric Supply) Order, 2011.
- CEA(Technical standard for connectivity to grid Amendment Regulation 2013) and CEA (Technical Standard for connectivity of Disturbed generated Resources) Regulation 2013
- PMO reference-representation received from MPSEB LTD Technical Employees Union.
- Furnishing the formulation for penalty Provisions on the Electricity Act 2003.

9.18 Legal Assistance/Advice to Utilities Comments furnished on the following references received from Utilities

- Petition No. 44/TL/2012 in the matter of Adani Power Ltd. Vs. National Load Despatch Center & others filed in CERC, was received.
- Reference received from Secretary WBERC, Kolkata regarding Change of domestic meters by concerned distribution companies.
- Arbitration in the matter of dispute between Techno-Electric & Engineer and UOI, NTPC & Ors.
- Reference received from Shri Pasupati Das Hoogly, West Bengal through Secretary, CEA regarding change of domestic meter by the concerned distribution companies.
- Reference received from Ministry of Power along with the D.O. letter from Hon'ble Chief Minister of Manipur and report on NER Power System Improvement project received from World Bank.

9.19 Court Cases

Twenty (21) number of Court Cases has been dealt with during the year, of which more important ones are briefly given below:

- 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.
- 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.
- W.P.(C) No.29615 of 2011 filed in the Hon'ble High Court of Odisha, Cuttack- Manmohan Samal & another vs. OPGCL & others.
- W.P. No. 79 of 2005 filed in Hon'ble Supreme Court of India regarding pollution by Thermal Power Plants.
- PIL No. 36 of 2011 filed in the Nagpur Bench of Hon'ble High Court of Judicature at Bombay – Shri Priyadarshan Chandrashekhar Madkholkar V/s State of Maharashtra & Ors.
- 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.
- CWP No. 2083 of 2012 titled Mangni Ram & others Vs. UOI & others pending before the Hon'ble High Court of Himachal Pradesh.
- Special Civil Application No. 14441 and 14443 of 2012 – Babhubhai Raviyabhai Patel Vs. PGCIL & others – Petition filed in the Hon'ble High Court of Gujarat at Ahmedabad.
- WP (MD) No. 3730 of 2012 – filed in the Hon'ble High Court of Tamil Nadu at Madurai in the matter of Shri B. Stalin Advocate Vs. UOI & ors.
- Writ Petition (C) No. 49 in review of WP No. 174 – filed in the Hon'ble High court of Delhi by M/s. ISNI Electric Company Ltd. regarding Coal Linkage.
- Petition No. 133 of 2012 in the matter of Power Transmission Corporation of Uttarakhand Ltd. Vs. NTPC & Ors. - received from Shri Avjeet Kumar Lala, Advocate for petitioner, Kailash Colony, New Delhi.
- Civil Appeal No.10329 of 2011 Lanco Amarkantak Power Ltd. Vs. Haryana Electricity Regulatory Commission and others.
- I.A. No. 1 of 2012 in Original Suit No. 3 of 2012 filed in the Hon'ble Supreme Court of India – State of Tamil Nadu Vs UOI.
- SLP NO. 10959 of 2012 filed in the Hon'ble Supreme Court of India - Bhushan Steel Limited Vs Ministry of Power.
- WP (C) No 6 of 2011 filed in the Hon'ble Supreme Court of India – Dr. Bharat Jhunjhunwala & Ors. Vs Central Electricity Authority & Ors. regarding environmental issues relating to Techno-Economic Concurrence to Hydro Schemes.
- PIL No.93 of 2013 filed in the Hon'ble High Court of judicature at Bombay (Nagpur branch).

9.20 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 & Uttarakhand), the distribution of employees and their grievances are to be examined and decided by Chairperson, CEA as Appellate Authority. During the year, four

cases have been examined and recommendations sent to the respective Board/State Government after the approval of Appellate Authority.

CHAPTER – 10 POWER GENERATION

10.1 Power Generation

Generation of Power by the utilities & IPPs stood at about 912057 million units during the Year 2012-13. This represents

the growth of about 4.01% over the same period during previous year 2011-12 as per details given below:

Power Generation during 2012-13

Category	Programme (MU)	Actual (MU)	Shortfall(-) / Excess (+) (MU)	% of Programme	Growth (%) w.r. to previous year Actual Gen.
Thermal	767275	760675.80	-6599.2	99.14	107.32
Nuclear	35200	32866.11	-2333.89	93.37	101.80
Hydro	122045	113720.29	-8324.71	93.18	87.14
Bhutan Import	5480	4794.50	-685.50	87.49	90.73
Total All India	930000	912056.70	-17943.3	98.07	104.01

Note: Generation from stations having installed capacity upto 25 MW is not being monitored in CEA since 01.04.10.

The highlights/ achievements of operation performance of generating stations in the country during the year 2012-13 are as under:

- Gross annual generation of the country has been 912 BU
- The annual growth in the energy generation during the year has been 4.01%.
- The total thermal generation has achieved a growth rate of 7.32%. The electricity generation during the financial year 2012-13 from coal based thermal power stations has been 659.231 BU with a growth rate of 12.73% against 9.24% over same period last year.
- 68 numbers of stations with an aggregate installed capacity of 74502.5 MW achieved PLF more than national average PLF of 69.93%.
- 14 numbers of thermal power stations with an aggregate installed capacity of 14780 MW operated above 90% PLF.
- Growth of thermal generation was mainly restricted due to coal shortages, receipt of poor quality/ wet coal and low schedule from beneficiaries.

The sector wise PLF /Generation during 2012-13 is given below:

CENTRAL SECTOR	TARGET (MU)	ACTUAL (MU)	PLF (%)
THERMAL	300405	295441.23	79.18
NUCLEAR	35200	32866.11	78.49
HYDRO	45920	47662.99	
TOTAL	381525	375970.33	
STATE SECTOR			
THERMAL	307358	291300.01	65.54
HYDRO	65429	55853.71	
TOTAL	372787	347153.72	

PVT SECTOR UTILITIES			
THERMAL	25322	25490.67	75.69
HYDRO	1450	1450.03	
TOTAL	26772	26940.70	
PVT SECTOR IPPs			
THERMAL*	134190	148443.89	62.16
HYDRO	9246	8753.56	
TOTAL	143436	157197.45	
BHUTAN IMPORT			
HYDRO	5480	4794.50	
ALL INDIA			
THERMAL	767275	760675.80	69.93
NUCLEAR	35200	32866.11	78.49
HYDRO	122045	113720.29	
BHUTAN IMPORT	5480	4794.50	
TOTAL	930000	912056.70	

*Includes import from some of the Captive Plant

10.1 Plant Load Factor of Thermal & Nuclear Power Stations

During the year 2012-13, the average PLF of thermal and nuclear power plants was 69.93 % and 78.49% respectively.

68 thermal stations achieved PLF higher than the All India average PLF of 69.93% as per details given in the table below:

List of Thermal Power Stations which have achieved PLF above National Average of 69.93 % during the year 2012-13

Sl.No.	Name of Stations	State	Sector	Installed Capacity (MW)	PLF (%)
1	TORANGALLU TPS(SBU-II)	600	PVT	KARNATAKA	101.94
2	DAHANU TPS	500	PVT	MAHARASHTRA	100.04
3	TORANGALLU TPS(SBU-I)	260	PVT	KARNATAKA	98.83
4	TALCHER (OLD) TPS	470	CENTRAL	ORISSA	94.22
5	UNCHAHAR TPS	1050	CENTRAL	UTTAR PRADESH	92.71
6	SINGRAULI STPS	2000	CENTRAL	UTTAR PRADESH	92.43
7	BHILAI TPS	500	CENTRAL	CHHATTISGARH	92
8	NORTH CHENNAI TPS	1230	STATE	TAMIL NADU	91.68
9	RAMAGUNDEM STPS	2600	CENTRAL	ANDHRA PRADESH	91.26
10	KAKATIYA TPS	500	STATE	ANDHRA PRADESH	91.06
11	OP JINDAL TPS	1000	PVT	CHHATTISGARH	91.01
12	NEYVELI (EXT) TPS	420	CENTRAL	TAMIL NADU	90.23
13	KORBA STPS	2600	CENTRAL	CHHATTISGARH	90.11
14	TUTICORIN TPS	1050	STATE	TAMIL NADU	90.04
15	KOTA TPS	1240	STATE	RAJASTHAN	89.66
16	SOUTHERN REPL. TPS	135	PVT	WEST BENGAL	89.55

17	GH TPS (LEH.MOH.)	920	STATE	PUNJAB	89.53
18	KOTHAGUDEM TPS (NEW)	1000	STATE	ANDHRA PRADESH	89.03
19	BUDGE BUDGE TPS	750	PVT	WEST BENGAL	88.37
20	JSW RATNAGIRI TPP	1200	PVT	MAHARASHTRA	87.99
21	NEYVELI TPS-II	1470	CENTRAL	TAMIL NADU	87.27
22	BAKRESWAR TPS	1050	STATE	WEST BENGAL	87.02
23	Dr. N.TATA RAO TPS	1760	STATE	ANDHRA PRADESH	86.96
24	IB VALLEY TPS	420	STATE	ORISSA	86.47
25	RIHAND STPS	2500	CENTRAL	UTTAR PRADESH	86.32
26	KORBA-WEST TPS	1340	STATE	CHHATTISGARH	86.15
27	SABARMATI (C STATION)	60	PVT	GUJARAT	86.06
28	METTUR TPS	1440	STATE	TAMIL NADU	84.26
29	RAYALASEEMA TPS	1050	STATE	ANDHRA PRADESH	83.63
30	TANDA TPS	440	CENTRAL	UTTAR PRADESH	83.61
31	ROPAR TPS	1260	STATE	PUNJAB	83.04
32	JOJOBERA TPS	360	PVT	JHARKHAND	82.96
33	SIMHADRI	2000	CENTRAL	ANDHRA PRADESH	82.6
34	NEYVELI TPS(Z)	250	PVT	TAMIL NADU	82.56
35	SURAT LIG. TPS	500	PVT	GUJARAT	82.36
36	DADRI (NCTPP)	1820	CENTRAL	UTTAR PRADESH	82.13
37	VINDHYACHAL STPS	4260	CENTRAL	MADHYA PRADESH	82.06
38	TALCHER STPS	3000	CENTRAL	ORISSA	81.61
39	SURATGARH TPS	1500	STATE	RAJASTHAN	80.44
40	SABARMATI (D-F STATIONS)	340	PVT	GUJARAT	80.37
41	RAMAGUNDEM - B TPS	62.5	STATE	ANDHRA PRADESH	79.61
42	TENUGHAT TPS	420	STATE	JHARKHAND	79.5
43	TITAGARH TPS	240	PVT	WEST BENGAL	78.47
44	DSPM TPS	500	STATE	CHHATTISGARH	78.39
45	MUNDRA UMTTP	4000	PVT	GUJARAT	77.94
46	NEYVELI TPS- I	600	CENTRAL	TAMIL NADU	76.77
47	NASIK TPS	880	STATE	MAHARASHTRA	76.21
48	ROSA TPP Ph-I	1200	PVT	UTTAR PRADESH	75.65
49	BARKHERA TPS	90	PVT	UTTAR PRADESH	75.09
50	UDUPI TPP	1200	PVT	KARNATAKA	74.98
51	PANIPAT TPS	1360	STATE	HARYANA	74.97
52	SIPAT STPS	2980	CENTRAL	CHHATTISGARH	74.95
53	KORBA-II	200	STATE	CHHATTISGARH	74.4
54	SAGARDIGHI TPS	600	STATE	WEST BENGAL	74.13
55	BADARPUR TPS	705	CENTRAL	DELHI	73.77
56	JALIPA KAPURDI TPP	1080	PVT	RAJASTHAN	73.77
57	SANJAY GANDHI TPS	1340	STATE	MADHYA PRADESH	73.52
58	KOTHAGUDEM TPS	720	STATE	ANDHRA PRADESH	73.05
59	KHAMBARKHERA TPS	90	PVT	UTTAR PRADESH	72.96
60	MAQSOODPUR TPS	90	PVT	UTTAR PRADESH	72.87

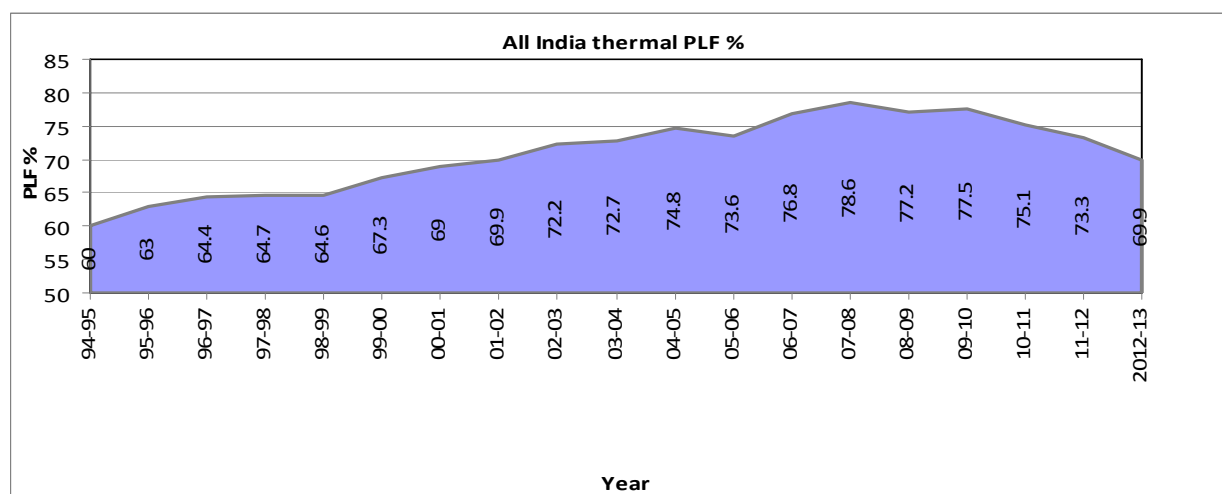
61	UKAI TPS	1350	STATE	GUJARAT	72.14
62	KASAI PALLI TPP	270	PVT	CHHATTISGARH	71.97
63	WARDHA WARORA TPP	540	PVT	MAHARASHTRA	71.94
64	KAHALGAON TPS	2340	CENTRAL	BIHAR	71.75
65	AMARKANTAK EXT TPS	450	STATE	MADHYA PRADESH	71.66
66	ANPARA TPS	1630	STATE	UTTAR PRADESH	71.53
67	CHANDRAPURA(DVC) TPS	1250	CENTRAL	JHARKHAND	70.63
68	WANAKBORI TPS	1470	STATE	GUJARAT	70.13

It may be seen from the above table that 14 numbers thermal power stations with an aggregate installed capacity of 14780 MW had the distinction of achieving PLF above 90%.

All India Sector-wise/Organization-wise, thermal generation, target & actual

generation, PLF for the year 2012-13 is given in the **Annexure-10A**.

The trend in All India PLF of Coal and Lignite based thermal power stations from 1994-95 onwards is shown below:



10.2 Generating Capacity Addition

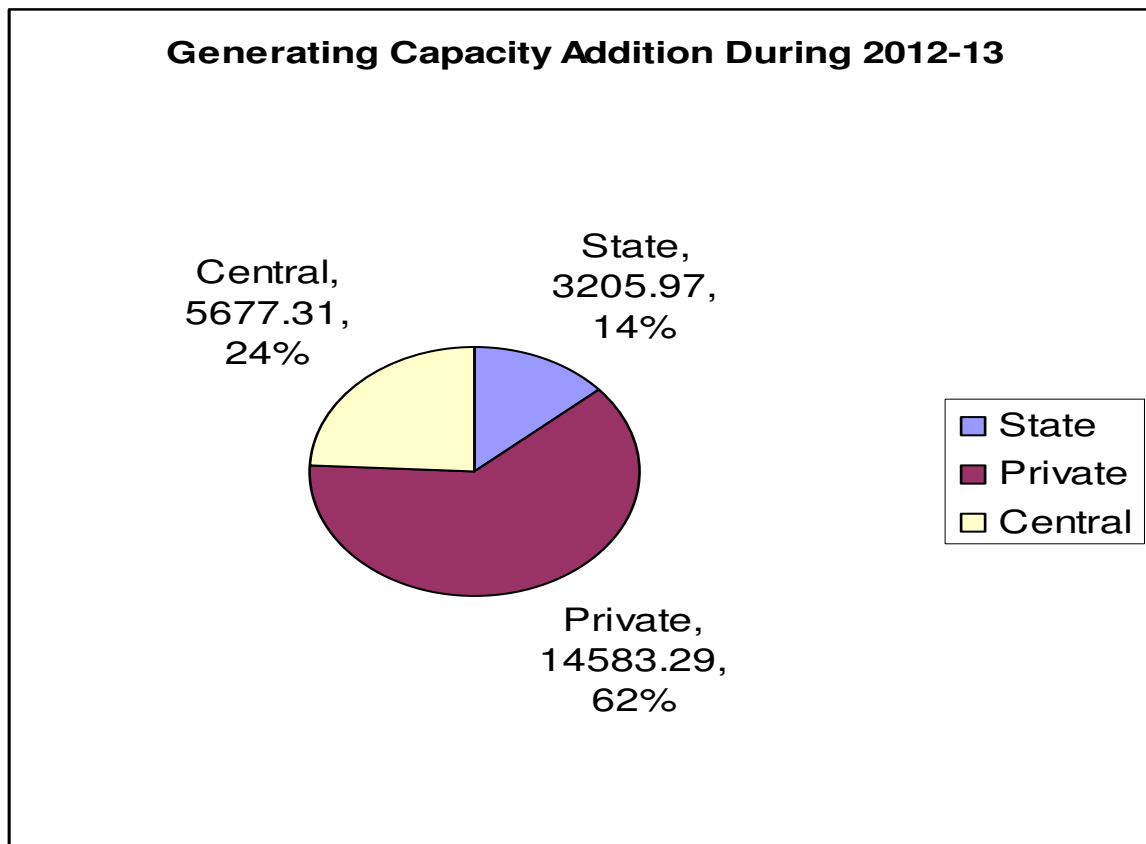
During the year, a total of 23466.57 MW generation capacity was added

(excluding addition due to Renewable Energy Sources). The capacity addition during the last 7 years is given below:

Year	Central Sector	State Sector	Private Sector	Total
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
2010-11	3330.00	2209.00	6621.50	12160.50
2011-12	4770.00	3761.00	11971.00	20502.00
2012-13	5677.31	3205.97	14583.29	23466.57

Note: (i) The above figures do not include Deration, Retirement, upration and Installed Capacity of Renewable Energy Sources.

Sector-wise generating capacity addition during 2011-12 is also shown in the chart below:



10.4 Installed Electricity Generation Capacity

Total All India Installed Electricity Generation Capacity as on 31.03.2013 is 223343.60 MW comprising of Thermal 151530.49 MW, Hydro 39491.40 MW,

Nuclear 4780.00 MW and 27541.71 MW from Renewable Energy Sources (RES). The details are shown in the Tables given below:

Type (MW)	Central Sector (MW)	State Sector (MW)	Private Sector (MW)	Total (MW)
HYDRO	9459.40	27437.00	2595.00	39491.40
THERMAL	51120.54	57939.43	42470.52	151530.49
NUCLEAR	4780.00	0.00	0.00	4780.00
RES	0.00	3748.19	23793.52	27541.71
Total	65359.94	89124.62	68859.04	223343.60

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:

Year	Thermal	Nuclear	Hydro	RES*	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
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
March, 2011	112824	4780	37567	18455	173626
March, 2012	131603	4780	38990	24504	199877
March, 2013	151531	4780	39491	27542	223344

*Renewable Energy Sources (RES) includes Wind, Small Hydro Project, Biomass Gasifier, Biomass Power, Urban & Industrial Waste Power & solar power.

CHAPTER – 11

POWER DEVELOPMENT IN NORTH-EASTERN REGION

11.1 Hydro-electric Potential in N.E. 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, 1242 MW (above 25 MW capacity) have been harnessed so far while projects amounting to 2810 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:

As on 31.03.2013

Region / State	Identified potential as per Re-assessment Study (MW)		Capacity Developed (Above 25 MW)	Capacity Under Construction (Above 25 MW)
	Total	(Above 25 MW)		
Meghalaya	2394	2298	282	40
Tripura	15	0	0	0
Manipur	1784	1761	105	0
Assam	680	650	375	0
Nagaland	1574	1452	75	0
Arunachal Pradesh	50328	50064	405	2710
Mizoram	2196	2131	0	60
Total(NER):	58971	58356	1242	2810

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 completed by CEA in Oct., 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 (30416 MW) in NE region under “50,000 MW Hydro Electric Initiative”

launched by Govt. of India in May, 2003. 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, Lohit 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 km upstream of Rotung village in Arunachal Pradesh, the project was modified into three separate schemes. 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	9750	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. Siang Upper has been declared as 'National Project'.
2	Siang Middle H.E. Project 15 km upstream of Raying near Roing village on the Siyom River which is a tributary of Siyom River	West Siang/ Roing	1000	Allotted to M/S Reliance Energy Ltd. DPR under Examination in CEA.
3.	Siang Lower H.E. Project Upstream of Pasighat near Routung village	Near Pasighat/ Routung	2700	Allotted to M/S Jaiprakash Associate Ltd. Concurred by CEA in Feb, 2010. Yet to be cleared by MOEF.

11.4.2 Subansiri basin Projects - Arunachal Pradesh

The originally identified project envisaged installed capacity of 4800 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. Details of these schemes are as under:

S. No.	Name of Scheme	Location (District/ Village)	Capacity (MW)	Present status
1.	Subansiri Middle H.E. Project Upstream of Tamen village on Kamla river which is tributary of Subansiri River	Lower Subansiri/ Tamen	1600	Project Allotted to M/S Jindal Power Ltd. Installed Capacity of 1800 MW has been tentatively finalise by CEA in October, 2012. DPR under Preparation.
2.	Subansiri Upper H.E. Project. Upstream of Daporijo near Mengal village on Subansiri River.	Upper Subansiri/ Menga	1800	Project allotted to M/s KSK Energy Ventures Ltd. DPR under preparation.

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 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 and 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 minutes of meeting, MoP had to submit a Supplementary Note to

be studied and considered in the Core Group of 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 MoEF 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) Updated revised cost estimates submitted by NEEPCO to CEA at Nov., 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 IDC component as Rs.828.99 crores (Nov. 2005 price level) in August, 2006. Thus, total cost at Nov., 2005 price level works out to Rs.5855.83 crores excluding 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 NH 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) Project was accorded environment clearance on 24.10.2008.
- (iv) Forest Proposal has been forwarded by Govt. of Mizoram to MoEF on 11.07.2011 for diversion of 1551.30 ha of forest land falling in Mizoram. Site inspection by Regional Office of MoEF, Shilong conducted on 8-3-9th Jan, 2013.

Manipur State forest deptt. forwarded Forest proposal to MoEF on 31.05.2011 for diversion of 22777.50 Ha of forest land falling in Manipur. Proposal was discussed by FAC on 11-12 Jan, 2012. FAC has recommended that a sub-committee of FAC alongwith domain experts in field of ecology, wildlife, hydrology etc. may visit the project site to suggest FAC on appropriate measures including reduction in dam height, minimize requirement of forest land for the project etc.. MoEF has constituted Sub- Committee of FAC on 06.02.2013.

Formation of Joint Venture: As per MoP letter dated 06.07.09, implementation of the project would be done through a Joint Venture among NHPC (69%), SJVNL (26%) and Govt of Manipur (5%). MOU has already been signed on 28.04.2010 amongst NHPC, Government of Manipur and SJVNL for formation of a Joint Venture Company. Promoter's Agreement for setting up a JV Company amongst NHPC SJVNL and Government of Manipur for implementation of the project has been signed on 22.10.2011. Approval of MOP has been sought on 30.10.11 for incorporation of JV under Company Act, 1956, as the equity participation of NHPC in JV would exceed the investment limit of Rs. 500 Crores, being beyond delegated powers of Miniratna Category-I companies. Draft MoA and AoA circulated in Nov, 2011. Meeting held between JV partners on 23.05.12 to discuss and finalize the draft MoA and AoA.

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.

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 in a joint venture was signed between NHPC and Govt. of Arunachal Pradesh on 21.09.2006. Later, a 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 Nov., 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 cost of 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 resulting in reduction in IDC and FC.
4. Difference between base cost and completion cost seems to be on higher side as compared to other Hydro Projects, which needs to be examined further.

PIB suggested that a committee should be set up to address to above issues and finalize 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 project to CCEA for Investment Approval.

Accordingly, a Committee was set up by MoP on 23.4.2008 which submitted its report with following recommendations:

- i) Considering remoteness of the place, present infrastructure, future development to be undertaken etc. compression of construction period is not feasible.
- ii) 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.
- iii) There is energy generation loss of about 880 MU due to flood moderation. Cost of flood moderation should be borne by MoWR.
- iv) 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. Cost apportioned to flood moderation component was taken as Rs.1107 cores.

MoWR vide their letter 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 project at Nov., 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.

E & F clearance: Environment and 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 conducted on 29.01.2008. Public Hearing for Dibang Valley District could not be conducted due to public agitation. In the mean time, extended period for submitting the proposal for Environmental Clearance under EIA Notification, 1994 expired on 13.09.2008 and proposal needed clearance under new EIA Notification, 2006.

TOR for pre-construction activities & EIA/EMP studies as per new notification was approved on 17.08.2009. On 26.08.10, Public hearing held on 11.03.2013 & 13.03.2013.

Forest land involved is 5056.5 ha. Forest proposal has been forwarded by State Govt. to MoEF on 18.08.2011.

Site inspection was conducted by RO, MoEF on 16-17th Feb, 2013. RO,

MoEF, Shillong vide letter dated 25.02.13 has desired that State Govt. may demarcate the sites for Compensatory afforestation, provide enumeration list of trees in sample plots, etc. After furnishing this information Site inspection shall be carried out again.

11.5 Status of Various Hydro Power Projects in North-Eastern Region

11.5.1 Central Sector Projects

(A) Sanctioned Projects

(i) Tuirial HEP (2x30 = 60 MW), Mizoram, NEEPCO

Tuirial HEP is located in the boarder of Aijwal district of Mizoram adjoining cachar district of Assam. The project envisage a 75 m earth filled dam, two diversion tunnel of Dia 8 m and length 770 m, power tunnel modified horse shoe shaped, open chute spillway with crest elevation of ogee weir at 76.60 m and a powerhouse with vertical Francis turbine operating under a head 56m and a tail race joining in to the main river.

The CCEA clearance of the project was accorded on 07.07.1998 with commissioning schedule in July, 2006. Original approved project cost (at June, 1997 PL) was Rs. 368.72 Crs.

After completion of about 30% of the project activities, the work had totally stopped w.e.f. 09.06.04 due to local unrest.

The works were revived after the CCEA approval of the revised cost estimate of the project (Rs. 913.63 crs at March, 2010 PL) which was accorded on 14.01.2011.

Civil works were awarded to M/s Patel Engg.. HM works have been awarded to M/S SEW-PES and EM work

has been awarded to BHEL. Major works are under progress.

The project is scheduled for commissioning in year 2016-17.

(ii) Loktak Down Stream (66 MW), Manipur, LDHCL

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 04.02.99 and forest clearance on 03.01.1997.

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 66 MW.

Ministry of DoNER vide their letter dated 24.11.2008 have accorded administrative and financial approval for central financial assistance from 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.

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 (LDHCL)" has also been incorporated on 23.10.2009.

Concurrence was transferred, from NHPC to LHDC on 06.08.2012. The validity of concurrence was extended by CEA upto 14.11.2014 on 24.01.2013. The Environment clearance accorded by MoE&F on 16.01.2013. In- principle forest clearance was accorded to the project by MoE&F vide letter dated 03.03.2011.

(iii) Pare Hydro Electric Project (2x55=110 MW) in Arunachal Pradesh

The Pare H E Project is located in the Papum Pare District of Arunachal Pradesh on river Dikrong which is tributary of river Brahmaputra. The CEA concurrence was accorded on 24th Sept., 2007. The CCEA clearance was accorded on 04.12.2008. The estimated cost of the project is Rs. 573.99 crores. The project would generate annual energy of 506.42 Gwh.

The project envisages construction of concrete gravity Dam, HRT, diversion tunnel and surface power house having Vertical Francis turbine for 2 units of 55 MW each.

Civil works has been awarded on 31.8.2009 to M/s H.C.C. HM works have been awarded to M/S Precision Infratech Ltd, Ahmdabad and EM work has been awarded to M/S Andritz Hydro Pvt Ltd & M/S Areva T&D IndiaLtd. Major works are under progress.

The project is scheduled for commissioning in year 2014-15.

(iv) Subansiri Lower (8x250 = 2000 MW), Arunachal Pradesh

The project is located in the districts Lower Subansiri /Dhemaji in Arunachal Pradesh/Assam on river Subansiri. The

project was Techno-Economically cleared by CEA on 13.01.2003. The CCEA clearance was accorded on 09.09.2003 for an estimated cost of Rs. 6285.33 crores with the schedule commissioning of the project in September, 2010. The design energy is 7421.59 Gwh.

The Project envisages construction of concrete gravity dam, horse shoe type head race tunnels, circular steel lined pressure shaft and surface power house having Francis turbine driven 8 nos. generating sets of 250 MW each.

Major civil works have been awarded to M/s. BGS-SGS-Soma Joint Venture and Larsen & Toubro Ltd. Chennai respectively on 19.12.2003. E&M works has been awarded to Consortium of M/s Alstom Power Hydraulic, France and Alstom Projects India Ltd. New Delhi on 11.02.2005. Hydro-Mechanical Package awarded to Texmaco on 19.06.2006. River diverted on 25.12.2007, Major works were under progress, however, since 16.12.2011, works stopped due to agitation by anti dam activists.

Four units of the project are now scheduled for commissioning in year 2016-17 and next four unit in 2017-18.

(v) Kameng HEP (4 x 150 = 600 MW), Arunachal Pradesh

Kameng H.E. Project is located in West Kameng District of Arunachal Pradesh with an installed capacity of 4x150 MW. The project is being executed by NEEPCO Ltd. The project envisages utilization of flows of Bichom & Tenga rivers (both tributaries of river Kameng) at a head of about 500 m available in an U – bend of the river, down stream of confluence of river Bichom with Kameng. The TEC was accorded by CEA on 30.04.1991. The

CCEA clearance was accorded on 02.12.2004. The approved cost of the project is Rs. 2496.90 crores (at March, 2004 price level). The design annual energy is 3592 Gwh in a 90% dependable year. The environmental and forest clearance was obtained on 29.03.2001 & 03.08.2000 respectively.

The project envisages construction of 2 nos. concrete gravity dams i.e. Bichom Dam and Tenga Dam, Head Race Tunnel, surge shaft, and surface power house having vertical Francis Turbines for 6 units of 150 MW each. All the civil, HM & EM works have been awarded. Major works are under progress.

The project is scheduled for commissioning in year 2016-17.

(B) CEA Cleared Projects

i) Tuivai H.E. Project (3x70 = 210 MW) in Mizoram cleared for Central Sector and transferred to State Sector

Scheme was concurred by CEA vide letter dated 19.02.1999 at an estimated cost of Rs. 964.22 crores at March 1997 price level including IDC of Rs.47.31 crores. Completed cost was estimated as Rs.1258.84 crores including IDC of Rs.58.89 crores.

Revised cost estimates were approved by CEA vide letter dated 28.05.2004 amounting to Rs. 1122.51 crores (April 2003 price level) including IDC 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 State Government. Besides, it was suggested that State Govt. may consider making NEEPCO a Joint Venture partner. Power Purchase agreement in respect of the Project being implement by Power Industry Dept. Govt. of Mizoram through PPP on design, built, finance, operate & transfer basis is under consideration.

**(ii) Tawang H.E Project St-I
(3x200=600 MW) in Ar. Pradesh
by NHPC Ltd.**

Project was accorded concurrence by CEA on 10.10.2011 at an estimated cost of Rs. 4824.01 Crores (including IDC & FC) at May, 2010 price level.

Project was accorded environment clearance on 10.06.2011. Forest proposal for diversion of 187.20 ha forest land was forwarded by State Govt. to MoE&F on 21.09.2011.

Project was discussed by FAC on 02.04.2012 and FAC desired that a cumulative bio diversity management plan be prepared for Tawang Basin and also desired from State that a perspective plan for river basin and possible future impacts in next 15-20 years be prepared. CCF (cons.) & Nodal Officer (FC), GoAP on 05.06.2012 requested NHPC to get the basin study conducted through reputed Institute.

Forest proposal was reconsidered by reconstituted FAC in its meeting on 17th-18th September, 2012. FAC adhered to its previous decision that the forest clearance will be reconsidered only after completion of Biodiversity of Tawang basin.

Studies have been awarded to North-eastern Hill University (NEHU) in Jan, 2013 by PCCF. MoA was signed between State Forest Dept. AP & NEHU on

15.03.2012 for undertaking the basin study covering all aspects desired by FAC.

**(iii) Tawang H.E Project St.-II
(4x200=800 MW) in Ar. Pradesh
by NHPC Ltd.**

The project was concurred by CEA on 22.09.2011 at an estimated cost of Rs. 6112.3 crores (including IDC & FC) at May, 2010 price level. Project was accorded environment clearance on 10.06.2011.

Forest proposal for forest clearance of 116.62 ha forest land was forwarded by State Govt. to MoE&F on 20.09.2011.

Project was discussed by FAC on 02.04.2012 and FAC desired that a cumulative bio diversity management plan be prepared for Tawang Basin and also desired from State that a perspective plan for river basin and possible future impacts in next 15-20 years be prepared. CCF (cons.) & Nodal Officer (FC), GoAP on 05.06.2012 requested NHPC to get the basin study conducted through reputed Institute.

Forest proposal was reconsidered by reconstituted FAC in its meeting on 17th-18th September, 2012. FAC adhered to its previous decision that the forest clearance will be reconsidered only after completion of Biodiversity of Tawang basin.

Studies have been awarded to North-eastern Hill University (NEHU) in Jan, 2013 by PCCF. MoA was signed between State Forest Dept. AP & NEHU on 15.03.2012 for undertaking the basin study covering all aspects desired by FAC.

**(iv) Kolodyne-II H.E Project (4x115 =
460MW) in Mizoram by NTPC
Ltd.**

Project was accorded concurrence on 14.09.2011 at an estimated cost of

Rs. 5188.13 crores (including IDC & FC) at October, 2010 price level. Project is being executed by NTPC Ltd. doesn't require CCEA approval since NTPC is a Maharatna Company.

Terms of Reference (TOR) cleared on 10.07.2009. EIA studies awarded to WAPCOS Ltd. on 14.09.2010 and the same is under finalization and shall be submitted after incorporation of land details to SPCB for public hearing. The land details yet to be finalized.

Submitted to State forest department on 20.12.2010. DFOs of Lunglei, Saiha and Lawngtlai submitted the forest land details to conservator of forest on 7.10.11, 11/2011 and 26.06.2012 respectively. However, all the proposals were returned to concern DFOs for further clarifications.

11.5.2 State Sector Projects

(A) CEA cleared Projects

(i) Bairabi Dam (2x40=80 MW), Mizoram, by Power & Electricity Deptt, Govt. of Mizoram

Concurrence was accorded by CEA on 09.11.2000 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.

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 08.11.2007.

Govt. of Mizoram on 21.08.2007 requested for further extension of TEC. 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 01.10.2007.

(ii) New Umtru (2x20 = 40 MW), Meghalaya, MeECL

New Umtru H.E. Project is located in Ri-Bhoi District of Meghalaya. The project is under execution by Meghalaya Energy Corporation Ltd. (MeECL). Sanctioned cost of the project is Rs. 226.40 crores.

The Project envisages construction of a Masonry dam, horseshoe type HRT, penstock and power house having Francis turbine for 2 units of 20 MW each.

All major civil & HM works and E&M works have been awarded. Civil works have been awarded in December, 2007 but due to land acquisition problem, works could be started only in December, 2008. Order for HM works has been placed in January, 2009. The Major works are in progress.

The project is likely to be commissioned in year 2014-15.

11.5.3 Private Sector Projects

B) 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).

MoE&F has accorded environmental clearance to the project on 12.02.2010. Clearance from Wildlife angle by Standing Committee of NBWL, MoE&F was accorded on 11.02.2012. Subsequently, "In-Principle" forest clearance (Stage-I) was accorded by MoE&F on 01.03.2012. Payments for NPV and compensatory Afforestation has been made and proposal

for stage-II Forest clearances forwarded by State Govt. to MoE&F on 22.03.2013.

b) Lower Siang HE Project (9x300=2700 MW), Ar. 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). Earlier TOR was approved for 2025 MW by MoE&F. MoE&F on 03.08.2010 accorded approval for revised TOR for IC of 2700 MW. Public hearing couldn't be conducted due to law & order. Efforts are being made to conduct public hearing. Forest proposal is being processed at State Govt. level.

c) Dibbin H.E. Project (2x60=120MW) in Arunachal Pradesh by M/s KSK Dibbin Hydro Power Private Limited

Dibbin H.E. Project was accorded concurrence on 04.02.2009 for an estimated completed cost of Rs. 728.54 Crores subjected to fulfillment of certain conditions, one of the condition was that M/s KSKDHPPL shall reimburse the expenditure of Rs. 8.86 Crores incurred on the project to M/s NEEPCO. This condition has yet not been complied with.

MoE&F has accorded environmental clearance to the project on 23.07.2012. Forest clearance (Stage-I) was accorded by MoEF on 07.02 2012.

d) Nafra H.E. Project (2x60=120 MW) - Arunachal Pradesh by M/s SEW Nafra Power Corporation Private Limited

Nafra H.E. Project (2x60 = 120MW) in Arunachal Pradesh to be executed by M/s SEW Nafra Power Corporation Private Limited (M/s SNPCPL) in Private Sector has been accorded concurrence by CEA on 11.02.2011 at an Estimated completed cost of Rs. 848.22 Crores including IDC & FC of Rs. 106.60 Crores and Rs. 5.94 Crores.

Project has been accorded environmental clearance by MOE&F on 17.01.2011 and Forest clearance in June, 2012.

e) Nyamjang Chhu H.E. Project (6x130=780MW) in Arunachal Pradesh by M/s NJC Hydro power Limited

Nyamjang Chhu H.E. Project was accorded concurrence by CEA on 24.03.2011 for an estimated completed cost of Rs. 6268.26 Crores (without Mega Power Project status) and Rs. 6115.60 Crores (with Mega Power Project status).

MoE&F has accorded environmental clearance on 19.04.2012. Forest clearance (Stage-I) was accorded by MoE&F on 09.04.2012

(f) Tato-II H.E Project (4x175=700MW) in Arunachal Pradesh By M/s THPPL

Tato-II H.E. Project (4x175=700MW) in Arunachal Pradesh to be executed by M/s THPPL in Private Sector has been accorded concurrence by CEA on 22.05.2012 at an Estimated completed cost of Rs. 5616.20 Crores.

MoE&F has accorded environmental clearance to the project on 27.06.2011.

The proposal for the forest clearance was considered by Forest Advisory Committee (FAC) on 31.05.2011 and on 17.09.2012. The committee took note that

basin cumulative study for Siang basin is being done by CWC and since the Siyom basin is part of Sing basin, no separate basin study is needed for Siyom basin. The committee desired that proposal may be placed before it for further deliberations on submission of cumulative study report of Siang basin and the information desired by the committee earlier.

(g) Gongri H.E Project (2x72=144MW) in Arunachal Pradesh By M/s DEPL :

Gongri H.E. Project (2x72 = 144 MW) in Arunachal Pradesh to be executed by M/s DEPL in Private Sector has been accorded concurrence by CEA on 04.02.2013 at an Estimated completed cost of Rs. 1436.27 Crores.

MoE&F has accorded Environmental Clearance on 19.03.2013 and Forest clearance on 07.09.2012.

11.5.4 H.E. Projects Allotted for implementation

A total of 109 H.E. Projects (above 25 MW capacity) with aggregate capacity of 42681.5 MW have been allotted in N.E. Region to Central and Private Sector for implementation in the near future and these are yet to be taken up for construction. In addition, Lower Kopili (120 MW) in Assam is being developed in State Sector by APGCL. Category-wise, these schemes are summarized below:-

Summary of HE Schemes Allotted in NER

Name of State	Central		Private		Total	
	No.	I.C. (MW)	No.	I.C. (MW)	No.	I.C. (MW)
Ar. Pradesh	3	4400	91	33224.5	94	37624.5
Assam	-	-	-	-	-	-
Manipur	2	1566	-	-	2	1566
Meghalaya	1	85	5	944	6	1029
Mizoram	5	2196	1	80	6	2276
Nagaland	-	-	1	186	1	186
Total (NER)	11	8247	98	34434.5	109	42681.5

11.6 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) Namrup CCGT (70 MW GT + 30 MW ST) – Assam (State Sector)

Namrup CCGT 100 MW is a replacement power project being executed by Assam Power Generation Corporation

Ltd. (APGCL) in District Dibrugarh, Assam. EPC contract was awarded to BHEL in February, 2009 with target date of commissioning as January, 2012. Main plant civil works were started in April, 2010 but due to very slow progress, BHEL floated tender for engaging new contractor for balance civil work. The erection of all major equipments is in progress. GT & ST Synchronization expected by Jan, 2014 & April, 2014 respectively and full load expected by June, 2014.

b) Palatana CCPP (2 x 363.3 MW) by OTPC– Tripura (Central Sector)

Palatana project is being executed by OTPC, a Joint Venture of ONGC, Govt. of Tripura and Infrastructure Leasing and Finance Services (IL & FS) at Palatana, Tripura. Main Plant order was placed on BHEL in June 2008 on EPC basis. Most of the material is available at site. Block-I was Synchronized with NER Grid in CC mode on 22.10.12 and achieved full load on 03.01.13. For Block-II erection of all major equipments are nearing completion. Synchronization in CC mode is expected in September, 2013 and full load expected in October, 2013.

C) Bongaigaon TPS (3x250 MW) - Assam (Central Sector)

The project is being executed by NTPC. The main plant order was placed on BHEL in February, 2008 with an original commissioning schedule of Jan, 2011 for Unit-1, May, 2011 for Unit-2 and Sept., 2011 for Unit-3. But the project has been delayed due to Law and Order problem, heavy rain & delay in completion of civil works for main plant. NTPC re-awarded the civil works for Unit-2 & 3 to a new contractor in July, 2011. Main plant erection for U-1 already started. However, for U-2 & U-3 Boiler erection started but TG erection yet to be started. NTPC now envisages the project commissioning in June, 2014, May, 2015 and October, 2015 for Unit-1, 2 and 3 respectively.

d) Monarchak Gas Based Power Project (101MW) –NEEPCO – Tripura (Central Sector)

The project is being executed by NEEPCO in Tripura. LOI for the main plant was placed on BHEL in July, 2010 with original commissioning schedule of May, 2013 and order for BoP packages was placed on to M/s. NBPPL. All clearances are

available. Erection of all major equipments & commissioning activities of Gas turbine in open cycle /closed cycle is in progress. The project is likely to be commissioned by June, 2014.

11.7 Detailed Status of New Thermal Power Projects Proposed in North-eastern States

Lakwa Replacement TPP by M/S APGCL - 70MW

M/s APGCL has a proposal to set up a 70 MW gas based Power Plant at Lakwa as replacement of old units. Land, water and fuel linkage is stated to be already available from the existing units. DPR under finalization.

Golaghat TPP by M/SAPGCL- 12 MW

M/s APGCL has a proposal to set up a gas based Power Plant in Golaghat District. DPR under preparation. Tie up of Land and fuel is under process. Water is stated to be sourced from borewell in the plant area.

Cachar TPP by APGCL-30 MW

M/s APGCL has a proposal to set up a gas based Power Plant in Cachar District. DPR under preparation. Tie up of Land and fuel is under process. Water is stated to be sourced from borewell in the plant area.

Margherita TPP-JV JV of NTPC & APGCL-500MW

M/S Assam Power Generation Corporation (APGCL) has a proposal to set up a 500 MW Thermal Power Project at Margherita in Assam for which APGCL has applied for coal linkage vide application dated 23.11.2009 to Min. of Coal. CEA had not prioritized this project for coal linkage as essential inputs including Terms of Reference from MoE&F were not tied-up.

Amguri TPP by APGCL- 100MW

M/s APGCL has a proposal to set up a gas based thermal power Plant in Assam. PFR has been prepared. DPR will be finalized once gas linkage is confirmed. Land is already available. Availability of water is yet to be tied up.

Bongaigaon TPP Unit-IV NTPC-250 MW

NTPC has a proposal to set up one more unit of 250 MW at Bongaigaon TPP where 3x250 MW are under construction by them. NTPC has submitted an application on 6.5.2010 to Ministry of Coal for coal linkage. The project has been prequalified and prioritized by CEA for coal linkage. Ministry of Power vide letter dated 30.12.2011 has recommended the proposal to Ministry of coal along with other proposals for accord of coal linkage.

Globe Power & Steel TPP Globe Power& Steel Ltd. - 2X660 MW

M/s Globe Power & Steel Limited has submitted a proposal for coal linkage for their proposed 2x660 MW TPP in Kamrup Distt. of Assam. The developer had submitted application for coal linkage to Ministry of Coal. The project was not prequalified as the financial documents furnished were not as per requirement.

Chandrapur TPS JV of IAPL& APGCL - 2x30 MW

This is an existing power plant based on liquid fuel and is under shut down since June, 99 due to exorbitant cost of fuel. It is proposed by APGCL to revive the plant by replacing the existing boiler by fluidized bed boiler based on coal firing using existing turbines through joint venture mode. APGCL has formed a joint venture Company with Imperial Group of Company in the name of M/s Imperial APGCL Power Limited (IAPL) for revival of CTPS on coal

on Public Private Participation (PPP) mode. IAPL has carried out the comprehensive RLA study of the existing Turbines & Generators and other associated auxiliaries & equipments of CTPS.

The RLA Study Report suggested extended turbine life of another 20 to 25 years after conducting various NDT tests and other related RLA tests. M/S IAPL is in the process of obtaining environmental clearance for the project. Govt. of Assam has requested Min. of Coal for allocating coal linkage for the project. Project recommended vide CEA letter dt.16.1.2012 to Ministry of Power subject to transfer of 67 Acres of land and 6 cusecs of water required for Chanderpur TPS in favour of M/s Imperial APGCL Limited.

Garo Hills NEEPCO – 500MW

NEEPCO has a proposal to set up a coal based thermal Power Plant at Garo Hills in Meghalaya. As informed by NEEPCO, MoA between State Govt. and NEEPCO has been signed in March,2011 for implementation of the project. The essential inputs and clearances for the project i.e. availability of land, water availability and Terms of Reference from MoE&F for the EIA study yet to be tied up for the project.

West Khasi Hills TPP by M/s NEEPCO- Meghalaya -240MW

NEEPCO has a proposal to set up a coal based TPP at West Khasi Hills in Meghalaya. They have applied for coal linkage to Min. of Coal. As intimated by NEEPCO, a proposal for implementation of the project as a Joint Venture with the State Govt. was submitted on 28.08.2008. Clearance from the State Govt. is awaited. The essential inputs and clearances for the project i.e. availability of land & water and

Terms of Reference for EIA study are yet to be tied up for the project.

11.8 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 six schemes have already been completed at an actual expenditure of Rs. 214.69 Crores to accrue a benefit of 96 MW. The remaining three schemes are under various stages of implementation and are likely to accrue a benefit of 116 MW at an estimated cost of Rs. 451.95 Crores. The Scheme-wise status of the R&M works of the hydro schemes of North Eastern Region as on 31.03.2013 is given hereunder:-

A. Schemes Completed

S. No.	Name of Scheme, Agency, State	Installed Cap. (MW)	Actual cost (Rs. 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, MeECL, 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 works completed in 2011-12
6.	Umium St.II, MeECL, Meghalaya	2x9	90.46	18(LE) + 2 (U)	R&M works completed in 2011-12

B. Ongoing – Under Implementation

S. No.	Name of Scheme, Agency, State	Installed Cap. (MW)	Est. cost (Rs. Crs.)	Benefits (MW)	Status
7.	Kopili, NEEPCO Assam	2x50 + 2x50	50.22	-	Orders placed on BHEL, the OEM. Likely to be completed by 2013-14 of XII Plan.
8.	Kyrdemkulai, (Umium St.III) MeSEB, Meghalaya	2x30	376.68	60(LE) + 6(U)	DPR under preparation. Likely to be completed in XIII Plan.
9.	Khandong, NEEPCO, Meghalaya	2x25	25.05	50(LE)	Orders placed on BHEL, the OEM. Likely to be completed in 2013-14 of XII Plan.

Abbreviations: MW – Mega Watt; Res. – Restoration; U – Uprating; LE – Life Extension

11.9 Installed Capacity in the N.E. Region

The total installed capacity in the Region is as under:

Sector	Installed Capacity (MW)
Hydro	1242
Thermal	1390
RES	253
Nuclear	-
Total	2885

11.10 Capacity Addition during 12th Plan

45 Hydro Electric Schemes (10897 MW) has been identified for setting up of new hydro power project during 12th Plan (2012-17) in the country. This includes 4 Hydro Electric schemes with total installed capacity of 1852 MW in N.E. Region.

11.11 Hydro Power Generation Performance

Hydro Power generation during the year 2012-13 (April, 2012 - March, 2013) in the North Eastern Region was 3911.08 MU against a target of 4200 MU, which is 6.88 % less.

11.12 Ministry of Development of North Eastern Region (DONER)

(a) The following power development schemes of NE states received from Ministry of DONER for funding under NLCPR were technically cleared during 2012-13:-

1. Scheme for construction of new 33/11 kV, 2x5 MVA sub-station at Thuribari with 40 km. of 33 kV line from Salakati to Thuribari and associated distribution system in Assam.

2. Scheme for establishment of 11/11 kV switching substation, upgrading of 11 kV transmission systems, augmentation and rejuvenation of distribution substation, extension, phase balancing and enhancing the load carrying capacity of LT distribution network and improvement of service connection system under Pakyong Division in East Sikkim.
3. Scheme for modernization and beautification of Distribution System with conversion of overhead lines with underground cable system in Jorhang Town, South Sikkim proposed to be funded under Non-lapsable Central Pool of Resources (NLCPR).

(b) The following power development schemes of North Eastern States to be funded under NLCPR received from Ministry of DONER were examined during 2012-13 and comments were sent to Ministry of DONER for clarifications /furnishing additional information:-

1. Scheme for construction of 33 kV transmission line from Namchi to Damthang and Temi and sub-stations at Temi/ Damthang in South Sikkim proposed to be funded under NLCPR.
2. Scheme for remodeling of distribution system in Rangpo Town in East Sikkim under NLCPR.
3. Scheme for construction of 33 kV D/C line from E Lungdar to Maicham-II HEP with LILO of one ckt at Zaizawhtlang S/S in Mizoram for funding under NLCPR.
4. Scheme for construction of 33/11 kV, 1x1.6 MVA S/S at Phuldungei in Mizoram for funding under NLCPR.
5. Project- Installation of 2x2.5 MVA, 33/11 kV S/Ss along with associated 33 kV line & associated works at

Gelnel, Senapati district in Manipur for possible funding under NLCPR.

6. Project- Installation of 2x5 MVA, 33/11 kV S/Ss along with associated 33 kV line & associated works at Sugnu, Thoubal district in Manipur for possible funding under NLCPR.
7. Project- Installation of 2x5 MVA, 33/11 kV S/Ss along with associated 33 kV line & associated works at Khongjom, Thoubal district in Manipur for possible funding under NLCPR.
8. Project- Installation of 2x2.5 MVA, 33/11 kV S/Ss along with associated 33 kV line & associated works at Gumnom, Ukhrul district in Manipur for possible funding under NLCPR.
9. Project- Installation of 2x5 MVA, 33/11 kV S/Ss along with associated 33 kV line & associated works at Nungbi Khullen, Ukhrul district in Manipur for possible funding under NLCPR.
10. Project- Installation of 2x5 MVA, 33/11 kV S/Ss along with associated 33 kV line & associated works at Sekmai, Imphal west district in Manipur for possible funding under NLCPR.

11.13 Status of Rural Electrification in North-eastern Region

During 2012-13 (upto March, 2013) 399 numbers of inhabited villages have been electrified in NE States and Cumulatively, 36676 inhabited villages constituting 90.8 % out of a total of 40377 inhabited villages

have been electrified in NE States and 9686 pump-sets 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 December 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 POWERGRID.

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. The DPRs for Arunachal Pradesh, Tripura and Sikkim were subsequently revised by POWERGRID in July 2010 to delete some transmission works taken up by these states and include new requirement of transmission lines and sub-stations proposed by these states. The details of the revised estimated cost is given below:

(Rs. in crores)

Sl. No	State	Transmission & Sub Trans (132 kV & above)		Distribution	Sub-Total	Consultancy	Total
		Phase-I	Phase-II				
1	Inter-State	44.49	250.23	0.00	294.72	39.01	333.73
2	Ar. Pradesh	959.23	466.77	217.14	1643.14	217.49	1860.63
3	Assam	711.74	940.55	741.72	2394.01	316.87	2710.88
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	0.00	152.08	1067.85	141.34	1209.19
8	Tripura	612.72	229.19	284.55	1126.46	149.1	1275.56
9	Sikkim	730.70	0.00	287.59	1018.29	134.78	1153.07
	Total	5355.4	2294.43	2372.15	10021.98	1326.52	11348.5

The comprehensive scheme for strengthening of Transmission and Distribution (T&D) scheme for 6 NER States (viz., Assam, Meghalaya, Manipur, Mizoram, Nagaland and Tripura), named as “NER Power System Improvement Project”, will be funded by the World Bank in three tranches of USD 500 million each. In order to prioritize the scope of works to be covered in in first tranche of proposed World Bank assistance, a team of CEA and POWERGRID officers has visited the above mentioned six states in the month of February, March and April, 2012. The funding for the scheme for Arunachal Pradesh, Sikkim works would be funded through Non-lapsable Central Pool of

Resources (NLCPR – Central) administered by Ministry of DONER and inter-state works would be funded by Government of India.

- (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 12th Plan and beyond is being reviewed because of changed generation scenario, enhanced capacity and new hydro projects.

CHAPTER – 12

TRAINING AND HUMAN RESOURCE DEVELOPMENT

12.1 Training of Manpower in CEA

As Human Resource is essential 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 competencies of the human resources are developed and enhanced through training. Keeping this objective in view, HRD, 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 changes 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, which were in force before the notification of Central Electricity Authority (measures relating to safety and electric Supply) Regulations 2010, now under these Regulations and under section 73(g) of the Electricity Act, 2003, CEA has been sending teams to 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 for training institutes for 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 endeavor of CEA management to impart at least one week training annually to each employee of CEA.

12.2 Management Development & Refresher Training programme

Management Development Programmes for CEA officers were conducted at professional institutes of National and international repute like, IIM Ahmedabad, CBIP, ISTM, National Water Academy, Pune.

The officers /officials were deputed for various in service refresher training programmes, technical courses, workshop, seminars, conferences etc at ISTM, CBIP, ESCI, Hyderabad, National Water Academy, Pune, NIH, Roorkee, etc.

The programmes were organized for enhancing the technical, managerial and interpersonal skills which included the topics such as Finance for non finance executives, Creativity Reinvention and self enhancement for practicing manager. Workshops and seminars on RTI Act were organized by ISTM and training programme for Hindi has also been conducted.

Induction training for fresh graduate engineers who joined CEA as Assistant Director-I was organized at NPTI, HPTC, Nangal for 3 weeks.

The Man days for these programmes (including in house training) were 763.

12.3 In-house training programme

The following in house training programmes were organized by CEA during 2012-13.

1. Half day comprehensive training programme on drafting & Noting and office procedure was organized on 23rd May, 2012 in CEA lecture hall by Shri B.Bandhopadhaya under secretary CEA. 40 participants attended this programme.
2. Presentation on portable inflatable lighting system for substation & project was organized on 14th May, 2012 by M/s. Aska Equipment New Delhi in CEA. 18 participants attended the presentation.
3. A programme on coal issues and their solution for power sector was organized on 22nd June, 2012 in CEA lecture hall by M/s GLEN Core India Pvt. Ltd., Mumbai.
4. A presentation on new development and capability of Hydro Power was organized in CEA's lecture hall on 12th October, 2012 by M/s Alsthom. 33 participants attended the programme.
5. An In house training programme on grid capability was organized on 29th January, 2013 in CEA lecture hall by M/s Alsthom. 52 participants attended the programme.
6. A presentation was held in CEA on 8th March, 2013 on metering and billing by M/s. Intron. 30 participants attended the programme.

12.4 Foreign visits /Training Programmes for CEA Officers.

S. No.	Name of Institute
1.	OMS Power Training and Research Institute, Bhubaneshwar.
2.	National Power Training Institute (WR), Nagpur.
3.	Employee Development Centre, PGCIL, Kishenpur, Jammu.
4.	*Salal Power Station Training Centre, NHPC, Salal, J&K.
5.	Central Board of Irrigation & Power, Malcha Marg, New Delhi.
6.	Hydro Power Training Centre of National Power Training Institutes at Nangal.

* It could not qualify and time was given for improvement.

Foreign training programmes were planned, processed and conducted during the year 2012 -13 for CEA engineers. Engineers of CEA were deputed abroad for project consultancy, International Conferences /Seminar /Workshops and technology transfer. The details of officers who visited foreign countries during the year 2012-13 are given in **Annexure 12A.**

12.5 Training Under Apprentice Act, 1961

7 Graduate (Engg.), 3 Technician (Diploma), 13 ITI qualified Draftsmen and 1 Technician (Vocational) apprentices have undergone training in CEA under the Apprentice Act 1961 during the year 2012-13.

12.6 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, which were in force till the notification of Central Electricity Authority (Measures relating to the Safety and Electric Supply) Regulations 2010 in September 2010, and now as per these Regulations, the Power Training Institutes/Centers of various SEBs/Utilities are visited by CEA officers, appraised, graded and then issued recognition on meeting the prescribed norms. The following 6 nos. Training institutes /Centers were visited and accorded recognition /renewal of recognition during the year 2012-13.

12.7 “Adopt an 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 and beyond on 4th and 5th July, 2007, wherein Utilities, State Governments, Central & State Regulatory/Commissions and other organizations participated. In the wake of the International Conclave the ‘Adopt an ITI’ Scheme was launched by MOP & CEA and the CPSUs were advised to adopt one or more ITIs near their project sites to build up a base of required skilled man power.

Central Sector Power Utilities have adopted sixty 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.

CEA also carried out a study for Evaluation of the performance of “Adopt an ITI” scheme.

12.8 Formation of Power Sector Skill Council

The PSSC is proposed to be formed to cater to the need for skilled manpower requirement for the Power Sector. The formation of PSSC with participations from Power organizations in Government and Pvt. Sectors is under way.

12.9 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 2012-2013, the CEA's sports teams participated in various Inter CPSU/Inter-Ministry tournament for the following events:-

1. Chess

CEA Chess Team took part in the 18th Inter CPSU Chess Tournament conducted by REC at Vishwa Yuvak Kendra, New Delhi 23rd to 25th January, 2013.

The achievement by CEA Chess Team is as under:-

- | | |
|------------------------------------|---|
| 1. Team Event | - |
| I st Position (Winners) | |
| 2. Sh. G. Medhi | - |
| I st Runners-up (Opens) | |

The Team also participated in the 17th Inter CPSU Tournament Conducted by NHPC at Faridabad from 21st to 23rd January' 2012 CEA Team got third place in the team Championship and in the individual open Championship, Sh. L.Lanrinsanga, AEE got second place and Sh. G.Medhi, AEE got third place.

Besides these games CEA Team also participated in the inter CPSU tournaments in Kabbadi, Volley Ball, Cricket, Badminton & Table Tennis.

ANNEXURES

Annexure-2A

(Item No. 2.7.4)

Status of Ongoing Projects under National Perspective Plan on R&D for Power Sector

S. No.	Scheme/implementing organization:	Funds released till date	Start	Completion
HYDRO				
1	Development of Silt Erosion Resistant Material for Turbines of Hydro generators - NML, Jamshedpur. Project implementing organization: NML, Jamshedpur.	Funds released till date: Rs 253.0 lakhs MoP share: Rs 149.0 lakhs; NHPC share: Rs 84.0 lakhs and SJVNL share Rs 20.0 lakhs	Start: August, 2006.	Completion: March, 2012.
2	Development of Silt Erosion Resistant Nano-composite Coatings by Physical Vapour Deposition for Hydro Turbine Components - IIT – Roorkee Project Implementing Organization: IIT – Roorkee.	Funds released till date: Rs 134.838 lakhs Total outlay: Rs 163.013 lakhs. Full support from MoP.	Start: Nov, 2009.	Completion: October, 2012. Extension granted upto: March, 2013.
3	Tunneling in water charge zones under high hydro static pressure - NHPC, Faridabad Project Implementing Organization: NHPC, Faridabad.	Funds released till date: Rs 52.20 lakhs. Total outlay: 109.03 lakhs. Full support from MoP.	Start: Nov, 2009.	Completion: October, 2011. Extension granted upto: March, 2013.
DISTRIBUTION				
4	National Effort to develop Technology for Custom Power Devices (STATCOM) (a) Development of STATCOM for application at: IT – Park, Trivandrum. Development of 4*500kVAR STATCOM for application at: IT-Park - C- DAC, Trivandrum Project Implementing Organization: C- DAC, Trivandrum (b) National Effort to develop Technology for Custom Power Devices (Static Compensator STATCOM) - Development of 2.5 MVAR for Bhilai Steel Plant - BHEL, Hyderabad. Project Implementing Organization: BHEL, Hyderabad.	Funds released till date: Rs 125.0 lakhs Total outlay: Rs 250 lakhs; MoP share: 125.0 lakhs; Funds released till date: Rs 182.88 lakhs Total outlay Rs 385.0 lakhs; MoP share: Rs 192.5 lakhs	Start: April, 2007. Start: April, 2007.	Completion: July, 2011. Project Completed Completion: Sept, 2011. Project Completed

5	Development of High Temperature Superconducting (HTS) 630kVA Distribution Transformers for application in Distribution System - EMCO, Mumbai Project Implementing Organization: EMCO, Mumbai	Funds released till date: Rs 95.75 lakhs Total outlay: Rs 200.0 lakhs. MoP share: Rs 100.0 lakhs	Start: April, 2006.	Completion: July, 2011. Project Completed
6	Development of DVR based voltage source stabilizers for process Industry- C-DAC, Thiruvananthapuram, TNEB and CIT-Coimbatore. Project Implementing Organization: C-DAC, Thiruvananthapuram, TNEB and CIT-Coimbatore.	Funds released till date: Rs 48.93 lakhs Total outlay: Rs 81.90 lakhs. Full support from MoP	Start: Nov, 2009.	Completion: October, 2011 Extension granted upto: December, 2013.
7	Design and Development of High Temperature Superconducting Fault Current Limiter (FCL)- Crompton Greaves, Mumbai Project Implementing Organization: Crompton Greaves, Mumbai	Funds released till date: Rs 76.0lakhs Total outlay Rs 306.0 lakhs (Mop support: 153.0 lakhs)	Start: Nov, 2009.	Completion: October, 2012 Extension granted upto: December, 2013.

TRANSMISSION

8	To develop a prototype of 132kV Optical Current Transformer for use in the 132kVsystem –ERDA, Vadodara Project implementing organization: ERDA	Funds released till date: Rs 19.0 lakhs PGCIL is supporting this project.	Start: June, 2006.	Completion: December, 2009. Project Completed
9	Improvement in reliability, safety and long term performance of power and converter transformers through improvements in quality of transformer oil -CPRI, Bangalore Project Implementing Organization: CPRI, Bangalore	Funds released till date: Rs 50.0 lakhs Total outlay: 90.0 lakhs. MoP is fully supporting	Start: Nov, 2009.	Completion: June, 2012 Extension granted upto: December, 2013.

RENEWABLES AND DISTRIBUTED GENERATION

10	Study on Stability & Reliability of the power system with large penetration of Wind Power - CPRI, Bangalore, TNEB and University of Saskatchewan, Canada. Project Implementing Organization: CPRI, Bangalore, TNEB and University of Saskatchewan, Canada.	Funds released till date: Rs. 40.0 lakhs Total outlay: Rs 174.484 lakhs. MoP support: 102.0 lakhs	Start: Nov, 2009.	Completion: October, 2012 Extension granted upto: December, 2013.
11	Integrated sustainable Power generation from short rotation forestry “enhanced bio-mass” in rural and semi urbanm areas within clean Development mechanism (CO₂ mitigation) – R&D initiative for Nation Biomass action Plan. Project Implementing Organization: Aligarh Muslim University	Total outlay: Rs 163.28 lakhs. MoP support: 100%	Start: April, 2013.	Completion: April, 2015.

Annexure-2B

(Item No. 2.9.2)

Awardees for the Year 2011-12 under Comprehensive Award Scheme

Sl. No.	Awarded Station/ Project/ Company	Organisation	Award Category	Scheme Code
A. GOLD SHIELD WINNERS				
1.	Toranagallu – I Thermal Power Station (260MW)	JSW Energy Limited	Performance of Thermal Power Stations	Th-1
2.	Mahatma Gandhi Thermal Power Project, Unit-1(660 MW)	Jhajjar Power Limited	Early completion of Thermal Power Projects	Th-2
3.	Rosa, TPP, Unit-4 (300 MW)	Rosa Power Limited	Early completion of Thermal Power Projects	Th-2
4.	Baspa-II Hydroelectric Power Station (3x100 MW)	Jaiprakash Power Ventures Ltd.	Performance of Hydro Power Stations	Hy-1
5.	Karcham Wangtoo Hydroelectric Project Unit-4 (250 MW)	Jaiprakash Power Ventures Ltd.	Early completion of Hydro Power Projects	Hy-2
6.	Eastern Region Transmission System -1, (220 kV & above)	POWERGIRD	Transmission system Availability	Tr-1
7.	North Eastern Region Transmission System -1, (132 kV & above)	POWERGIRD	Transmission system Availability	Tr-1
8.	2x100MVA, 220/66KV Charanka sub-station	GETCO	Early completion of Transmission Projects	Tr-2
9.	Kakrapara Atomic Power Station (440 MW)	NPCIL	Performance of Nuclear Power Stations	Nu-1
10.	Jamshedpur Utilities & Services Company Ltd. (JUSCO), Jharkhand		Performance of Distribution Companies	Rf-1
11.	Pratap Singh / NPCL West / Uttar Pradesh		Performance of Rural Distribution Franchisees	Rf-2
B. SILVER SHIELD WINNERS				
1.	Trombay Combined Cycle Power Station (180 MW)	Tata Power Company Ltd.	Performance of Thermal Power Stations	Th-1
2.	Dahanu Thermal Power Station (500 MW)	Reliance Infrastructure Limited	Performance of Thermal Power Stations	Th-1
3.	Rosa,TPP Unit-3 (300 MW)	Rosa Power Limited	Early completion of Thermal Power Projects	Th-2
4.	Anpara 'C' Thermal Power Project, Unit-2 (600MW)	Lanco Anpara Power Limited	Early completion of Thermal Power Projects	Th-2
5.	Pong Power House (6x66 MW)	BBMB	Performance of Hydro Power Stations	Hy-1
6.	Karcham Wangtoo Hydroelectric Power Project Unit-2 (100 MW)	Jaiprakash Power Ventures Ltd.	Early completion of Hydro Power Projects	Hy-2
7.	Western Region Transmission System-I (220 KV & above)	POWERGRID	Transmission System Availability	Tr-1

8.	Jhajjar – Kabulpur – Dipalpur , 400 KV D/C Line (Quad)	Jhajjar KT Transco Pvt. Ltd.	Early completion of Transmission Projects	Tr-2
9.	Dahanu Thermal Power Station (2x250 MW)	Reliance Infrastructure Ltd.	Environment Management Award Scheme for Coal Based Thermal Power Stations	En-1
10.	Tata Power Company Limited, Maharashtra		Performance of Distribution Companies	Rf-1
11	Bilaspur / GB Nagar / NPCL South / Uttar Pradesh		Performance of Rural Distribution Franchisees	Rf-2

C. BRONZE SHIELD WINNERS

1.	Vindhyachal Super Thermal Power Station (3260 MW)	NTPC Limited	Performance of Thermal Power Stations	Th-1
2.	Ramagundam Super Thermal Power Station (2600 MW)	NTPC Limited	Performance of Thermal Power Stations	Th-1
3.	Dadri Super Thermal Power Station (1820 MW)	NTPC Limited	Performance of Thermal Power Stations	Th-1
4.	Nathpa Jhakri Hydroelectric Power Station (6x250 MW)	SJVNL	Performance of Hydro Power Stations	Hy-1
5	Tata Power Delhi Distribution Limited (TPDDL), Delhi		Performance of Distribution Companies	Rf-1
6	Surajpur / GB Nagar / NPCL East / Uttar Pradesh		Performance of Rural Distribution Franchisees	Rf-2

D. Consolation Award / Certificate of Merit

1	Guru Hargobind Thermal Plant, Lehra Mohabbat (920 MW)	PSPCL	Performance of Thermal Power Stations	Th-1
2.	Rajasthan Atomic Power Station (1180 MW)	NPCIL	Performance of Nuclear Power Stations	Nu-1
3.	Tarapur Atomic Power Station (1400 MW)	NPCIL	Performance of Nuclear Power Stations	Nu-1

Shield Awards proposed are 28 as against 31 Shield Awards as per scheme. In addition to this three Consolation Awards/Certificate of Merits are also being given.

SJVNL
PSPCL
NPCIL
BBMB
GETCO
CSPGCL

Satluj Jal Vidyut Nigam Limited
Punjab State Power Corporation Limited
Nuclear Power Corporation of India Limited
Bhakra Beas Management Board
Gujarat Energy Transmission Corporation Limited
Chhattisgarh State Power Generation Company Limited

Annexure-3A

(Item no. 3.2)

Details of Inter-Regional Transmission – Existing as on 31-03-2013

(Transmission capacity in MW)

Details of Inter-Regional Transmission – Existing and expected during 11th Plan	At the end of 10th Plan	At the end of 11th Plan	At the end of 2012-13
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
ER-SR total	3130	3630	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	1600	1600
Biharshariff-Balia 400kV D/C quad		1600	1600
Barh-Balia 400kV D/C quad		1600	1600
Sasaram–Fatehpur 765kV S/C line-1		2100	2100
Gaya–Balial 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	1000	1000
ER-NR total	3430	12130	12130
ER – WR			
Rourkela-Raipur 400kV D/C	1000	1000	1000
TCSC on Rourkela-Raipur 400kV D/C	400	400	400
Budhipara-Korba 220kV D/C+S/C	390	390	390
Ranchi-Sipat 400kV D/C (40% SC)		1200	1200
Ranchi-Rourkela-Raipur 400kV D/C with fixed series capacitor, TCSC in parallel line		1400	1400
ER-WR total	1790	4390	4390
ER - NER			
Birpara-Salakati 220kV D/C	260	260	260
Malda-Bongaigaon 400kV D/C	1000	1000	1000
ER-NER total	1260	1260	1260
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-1 765 kV op.	1100	1100	2100
Agra-Gwalior 765kV S/C line-2 765 kV op.		1100	2100
Kankroli-Zerda 400kV D/C		1000	1000
NR-WR total	2120	4220	6220

Details of Inter-Regional Transmission – Existing and expected during 11th Plan	At the end of 10th Plan	At the end of 11th Plan	At the end of 2012-13
WR-SR			
Chandrapur HVDC back to back	1000	1000	1000
Barsur–L.Sileru 200kV HVDC mono pole @	200	-	-
Kolhapur-Belgaum 220kV D/C	260	260	260
Ponda – Nagajhari 220kV D/C	260	260	260
WR-SR total	1720	1720	1720
TOTAL ALL INDIA (200kV & above), in MW	13450	27150	29150
132kV/110kV Inter-Regional links 4xD/C + 4XS/C = 12 ckts \$	600	600	600
TOTAL ALL INDIA (110/132kV & above), in MW	14050	27750	29750
Note:- (1) @ - 200 MW HVDC Monopole is currently not in operation. (2) \$ - 132/110kV lines are operated in radial mode from time to time.			

ISSUES PERTAINING TO TRANSMISSION SYSTEM PLANNING TAKEN UP DURING 2012-13

31st Standing Committee Meeting of the Standing Committee on Power System Planning in Northern Region.

1. System Strengthening scheme NRSS-XXIX for providing alternate grid connectivity to J&K.
2. Delinking of RAPP – Shujalpur 400 kV D/c line with RAPP 7&8 generation RAPP.
3. Revised evacuation system for Mala-II HEP.
4. LILO of 220 kV, Gladini – Hiranagar S/c line at Samba 400/220 kV substation.
5. Northern Region System Strengthening Scheme- NRSS XXX.
6. Northern Region System Strengthening Scheme- NRSS XXXI.
7. Northern Region System Strengthening Scheme- NRSS XXXII.
8. HVPN's transmission system connected with Faridabad CCGT.
9. Revised Transmission System for transfer of power from IPPs of SR to WR/ NR
10. Spare 400/220 kV, 500 MVA ICT for Northern Region.
11. Perspective Transmission Scheme for evacuation of power from Chenab Basin Projects in J&K.
12. SVC of $\pm$ 400 MVAR at Nalagarh and Lucknow.
13. Northern Regional System Strengthening scheme-XXXIII for power supply to M/s Noida Power Co. Ltd.
14. Spare 765/400 kV ICTs for Northern Region.
15. Replacement of 50 MVAR Bus reactors with 125 MVAR Bus Reactors at Agra and Muradnagar (UPPTCL).
16. LILO of 220 kV Anta-Dausa line (one circuit) at Lalsot S/s.

1st 2013 Meeting of the Standing Committee on Power System Planning in Eastern Region

1. System strengthening in Eastern Regional Grid
2. Establishment of 400kV sub-station at Chalbapur (West Bengal) and LILO of one Ckt. of 400kV Mejia- Maithon D/C line at Chalbapur by DPSC Limited.
3. Establishment of 400/220kV 2x315MVA S/S at Pandiabil (an alternative site) in Orissa as GIS with LILO of 400kV Mendhasal-Baripada D/C line under the approved ERSS-III scheme - Modifications in the ERSS-III Scheme.
4. 220 kV S/S along with lines by OPTCL Board.
 - a. Pandiabil GIS S/S-Puri 220 kV D/C line
 - b. Pandiabil GIS S/S-Pratap Sasan 220 kV D/C line
5. Establishment of 2x315 MVA, 400/220 kV GIS S/S at Kishanganj (Bihar) instead of earlier approved AIS S/S at Karandighi (W.B.)
6. Augmentation of transformation capacity at 400/220 kV, 2x315 MVA Muzaffarpur S/S of PGCIL with an additional 1x500 MVA, 400//220 kV ICT.
7. Converting 2x80 MVA fixed reactor at Gorakhpur end of 400 kV Barh-Gorakhpur D/C line into switchable line reactors.
8. Establishment of 765/400 kV Pooling Station at Sundergarh instead of Jharsuguda.

9. Following lines to be executed for drawl of power from 400/220 kV Bolangir (PG) S/S.
 - a. LILO of Burla-Bolangir 220 kV S/C line at Bolangir(PG)
 - b. Bolangir(OPTCL)-Bolangir(PG) 220 kV S/C line
 - c. Kisinga-Bolangir (PG) 220 kV S/C line.

34th meeting of the Standing Committee on Power System Planning in Western Region held on 9th May 2012 at New Delhi.

1. Review of Progress on Earlier Agreed Transmission Schemes
2. Overloading of Kawas – Ichhapore 220 kV S/c line.
3. MSETCL proposal of connectivity of Ghodbunder with Boisar
4. High Voltage Studies in Western Region
5. CSPTCL proposal of LILO of 400 kV S/c line between Raipur (PG) and
6. Khedamera (Bhilai) at Raipur (Raita) 400kV substation and provision of 125
7. MVAR bus reactor at Raipur (Raita).
8. Review of Daman & Diu's proposal of LILO of one circuit of Vapi-Magarwada
9. 220kV D/c line at Ringanwada 220/66 kV substation
10. GETCO proposal for LILO of one circuit of 400 kV D/c Mundra UMPP –
11. Chorania line at Halvad (GETCO) substation, as an interim arrangement
12. Conversion of fixed line reactors to switchable line reactors associated with
13. Aurangabad-Pune and Pune-Parli 400 kV D/C lines at Pune 400 kV substation.
14. Interconnection of Navsari 400 kV (GIS) and Vapi 400 kV substation as an interim arrangement.
15. Laying of 765kV D/C towers instead of S/c towers in RoW constraints stretches of 765kV 2xS/c Vindhyachal pooling station –Satna – Gwalior line
16. LILO of 220 kV Raigarh (CSPTCL)-Budhipadar line at 400/220 kV Raigarh PGCIL substation- Proposal by CSPTCL
17. Provision of 63 MVAR line reactor for one circuit of Raipur – Bhadrawati 400 kV line at Raipur end
18. Establishment of Varanasi- Balia 765 kV S/c line instead LILO of 765 kV Gaya – Balia 765 kV S/c line at Varanasi 765/400 kV substation
19. Proposals put up for discussion by MSETCL during the meeting

35th meeting of the Standing Committee on Power System Planning of WR held on 3rd January 2013 at PGCIL, Gurgaon.

1. Review of Progress on Earlier Agreed Transmission Schemes.
2. 400/220 kV 315 MVA 3rd ICT at Vapi (PG) and establishment of Kala 400/220 kV substation in DNH.
3. Interconnection of Navsari 400 kV (GIS) and Vapi 400 kV substation.
4. LILO of one circuit of 400 kV D/C Mundra UMPP – Chorania line at Halvad (GETCO) substation, as an interim arrangement
5. LILO of 400 kV S/c line between Raipur (PG) and Khedamera (Bhilai) at Raipur (Raita) 400kV substation and provision of 2X50 MVAR switchable line reactors at Raita end.
6. Status of 10 nos. of bus reactors agreed in the 33rd SCM of WR.
7. Status of 17 nos. of bus reactors agreed in the 34th SCM of WR
8. Shifting of 1x315 MVA ICT-III at Wardha S/s to Solapur (PG) substation.

9. Provision of 2 nos. of 400 kV bays at Boisar for termination of Ghodbunder – Boisar 400 kV D/c line.
10. Interim arrangement for reconfiguration of one circuit of Mundra - Limbdi 400 kV D/c line for LILO at Jetpur.
11. LILO of Padghe – Kharghar 400 kV line at Navi Mumbai substation and use of 400 kV cable for termination at Navi Mumbai.
12. 220 kV interconnections from Kala 400/220 kV substation in DNH – modifications in the earlier agreed schemes.
13. Laying of Multi circuit towers near approach end of 765/400 kV Vadodara GIS substation.
14. Direct interconnection of Vadodara – Pirana and Vadodara – Asoj 400 kV D/C (Quad) lines by passing Vadodara substation as a contingency arrangement
15. Commissioning of line reactors as bus reactors at Satna and Bilaspur 765 kV substations
16. Procurement of Spare 333 MVA, 765/400 kV and 500 MVA, 765/400 kV ICTs for Western Region.
17. Requirement of Reactive Compensation at 400kV Bina Substation.
18. Interim arrangement for evacuation of power from proposed Vindhyachal – IV (2x500MW) generation project.
19. Unified Real Time Dynamic State Measurement (URTDMS) Project
20. Transmission system associated with New IPP projects in Chattishgarh-Shifting of converter terminal associated with + 600 kV 4000 MW, Raigarh (Kotra) – Dhule HVDC line from Dhule in Western Region to a suitable location in Southern Region.
21. Proposal for Static VAR Compensators (SVC) in Western Region
22. Termination of Vapi – Navi Mumbai 400kV D/c line at upcoming Kudus substation of MSETCL.
23. 400 kV outlet from 765/400 kV Gwalior (PG) sub-station.
24. Review of Transmission System for transfer of power from IPPs of SR to WR / NR.
25. Commissioning of line reactors as bus reactors at Bina 765kV substation.
26. Intra-state Transmission System proposed by MSETCL for evacuation of power from various IPPs located in eastern part of Maharashtra.
27. Review of Transmission Planning Criteria
28. Integrated planning for State transmission system
29. State wise assessment of Load Generation Scenario of Western Region
30. 3rd 765 kV line from Sipat STPP – Agenda by NTPC
31. LILO of both circuits of Korba-Kotmikala-Amkantak 220 kV D/C line at Annuppur.
32. Strengthening of ISTS system in Gujarat- proposal by GETCO

34th Meeting of the Standing Committee on Power System Planning in Southern Region

1. Transmission System for Evacuation of Wind Power from Tamil Nadu
2. Construction of 220kV Mylatti- Puttur line as a System Strengthening Scheme
3. Transmission System for evacuation of power from Yermarus TPS (2x800MW) /Edlapur TPS (1x800 MW) of KPCL in Karnataka
4. 400kV D/c Quad line from Pugalur 400kV S/S to Sholingallur 400kV S/S
5. Establishment of 400/220kV S/s near Doni to facilitate Wind Energy Evacuation
6. Transmission System for evacuation of power from 2x500 MW Neyveli Lignite Corporation Ltd. TS-I (Replacement) in Neyveli, Tamil Nadu
7. 220kV bays for 400/220kV transformer augmentation

8. Line reactor at Madakathara(North Trissur)
9. Transmission system for Kudgi Phase-I TPS of NTPC (3x800 MW)
10. HVDC system strengthening in Southern Region
11. TNEB/TANGEDCO/TANTRANSCO Proposal to establish four no. of 400 kV S/s
12. Re-configuration of Bangalore 400kV ring for Yelahanka 400kV S/S
13. Discussions on the Connectivity and LTA applications for Projects in Southern Region
 - New connectivity and LTA application of NCC Power Projects Limited (2x660 MW)
 - Early Commissioning of Vemagiri & Nagapattinam Pooling Stations
 - Request of M/s Lanco Kondapalli Power Limited (LKPL) to reduce Long-term Open Access quantum from 350 MW to 250 MW

35th Meeting of the Standing Committee on Power System Planning in Southern Region

1. Transmission System for Evacuation of Wind Power from Andhra Pradesh
2. Connectivity for Nirmal 400kV S/S of APTRANSCO and Transmission System for Singareni Collieries (SCCL) Generation Project (2x600 MW)
3. Transmission System for evacuation of power from 2x500 MW Neyveli Lignite Corporation Ltd. TS-I (Replacement) (NNTPS) in Neyveli, Tamil Nadu.
4. KSEB proposals to avoid congestion in S1-S2 corridor
5. 220 kV downstream Networks at 400 kV Bidadi, Yelahanka and Cochin Substations.
6. Two (2) nos. of 125 MVAR, 400kV Bus Reactors at Vijayawada Substation of POWERGRID.
7. Review of Transmission Planning Criteria
8. Integrated planning for State transmission system and issues related to State-wise assessment of the Load Generation Scenario of Southern region
9. Proposal for installation of SVC's / STATCOM's at Hyderabad, Udumalpet, and Trichy substations of POWERGRID.
10. Transmission System Associated with Vallur TPS
11. Modification to the under implementation System Strengthening in Southern region –XII and XII Schemes
12. Implementation of 2nd Raichur – Kurnool 765kV S/c line
13. Discussions on the Connectivity and LTA applications for Projects in Southern Region
 - Common Transmission System Associated with IPP Projects in Srikakulam Area, Andhra Pradesh.
 - Issue of Long Term Open Access Granted to Udupi Power Corporation Ltd.

**Details of the Schemes notified through Tariff based Competitive Bidding
(TBCB)**

(a) Schemes presently under implementation by the Transmission Service Providers:

1. Scheme for enabling import of NER /ER surplus by NR (Sterlite Technologies Ltd.)
2. System Strengthening in NR for import of power from North Karanpura and other projects outside NR and System Strengthening in WR for import of power from North Karanpura and other projects outside Western Region and also for projects within Western Region. (Reliance Power Transmission Company Ltd.)
3. Talcher-II Augmentation System. (Reliance Power Transmission Company Ltd)
4. System strengthening common for WR and NR (Sterlite Transmission Projects Pvt Ltd.)
5. Transmission System Associated with Krishnapattnam UMPP-Synchronous interconnection between SR and WR (Part-B) (Consortium of Patel-Simplex-BSTranscomm).
6. System Strengthening for WR (Sterlite Transmission Projects Private Ltd.)
7. Transmission system associated with IPPs of Nagapattinam / Cuddalore Area – Package a (Power Grid Corporation of India Ltd.)
8. Transmission System associated with IPPs of Vemagiri Area-Package a (Power Grid Corporation of India Ltd.)

(b) Schemes presently under bidding process by the Bid Process Coordinators:

1. Transmission System associated with DGEN TPS (1200 MW) of Torrent Power Ltd.
2. System Strengthening in Southern region for import of power from Eastern region.
3. Bairasuil HEP – Sarna 220kV line
4. Transmission System for Patran 400kV S/S
5. ATS of Unchahar TPS
6. Part ATS for RAPP U-7&8 in Rajasthan
7. Transmission System for Connectivity for NCC Power Projects Ltd (1320 MW)
8. Transmission System required for evacuation of power from Kudgi TPS (3x800 MW in Phase-I) of NTPC Limited.
9. Eastern Region System Strengthening Scheme-VI
10. Eastern Region System Strengthening Scheme-VII

Issues Pertaining to Transmission System Planning taken up in Empowered Committee on Transmission during 2012-13

29th Meeting of the Empowered Committee on Transmission

1. Review of the progress of transmission projects under bidding process
 - Transmission system associated with IPPs of Vemagiri area-Package A
 - Transmission system associated with IPPs of Nagapattinam /Cuddalore area- Package A
 - Transmission system associated with DGEN TPS (1200 MW) of Torrent Power Ltd. AND Inter-connection between Srinagar (Uttarakhand) and Tehri
2. Evacuation System for Vizag-Vemagiri Projects- Hinduja (1040 MW)
3. Review of notified transmission schemes for start of bidding process
 - Transmission System associated with IPPs of Vemagiri Area- Package-B
 - Transmission System associated with IPPs of Nagapattinam /Cuddalore area - Package-C
 - Transmission System associated with IPPs of Vemagiri Area- Package-C
4. Issues related to revision of Standard Bid Documents (SBD) for aligning with the POC(Point of Connection) mechanism of sharing of transmission charges.
5. New schemes to be taken up through Tariff Based Competitive Bidding
 - Bairasuil HEP – Sarna 220kV line
 - Transmission System for Patran 400kV S/S
 - ATS of Unchahar TPS
 - Part ATS of RAPP U-7&8 in Rajasthan
 - Transmission System for Connectivity for NCC Power Projects Ltd. (1320 MW)
 - Transmission System required for evacuation of power from Kudgi TPS (3x800 MW in Phase-I) of NTPC Limited
 - Eastern Region System Strengthening Scheme-VI
 - Eastern Region System Strengthening Scheme-VII
6. HVDC Bipole Strengthening in Southern Region

30th Meeting of the Empowered Committee on Transmission

1. Cut off estimated cost for projects to be taken up under TBCB
2. Exemption of Transmission elements required to be built in a flexible manner
3. Issues related to revision of Standard Bid Documents (SBD) for aligning with the POC (Point of Connection) mechanism of sharing of transmission charges
4. Review of progress of transmission projects awarded through the TBCB process
5. Review of Vemagiri – Khammam – Hyderabad 2nd 765 kV corridor
6. Associated Transmission Scheme for Kudgi TPS (3x800 MW)
7. New Transmission schemes to be taken up through Tariff Based Competitive Bidding
 - Transmission System Strengthening associated with Vindhyachal – V
 - New Pugalur – Hyderabad HVDC scheme in Southern Region

31st Meeting of the Empowered Committee on Transmission

1. Proposal of POWERGRID to review the project selection procedure for Tariff Based Competitive Bidding (TBCB) for transmission sector
2. Review of scope of the scheme “Transmission system associated with DGEN TPS (1200 MW) Torrent Power Limited”
3. Review of scope of the scheme “Transmission system associated with IPPs of Nagapattinam / Cuddalore Area – Package C”
4. Revision of Standard Bid Documents (SBD) for aligning with the POC (Point of Connection) mechanism of sharing of transmission charges
5. NER System Strengthening Scheme - II (TBCB Part)
6. HVDC Bipole Strengthening in Southern Region
7. Mangalore (UPCL) –Kasargode- Kozhikode 400 kV link
8. Transmission System associated with Lara STPS –I (2x800 MW)
9. Transmission System associated with Darlipalli TPS (2x800 MW)
10. Northern Region System Strengthening Scheme, NRSS – XXIX
11. Northern Region System Strengthening Scheme, NRSS – XXXI (Part – A)
12. Northern Region System Strengthening Scheme, NRSS – XXXI (Part – B)
13. Northern Region System Strengthening Scheme, NRSS – XXXIII
14. ATS for Tanda Expansion TPS (2x660 MW)
15. Establishment of Lucknow (PG) – Kanpur (New) (PG) 400 kV D/c line
16. Panchkula – Patiala 400 kV D/c line
17. Strengthening of ISTS system in Gujarat
18. Briefing by BPCs on the schemes under bidding process

**TRANSMISSION LINES COMMISSIONED /READY FOR
COMMISSIONING DURING 2012-13**

Sl. No.	Name of Transmission Lines	Circuit Type	Executing Agency	Line Length (Ckm)	Month of Completion
1	2	3	4	5	6
765 kV					
CENTRAL SECTOR					
1	Bhiwani - Moga	S/C	PGCIL	273	MAY-12
2	Fatehpur- Agra Line I	S/C	PGCIL	334	MAY-12
3	Satna - Bina line -II	S/C	PGCIL	276	JUN-12
4	Jhatikara - Bhiwani	S/C	PGCIL	85	SEP-12
5	Sasan - Satna line -I	S/C	PGCIL	241	DEC-12
Total of CENTRAL Sector				1209	
Total of 765 kV				1209	
400 kV					
CENTRAL SECTOR					
6	Durgapur-Jamshedpur (Part Line)	D/C	PGCIL	276	APR-12
7	Jamshedpur - Baripada (Part Line)	D/C	PGCIL	220	APR-12
8	Manesar - Neemrana	D/C	PGCIL	134	MAY-12
9	Mauda - Wardha (2 nd Ckt)	S/C	PGCIL	124	MAY-12
10	Nabinagar - Sasaram line (Twin lapwing)	D/C	PGCIL	164	MAY-12
11	LILO of Agra - Jaipur line at Jaipur (Part Line)	D/C	PGCIL	75	JUN-12
12	LILO of one ckt Balia - Lucknow at Sohawal	D/C	PGCIL	12	JUN-12
13	Palatana - Surajmaninagar line (Charged at 132 kV)	D/C	PGCIL	74	JUN-12
14	Gandhar - Navsari	D/C	PGCIL	204	JUL-12
15	LILO of both Ckt of Allahabad - Mainpuri at Fatehpur	2xD/C	PGCIL	73	JUL-12
16	Gurgaon -Manesar(Q)	D/C	PGCIL	34	AUG-12
17	LILO of Both Ckt of Agra - Jaipur line at Jaipur (Ckt-II)	D/C	PGCIL	75	AUG-12
18	LILO of Both ckt Bahadurgarh - Hissar at Bhiwani	D/C	PGCIL	33	AUG-12
19	LILO of Meramundli - Jeypore line at Bolangir	S/C	PGCIL	42	AUG-12
20	LILO of both ckt of Udumalpet - Madakathara at Chulliar (Ckt-II)	D/C	PGCIL	49	AUG-12
21	Mundra - Jetpur (Part line)	S/C	PGCIL	314	AUG-12
22	LILO of both ckt of Mundka /Bawana - Bamnoli at Jhatikara (Q)	D/C	PGCIL	26	SEP-12
23	LILO of One Ckt of Bareilly - Mandola line at Meerut	D/C	PGCIL	110	SEP-12
24	LILO of Barh - Balia at Patna	D/C	PGCIL	16	NOV-12
25	LILO of Kahalgaoon - Biharsharif line (2 nd line) at Banka	D/C	PGCIL	56	NOV-12
26	Bongaigaon TPS - Bongaigaon	D/C	PGCIL	6	DEC-12
27	Mundra - Jetpur (Balance portion)	S/C	PGCIL	358	DEC-12
28	Raipur (PG) – Wardha(PG)	D/C	PGCIL	741	DEC-12

29	Sasan - Vindhyachal Pooling station	D/C	PGCIL	12	DEC-12
30	Vindhyachal-IV - Vindhyachal Pooling Station (Q)	D/C	PGCIL	58	DEC-12
31	Bina - Bina (MPPTCL)	D/C	PGCIL	1	JAN-13
32	LILO of Both Ckt-II Balia - Lucknow line at Sohawal	D/C	PGCIL	12	JAN-13
33	LILO of Rengali - Baripada line at Keonihar	S/C	PGCIL	18	JAN-13
34	Maithon - Koderma line (Contingency combining M-G and K-G and by passing common MC portion & Gaya S/S)	D/C	PGCIL	526	JAN-13
35	Bhiwani - Jind line	D/C	PGCIL	165	MAR-13
36	Chamera-II HEP - Jullundur line	D/C	PGCIL	324	MAR-13
37	Kishanpur - Samba line	D/C	PGCIL	70	MAR-13
38	LILO of 2 nd Ckt Bareilly - Mandola line at Meerut	S/C	PGCIL	112	MAR-13
39	LILO of Kaithalguri - Misa line at Mariani (New) (Charged at 220 kV)	D/C	PGCIL	1	MAR-13
40	LILO of Both Ckt SEPL/MEPL - Nellore at Nellor Pooling Stn.	D/C	PGCIL	15	MAR-13
41	LILO of Meramundli -Jeypore at Angul Pooling Stn.	D/C	PGCIL	9	MAR-13
42	LILO of Rourkela - Raigarh at Jharsuguda Pooling Stn.	D/C	PGCIL	44	MAR-13
43	Nellore - Gooty line	D/C	PGCIL	578	MAR-13
44	Raipur Pooling Station - Raipur line	D/C	PGCIL	43	MAR-13
45	Vallure TPS - Melakottaiyur line	D/C	PGCIL	71	MAR-13
46	Vapi - Navsari line	D/C	PGCIL	236	MAR-13
Total of CENTRAL Sector				5511	
PVT SECTOR					
47	LILO of Lonikhand - Kalwa at Pune (2 nd Ckt)	S/C	RPTL	3	MAY-12
48	Kasaipalli TPP -Bharai (Sipat) Pooling station	D/C	ACB	112	JUL-12
49	Adhunik - Jamshedpur (PG) (Padampur)	D/C	ADHUNIK	1	JUL-12
50	Mohindergarh HVDC - Bhiwani	D/C	APL	100	JUL-12
51	Mohindergarh HVDC- Mohindergarh HVPNI (Dhanonda)	D/C	APL	10	JUL-12
52	Karcham Wangtoo-Abdullapur	D/C	JV(PG&JP)	432	JUL-12
53	Solapur (PG) - Kolhapur (MSETCL)	D/C	RPTL	440	JUL-12
54	LILO of one Ckt Korba- Birsinghpur at Vandana	D/C	VVL	6	JUL-12
55	Tiroda TPP - Warora (2 nd ckt)	D/C	APL	218	AUG-12
56	Palatana -Silchar	D/C	NETC	495	AUG-12
57	LILO of Koradi - Akola at Amravati	D/C	IBPL	14	OCT-12
58	EMCO - Bhadrawathi (PG)	D/C	GMR ENGY.	80	JAN-13
59	Silchar - Byrnihat	D/C	NETC	428	FEB-13
60	Tiroda TPP - Warora (1 st ckt)	S/C	APL	218	MAR-13
61	Gandhar-Hazira	D/C	EPTCL	208	MAR-13
Total of PVT Sector				2765	
STATE SECTOR					
62	Lonikand - I - Lonikand II	S/C	MSETCL	1	MAY-12
63	Warora - Wardha (1 st Ckt)	S/C	MSETCL	78	MAY-12
64	LILO of Kolaghat TPS - Baripada at Kharagpur	D/C	WBSETCL	8	JUN-12
65	Nandikur (UTPS) - Shantigram (Hassan)	D/C	KPTCL	358	AUG-12
66	Koradi (Old)- New Khaperkheda	S/C on D/C	MSETCL	4	AUG-12

67	Vallur JV Project - NCTPS St.II	D/C	TANTRANSCO	7	AUG-12
68	LILO Korba (West) - Bhilai at Raipur (CSPTCL)	D/C	CSPTCL	47	SEP-12
69	Krishnapatnam TPS - Nellore.	D/C	APTRANSCO	72	NOV-12
70	Yeddumaiaram - Gajwel	D/C	APTRANSCO	210	NOV-12
71	LILO of samayapur-Greate Noida at Nawada	D/C	HVPNL	1	NOV-12
72	Korba (W)-Bhilai (khedamara)	D/C	CSPTCL	447	DEC-12
73	Chhabra TPS-Kawai SCTPS	S/C	RVPNL	16	DEC-12
74	Daultabad -Dhanonda	D/C	HVPNL	146	JAN-13
75	Warora-Wardha(2 nd Ckt)	S/C	MSETCL	76	JAN-13
76	Talwandi Sabo - Dhuri	D/C	PSTCL	175	JAN-13
77	Jodhpur - Merta (2 nd Ckt) line	D/C	RVPNL	98	JAN-13
78	MTPS St.III - Arasur	D/C	TANTRANSCO	220	JAN-13
79	NCTPS St.II- Alamathy 400 kV S/S	M/C	TANTRANSCO	136	JAN-13
80	Malkaram-Narsapur	D/C	APTRANSCO	147	FEB-13
81	Narsapur-Suryapet	D/C	APTRANSCO	149	FEB-13
82	Vijayawada TPS-Suryapeta	D/C	APTRANSCO	226	FEB-13
83	Malwa TPP - Chhegaon	D/C	MPPTCL	105	FEB-13
84	UKai-Kosamba	D/C	GETCO	145	MAR-13
85	LILO of Palatana - Bongaigaon at Killing (Byrnihat)	D/C	MeECL	9	MAR-13
86	Talwandi Sabo - Moga	D/C	PSTCL	204	MAR-13
Total of STATE Sector				3085	
Total of 400 kV				11361	
220 kV					
CENTRAL SECTOR					
87	LILO of Sikar (RVPN)-Ratnagarh at Sikar (2 nd LILO)	D/C	PGCIL	6	APR-12
88	LILO of both ckts of Kawas-Navsari at Navsari.	D/C	PGCIL	82	JUL-12
89	Kalpakkam PFBR-Kanchepurram	D/C	PGCIL	160	AUG-12
90	Dhanbad-Giridih	D/C	DVC	86	MAR-13
Total of CENTRAL Sector				334	
STATE SECTOR					
91	Madhavanahally S/S - Chamarajanagar S/S	D/C	KPTCL	83	APR-12
92	Mannukkad (Chulliar) - Kanjikode (Palakkad) 2 nd D/C	M/C	KSEB	12	APR-12
93	LILO of Padghe-Boisar (PG) at Vasai S/S	D/C	MSETCL	5	APR-12
94	LILO one ckt of Lalton Kalan-Sahnewal at Ludhiana(PG)	D/C	PSTCL	7	APR-12
95	Kalisindh-Jhalawar line	D/C	RVPNL	19	APR-12
96	LILO of Halvad-Morbi I at Bhachau	D/C	GETCO	217	MAY-12
97	LILO of Halvad-Morbi II at Bhachau	D/C	GETCO	216	MAY-12
98	East Div Compound - Nimhans Station	UG Cable	KPTCL	5	MAY-12
99	Pakhowal - Mehal Kalan	S/C	PSTCL	58	MAY-12
100	Sarnath-Gajokhar	S/C on D/C	UPPTCL	30	MAY-12
101	LILO of Ramagundam - Dichpally at Medaram	D/C	APTRANSCO	10	JUN-12
102	LILO of Ramagundam - Nirmal at Vemnur	D/C	APTRANSCO	2	JUN-12
103	Tharad-Thavar line	D/C	GETCO	98	JUN-12
104	Gurgaon Sector - 72 - Gurgaon Sector - 56	D/C	HVPNL	21	JUN-12
105	Gurgaon Sector-72- Gurgaon Sector-52 A	D/C	HVPNL	23	JUN-12

106	Khaperkheda (New) - Khaperkheda	M/C	MSETCL	12	JUN-12
107	LILO of Kalwa - Ghatghar at Bapgaon	D/C	MSETCL	4	JUN-12
108	LILO of Osmanabad - Barshi at Paranda	D/C	MSETCL	74	JUN-12
109	Loc 13 of Butibori I - Butibori II - Butibori TPS	S/C	MSETCL	1	JUN-12
110	Old Butibori I - Butibori - III	D/C on M/C	MSETCL	2	JUN-12
111	Kapurthala - 400 kV Jalandhar line	S/C on D/C	PSTCL	24	JUN-12
112	Khushkhera-Neemrana line	S/C	RVPNL	53	JUN-12
113	LILO of RTPP - ATP at Thimmapuram	D/C	APTRANSCO	5	JUL-12
114	Kochin East (Pallikara) - Marakkala line	M/C	KSEB	9	JUL-12
115	LILO of Sultanpur - Patti at Chola Sahib.	D/C	PSTCL	10	JUL-12
116	Bhilwara - M/s. Jindal Saw	S/C	RVPNL	2	JUL-12
117	LILO of Sanganer - Heerapura line at Mansarovar	D/C	RVPNL	5	JUL-12
118	LILO of one ckt Khushkhera - Neemrana line at Neemrana (Pg)	D/C	RVPNL	5	JUL-12
119	LILO of one ckt of KTPS - Gulabpura at Bundi	D/C	RVPNL	8	JUL-12
120	LILO of Allahabad (Ald) (PG) - Phoolpur at Jhusi	D/C	UPPTCL	13	JUL-12
121	LILO of Savarkundla - Mahva (otha) at Pipavav (GPPC) (line-2)	D/C	GETCO	81	AUG-12
122	LILO of both ckt Mayyar (PGCIL) - Isherwal at Sagwan	D/C	HVPNL	68	AUG-12
123	Beed-Patoda	D/C	MSETCL	86	AUG-12
124	LILO of Vita - Pandharpur line at Hiwarwadi S/S	D/C	MSETCL	12	AUG-12
125	Bottianwala-Masterwala line	S/C on D/C	PSTCL	24	AUG-12
126	Dhuri - Nabha	S/C	PSTCL	20	AUG-12
127	Goindwal Sahib - Sultanpur Lodhi	D/C	PSTCL	38	AUG-12
128	Suratgarh - Padampur	S/C	RVPNL	57	AUG-12
129	Kavanur - Karaikudi	S/C on D/C	TANTRANSCO	82	AUG-12
130	LILO of NCTPS - Mosur at Athipattu	D/C	TANTRANSCO	4	AUG-12
131	LILO of TTPS - Tuticorin at Tuticorin JV	D/C	TANTRANSCO	1	AUG-12
132	Charla - Section of (Muzaffarnagar - Modipuram II)	S/C	UPPTCL	12	AUG-12
133	Kondapuram - Thimmapuram	D/C	APTRANSCO	19	SEP-12
134	LILO of Agia - Sarusajai line at Kukurmara S/S	D/C	AEGCL	4	SEP-12
135	LILO of Fatwa- Khagaul at Sipara (2 nd Ckt)	D/C	BSEB	19	SEP-12
136	LILO of DCRTTP - Abdullapur at Rampur Kamboan	D/C	HVPNL	38	SEP-12
137	LILO of Tepla - Madanpur at Raiwali	D/C	HVPNL	8	SEP-12
138	Kanhan - Umred (2 nd Ckt)	S/C	MSETCL	50	SEP-12
139	Dechu - Phalodi	D/C	RVPNL	71	SEP-12
140	LILO of Hindaun - Dausa at Sikrai (GSS)	S/C	RVPNL	19	SEP-12
141	Udyogvihar - Hanumangarh	S/C	RVPNL	48	SEP-12
142	LILO of Renigunta - Chittoor at Nagari	D/C	APTRANSCO	75	OCT-12
143	LILO of Pithampur-Indore & Pithampur-Badnagar line at Pithampur 400 KV S/S	D/C	MPPTCL	65	OCT-12
144	Jalna-Chikhali (2 nd Ckt)	D/C	MSETCL	75	OCT-12
145	Parli TPS-Nanded (waghala)	M/C	MSETCL	181	OCT-12
146	LILO of Wadala Granthian - Verpal at Udhoke	D/C	PSTCL	6	OCT-12
147	Sahnewal - Doraha	D/C	PSTCL	16	OCT-12
148	LILO of 2nd ckt of Mechal - Minpur at Gajwel	D/C	APTRANSCO	81	NOV-12
149	Hadala - Halvad line	D/C	GETCO	170	NOV-12

150	Tharad-Deodar line	D/C	GETCO	77	NOV-12
151	Nawada - A5	S/C	HVPNL	6	NOV-12
152	Rangala Raipur-Palwal line	D/C	HVPNL	102	NOV-12
153	LILO of Hoody - Somanahalli at HSR layout	D/C	KPTCL	4	NOV-12
154	LILO of Amarkantak - Korba at Anoopur	D/C	MPPTCL	16	NOV-12
155	LILO of Karad Pedambe at Dasgaon	D/C	MSETCL	8	NOV-12
156	LILO of Satara MIDC - Vankuswade at Ajinkyatara SSk Ltd.	D/C	MSETCL	8	NOV-12
157	Mhindra - Brldgestone	D/C	MSETCL	12	NOV-12
158	LILO of Mandawar - Bharatpur at Nadbai (GSS)	D/C	RVPNL	11	NOV-12
159	Muzaffarnagar - Modipuram (II Ckt)	S/C	UPPTCL	36	NOV-12
160	Jodhpur - Karwad / Bhawad	D/C	RVPNL	78	DEC-12
161	Marwa - Banari (Start up power)	D/C	CSPTCL	28	JAN-13
162	Naggal (PGCIL) - Raiwali	D/C	HVPNL	25	JAN-13
163	Satpura - Pandhurma line (2 nd Ckt)	S/C	MPPTCL	83	JAN-13
164	Sidhi - Mahan (M/s. Hindalco.) line	S/C	MPPTCL	79	JAN-13
165	New Bhusaval S/S - existing 400 kV Khadka	D/C on M/C	MSETCL	18	JAN-13
166	South Solarpur (PG) - South Solarpur (2 nd Ckt)	S/C	MSETCL	5	JAN-13
167	Talegaon - M/s. General Motors line	S/C	MSETCL	1	JAN-13
168	Urse - Talegaon line	S/C	MSETCL	9	JAN-13
169	LILO of Gobingarh -Malerkotla line at Ikolaha	D/C	PSTCL	13	JAN-13
170	LILO of both ckts Sunam - Dhuri at Dhuri	D/C	PSTCL	52	JAN-13
171	Bikaner - Gajner	D/C	RVPNL	117	JAN-13
172	Teesta LD III-New Jalpaiguri	S/C	WBSETCL	81	JAN-13
173	LILO of Gachibowli - Yeddumialaram at Yeddumialaram	D/C	APTRANSCO	12	FEB-13
174	Jurala Hydel Plant - Raichur	D/C	KPTCL	98	FEB-13
175	LILO of Khaperkheda-Kanhan II at M/s Suryalaxmi cotton Mills	D/C	MSETCL	6	FEB-13
176	Mandawar -Alwar MIA line	S/C	RVPNL	57	FEB-13
177	Kosamba-Mobha line	D/C	GETCO	178	MAR-13
178	Tharad-Kintech	D/C	GETCO	175	MAR-13
179	LILO Kishenpur-Pampore at Ramban	D/C	JKPDD	4	MAR-13
180	Miran Sahib - Bishnah	D/C	JKPDD	19	MAR-13
181	LILO of Guttur - Ittagi at Neelagunda S/s.	D/C	KPTCL	7	MAR-13
182	Marakkala - Brahmapuram line	M/C	KSEB	17	MAR-13
183	Raigarh - Common Point near Pithampur (Diversion)	D/C	MPPTCL	3	MAR-13
184	Kolhapur-Sawantwadi (2 nd Ckt)	S/C	MSETCL	122	MAR-13
185	LILO of Chichwad-Theur at Khadakwasla (Nanded city)	D/C	MSETCL	5	MAR-13
186	Lonand - Bothe (Ckt-II)	S/C	MSETCL	41	MAR-13
187	Paras - Balapur	D/C on M/C	MSETCL	24	MAR-13
188	LILO of GGSSTP - Kohara at Gaunsgarh.	D/C	PSTCL	33	MAR-13
189	LILO of Khassa - Civil lines ASR at Chogawan	D/C	PSTCL	20	MAR-13
190	Barheni-Patnagar (2 nd Ckt)	S/C	PTCUL	35	MAR-13
191	LILO of Bhilwara - Chittorgarh at Hamirgarh	D/C	RVPNL	15	MAR-13
Total of STATE Sector				4203	
Total of 220 kV				4537	
Grand Total				17107	

Annexure-3F
(Item no. 3.15)

SUB-STATION COMPLETED DURING 2012-2013

(As on 31.03.2013)

Sl. No.	Name of Sub-Station	Voltage Ratio (kV/kV)	Executing Agency	Capacity (MW/MVA)	Month of Completion
1	2	3	4	5	6
±500 kV					
CENTRAL SECTOR					
1	Balia & Bhiwadi convertor Stn. (Pole-II)	±500	PGCIL	1250	JUN-12
Total of Central Sector				1250	
PVT SECTOR					
2	Mundra & Mohindergarh (HVDC converter stn.) both poles	±500	APL	2500	MAR-13
Total of PVT Sector				2500	
Total of ±500 kV				3750	
765 kV					
CENTRAL SECTOR					
3	Agra Aug.	765/400	PGCIL	1500	MAY-12
4	Bhiwani. S/S	765/400	PGCIL	1000	MAY-12
5	Gaya (3rd Transf)	765/400	PGCIL	1500	MAY-12
6	Moga (Aug.)	765/400	PGCIL	1500	MAY-12
7	Satna (1st ICT)	765/400	PGCIL	1000	JUN-12
8	WR Pooling Station near Sipat (Bilaspur) (3 rd ICT)	765/400	PGCIL	1500	JUL-12
9	Agra (ICT-II) S/S	765/400	PGCIL	1500	AUG-12
10	Bina. S/S	765/400	PGCIL	1000	AUG-12
11	Moga (ICT-II) S/S	765/400	PGCIL	1500	AUG-12
12	Satna (2 nd ICT)	765/400	PGCIL	1000	AUG-12
13	Bhiwani ICT -II S/S	765/400	PGCIL	1000	SEP-12
14	Jhatikara S/S	765/400	PGCIL	6000	SEP-12
15	Bina (ICT-II) S/S	765/400	PGCIL	1000	MAR-13
16	Gwalior	765/400	PGCIL	3000	MAR-13
Total of Central Sector				24000	
Total of 765 kV				24000	
400 kV					
CENTRAL SECTOR					
17	Jaipur (South)	400/220	PGCIL	500	MAY-12
18	Manesar (GIS)	400/220	PGCIL	500	MAY-12
19	Misa (2 nd ICT)	400/220	PGCIL	315	JUN-12
20	Sohawal	400/220	PGCIL	630	JUN-12
21	Manesar (GIS) ICT-II	400/220	PGCIL	500	JUL-12
22	Navsari GIS	400/220	PGCIL	630	JUL-12
23	Bolangir (1st Trf.)	400/220	PGCIL	315	AUG-12

24	Bolangir (2 nd Trf.)	400/220	PGCIL	315	OCT-12
25	Banka S/S (1 st Trf.)	400/132	PGCIL	200	NOV-12
26	Bhiwani. S/S (1 st Trf.)	400/220	PGCIL	315	NOV-12
27	Jaipur (South, 2 nd Trf.)	400/220	PGCIL	500	NOV-12
28	Banka S/S (2 nd Trf.)	400/132	PGCIL	200	DEC-12
29	Bhiwani. S/S (2 nd Trf.)	400/220	PGCIL	315	JAN-13
30	Kenonjhar	400/220	PGCIL	315	JAN-13
31	Vapi (ICT) S/S	400/220	PGCIL	315	JAN-13
32	Keonjhar (2 nd Trf.)	400/220	PGCIL	315	FEB-13
33	Bidadi (2 nd Trf) S/S	400/220	PGCIL	500	MAR-13
34	Jind	400/220	PGCIL	630	MAR-13
35	Samba (With 80 MVAR B. Reactor)	400/220	PGCIL	630	MAR-13
Total of CENTRAL Sector				7940	
STATE SECTOR					
36	Dhanoda (Mohindergarh)	400/220	HVPL	315	APR-12
37	Lonikhand-II (1 st Trf.)	400/220	MSETCL	500	JUN-12
38	Arambag(Aug.)	400/220	WBSETCL	315	JUN-12
39	Kharagpur (1 st Trf.)	400/220	WBSETCL	315	JUL-12
40	Girwali (Parli) S/S	400/220	MSETCL	500	AUG-12
41	Kolhapur S/S	400/220	MSETCL	500	AUG-12
42	Lonikand II (2 nd Trf.)	400/220	MSETCL	500	AUG-12
43	kharagpur(2 nd Trf.)	400/220	WBSETCL	315	OCT-12
44	Shankarapally(Yeddumailaram)1 st (Trf.)	400/220	APTRANSCO	315	NOV-12
45	Dhanonda (Mohindergarh) (2 nd Trf.)	400/220	HVPL	315	NOV-12
46	Padghe S/S	400/220	MSETCL	600	NOV-12
47	Chhegaon S/S	400/220	MPPTCL	315	DEC-12
48	Gajwel (Addl. Trf)	400/220	APTRANSCO	100	JAN-13
49	Malkaram (Addl. Trf)	400/220	APTRANSCO	100	JAN-13
50	Nawada (1 st Trf.)	400/200	HVPL	315	JAN-13
51	Dhuri (2x500)	400/220	PSTCL	1000	JAN-13
52	Warora (New) S/S	400/220	MSETCL	500	FEB-13
53	Killing (Byrnihat) (1 st Trf.) S/S	400/220	MeECL	315	FEB-13
54	Azamgarh (Aug.)	400/132	UPPTCL	75	FEB-13
55	Shankarapally (Yeddumailaram) 2 nd & 3 rd (Trf.)	400/220	APTRANSCO	630	MAR-13
56	Warora S/S	400/220	MSETCL	500	MAR-13
57	Sunguvarchatram (Add.Trf)	400/110	TANTRANSCO	200	MAR-13
58	Jeerat (Aug.)	400/220	WBSETCL	315	MAR-13
Total of State Sector				8855	
Total of 400 kV				16795	
220 kV					
CENTRAL SECTOR					
59	Girdih (1 st Trf.) S/S	220/33	DVC	80	SEP-12
60	Giridih (1 st Trf.) S/S	220/132	DVC	160	SEP-12
61	Dhanbad	220/132	DVC	300	DEC-12
62	Siliguri S/S (Extn.)	220/132	PGCIL	160	DEC-12

63	Birpara (Aug.) (160-50)	220/132	PGCIL	110	JAN-13
64	Malda (Aug.) (160-50)	220/132	PGCIL	110	JAN-13
65	Malda (2 nd Trf.) (Aug.) (160-50)	220/132	PGCIL	110	FEB-13
66	CTPS (Aug.) (160-100)	220/132	DVC	60	MAR-13
67	Dhanbad S/S	220/33	DVC	80	MAR-13
68	Giridih (2 nd Trf.) S/S	220/33	DVC	80	MAR-13
69	Parrulia (Aug.) (80-50)	220/33	DVC	30	MAR-13
Total of Central Sector				1280	
STATE SECTOR					
70	Agathala	220/66	GETCO	100	APR-12
71	Anjar	220/66	GETCO	100	APR-12
72	Charanka	220/66	GETCO	200	APR-12
73	Kangasiyali (3rd Trf.)	220/66	GETCO	100	APR-12
74	Lunawada	220/66	GETCO	100	APR-12
75	Shapur	220/132	GETCO	200	APR-12
76	Shiralakha	220/66	GETCO	100	APR-12
77	Tappar	220/66	GETCO	100	APR-12
78	Chhegaon S/S	220/132	MPPTCL	160	APR-12
79	Daloda	220/132	MPPTCL	160	APR-12
80	Seoni (Addl.)	220/132	MPPTCL	160	APR-12
81	Baramati	220/33	MSETCL	25	APR-12
82	Paranda (2nd trf.)	220/33	MSETCL	50	APR-12
83	Wadala Granthian	220/66	PSTCL	100	APR-12
84	Aspur S/S	220/132	RVPNL	100	APR-12
85	Dechu (Jodhpur)	220/132	RVPNL	100	APR-12
86	K.K. Dhani (GIS) S/S	220/132	RVPNL	160	APR-12
87	Padampur	220/132	RVPNL	100	APR-12
88	Barsoor. (Addl)	220/132	CSPTCL	160	MAY-12
89	Girinager (Aug.)	220/132	HPPTCL	100	MAY-12
90	Mehgaon (Addl.)S/S	220/132	MPPTCL	160	MAY-12
91	Tikamgarh (Addl.) (1x160)	220/132	MPPTCL	160	MAY-12
92	Medaram (2x50)	220/11	APTRANSCO	100	JUN-12
93	Vemnur (2x50)	220/11	APTRANSCO	100	JUN-12
94	Palla (Aug.) S/S	220/66	HVPNL	100	JUN-12
95	Balapur S/S	220/33	MSETCL	25	JUN-12
96	Bapgaon (2x50)	220/22	MSETCL	100	JUN-12
97	Jalna S/S	220/33	MSETCL	50	JUN-12
98	Yewalwadi (VSNL Dighi)	220/22	MSETCL	50	JUN-12
99	Balasore (Aug.)	220/132/33	OPTCL	60	JUN-12
100	Paradeep S/S	220/132/33	OPTCL	50	JUN-12
101	Kharar (Aug.)	220/66	PSTCL	100	JUN-12
102	Sunam (Aug.)	220/66	PSTCL	60	JUN-12
103	Gunrock	220/132	APTRANSCO	160	JUL-12
104	Thimmapuram	220/11	APTRANSCO	50	JUL-12
105	Electric Lane (GIS)	220/33	DTL	200	JUL-12

106	Kunihar (Aug.)	220/132	HPPTCL	100	JUL-12
107	Daulatabad (Aug.)	220/66	HVPNL	100	JUL-12
108	Isherwal (Aug.)	220/132	HVPNL	100	JUL-12
109	Masudpur	220/33	HVPNL	100	JUL-12
110	Kattakkada (New)	220/110	KSEB	200	JUL-12
111	Punnapra	220/110	KSEB	200	JUL-12
112	South Solapur S/S	220/33	MSETCL	50	JUL-12
113	Ferozepur Road Ludhiana S/S (Addl Trf)	220/66	PSTCL	160	JUL-12
114	Kharagpur (1 st Trf.)	220/132	WBSETCL	160	JUL-12
115	A-5 Faridabad	220/66	HVPNL	100	AUG-12
116	Masudpur (2 nd trf.)	220/132	HVPNL	100	AUG-12
117	Sagwan S/S (1 st Trf.)	220/132	HVPNL	100	AUG-12
118	Sagwan S/S (2 nd Trf.)	220/33	HVPNL	100	AUG-12
119	Nimhans S/s	220/66	KPTCL	300	AUG-12
120	Sabargarh (Addl.) (1x160)	220/132	MPPTCL	160	AUG-12
121	Bapgaon S/S	220/132	MSETCL	400	AUG-12
122	Hiwarwadi S/S	220/22	MSETCL	50	AUG-12
123	Goraya (Addl.)S/S	220/132	PSTCL	100	AUG-12
124	Mohali-II (Addl.) S/S	220/66	PSTCL	100	AUG-12
125	Athipet S/S	230/110	TANTRANSCO	100	AUG-12
126	Kondapuram (1 st Trf.)	220/132	APTRANSCO	100	SEP-12
127	Mundka (2 nd ICT)	220/66	DTL	160	SEP-12
128	Achhalia (Aug.) S/S	220/132	GETCO	50	SEP-12
129	Bhat (Aug.)	220/66	GETCO	100	SEP-12
130	Dahej (Aug.)	220/66	GETCO	100	SEP-12
131	Haladarwa (Aug.)	220/132	GETCO	50	SEP-12
132	Mota (Aug.)	220/66	GETCO	50	SEP-12
133	Timbdi (Aug.)	220/66	GETCO	50	SEP-12
134	Baddi (Addl.) 1x100 MVA	220/66	HPPTCL	100	SEP-12
135	Raiwali S/S	220/66	HVPNL	200	SEP-12
136	Rampur Kamboan S/S (1 st Trf.)	220/66	HVPNL	100	SEP-12
137	Rampur Kamboan S/S (2 nd Trf.)	220/33	HVPNL	100	SEP-12
138	South Solapur S/S	220/132	MSETCL	200	SEP-12
139	Kotli Surat Malhi (Addl.) S/S	220/66	PSTCL	100	SEP-12
140	Mansa (Addl.) S/S	220/66	PSTCL	100	SEP-12
141	Karambayam	230/110	TANTRANSCO	200	SEP-12
142	Jhusi (2 nd Trf.)	220/132	UPPTCL	160	SEP-12
143	Nagari	220/132	APTRANSCO	200	OCT-12
144	Bhilai (Addl.) S/S	220/132	CSPTCL	160	OCT-12
145	Jeur (Trf) S/S	220/132	MSETCL	100	OCT-12
146	Ikolaha (Addl.) S/S	220/66	PSTCL	100	OCT-12
147	Kotla Jangan (Addl) (2nd Trf.)	220/66	PSTCL	100	OCT-12
148	Sadiq (Aug.) (2 nd T/F) S/S	220/66	PSTCL	100	OCT-12
149	Hathras (Aug.) (160-100) S/S	220/132	UPPTCL	60	OCT-12

150	Laxmikantapur (Aug.)	220/132	WBSETCL	160	OCT-12
151	Kharagpur (2 nd Trf.)	220/132	WBSETCL	160	OCT-12
152	Halbarga (2x100)	220/110	KPTCL	200	NOV-12
153	Akola (Aug.) S/S	220/132	MSETCL	50	NOV-12
154	Telco S/S	220/22	MSETCL	50	NOV-12
155	Wani (Aug.) S/S	220/33	MSETCL	25	NOV-12
156	Bundi S/S	220/132	RVPNL	100	NOV-12
157	Nadbai S/S	220/132	RVPNL	100	NOV-12
158	Sikrai (Upgradation)	220/132	RVPNL	100	NOV-12
159	Dehri (Aug.)	220/132	BSEB	100	DEC-12
160	Rohini (1st Trf.)	220/66	DTL	160	DEC-12
161	Amarkantak (Anoopur) (1x160)	220/132	MPPTCL	160	DEC-12
162	Kakrala S/S	220/66	PSTCL	100	DEC-12
163	Sultanpur Lodhi (Addl.) S/S	220/66	PSTCL	160	DEC-12
164	Udhoke S/S	220/66	PSTCL	100	DEC-12
165	Bommuru (Aug.)	220/132	APTRANSCO	60	JAN-13
166	Brandix (Addl. Trf)	220/132	APTRANSCO	100	JAN-13
167	Ghanapur (Aug)	220/132	APTRANSCO	60	JAN-13
168	Gudivada (Addl. Trf)	220/132	APTRANSCO	100	JAN-13
169	Kondamallepally (Addl. Trf)	220/132	APTRANSCO	100	JAN-13
170	Medchal (Aug)	220/132	APTRANSCO	60	JAN-13
171	Pendurthy (Aug)	220/132	APTRANSCO	60	JAN-13
172	Shadnagar (Addl. Trf)	220/132	APTRANSCO	100	JAN-13
173	Yeddumailaram (Aug)	220/132	APTRANSCO	60	JAN-13
174	Rohini (2nd Trf.)	220/66	DTL	160	JAN-13
175	Amreli S/S	220/66	GETCO	50	JAN-13
176	Gavasad S/S	220/66	GETCO	50	JAN-13
177	Keshod S/S	220/66	GETCO	50	JAN-13
178	Kim S/S	220/66	GETCO	50	JAN-13
179	Lunawada (2 nd Trf.)	220/66	GETCO	100	JAN-13
180	Zagadia S/S	220/66	GETCO	50	JAN-13
181	Dadhi Bana S/S (1 st Trf.)	220/132	HVPNL	100	JAN-13
182	Dadhi Bana S/S (2 nd Trf.)	220/33	HVPNL	100	JAN-13
183	Rangala Rajpur (1 st Trf)	220/66	HVPNL	100	JAN-13
184	Bidri S/S	220/33	MSETCL	25	JAN-13
185	Dasgaon S/S	220/33	MSETCL	50	JAN-13
186	Bassi Pathana S/S	220/66	PSTCL	100	JAN-13
187	Doraha (U/G) (1x100 MVA)	220/66	PSTCL	100	JAN-13
188	Gaunsgarh S/S	220/66	PSTCL	100	JAN-13
189	Himmatpura (Aug) S/S	220/66	PSTCL	100	JAN-13
190	Lalru (Aug) (2 nd T/F)	220/66	PSTCL	100	JAN-13
191	Passiana S/S	220/66	PSTCL	100	JAN-13
192	Sarna (Aug.) S/S	220/66	PSTCL	100	JAN-13
193	Talwandi Bhai	220/66	PSTCL	100	JAN-13
194	Roorkee (Addl.) S/S	220/33	PTCUL	100	JAN-13
195	Gajner	220/132	RVPNL	100	JAN-13

196	Thatchankurichy (Aug.)	230/110	TANTRANSCO	50	JAN-13
197	Allahabad Cantt. (2 nd) (Aug.) S/S	220/132	UPPTCL	60	JAN-13
198	Allahabad Cantt. (Aug.) S/S	220/132	UPPTCL	60	JAN-13
199	Atroli (Aug.) S/S	220/132	UPPTCL	60	JAN-13
200	Charla S/S	220/132	UPPTCL	160	JAN-13
201	Chibramau (Aug.) S/S	220/132	UPPTCL	60	JAN-13
202	Hardoi (Aug.) S/S	220/132	UPPTCL	60	JAN-13
203	Noida Sec-62 S/S	220/132	UPPTCL	160	JAN-13
204	Orai (Aug.) S/S	220/132	UPPTCL	60	JAN-13
205	Pratapgarh S/S	220/132	UPPTCL	200	JAN-13
206	R.C. Green (new) S/S	220/132	UPPTCL	160	JAN-13
207	R.C. Green S/S	220/132/33	UPPTCL	100	JAN-13
208	Reva Road Allahabad (Aug.) S/S	220/132	UPPTCL	60	JAN-13
209	Sikandara (Aug.) S/S	220/132	UPPTCL	60	JAN-13
210	Sohawal S/S	220/33	UPPTCL	100	JAN-13
211	Alephata (Addl) S/S	220/33	MSETCL	50	FEB-13
212	Anandnagar (Addl) S/S	220/22	MSETCL	50	FEB-13
213	Badnera (Add.)	220/132	MSETCL	50	FEB-13
214	Bhosari (New)	220/22	MSETCL	50	FEB-13
215	Matradevi (Addl.)	220/132	MSETCL	50	FEB-13
216	Nerul (Addl) S/S	220/33	MSETCL	50	FEB-13
217	Palsi (New) S/S	220/33	MSETCL	100	FEB-13
218	Butari (Addl.) S/S	220/33	PSTCL	100	FEB-13
219	Lalton Kalan (Addl.) S/S	220/33	PSTCL	160	FEB-13
220	Banda (Aug.)	220/132	UPPTCL	60	FEB-13
221	Muzaffarnagar (Aug.)	220/132	UPPTCL	60	FEB-13
222	Muzaffarpur TPS (Kanti) (Aug.)	220/132	BSEB	100	MAR-13
223	Sipara (Patna) (2x150)	220/132	BSEB	300	MAR-13
224	Bhachau S/S	220/66	GETCO	100	MAR-13
225	Bhatiya. S/S	220/132	GETCO	100	MAR-13
226	Kapadwanj S/S	220/66	GETCO	50	MAR-13
227	Limbdi (Addl.) S/S	220/66	GETCO	50	MAR-13
228	Sadla	220/66	GETCO	100	MAR-13
229	Shapur (3 rd Trf.)	220/66	GETCO	100	MAR-13
230	Kaul S/S (2 nd Trf.)	220/132	HVPNL	100	MAR-13
231	Nawada (1x100)	220/33	HVPNL	100	MAR-13
232	Rangala Rajpur (2 nd Trf)	220/33	HVPNL	100	MAR-13
233	Delina (Aug.)	220/132	JKPDD	160	MAR-13
234	Neelagunda S/S	220/66	KPTCL	200	MAR-13
235	Hamigarh (1x100)	220/132	RVPNL	100	MAR-13
236	Karwad / Bhawad S/S	220/132	RVPNL	100	MAR-13
237	Kasba (Aug.)	220/132	WBSETCL	160	MAR-13
Total of State Sector				17840	
Total of 220 kV				19120	
Grand Total				63665	

Power Supply Position for 2012-13

State / System / Region	Energy				Peak			
	April, 2012 - March, 2013				April, 2012 - March, 2013			
	Requirement	Availability	Surplus / Deficit (-)		Peak Demand	Peak Met	Surplus / Deficit (-)	
	(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(%)
Chandigarh	1,637	1,637	0	0	340	340	0	0
Delhi	26,088	25,950	-138	-0.5	5,942	5,642	-300	-5.0
Haryana	41,407	38,209	-3,198	-7.7	7,432	6,725	-707	-9.5
Himachal Pradesh	8,992	8,744	-248	-2.8	2,116	1,672	-444	-21.0
Jammu & Kashmir	15,410	11,558	-3,852	-25.0	2,422	1,817	-605	-25.0
Punjab	48,724	46,119	-2,605	-5.3	11,520	8,751	-2,769	-24.0
Rajasthan	55,538	53,868	-1,670	-3.0	8,940	8,515	-425	-4.8
Uttar Pradesh	91,647	76,446	-15,201	-16.6	13,940	12,048	-1,892	-13.6
Uttarakhand	11,331	10,709	-622	-5.5	1,759	1,674	-85	-4.8
Northern Region	300,774	273,240	-27,534	-9.2	45,860	41,790	-4,070	-8.9
Chattisgarh	17,302	17,003	-299	-1.7	3,271	3,134	-137	-4.2
Gujarat	93,662	93,513	-149	-0.2	11,999	11,960	-39	-0.3
Madhya Pradesh	51,783	46,829	-4,954	-9.6	10,077	9,462	-615	-6.1
Maharashtra	123,984	119,972	-4,012	-3.2	17,934	16,765	-1,169	-6.5
Daman & Diu	1,991	1,860	-131	-6.6	311	286	-25	-8.0
Dadar Nagar Haveli	4,572	4,399	-173	-3.8	629	629	0	0.0
Goa	3,181	3,107	-74	-2.3	524	475	-49	-9.4
Western Region	296,475	286,683	-9,792	-3.3	40,075	39,486	-589	-1.5
Andhra Pradesh	99,692	82,171	-17,521	-17.6	14,582	11,630	-2,952	-20.2
Karnataka	66,274	57,044	-9,230	-13.9	10,124	8,761	-1,363	-13.5
Kerala	21,243	20,391	-852	-4.0	3,578	3,262	-316	-8.8
Tamil Nadu	92,302	76,161	-16,141	-17.5	12,736	11,053	-1,683	-13.2
Pondicherry	2,331	2,291	-40	-1.7	348	320	-28	-8.0
Lakshadweep	36	36	0	0	8	8	0	0
Southern Region	281,842	238,058	-43,784	-15.5	38,767	31,586	-7,181	-18.5
Bihar	15,409	12,835	-2,574	-16.7	2,295	1,784	-511	-22.3
DVC	17,299	16,339	-960	-5.5	2,573	2,469	-104	-4.0
Jharkhand	7,042	6,765	-277	-3.9	1,263	1,172	-91	-7.2
Orissa	25,155	24,320	-835	-3.3	3,968	3,694	-274	-6.9
West Bengal	42,143	41,842	-301	-0.7	7,322	7,249	-73	-1.0
Sikkim	409	409	0	0.0	95	95	0	0.0
Andaman- Nicobar	241	186	-55	-23	48	48	0	0
Eastern Region	107,457	102,510	-4,947	-4.6	16,655	15,415	-1,240	-7.4
Arunachal Pradesh	589	554	-35	-5.9	116	114	-2	-1.7
Assam	6,495	6,048	-447	-6.9	1,197	1,148	-49	-4.1
Manipur	574	543	-31	-5.4	122	120	-2	-1.6

Meghalaya	1,828	1,607	-221	-12.1	334	330	-4	-1.2
Mizoram	406	378	-28	-6.9	75	73	-2	-2.7
Nagaland	567	535	-32	-5.6	110	109	-1	-0.9
Tripura	1,108	1,054	-54	-4.9	229	228	-1	-0.4
North-Eastern Region	11,566	10,718	-848	-7.3	1,998	1,864	-134	-6.7
All India	998,114	911,209	-86,905	-8.7	135,453	123,294	-12,159	-9.0

Lakshadweep and Andaman & Nicobar Islands are stand- alone systems, power supply position of these,does not form part of regional requirement and availability

Annexure - 5A

(Item No: 5.2)

PFRS under 50 000 MW Hydroelectric Initiative

Statewise List of Schemes								
S.No.	Scheme	Consultant	Installed Capacity			Head (m)	Annual Energy (GWh)	Tariff Rs./kWh
			Nos of Units	Size (MW)	Total (MW)			
Andhra Pradesh								
1	Pondugala	WAPCOS	3	27	81	18.67	399.36	3.48
Total (Andhra Pradesh) 1 Scheme			3		81			
Arunachal Pradesh								
2	Agoline	NHPC	3	125	375	163.00	1267.38	3.51
3	Amulin	NHPC	3	140	420	132.00	1716.40	3.37
4	Ashupani	NHPC	2	15	30	395.00	126.45	8.75
5	Attunli	NHPC	4	125	500	264.00	2247.32	2.35
6	Badao	NEEPCO	4	30	120	154.50	441.00	2.32
7	Bhareli-I	NEEPCO	8	140	1120	97.00	4112.40	1.85
8	Bhareli-II	NEEPCO	5	120	600	51.00	2345.00	1.67
9	Chanda	NEEPCO	4	27.5	110	175.67	401.91	2.67
10	Demwe	NHPC	12	250	3000	138.00	10823.82	1.97
11	Dengser	NHPC	4	138	552	120.00	2666.71	3.26
12	Dibbin	NEEPCO	2	50	100	151.24	335.72	2.23
13	Duimukh	NHPC	3	50	150	65.00	551.48	8.50
14	Elango	NHPC	3	50	150	363.00	583.14	5.00
15	Emini	NHPC	4	125	500	125.00	1695.45	3.51
16	Emra-II	NHPC	3	130	390	278.00	1648.09	3.02
17	Etabue	NHPC	3	55	165	378.00	683.66	3.43
18	Etalin	NHPC	16	250	4000	385.00	16071.60	1.70
19	Hirong	NHPC	4	125	500	285.00	2535.80	1.62
20	Hutong	WAPCOS	12	250	3000	166.77	9901.00	1.28
21	Kalai	WAPCOS	10	260	2600	193.21	10608.64	1.01
22	KamengDam	NEEPCO	5	120	600	65.00	2345.55	2.29
23	Kapakleyak	NEEPCO	4	40	160	245.00	627.95	1.74
24	KurungI&II	NHPC	3	110	330	151.00	1435.40	4.04
25	Mihumdon	NHPC	4	100	400	286.00	1451.75	3.60
26	Mirak	NHPC	3	47	141	136.40	748.44	3.42
27	Naba	NHPC	4	250	1000	221.00	3995.25	2.14
28	Nalo	NHPC	4	90	360	221.00	1733.00	3.27
29	Naying	NHPC	4	250	1000	245.00	5077.15	1.18
30	Niare	NHPC	4	200	800	205.00	3356.62	2.02
31	Oju-I	NHPC	4	175	700	257.00	3291.58	2.08
32	Oju-II	NHPC	4	250	1000	322.00	4629.93	1.46
33	Pakke	NEEPCO	2	55	110	452.50	335.26	3.33
34	Papu	NEEPCO	2	100	200	238.00	505.00	2.94
35	Phanchung	NEEPCO	2	30	60	157.13	174.83	3.24

36	Ringong	NHPC	3	50	150	166.50	659.07	3.61
37	Sebu	NEEPCO	2	40	80	123.00	227.53	3.71
38	Simang	NHPC	3	30	90	125.00	417.82	5.43
39	Talong	NEEPCO	3	100	300	171.67	915.50	2.24
40	Tarangwarang	NEEPCO	2	15	30	185.55	93.81	2.88
41	Tato-II	NHPC	4	175	700	168.00	3465.90	1.48
42	Tenga	NEEPCO	4	150	600	875.00	1046.50	3.52
43	Utung	NEEPCO	3	33.3	100	291.00	359.13	3.10
Total (Arunachal Pr.) 42 Schemes			182		27293			
Chhattisgarh								
44	Kotri	WAPCOS	3	50	150	36.99	330.95	5.48
45	Nugur-I	WAPCOS	5	34	170	24.54	316.13	4.89
46	Nugur-II	WAPCOS	5	42	210	16.66	787.78	4.16
47	Rehar-I	WAPCOS	3	57	171	46.84	264.38	8.70
48	Rehar-II	WAPCOS	3	49	147	38.17	290.32	5.16
Total (Chhattisgarh) 5 Schemes			19		848			
Himachal Pradesh								
49	Bajoli Holi	HPSEB	3	60	180	278.00	762.98	2.03
50	Bardang	HPSEB	3	38	114	55.00	438.41	2.91
51	Chamba	HPSEB	3	42	126	110.00	646.82	1.48
52	Chhatru	HPSEB	3	36	108	160.00	455.72	2.89
53	Gharopa	HPSEB	3	38	114	169.00	534.25	2.09
54	Gondhala	HPSEB	3	48	144	134.00	586.08	1.92
55	Jangi Thopan	HPSEB	3	160	480	174.14	1779.45	2.00
56	Khab-I	SJVNL	3	150	450	170.00	1551.00	2.24
57	Khab-II	SJVNL	3	62	186	70.00	640.00	3.04
58	Khoksar	HPSEB	3	30	90	99.00	351.91	2.46
59	Luhri	HPSEB	3	155	465	88.00	1825.13	2.41
60	Thopan Powari	HPSEB	3	160	480	161.14	1786.26	1.81
61	Tidong-I	HPSEB	2	30	60	511.50	211.65	2.71
62	Tidong-II	HPSEB	2	35	70	575.00	256.18	2.02
63	Yangthang	HPSEB	3	87	261	186.45	938.02	2.08
Total (Himachal Pr.) 15 Schemes			43		3328			
Jammu & Kashmir								
64	Barinium	WAPCOS	2	120	240	117.77	1170.34	2.54
65	Bichlari	WAPCOS	2	17.5	35	462.60	148.29	1.11
66	Dumkhar	NHPC	3	15	45	27.80	219.18	4.66
67	Kanyunche	NHPC	3	15	45	28.76	223.02	4.71
68	Karkit	NHPC	3	10	30	26.90	153.11	5.40
69	Kawar	WAPCOS	4	80	320	74.00	1426.56	1.09
70	Khalsi	NHPC	3	20	60	33.00	272.60	4.10
71	Kiru	WAPCOS	4	107.5	430	105.33	1935.77	0.77
72	Ratle	WAPCOS	4	140	560	92.33	2483.37	1.40
73	Shamnot	WAPCOS	4	92.5	370	56.33	1650.19	1.69

74	Shuas	WAPCOS	2	115	230	115.70	1117.87	2.94
75	Takmaching	NHPC	3	10	30	18.53	145.52	5.54
76	Ujh	WAPCOS	4	70	280	143.33	465.06	5.06
Total (J & K) - 13 Schemes			41		2675			
Karnataka								
77	Agnashini	KPCL	4	150	600	427.00	1431.00	1.07
78	Gangavali	KPCL	2	200	400	378.30	759.00	1.46
79	Gundia	KPCL	2	150	300	600.00	616.00	1.41
80	Kalinadi St.III	KPCL	2	150	300	407.67	610.00	1.67
81	Tamankal	KPCL	2	150	300	87.29	401.00	3.32
Total (Karnataka) - 5 Schemes			12		1900			
Kerala								
82	Karappara Kuriarkutty	WAPCOS	2 ph1 2 ph2	18 15	66	390.00 307.00	126.10	7.88
83	Perianjakully	WAPCOS	2	30	60	282.90	86.30	6.25
Total (Kerala) - 2 Schemes			6		126			
Madhya Pradesh								
84	Basania	NHPC	3	30	90	38.00	240.00	17.23
85	Bauras	NHPC	3	18.33	55	17.50	248.43	3.96
86	Hoshangabad	NHPC	3	20	60	16.50	288.21	4.10
Total (Madhya Pradesh) - 3 Schemes			9		205			
Maharashtra								
87	Ghargaon	WAPCOS	4	13	52	9.84	74.47	15.50
88	Hiranyakeshi	WAPCOS	2	9	18	36.10	23.76	20.26
89	Kadvi	WAPCOS	2	11	22	36.30	29.59	34.03
90	Kasari	WAPCOS	2	12.5	25	40.67	33.32	18.16
91	Kumbhi	WAPCOS	2	8.5	17	37.48	22.93	35.19
92	Kunghara	WAPCOS	4	18	72	12.77	133.40	11.34
93	Pranhita	WAPCOS	2	24	48	25.30	135.96	10.32
94	Samda	WAPCOS	4	13	52	10.64	83.40	14.11
95	Wainganga	WAPCOS	5	21	105	19.74	246.15	3.86
Total (Maharashtra) - 9 Schemes			27		411			
Manipur								
96	Khongnum Chakka st.-II	WAPCOS	2	33.5	67	281.25	192.84	4.59
97	Nunglieban	WAPCOS	2	52.5	105	82.42	268.93	5.16
98	Pabaram	WAPCOS	2	95	190	116.67	474.77	4.33
Total (Manipur) - 3 Nos. Schemes			6		362			
Meghalaya								
99	Mawblei	WAPCOS	2	70	140	400.33	303.66	4.44
100	Mawhu	WAPCOS	3	40	120	438.15	482.96	1.40
101	Mawput	WAPCOS	3	7	21	93.42	83.95	4.07
102	Nongkolait	WAPCOS	2	60	120	463	332.87	1.97
103	Nongnam	WAPCOS	2	25	50	215.17	212.59	2.44
104	Rangmaw	WAPCOS	2	32.5	65	321.00	229.60	2.32

105	Selim	WAPCOS	2	85	170	433.67	534.68	2.02
106	Sushen	WAPCOS	2	32.5	65	114.58	220.6	3.85
107	Umduna	WAPCOS	3	19	57	253.17	231.24	1.68
108	Umjaut	WAPCOS	3	23	69	375.20	276.70	1.51
109	Umngi	WAPCOS	2	27	54	304.75	89.65	2.86
Total (Meghalaya) - 11 Schemes			26		931			
Mizoram								
110	Boinu	WAPCOS	4	160	640	158.67	1118.93	4.83
111	Lungleng	WAPCOS	5	163	815	219.67	1169.06	4.17
112	Tlawng	WAPCOS	2	22.5	45	123.67	151.67	5.84
Total (Mizoram) - 3 Schemes			11		1500			
Nagaland								
113	Dikhu	NEEPCO	4	35	140	79.44	513.41	2.8
114	Tizu	NEEPCO	3	50	150	64.19	568.41	2.56
115	Yangnyu	NEEPCO	2	20	40	115	176.45	4.48
Total (Nagaland) - 3 Schemes			9		330			
Orissa								
116	Baljori	WAPCOS	2	89	178	165.75	479.8	5.9
117	Lower Kolab	WAPCOS	3	155	465	196.9	845.86	7.1
118	Naraj	WAPCOS	7	41	287	16.14	759.31	4.92
119	Tikarpara	WAPCOS	7	37	259	16.97	828.37	3.69
Total (Orissa) - 4 Schemes			19		1189			
Sikkim								
120	Dikchu	NHPC	3	35	105	352	469	2.15
121	Lachen	NHPC	3	70	210	350	865.94	2.35
122	Lingza	NHPC	3	40	120	736	477.51	2.85
123	Panan	NHPC	4	50	200	312	762	2.15
124	Rangyong	NHPC	3	47	141	723.18	639.52	2.7
125	Ringpi	NHPC	2	35	70	1106.4	317.41	3.17
126	Rongni Storage	NHPC	3	65	195	442	510.35	8.6
127	Rukel	NHPC	3	11	33	537.1	149.41	5.48
128	Talem	NHPC	3	25	75	393.19	305.48	4.34
129	Teesta-I	NHPC	4	80	320	576.85	1298.12	1.8
Total (Sikkim) - 10 Schemes			31		1469			
Uttaranchal								
130	Arakot Tiuni	UJVNL	3	24	72	250.2	382.9	1
131	Badrinath	WAPCOS	2	70	140	459.67	702.7	0.81
132	Bagoli Dam	UJVNL	3	24	72	139.5	340.7	4.1
133	Bhaironghati	WAPCOS	2	32.5	65	108.9	293.18	1.8
134	Bogudiyar - Sirkari Bhyal	WAPCOS	2	85	170	344.47	744	1.99
135	Bokang Baling	WAPCOS	3	110	330	455.2	1124.62	1.68
136	ChhungerChal	WAPCOS	2	120	240	292.83	853.28	1.13
137	Deodi	WAPCOS	2	30	60	560.3	296.76	1.37
138	Devsari	WAPCOS	3	100	300	227.5	878.5	2.77

139	Gangotri	WAPCOS	1	55	55	336.33	264.76	1.62
140	GarbaTawaghat	WAPCOS	3	210	630	470.97	2483.11	0.9
141	Gohana Tal	WAPCOS	2	30	60	584.52	269.35	1.64
142	Harsil	WAPCOS	3	70	210	281.33	920.57	1.1
143	Jadh Ganga	WAPCOS	2	25	50	142.6	220.88	2.19
144	Jakhol Sankri	UJVNL	3	11	33	364	144.24	1.71
145	Jelam Tamak	WAPCOS	2	30	60	195.58	268.12	1.71
146	Kalika Dantu	WAPCOS	2	115	230	99.75	1067.3	2.95
147	Karmoli	WAPCOS	2	70	140	419.7	621.31	1.3
148	Khartoi Lumti Talli	WAPCOS	2	27.5	55	56.6	241.51	3
149	Lata Tapovan	UJVNL	4	77.5	310	265	1123	2.21
150	Maleri Jelam	WAPCOS	2	27.5	55	200.33	243.07	1.8
151	Mapang-Bogidiyar	WAPCOS	2	100	200	465.07	882.04	1.3
152	Naitwar-Mori	UJVNL	3	11	33	76	151	1.85
153	Nand Prayag	UJVNL	3	47	141	72	794	2.05
154	Ramganga	UJVNL	3	22	66	100.1	327	3.25
155	Rishi Ganga- 1	WAPCOS	2	35	70	536.17	327.3	1.18
156	Rishi Ganga - II	WAPCOS	1	35	35	236.96	164.64	2.22
157	Rupsiabagar Khasiyabara	WAPCOS	2	130	260	449.47	1195.63	1.59
158	Sela Urthing	WAPCOS	2	115	230	255.5	816.73	1.4
159	Sirkari Bhyol Rupsiabagar	WAPCOS	3	70	210	388.97	967.97	1.55
160	Taluka Sankri	UJVNL	2	70	140	564.9	559.47	1.33
161	Tamak Lata	UJVNL	4	70	280	291.4	1040.7	2.3
162	Urthing Sobla	UJVNL	4	70	280	414.96	1360.2	1.49
Total (Uttaranchal) - 33 Schemes			81		5282			
Grand Total - 162 Schemes			525		47930			

Annexure- 5B

(Item No. 5.4)

Hydro Capacity Addition during the Year 2012-13

Sl. No.	Particular	Unit Nos.	Capacity (MW)	Commissioning as programmed	Actual (A)/ Anticipated	Remarks
A. Central Sector						
1	Chamera-III NHPC, H.P. 3x77= 231 MW	Unit # 1 Unit # 2 Unit # 3	77 77 77	Jun-12 Aug-12 Oct -12	28.06.2012(A) 12.06.2012(A) 07.06.2012(A)	
2	Uri-II NHPC, J&K 4x60= 240 MW	Unit # 1 Unit # 2 Unit # 3 Unit # 4	60 60 60 60	Aug -12 Sept -12 Nov-12 Dec-12	Slipped Slipped Slipped Slipped	- Local agitation from mid March, 12 to June, 12 end.. - TRT was flooded on 17.09.12 due to flash flood. - Filling of U/s Water conductor system delayed due to agitation by local people demanding employment in NHPC.
3	Chutak NHPC, J&K 4x11 =44 MW	Unit # 1 Unit # 2 Unit # 3 Unit # 4	11 11 11 11	Sept-12 Sept-12 Nov -12 Dec-12	22.11.2012(A) 08.11.2012(A) 11.11.2012(A) 28.01.2013(A)	Unit # 1, Unit #2 & Unit# 3 were synchronized on 06.11.11, 26.03.12 & 31.07.12 respectively but commissioning delayed due to non-availability of sufficient load
4	Parbati-III NHPC, HP 4x130= 520 MW	Unit # 1	130	Mar-13	Slipped	
Sub- total (A):			645			
B. State Sector						
5	Bhawani Kattalai -II TANGEDCO, T.N. Tamil Nadu, 2x15 = 30 MW	Unit # 1 Unit # 2	15 15	June-12 July-12	Commissioning at full load expected in 2013-14, since water availability for full load likely in monsoon 2013	Unit#1&2 Synchronised at part load in July,11& Sept,11 - Reservoir filling delayed on account of less release from Mettur dam.
6	Bhawani Kattalai -III TANGEDCO, T.N. 2x15 = 30 MW	Unit # 1	15	Oct-12	08.12.12(A)	Delay in Reservoir filling on account of release of water from Mettur dam.

Sl. No.	Particular	Unit Nos.	Capacity (MW)	Commissioning as programmed	Actual (A)/ Anticipated	Remarks
7	Myntdu, MeECL, Meghalaya 3x42 = 126 MW	Unit # 3	42	Mar-13	07.03.2013(A)	
Sub- total (B):			87			
C. Private Sector						
8	Budhil Lanco Green Power H P 2x35=70 MW	Unit # 1 Unit # 2	35 35	May-12 July-12	30.05.2012(A) 26.05.2012(A)	
Sub- total (C):			70			
Total (A+B+C)			802			
Commissioned (MW)			402			
D. Outside the programme 2012-13- Commissioning advanced						
1	Teesta Low Dam –III NHPC, WB 4x33=132 MW	Unit # 1 Unit #2 Unit #3	33 33 33	2013-14 2013-14 2013.14	30.01.2013(A) 20.01.2013(A) 24.02.2013(A)	
Sub- total (D):			99			
Total Commissioned During 2012-13			501			

Hydro Projects Monitorable Target for 2013-14

Sl. No.	Particular	Unit Nos.	Capacity (MW)	Commissioning as programmed	Remarks
A. Central Sector					
1	Teesta Low Dam-III NHPC, WB. 4x33 = 132 MW	Unit # 4	33	April-13	Achieved on 01-04-2013
2	Uri-II NHPC, J&K 4x60 = 240 MW	Unit # 1 Unit # 2 Unit # 3 Unit # 4	60 60 60 60	May-13 June-13 July-13 Aug-13	
3	Parbati-III NHPC, HP 4x130= 520 MW	Unit # 1 Unit # 2 Unit # 3	130 130 130	June-13 July-13 Feb-14	
4	Nimoo Bazgo NHPC, J&K 3x15 = 45 MW	Unit # 1 Unit # 2 Unit # 3	15 15 15	Nov-13 Nov-13 Dec-13	
5	Rampur SJVN Limited, HP. 6x68.67 = 412 MW	Unit # 1 Unit # 2 Unit # 3	68.67 68.67 68.67	Jan-14 Feb-14 Mar-14	
Sub- total (A):			914		
B. State Sector					
6.	Lower Jurala APGENCO, A.P. (6x40 = 240 MW)	Unit # 1	40	Dec-13	
7	Bhawani Kattalai -II TANGEDCO, T.N Tamil Nadu, 2x15 = 30 MW	Unit # 1 Unit # 2	15 15	July -13 Aug- 13	
8	Bhawani Kattalai -III TANGEDCO, T.N Tamil Nadu, 2x15 = 30 MW	Unit # 2	15	June -13	
Sub- total (B):			85		
C. Private Sector					
9	Sorang Himachal Sorang Power Pvt. LTD, H P. 2x50 = 100 MW	Unit # 1 Unit # 2	50 50	Nov-13 Dec-13	
10	Chuzachen Gati Infra. Limited 2x49.5 = 99	Unit # 1 Unit # 2	49.5 49.5	June -13 July -13	
Sub- total (C):			199		
Total (A+B+C)			1198		

**List of Hydro Electric Projects likely to give benefits during 12th Plan
(2012-17)**

Sl. No.	Name of Project/ Executing Agency	State	Rating Nos x MW	Total
1.	Kol Dam NTPC	H.P.	4x200 = 800	800
2.	Tapovan Vishnugad NTPC	Uttar.	4x130 = 520	520
3.	Pare NEEPCO	Ar. P	2x55=110	110
4.	Tuirial NEEPCO	Miz.	2x30=60	60
5.	Kameng NEEPCO	Ar.P	4x150=600	600
6.	Rampur SJVNL	H.P.	6x68.67=412	412
7.	Parbati-III NHPC	H.P.	4x130 =520	520
8.	Nimoo Bazgo NHPC	J&K	3x15 = 45	45
9.	Teesta Low Dam-III NHPC	W.B.	4x33 = 132	132
10.	Teesta Low Dam-IV NHPC	W.B.	4x40 = 160	160
11.	Parbati-II NHPC	H.P.	4x200=800	800
12.	Kishanganga NHPC	J&K	3x110=330	330
13.	Uri-II NHPC	J&K	4x60 = 240	240
14.	Chamera-III NHPC	H.P.	3x77= 231	231
15.	Chutak NHPC	J&K	4x11 = 44	44
16.	Subansiri Lower NHPC	Ar. Pradesh /Assam	8x250=2000	1000
Sub-total (C.S)				6004
State Sector				
17.	Baglihar-II JKPDC	J&K	3x150= 450	450
18.	Uhl-III BVPCL (HPSEB)	H.P.	3x33.3= 100	100
19.	Swara Kuddu HPPCL	H.P.	3x37 =111	111
20.	Kashang-I HPPCL	H.P.	65	65
21.	Kashang-II & III HPPCL	H.P.	1x65+1x65= 130	130
22.	Sainj HPPCL	H.P.	2x50=100	100
23.	Lower Jurala APGENCO	A.P.	6x40=240	240
24.	Pulichintala APGENCO	A.P.	4x30=120	120
25.	Nagarjuna Sagar TR APGENCO	A.P.	2x25= 50	50
26.	Bhawani Kattalai Barrage-II TNEB	T.N.	2x15= 30	30
27.	Bhawani Kattalai Barrage-III TNEB	T.N.	2x15= 30	30
28.	Pallivasal KSEB	Kerala	2x30=60	60
29.	Thottiyar KSEB	Kerala	1x30+1x10= 40	40
30.	New Umtru MeECL	Megh.	2x20= 40	40
31.	Myntdu MeECL	Megh.	3x42=126	42
Sub-total (S.S)				1608
Private Sector				
32.	Sorang HSPCL	H.P.	2x50 = 100	100
33.	Tidong-I NSL Tidong	H.P.	2x50= 100	100

34.	Tangnu Romai-I M/sTangnu Romai Power	H.P.	2x22= 44	44
35.	Budhil LANCO Green Power	H.P.	2x35 = 70	70
36.	Shrinagar GVK Ind.	Uttar.	4x82.5=330	330
37.	Phata Byung M/s LANCO	Uttar.	2x38= 76	76
38.	Singoli Bhatwari M/s L&T	Uttar.	3x33= 99	99
39.	Maheshwar SMHPCL	M.P.	10x40= 400	400
40.	Chujachen Gati Infra	Sikkim	2x49.5= 99	99
41.	Teesta-III Teesta Urja	Sikkim	6x200= 1200	1200
42.	Teesta-VI M/s LANCO	Sikkim	4x125= 500	500
43.	Rangit-IV Jal Power	Sikkim	3x40= 120	120
44.	Jorethang Loop M/s DANS Energy	Sikkim	2x48= 96	96
45.	Bhasmay Gati Infra.	Sikkim	3x17= 51	51
Sub-total (P.S.)				3285
Total -All-India (C.S+S.S+P.S)				10897

**Details of savings achieved in the Cost while Concurring/Appraising of Hydro
Generation Schemes by
Central Electricity Authority during 2012-13 (01.04.2012 to 31.03.2013)**

(Landscape)

Salient Features /Broad Status of UMPPs under construction

(landscape)

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	Distt Jhajjar	2x660	The project is already commissioned
Punjab				
2	Talwandi Saboo	Distt. Mansa	3x660	Already awarded and the project is under construction
3	Rajpura	Rajpura Distrt Patiala	2x660	Already awarded. Project under construction.
Rajasthan				
4	Banswara TPP	Distt. Banswara	2x660	Coal linkage yet to be tied up. Project is yet to be awarded.
Madhya Pradesh				
5	Shahpura	Distt. Jabalpur	2x660	Coal linkage yet to be tied up. Project is yet to be awarded.
Uttar Pradesh				
6	Anpara 'C'	Distt. Sonebhadra	2x600	The project is already commissioned
7	Bara	Distt. Allahabad	3x660	Already awarded and the project is under construction
8	Karchanna	Distt. Allahabad	2x660	Already awarded. Construction held up as land not yet transferred.
9	Jawaharpur TPP	Distt. Etah	2x660	Coal linkage yet to be tied up .Project yet to be awarded.
10	Dopaha TPP	Distt. Sonebhadra	3x660	Coal linkage yet to be tied up. Project yet to be awarded.
11	Yammuna Expressway	Distt. Bulandsahar	3x660	Coal linkage yet to be tied up. Project yet to be awarded.
Chhattisgarh				
12	Bhaiyathan	Distt.Surguja	2x660	Already awarded, but the project since deferred.
Maharashtra				
13	Maharashtra Industrial Development Corp.	Distt. Bhadrawati	2x660	Coal linkage yet to be tied up. Project yet to be awarded.
14	Aurangabad TPP	Distt. Aurangabad	2x800	Coal linkage yet to be tied up. Project yet to be awarded.
15	Dhopave TPP	Distt. Ratnagiri	3x660	Coal linkage yet to be tied up. Project yet to be awarded.
16	Dondiacha Ph-I	Distt. Dhule	2x660	Coal linkage yet to be tied up. Project yet to be awarded.
17	Dondiacha Ph-II	Distt. Dhule	3x660	Coal linkage yet to be tied up. Project yet to be awarded.
Karnataka				
18	Gulbarga TPP	Distt. Gulbarga	2x660	Coal linkage yet to be tied up. Project yet to be awarded.
19	Ghatprabha	Distt. Belgaum	2x660	Coal linkage yet to be tied up. Project yet to be awarded.
Bihar				
20	Lakhisarai TPP	Distt. Lakhisarai	2x660	Coal linkage yet to be tied up. Project yet to be awarded.
21	Buxar TPP	Distt. Buxar	2x660	Coal linkage yet to be tied up. Project yet to be awarded.
22	Pirpainti TPP	Distt. Bhagalpur	2x660	Coal linkage yet to be tied up. Project yet to be awarded.
Total			33160 MW	

Annexure-6C
(Item No. 6.5.1)

Thermal Units Programmed for Commissioning During 2012-13

(As on 31.03.2013)

State	Project Name	Impl. Agency	Unit No	LOA Date	BTG Supplier	Targeted Cap. (MW)	Comm. Cap. (MW)	Actual Comm. Date
CENTRAL SECTOR								
Chhattisgarh	Sipat STPS St-I	NTPC	U-3	Apr-04	Others	660	660	02.06.12
Haryana	Indira Gandhi TPP	APCPL	U-3	Jul-07	BHEL	500	500	07.11.12
Jharkhand	Koderma TPP	DVC	U-2	Jun-07	BHEL	500	500	15.02.13
Maharashtra	Mouda TPP St-I	NTPC	U-1	Nov-08	BHEL	500	500	19.04.12
MP	Vindhyachal STPS St-IV	NTPC	U-11	Jan-09	BHEL	500	500	14.06.12
TN	Vallur TPP Ph-I	NTECL	U-2	Aug-07	BHEL	500	500	28.02.13
Tripura	Tripura Gas	ONGC	Module-1	Jun-08	BHEL	363.3	363.3	03.01.13
UP	Rihand TPP-III	NTPC	U-5	Feb-09	BHEL	500	500	25.05.12
Total Central Sector						4023.3	4023.3	
STATE SECTOR								
Chhattisgarh	Marwa TPP	CSEB	U-1	Apr-08	BHEL	500		Slipped
Delhi	Pragati CCGT - III	PPCL	GT-3	May-08	BHEL	250	250	27.06.12
Gujarat	Pipavav CCPP	GSECL	Block-2	Dec-07	BHEL	351	351	27.03.13
Gujarat	Ukai TPP Extn	GSECL	U-6	Sep-07	BHEL	490	500	05.03.13
Rajasthan	Ramgarg GT	RRVUNL	GT	Aug-09	BHEL	110	110	20.03.13
Rajasthan	Ramgarg GT	RRVUNL	ST-1	Aug-09	BHEL	50		Slipped
MP	Satpura TPP Extn.	MPPGCL	U-10	Mar-08	BHEL	250	250	22.03.13
TN	Mettur TPP Ext	TNEB	U-1	Aug-08	Chinese	600	600	11.10.12
TN	North Chennai Extn.	TNEB	U-2	Aug-08	BHEL	600	600	09.03.13
UP	Harduaganj Ext	UPRVUNL	U-9	Jun-06	BHEL	250	250	25.05.12
UP	Parichha Extn	UPRVUNL	U-5	Jun-06	BHEL	250	250	24.05.12
UP	Parichha Extn	UPRVUNL	U-6	Jun-06	BHEL	250	250	11.03.13
Total -State Sector						3951	3411	
PRIVATE SECTOR								
AP	Simhapuri TPP Ph-1	Madhucon Projects Ltd.	U-2	Jan-09	Chinese	150	150	02.07.12
AP	Thammina-patnam TPP-I	Meenakshi Energy. Pvt. Ltd.	U-1	Aug-09	Chinese	150	150	09.09.12
AP	Thammina-patnam TPP-I	Meenakshi Energy. Pvt. Ltd.	U-2	Aug-09	Chinese	150		Slipped

Chhattisgarh	Kasaipalli TPP	ACB (India)	U-2	Nov-08	Chinese	135	135	21.06.12
Chhattisgarh	Vandana Vidyut TPP	Vandna Vidyut	U-1	Nov-08	Chinese	135		Slipped
Chhattisgarh	Swastik Korba TPS	ACB	U-1	02/10	Others	25		Slipped
Gujarat	Mundra Ultra Mega TPP	Tata Power Co.	U-2	May-07	Others	800	800	25.07.12
Gujarat	Salaya TPP	ESSAR	U-2	Nov-07	Chinese	600	600	13.06.12
Haryana	Jhajjar TPP (Mahatma Gandhi TPP)	CLP Power India Pvt. Ltd.	U-2	Jan-09	Chinese	660	660	11.04.12
Jharkhand	Mahadev Prasad TPP	Adhunik Power Co. Ltd.	U-1	May-09	BHEL	270	270	19.11.12
Jharkhand	Mata Shree Usha TPP	Corporate Power Ltd.	U-1	Dec-09	BHEL	270		Slipped
Maharashtra	Bela TTP-I	IEPL	U-1	Dec-08	BHEL	270	270	20.03.13
Maharashtra	Butibori TPP Ph-II	Vidarbha Ind. Power	U-1	Dec-09	Chinese	300	300	17.08.12
Maharashtra	EMCO Warora TPP	EMCO Engy. Ltd. (GMR)	U-1	Sep-09	Chinese	300	300	07.02.13
Maharashtra	Tirora TPP Ph-I	Adani Power Ltd	U-1	Feb-08	Chinese	660	660	11.09.12
Maharashtra	Tirora TPP Ph-I	Adani Power Ltd	U-2	Feb-08	Chinese	660	660	25.03.13
Maharashtra	Tirora TPP Ph-II	Adani Power Ltd	U-1	Feb-08	Chinese	660		Slipped
MP	Bina TPP	Bina Power Ltd.	U-1	Sep-08	BHEL	250	250	12.08.12
Orissa	Sterlite TPP	Sterlite Energy Ltd.	U-4	Sep-08	Chinese	600	600	25.04.12
Rajasthan	Jallipa-Kapurdi TPP	Raj west power Ltd (JSW)	U-5	Mar-07	Chinese	135	135	05.02.13
Total -Private Sector						7180	5940	
Total for during the year 2012-13						15154.3	13374.3	
Additional Capacity Commissioned from 12th Plan target i.e 88537 MW during the year 2012-13								
Chhattisgarh	Ratija TPP	SCPL	U-1	06/11	Chinese		50	04.02.13
Maharashtra	GEPL TPP	GEPL Pvt. Ltd.	U-1	Mar-09	Chinese		60	08.09.12
Maharashtra	GEPL TPP	GEPL Pvt. Ltd.	U-2	Mar-09	Chinese		60	28.04.12

Rajasthan	Jallipa-Kapurdi TPP	Raj west ower Ltd (JSW)	U-6	Mar-07	Chinese		135	03.03.13
Chhattisgarh	Korba West Extn.TPS St-III	CSEB	U-5	11/08	BHEL		500	22/3/13
MP	Vindhyachal STPS St-IV	NTPC	U-12	Jan-09	BHEL		500	22.03.13
Maha-rashtra	Amaravathi TPP	Indiabulls	U-1	11/09	BHEL		270	25.03.13
Jharkhand	Mahdev Prasad TPP	Adhunik Power Ltd	U-2	05/09	BHEL		270	29.03.13
Orissa	Kamalanga TPP	GMR Energy	U-1	08/08	Chinese		350	28.03.13
Maharashtra	Mouda TPP St-I	NTPC	U-2	Nov-08	BHEL		500	29.03.13
MP	Bina TPP	Bina Power Ltd.	U-2	09/08	BHEL		250	31.03.13
Total Additional							2945	
Additional Capacity Commissioned from out side the 12th Plan target i.e. 88537 MW during the year 2012-13								
Gujarat	Mundra Ultra Mega TPP	Tata Power Co.	U-3	May-07	Others		800	16.10.12
Gujarat	Mundra Ultra Mega TPP	Tata Power Co.	U-4	May-07	Others		800	16.01.13
Gujarat	Mundra Ultra Mega TPP	Tata Power Co	U-5	May-07	Others		800	18.03.13
MP	Mahan TPP	Essar Power MP Ltd.	U-1	08/07	Chinese		600	24.02.13
Gujarat	Uno Sugan CCPP	Torrent Power Ltd.	Mod ule-1	07/10	Others		382.5	20.01.13
Rajasthan	Jallipa-Kapurdi TPP	Raj west power Ltd (JSW)	U-8	Mar-07	Chinese		135	28.02.13
Rajasthan	Jallipa-Kapurdi TPP	Raj west power Ltd (JSW)	U-7	Mar-07	Chinese		135	16.03.13
TN	Tuticorin TPP	Ind Barath	U-1	NA	Chinese		50	10/3/2013
Total Additional							3802.5	
Total Additional achievement							6747.5	
Grand Total for during the year 2012-13							20121.8	

Thermal Units Programmed for Commissioning during 2013-14 (RFD)

Sl. No.	Project Name	State	Developer	Capacity (MW)	Comm. Schedule (Level.)	Ant. Comm. Schedule	Q1	Q2	Q3	Q4
				2013-14						
	Central Sector									
1	Barh II U-4	Bihar	NTPC	660	12/13	08/13			660	
2	Vallur (Ennore) TPP U-3	TN	NTPC/TN EB JV	500	03/14	02/14				500
3	Tuticorin TPPU-1	TN	NLC/TNE B JV	500	3/14	1/14				500
4	Tripura CCGT, Block-2	Tripura	ONGC JV	363.3	09/13	08/13		363.3		
5	Rihand STPS-III U-6	UP	NTPC	500	12/13	11/13			500	
6	Raghunathpur TPP U-1	WB	DVC	600	03/14	11/13				600
		Sub-total		3123.3			0	363.3	1160	1600
	State Sector									
7	Marwa TPP U- 1	Chhattisgarh	CSEB	500	09/13	07/13		500		
8	Pragati -III CCGT (Bawana) GT-4	Delhi	PPCL	250	06/13	04/13	250			
9	Pragati -III CCGT (Bawana) ST-2	Delhi	PPCL	250	09/13	08/13		250		
10	Pipavav JV CCGT Block-1	Gujarat	GSECL	351	09/13	07/13		351		
11	Shree Singaji TPP U-1	MP	MPPGCL	600	06/13	06/13	600			
12	Satpura TPS U-11	MP	MPPGCL	250	10/13	08/13			250	
13	Chandrapur TPP Ext. U 8	Maharashtra	MAHGENCO	500	12/13	09/13			500	
14	Kalisindh TPP U1	Rajasthan	RRVUNL	600	12/13	10/13			600	
15	Chhabra TPP Ext U-3	Rajasthan	RRVUNL	250	06/13	05/13	250			
16	Chhabra TPP Ext U-4	Rajasthan	RRVUNL	250	01/14	10/13				250
17	Ramgarh ST	Rajasthan	RRVUNL	50	12/13	9/13			50	
18	North Chennai TPP Ext U-1	TN	TNEB	600	09/13	07/13		600		
		Sub-total		4451			1100	1701	1400	250
	Private Sector									
19	Vizag TPP,U-1	AP	Hinduja	520	3/14	1/14				520

20	Thamminapatnam TPP U-2	AP	Meenakshi Energy	150	09/13	06/13		150		
21	Tamnar TPP U-1	Chhattisgarh	Jindal Power	600	3/14	02/14				600
22	Vandana Vidyut TPP U-1	Chhattisgarh	Vandana Vidyut	135	06/13	05/13	135			
23	D B Power TPP U-1	Chhattisgarh	DB Power Ltd	600	12/13	09/13			600	
24	Swastik Korba TPP U-1	Chhattisgarh	ACB	25	12/13	9/13			25	
25	Akaltara TPP U-1	Chhattisgarh	KSK Mahanadi	600	9/13	7/13		600		
26	Sasan UMPP U-3	MP	Reliance Power	660	5/13	04/13	660			
27	Sasan UMPP U-2	MP	Reliance Power	660	09/13	07/13		660		
28	Nasik TPP Ph-I,U-1	Maharashtra	India Bulls	270	09/13	07/13		270		
29	Dhariwal Infrastructure (P) Ltd TPP U-1	Maharashtra	Dhariwal Infra.	300	06/13	05/13	300			
30	Dhariwal Infrastructure (P) Ltd TPP U-2	Maharashtra	Dhariwal Infra.	300	12/13	10/13			300	
31	EMCO Warora TPP U-2	Maharashtra	GMR EMCO Energy Ltd.	300	06/13	05/13	300			
32	Tiroda TPP U-3	Maharashtra	Adani Power	660	06/13	5/13	660			
33	Derang TPP U1	Orissa	Jindal India Thermal Power	600	12/13	11/13			600	
34	Kamalanga TPP U-2	Orissa	GMR Energy	350	12/13	09/13		350		
35	Goindwal Sahib TPP U-1	Punjab	GVK Industries	270	06/13	04/13	270			
36	Talwandi Sabo TPP U-1	Punjab	Sterlite	660	01/14	12/13				660
		Sub-total		7660			2325	2030	1525	1780
		Total		15234.3			3425	4094.3	4085	3630

Unit-wise and Sector wise details of LE and R&M works to be executed during the year 2013-14

State Sector (LE Works)						
Sl. No.	Name of Utility	Name of Station	Unit No.	Year of Comm.	Cap. (MW)	Present status / Expected Date of Completion
2	UPRVUNL	Harduaganj	7	1978	110	BHEL is executing agency. Unit taken under S/d since 05.03.2011. Expected to be synchronised by June 2013.
3	PSEB	Bathinda	4	1979	110	BHEL is executing agency. Unit taken under s/d on 05.11.2012, Unit-4 will be synchronized by end of July 2013.
4	KBUNL	Muzaffar pur	1	1985	110	BHEL is executing agency. Unit was under s/d since 6.10.2003. Synchronisation is expected by April, 2013 with 5 mills.
5	KBUNL	Muzaffar pur	2	1985	110	BHEL is executing agency. S/d taken on 29.03.2012. Expected Synchronisation by October, 2013.
6	BSPGCL	Barauni	7	1985	110	BHEL revised schedule for synchronisation is 15.06. 2013.
Total of State Sector			6		660	
Central Sector (LE Works)						
1	NTPC	Kawas CCGT	GT-1B	1992	106	Order placed on M/s GE on 23/03/12. Completion expected by July, 2013
2	NTPC	Kawas CCGT	GT-2B	1992	106	Order placed on M/s GE on 23/03/12. Completion expected by January, 2014
3	NTPC	Gandhar CC GT	GT-3	1994	131	Order placed on M/s Alstom on 16.05.2012. Completion expected by December, 2013
Total Central Sector			3		343	
Grand Total (S.S.+C.S.)			9		1003	
State Sector (R&M Works)						
1	UPRVUNL	Obra	7	1974	100	E&C works started on 03.06.2011. Completion expected by June, 2012.
2		Anpara' B	4	1993	500	R&M works is being executed by M/s BHEL & M/s MITSUI, Japan.. Expected completion by Sept., 2013.
3		Anpara' B	5	1994	500	
4	JSEB	Patratu	10		110	R&M is under progress by M/s BHEL. U-10 is expected to be synchronised by March, 2014.
Total of State Sector			4		1210	

**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
IN INDIA			
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-I	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 Singh-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
WESTERN REGION			
30.	Ban Sagar Tons	3x105=315	1991-92
31.	Hasdeo Bango	3x40=120	1994
32.	Paithon	1x12=12	1984
33.	Rajghat	3x15=45	1999
34.	Koyna IV	4x250=1000	1999-2000
35.	Sardar Sarovar CHPH	5x50=250	2003
36.	Indira Sagar	8x125=1000	2004-05
37.	Sardar Sarovar RBPH	6x200=1200	2006-07

SOUTHERN REGION			
38.	Lower Sileru	$4 \times 115 = 460$	1976-78
39.	N.J. Sagar PSS	$1 \times 110 + 7 \times 100 = 810$	1978-85
40.	Kadamparai	$4 \times 100 = 400$	1987-90
41.	Srisaillam LBPH	$6 \times 150 = 900$	2001-03
42.	Pykara Ultimate	$3 \times 50 = 150$	2005-06
EASTERN REGION			
43.	Kosi	$4 \times 5 = 20$	1970-78
44.	Subernrekha I	$1 \times 65 = 65$	1977
45.	Subernrekha II	$1 \times 65 = 65$	1980
46.	Sone Western Canal	$4 \times 1.65 = 6.6$	1993
47.	Eastern Gandak	$3 \times 5 = 15$	1994-96
48.	Sone Eastern	$2 \times 1.65 = 3.3$	1996
49.	Rengali	$5 \times 50 = 250$	1985-92
50.	Upper Kolab	$4 \times 80 = 320$	1988-93
51.	Lower Lagyap	$2 \times 6 = 12$	1979
52.	Upper Rongnichu	$4 \times 2 = 8$	1993-94
53.	Myangchu	$2 \times 2 = 4$	1993
54.	Rammam II	$4 \times 12.75 = 51$	1995-96
55.	Teesta Canal Falls I,II,III	$3 \times 3 \times 7.5 = 67.5$	1997-99
56.	Upper Indravati	$4 \times 150 = 600$	2000-01
57.	Chandil	$2 \times 4 = 8$	-
NORTH EASTERN REGION			
58.	Kyrdemkulai	$2 \times 30 = 60$	1979
59.	Umiam St.I	$4 \times 9 = 36$	1965
60.	Umiam St.II	$2 \times 9 = 18$	1970
61.	Umiam Umtru St.IV	$2 \times 30 = 60$	1992
62.	Gumti	$3 \times 5 = 15$	1976-84
63.	Khandong	$2 \times 25 = 50$	1984
64.	Kopili	$2 \times 50 = 100$	1988
65.	Kopili Extn.	$2 \times 50 = 100$	1996-97
66.	Loktak	$3 \times 35 = 105$	1983&91
67.	Ranganadi	$3 \times 135 = 405$	2002-03
68.	Doyang	$3 \times 25 = 75$	2000
69.	Myntdu Leshka	2×42	2012
IN NEIGHBOURING COUNTRIES			
NEPAL			
70.	Gandak	$3 \times 5 = 15$	-
71.	Trisuli	$3 \times 7 = 21$	-
BHUTAN			
72.	Chukha	$4 \times 84 = 336$	1986-88
73.	Gyesta	$3 \times 0.5 = 1.5$	-
74.	Khaling	$3 \times 0.2 = 0.6$	-
75.	Tala	$6 \times 170 = 1020$	2007-08
BURMA			
76.	Sedawgyi	$2 \times 12.5 = 25$	-

**ALL INDIA/SECTOR-WISE/ORGANISATION-WISE GENERATION
TARGET/ACTUAL GENERATION FOR THE YEAR 2012-13**

THERMAL			
SECTOR / ORGANISATION	TARGET (MU)	ACTUAL (MU)	PLF %
CENTRAL SECTOR			
APCPL	5000	5079.68	57.86
DVC	28265	26077.88	64.95
K.B.U.N.L	400	0	0
NEEPCO.	2372	2313.06	
NLC	18403	19901.6	82.8
NSPCL	3816	4029.76	92
NTECL	354	868.7	48.88
NTPC Ltd.	232000	232014.8	82.22
ONGC		28.39	
RGPPL	9795	5127.36	
TOTAL CENTRAL SECTOR	300405	295441.2	79.18
STATE SECTOR			
HPGCL	20702	14858.37	53.68
IPGPCL	5534	6046.47	67.04
JK, PDD	0	0	
PSPCL	18786	18012.31	78.48
RRVUNL	26618	25366.9	77.54
UPRVUNL	21670	20960.28	53.81
CSPGCL	12629	12101.79	77.61
GMDCL	1000	921.61	42.08
GSECL	27292	22683.05	64.05
GSEGL	972	705.71	
MAHAGENCO	44388	42989.26	58.1
MPPGCL	16290	16836.38	65.73
APGENCO	36274	37930.95	85.03
KPCL	15895	14208.37	67.2
KSEB	330	532.95	
P&ED, Pudu.	257	230.76	
TNGDCL	22049	22410.44	77.94
A&N ADM	100	135.81	
BSEB	200	0	0
DPL	3020	1822.33	32.76
JSEB	850	735.72	10.91
OPGC	3097	3181.58	86.47
TVNL	2700	2924.87	79.5
WBPDC	24568	23520.92	61.87
APGPCL	1387	1419.34	0
ED, Manipur	0	0	
TSECL	750	763.84	
TOTAL STATE SECTOR	307358	291300	65.54

PRIVATE UTILITY			
CESC	8990	8714.02	77.41
RIL (DAHANU)	4200	4381.74	100.04
TATA PCL	9177	9423.68	63.82
TOR. POW. (UNOSUGEN)	2955	2971.23	81.22
TOTAL PRIVATE SECTOR UTL	25322	25490.67	75.69
PRIVATE SECTOR IPP			
ABAN POWER	700	881.96	
ACB	792	1415.02	71.97
ADHUNIK	0	341.98	61.55
AMNEPL	1000	740.14	34.35
APGCL		1168.17	
APL	24508	23276.7	53.75
BALCO	324	0	
BELLARY	50	10.07	
BEPL	1633	2688.63	68.46
BPSCL	270	474.04	34.64
BSES(C)	50	135.98	
BSES(P)	1284	713.2	
CGPL	3611	12440.39	77.94
CPL	292	0	
DBPCL		0	
DIPL		0	
DPSCLTD	0	0	
EEL	324	120.53	
EPGL	1700	4124.34	43.82
ESSAR	200	481.47	
ESSARPMPL		23.5	
GAUTAMI	1691	997.36	
GEPL		383.29	51.34
GIPCL	4353	3984.7	82.36
GMR ENERG	1148	416.74	
GTE CORP	1982	1405.8	
GVKP&IL	2124	1689.04	
IBPIL		0	
IBPL	0	0.28	
IEPL	292	5.5	
JPL	8350	7972.55	91.01
JSWEL	11887	16858.9	93.42
JhPL(HR)	1925	3075.14	30.26
KONA	1800	914.92	
KONDAPALI	3392	2429.89	
KWPCL		0	
LANCO	4000	3153.26	59.99
LAPPL	4200	3978.16	37.84
LVS POWER	50	0	
MADURAI P	300	356.76	
MEL	162	384.64	55.31
MPL	3647	4759.42	59.08

NDPL	323	138.82	
PENNA	376	380.42	
PPNPGCL	1800	1817.92	
RELIANCE	254	245.41	
RPL		0	
RPSCL	7594	7952.24	75.65
RWPL (JSW)	2775	3849.76	73.77
SAMALPATI	300	329.16	
SCPL		24.13	38.92
SEL	7894	8385.32	40.45
SEPL	806	1618.73	68.9
SPGL	1175	1032.98	
ST-CMSECP	1864	1808.02	82.56
SVPPL	230	48.11	8.72
TATA PCL	2630	2700.32	82.96
TOR. POW. (SUGEN)	5226	4119.87	
TOR. POW. (UNOSUGEN)		144.84	
UPCL	6070	6422.94	74.98
VASAVI	900	610.01	
VEMAGIRI	1743	960.77	
VESPL	120	56.23	18.34
VIP		1.97	
VVL	146	0	
WPCL	3429	3403.27	71.94
TOTAL PRIVATE SECTOR IPP	133696	147853.7	62.16
PRIVATE SECTOR IMP			
GIPCL	184	216.16	
ICCL	210	160.1	
NALCO	100	213.92	
TOTAL PRIVATE SECTOR IMP.	494	590.18	
TOTAL IPP & IMPORT	134190	148443.9	62.16
TOTAL PRIVATE SECTOR	159512	173934.6	64.07
NUCLEAR			
KAIGA	5756	5442.13	70.6
KAKRAPARA	3174	3470.22	90.03
KUNDAKULLAM	3000	0	
MADRAS A.P.S.	3128	2741.43	71.12
NARORA A.P.S.	2731	2541.14	65.93
RAJASTHAN A.P.S.	8068	8846.88	85.59
TARAPUR	9343	9824.31	80.11
TOTAL NUCLEAR	35200	32866.11	78.49
HYDRO			
CENTRAL SECTOR			
BBMB	10023	10944.67	
DVC	256	199.33	
NEEPCO.	2698	2377.74	
NHDC	3384	4203.92	
NHPC	19117	18893.49	
SJVNL	6500	6777.78	

THDC	3942	4266.06	
TOTAL CENTRAL SECTOR	45920	47662.99	
STATE SECTOR			
HPSEB	1708	1460.22	
JK, PDD	3423	3700	
PSPCL	3852	3925.85	
RRVUNL	545	845.34	
UJVNL	4604	4677.87	
UPJVNL	885	1577.92	
CSPGCL	250	301.51	
GSECL	616	880.02	
MAHAGENCO	3874	4011.46	
MPPGCL	2389	3023.79	
SSNNL	3141	3698.29	
APGENCO	8187	3456.75	
KPCL	12205	10169.78	
KSEB	6909	4650.08	
TNGDCL	5061	2868	
JSEB	160	141.98	
OHPC	5497	4373.8	
WBSEDCL	1069	1138.12	
APGPCL	425	343.04	
MeECL	629	609.89	
TOTAL	65429	55853.71	
PRIVATE SECTOR UTILITY			
BHIRA HPS	893	474.1	
BHIRA PSS HPS	0	381.54	
BHIVPURI HPS	307	301.59	
KHOPOLI HPS	250	292.8	
TOTAL PVT SEC. UTL	1450	1450.03	
PVT SECTOR-IPP			
ALLAIN DUHANGAN HPS	750	681.32	
BASPA HPS	1213	1239.69	
BHANDARDHARA HPS ST-	55	95.98	
BUDHIL HPS	277	156.79	
CHUJACHAN HPS	0	0	
KARCHAM WANGTOO HPS	4426	4056.75	
MAHESHWAR HPS		0	
MALANA HPS	350	333.15	
MALANA-II HPS	400	312.5	
SHRINAGAR HPS		0	
SORANG HPS	0	0	
TEESTA-III HPS		0	
VISHNU PRAYAG HPS	1775	1877.38	
TOTAL PRIVATE SECTOR IPP	9246	8753.56	
TOTAL PRIVATE SECTOR	10696	10203.59	

Annexure-10B

(Item - 10.4)

**INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES /UTS
LOCATED IN NORTHERN REGION INCLUDING ALLOCATED SHARES IN
JOINT & CENTRAL SECTOR UTILITIES**

(As on 31.03.2013)

State	Ownership Sector	Modewise breakup							Grand Total
		Thermal			Total Thermal	Nuclear	Hydro (Renewable)	RES ** (MNRE)	
		Coal	Gas	Diesel					
Delhi	State	135.00	1550.40	0.00	1685.40	0.00	0.00	0.00	1685.40
	Private	0.00	108.00	0.00	108.00	0.00	0.00	18.56	126.56
	Central	4355.41	207.61	0.00	4563.02	122.08	666.12	0.00	5351.22
	Sub-Total	4490.41	1866.01	0.00	6356.42	122.08	666.12	18.56	7163.18
Haryana	State	3160.00	25.00	3.92	3188.92	0.00	884.51	70.10	4143.53
	Private	1620.00	0.00	0.00	1620.00	0.00	0.00	53.10	1673.10
	Central	1174.00	535.29	0.00	1709.29	109.16	478.67	0.00	2297.12
	Sub-Total	5954.00	560.29	3.92	6518.21	109.16	1363.18	123.20	8113.75
Himachal Pradesh	State	0.00	0.00	0.13	0.13	0.00	393.60	587.91	981.64
	Private	0.00	0.00	0.00	0.00	0.00	1748.00	0.00	1748.00
	Central	135.16	61.88	0.00	197.04	34.08	809.34	0.00	1040.46
	Sub-Total	135.16	61.88	0.13	197.17	34.08	2950.94	587.91	3770.10
Jammu & Kashmir	State	0.00	175.00	8.94	183.94	0.00	780.00	130.53	1094.47
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	296.51	129.14	0.00	425.65	77.00	796.43	0.00	1299.08
	Sub-Total	296.51	304.14	8.94	609.59	77.00	1576.43	130.53	2393.55
Punjab	State	2630.00	25.00	0.00	2655.00	0.00	2230.23	244.50	5129.73
	Private	360.00	0.00	0.00	360.00	0.00	0.00	143.08	503.08
	Central	619.54	263.92	0.00	883.46	208.04	784.66	0.00	1876.16
	Sub-Total	3609.54	288.92	0.00	3898.46	208.04	3014.89	387.58	7508.97
Rajasthan	State	3615.00	553.80	0.00	4168.80	0.00	987.96	30.25	5187.01
	Private	1380.00	0.00	0.00	1380.00	0.00	0.00	3297.37	4677.37
	Central	957.10	221.23	0.00	1178.33	573.00	539.84	0.00	2291.17
	Sub-Total	5952.10	775.03	0.00	6727.13	573.00	1527.80	3327.62	12155.55
Uttar Pradesh	State	4923.00	0.00	0.00	4923.00	0.00	524.10	25.10	5472.20
	Private	3090.00	0.00	0.00	3090.00	0.00	0.00	798.88	3888.88
	Central	2749.90	549.97	0.00	3299.87	335.72	1297.32	0.00	4932.91
	Sub-Total	10762.90	549.97	0.00	11312.87	335.72	1821.42	823.98	14293.99
Uttranchal	State	0.00	0.00	0.00	0.00	0.00	1252.15	174.82	1426.97
	Private	0.00	0.00	0.00	0.00	0.00	400.00	15.05	415.05
	Central	280.88	69.35	0.00	350.23	22.28	346.03	0.00	718.54
	Sub-Total	280.88	69.35	0.00	350.23	22.28	1998.18	189.87	2560.56
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	29.81	15.32	0.00	45.13	8.84	51.74	0.00	105.71
	Sub-Total	29.81	15.32	0.00	45.13	8.84	51.74	0.00	105.71
Central - Unallocated		902.19	290.35	0.00	1192.54	129.80	497.05	0.00	1819.39
Total Northern Region	State	14463.00	2329.20	12.99	16805.19	0.00	7052.55	1263.21	25120.95
	Private	6450.00	108.00	0.00	6558.00	0.00	2148.00	4326.04	13032.04
	Central	11500.50	2344.06	0.00	13844.56	1620.00	6267.20	0.00	21731.76

Grand Total		32413.50	4781.26	12.99	37207.75	1620.00	15467.75	5589.25	59884.75
(As on 31.03.2013)									
State	Ownership Sector	Modewise breakup							Grand Total
		Thermal			Total Thermal	Nuclear	Hydro (Renewable)	RES ** (MNRE)	
		Coal	Gas	Diesel					
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	326.17	0.00	0.00	326.17	25.80	0.00	0.00	351.97
	Sub-Total	326.17	48.00	0.00	374.17	25.80	0.00	30.05	430.02
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	36.71	4.20	0.00	40.91	7.38	0.00	0.00	48.29
	Sub-Total	36.71	4.20	0.00	40.91	7.38	0.00	0.00	48.29
Gujarat	State *	4470.00	1594.72	17.28	6082.00	0.00	772.00	32.90	6886.90
	Private	9000.00	2960.00	0.20	11960.20	0.00	0.00	3935.08	15895.28
	Central	2648.27	424.27	0.00	3072.54	559.32	0.00	0.00	3631.86
	Sub-Total	16118.27	4978.99	17.48	21114.74	559.32	772.00	3967.98	26414.04
Madhya Pradesh	State	2995.00	0.00	0.00	2995.00	0.00	1703.66	86.16	4784.82
	Private	1100.00	0.00	0.00	1100.00	0.00	0.00	440.02	1540.02
	Central	2256.39	257.18	0.00	2513.57	273.24	1520.00	0.00	4306.81
	Sub-Total	6351.39	257.18	0.00	6608.57	273.24	3223.66	526.18	10631.65
Chhatisgarh	State	2280.00	0.00	0.00	2280.00	0.00	120.00	52.00	2452.00
	Private	2018.00	0.00	0.00	2018.00	0.00	0.00	253.90	2271.90
	Central	1490.49	0.00	0.00	1490.49	47.52	0.00	0.00	1538.01
	Sub-Total	5788.49	0.00	0.00	5788.49	47.52	120.00	305.90	6261.91
Maharastra	State	8400.00	672.00	0.00	9072.00	0.00	2884.84	303.75	12260.59
	Private	6986.00	180.00	0.00	7166.00	0.00	447.00	3853.07	11466.07
	Central	3313.27	2623.93	0.00	5937.20	690.14	0.00	0.00	6627.34
	Sub-Total	18699.27	3475.93	0.00	22175.20	690.14	3331.84	4156.82	30354.00
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	44.37	27.10	0.00	71.47	8.46	0.00	0.00	79.93
	Sub-Total	44.37	27.10	0.00	71.47	8.46	0.00	0.00	79.93
Central - Unallocated		1622.35	196.91	0.00	1819.26	228.14	0.00	0.00	2047.40
Total western Region	State	18145.00	2266.72	17.28	20429.00	0.00	5480.50	474.86	26384.36
	Private	19104.00	3188.00	0.20	22292.20	0.00	447.00	8512.07	31251.27
	Central	11738.01	3533.59	0.00	15271.60	1840.00	1520.00	0.00	18631.60

Grand Total	48987.01	8988.31	17.48	57992.80	1840.00	7447.50	8986.93	76267.23
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(As on 31.03.2013)

State	Ownership Sector	Modewise breakup							Grand Total
		Thermal			Total Thermal	Nuclear	Hydro (Renewable)	RES ** (MNRE)	
		Coal	Gas	Diesel					
Andhra Pradesh	State	5092.50	0.00	0.00	5092.50	0.00	3734.53	223.03	9050.06
	Private	450.00	3370.40	36.80	3857.20	0.00	0.00	884.71	4741.91
	Central	2880.98	0.00	0.00	2880.98	275.78	0.00	0.00	3156.76
	Sub-Total	8423.48	3370.40	36.80	11830.68	275.78	3734.53	1107.74	16948.73
Karnataka	State	2720.00	0.00	127.92	2847.92	0.00	3599.80	901.35	7349.07
	Private	2060.00	0.00	106.50	2166.50	0.00	0.00	2610.43	4776.93
	Central	1378.39	0.00	0.00	1378.39	254.86	0.00	0.00	1633.25
	Sub-Total	6158.39	0.00	234.42	6392.81	254.86	3599.80	3511.78	13759.25
Kerala	State	0.00	0.00	234.60	234.60	0.00	1881.50	174.73	2290.83
	Private	0.00	174.00	21.84	195.84	0.00	0.00	0.03	195.87
	Central	914.56	359.58	0.00	1274.14	95.60	0.00	0.00	1369.74
	Sub-Total	914.56	533.58	256.44	1704.58	95.60	1881.50	174.76	3856.44
Tamil Nadu	State	4170.00	523.20	0.00	4693.20	0.00	2137.20	118.55	6948.95
	Private	400.00	503.10	411.66	1314.76	0.00	0.00	7338.99	8653.75
	Central	3306.23	0.00	0.00	3306.23	524.00	0.00	0.00	3830.23
	Sub-Total	7876.23	1026.30	411.66	9314.19	524.00	2137.20	7457.54	19432.93
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
Puducherry	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	0.03	0.03
	Central	230.09	0.00	0.00	230.09	19.28	0.00	0.00	249.37
	Sub-Total	230.09	32.50	0.00	262.59	19.28	0.00	0.03	281.90
Central - Unallocated		1329.58	0.00	0.00	1329.58	150.48	0.00	0.00	1480.06
Total Southern Region	State	11982.50	555.70	362.52	12900.72	0.00	11353.03	1417.66	25671.41
	Private	2910.00	4047.50	576.80	7534.30	0.00	0.00	10834.19	18368.49
	Central	10140.00	359.58	0.00	10499.58	1320.00	0.00	0.00	11819.58
Grand Total		25032.50	4962.78	939.32	30934.60	1320.00	11353.03	12251.85	55859.48

(As on 31.03.2013)

Bihar	State	430.00	0.00	0.00	430.00	0.00	0.00	70.70	500.70
	Private	0.00	0.00	0.00	0.00	0.00	0.00	43.30	43.30
	Central	1194.70	0.00	0.00	1194.70	0.00	129.43	0.00	1324.13
	Sub-Total	1624.70	0.00	0.00	1624.70	0.00	129.43	114.00	1868.13
Jharkhand	State	1190.00	0.00	0.00	1190.00	0.00	130.00	4.05	1324.05
	Private	900.00	0.00	0.00	900.00	0.00	0.00	16.00	916.00
	Central	228.88	0.00	0.00	228.88	0.00	70.93	0.00	299.81
	Sub-Total	2318.88	0.00	0.00	2318.88	0.00	200.93	20.05	2539.86
West Bengal	State	4970.00	100.00	12.06	5082.06	0.00	977.00	143.40	6202.46
	Private	1341.38	0.00	0.14	1341.52	0.00	0.00	28.05	1369.57
	Central	805.96	0.00	0.00	805.96	0.00	238.30	0.00	1044.26
	Sub-Total	7117.34	100.00	12.20	7229.54	0.00	1215.30	171.45	8616.29
DVC	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	1050.00	0.00	0.00	1050.00	0.00	0.00	0.00	1050.00
	Central	5505.60	90.00	0.00	5595.60	0.00	193.26	0.00	5788.86
	Sub-Total	6555.60	90.00	0.00	6645.60	0.00	193.26	0.00	6838.86
Orissa	State	420.00	0.00	0.00	420.00	0.00	2061.92	64.30	2546.22
	Private	2750.00	0.00	0.00	2750.00	0.00	0.00	33.00	2783.00
	Central	1512.10	0.00	0.00	1512.10	0.00	105.01	0.00	1617.11
	Sub-Total	4682.10	0.00	0.00	4682.10	0.00	2166.93	97.30	6946.33
Sikkim	State	0.00	0.00	5.00	5.00	0.00	0.00	52.11	57.11
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	74.10	0.00	0.00	74.10	0.00	75.27	0.00	149.37
	Sub-Total	74.10	0.00	5.00	79.10	0.00	75.27	52.11	206.48
Central - Unallocated		1355.16	0.00	0.00	1355.16	0.00	0.00	0.00	1355.16
Total Eastern Region	State	7010.00	100.00	17.06	7127.06	0.00	3168.92	334.56	10630.54
	Private	6041.38	0.00	0.14	6041.52	0.00	0.00	120.35	6161.87
	Central	10676.50	90.00	0.00	10766.50	0.00	812.20	0.00	11578.70
Grand Total		23727.88	190.00	17.20	23935.08	0.00	3981.12	454.91	28371.11
Assam	State	60.00	276.20	20.69	356.89	0.00	100.00	31.11	488.00
	Private	0.00	24.50	0.00	24.50	0.00	0.00	0.00	24.50
	Central	0.00	297.82	0.00	297.82	0.00	329.72	0.00	627.54
	Sub-Total	60.00	598.52	20.69	679.21	0.00	429.72	31.11	1140.04
Arunachal Pradesh	State	0.00	0.00	15.88	15.88	0.00	0.00	103.91	119.79
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
	Central	0.00	32.05	0.00	32.05	0.00	97.57	0.00	129.62
	Sub-Total	0.00	32.05	15.88	47.93	0.00	97.57	103.94	249.44
Meghalaya	State	0.00	0.00	2.05	2.05	0.00	282.00	31.03	315.08
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	65.61	0.00	65.61	0.00	74.58	0.00	140.19
	Sub-Total	0.00	65.61	2.05	67.66	0.00	356.58	31.03	455.27
Tripura	State	0.00	148.50	4.85	153.35	0.00	0.00	16.01	169.36
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	180.34	0.00	180.34	0.00	62.37	0.00	242.71

	Sub-Total	0.00	328.84	4.85	333.69	0.00	62.37	16.01	412.07
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	46.96	0.00	46.96	0.00	80.98	0.00	127.94
	Sub-Total	0.00	46.96	45.41	92.37	0.00	80.98	5.45	178.80
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	32.84	0.00	32.84	0.00	53.32	0.00	86.16
	Sub-Total	0.00	32.84	2.00	34.84	0.00	53.32	28.67	116.83
Mizoram	State	0.00	0.00	51.86	51.86	0.00	0.00	36.47	88.33
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	27.28	0.00	27.28	0.00	34.31	0.00	61.59
	Sub-Total	0.00	27.28	51.86	79.14	0.00	34.31	36.47	149.92
Central - Unallocated		0.00	55.40	0.00	55.40	0.00	127.15	0.00	182.55
Total N. E. Region	State	60.00	424.70	142.74	627.44	0.00	382.00	252.65	1262.09
	Private	0.00	24.50	0.00	24.50	0.00	0.00	0.03	24.53
	Central	0.00	738.30	0.00	738.30	0.00	860.00	0.00	1598.30
Grand Total		60.00	1187.50	142.74	1390.24	0.00	1242.00	252.68	2884.92

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE ISLANDS

(As on 31.03.2013)

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ALL INDIA INSTALLED CAPACITY (IN MW) OF POWER STATIONS LOCATED IN THE REGIONS OF MAIN LAND AND ISLANDS

(UTILITIES)

(As on 31.03.2013)

(As on 31.03.2013)									
Region	Ownership Sector	Modewise breakup							Grand Total
		Thermal			Total Thermal	Nuclear	Hydro (Renewable)	RES ** (MNRE)	
		Coal	Gas	Diesel					
Northern Region	State	14463.00	2329.20	12.99	16805.19	0.00	7052.55	1263.21	25120.95
	Private	6450.00	108.00	0.00	6558.00	0.00	2148.00	4326.04	13032.04
	Central	11500.50	2344.06	0.00	13844.56	1620.00	6267.20	0.00	21731.76
	Sub Total	32413.50	4781.26	12.99	37207.75	1620.00	15467.75	5589.25	59884.75
Western Region	State	18145.00	2266.72	17.28	20429.00	0.00	5480.50	474.86	26384.36
	Private	19104.00	3188.00	0.20	22292.20	0.00	447.00	8512.07	31251.27
	Central	11738.01	3533.59	0.00	15271.60	1840.00	1520.00	0.00	18631.60
	Sub Total	48987.01	8988.31	17.48	57992.80	1840.00	7447.50	8986.93	76267.23
Southern Region	State	11982.50	555.70	362.52	12900.72	0.00	11353.03	1417.66	25671.41
		2910.00	4047.50	576.80	7534.30	0.00	0.00	10834.19	18368.49
	Central	10140.00	359.58	0.00	10499.58	1320.00	0.00	0.00	11819.58
	Sub Total	25032.50	4962.78	939.32	30934.60	1320.00	11353.03	12251.85	55859.48
Eastern Region	State	7010.00	100.00	17.06	7127.06	0.00	3168.92	334.56	10630.54
	Private	6041.38	0.00	0.14	6041.52	0.00	0.00	120.35	6161.87
	Central	10676.50	90.00	0.00	10766.50	0.00	812.20	0.00	11578.70
	Sub Total	23727.88	190.00	17.20	23935.08	0.00	3981.12	454.91	28371.11
North Eastern Region	State	60.00	424.70	142.74	627.44	0.00	382.00	252.65	1262.09
	Private	0.00	24.50	0.00	24.50	0.00	0.00	0.03	24.53
	Central	0.00	738.30	0.00	738.30	0.00	860.00	0.00	1598.30
	Sub Total	60.00	1187.50	142.74	1390.24	0.00	1242.00	252.68	2884.92
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	0.85	20.85
	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	6.10	76.12
ALL INDIA	State	51660.50	5676.32	602.61	57939.43	0.00	27437.00	3748.19	89124.62
	Private	34505.38	7368.00	597.14	42470.52	0.00	2595.00	23793.52	68859.04
	Central	44055.01	7065.53	0.00	51120.54	4780.00	9459.40	0.00	65359.94
	Total	130220.89	20109.85	1199.75	151530.49	4780.00	39491.40	27541.71	223343.60

Renewable Energy Sources (RES) include SHP, BP, U&I, Solar and Wind Energy

Abbreviation: SHP=Small Hydro Project, BP=Biomass Power, U&I=Urban & Industrial Waste Power, RES=Renewable Energy Sources

Note :-

- i) The Hydro generating stations with installed capacity less than or equal to 25 MW are included in RES.
- ii) The installed capacity figures in respect of RES is as on 31.03.2013 and is based on MNRE letter dt.10.04.2013 where cumulative Grid interactive power installed capacity has been indicated as 28067.26 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 has been added. The installed capacity due to wind and small hydro amounting to 623.34 MW appearing in captive capacity has been deducted to arrive at installed capacity of utilities in respect of RES (28067.26-623.35+67.8+30=27541.71).
- iii) 10% of the Installed capacity of Pragati CCGT which is indicated to be Merchant Power by IRP Div has been included in I/C of Delhi State Sector.
- iv) The Vijeshwaram CCPP of 272 MW Installed capacity has been included as an IPP in the state of Andhra Pradesh.

- v) Unit No 3 of Satpura T P S of MPPGCL of 62.5 MW capacity has been retired w.e f 01.10.2012 during the month of January, 2013.
- vi) The Obra T P S Unit No '6' of derated capacity of 94 MW of UPRVUNL and Units No 1 & 2 of Nasik T P S of derated capacity of 125 MW of MAHAGENCO were retired during June 2012.
- vii) With the commissioning of 3rd Unit in the month of Oct,2012,the shares of First Three Units (of 800MW each) of MUNDRA UMPP Station (5*800MW) (Gujarat) have been divided amongst the States of U.P,Punjab,Haryana,Rajasthan,Gujarat & Maharashtra in quantum as 180,270,225,225, 1110 & 390MW respectively (as per intimation received from IRP Div,vide letter No CEA/PLG/IRP/1/12/2194 Dt. 08.10.2012) & not in the state of Gujarat alone as a whole as was beeing done earlier.
- viii) With the achiving of full load by Tripura CCGT ist Unit (363.3MW). The fir share allocated to IL&FC/OTPC has been adjusted in The state of TRIPURA only.
- ix) The share of Manipur due to Tripura CCGT Central Sector Station (21 MW) inadvertantly posted in the Pvt, sector of the state during Feb 2013 has now been correctly posted in the central sector of the state of Manipur
- Figures at second place of decimal may not tally due to rounding off.

Annexure-11A

(Item No.11.3)

50 000 MW Hydroelectric Initiative (DPR Prepared)

Scheme	State	I. C. (MW) As per PFR	I. C. (MW) As per DPR	Agency	Remarks
Demwe	Ar.Pradesh	3000.00	2890.00	Athena Demwe Projects Ltd.	Demwe lower (1750 MW) DPR prepared & Concurred. DPR of Demwe upper (1140 MW) submitted in Mar.,2011 and returned for resubmission
Etalin	Ar.Pradesh	4000.00	3097.00	Jindal Steel & Power Ltd.	DPR submitted to CEA in Feb'12 and under examination.
Hirong	Ar. Pradesh	500.00	500.00	Jaiprakash Power Ltd.	DPR submitted to CEA in May'11 and under examination.
Hutong	Ar. Pradesh	3000.00	1200.00	Mountain Falls Ltd.	DPR of Hutong-II (1200 MW) submitted to CEA in Dec'11. Hutong-I (588 MW) abandoned. Issue of Storage Vs RoR to be shorted out.
Kalai	Ar. Pradesh	2600.00	2650.00	Mountain Falls Ltd. / Reliance Power Ltd.	DPR of Kalai-I (1450 MW) and Kalai-II (1200) prepared, issue of Storage Vs RoR to be shorted out.
Naying	Ar. Pradesh	1000.00	1000.00	D.S. Construction Ltd.	DPR submitted in Dec., 2010. Under Examination in CEA.
Tato-II	Ar. Pradesh	700.00	700.00	Reliance Power Ltd.	DPR prepared. TEC held on 27.06.2011. Env't. Clearance obtained. Forest clearance awaited.
Badao	Ar.Pradesh	120.00	60.00	Coastal Projects Pvt. Ltd.	DPR earlier prepared by NEEPCO. Project has allotted to Coastal Projects Pvt. Ltd. DPR likely by Dec.,2011

Dibbin	Ar.Pradesh	100.00	120.00	KSK Electricity Financing India Ltd.	DPR prepared. Concurred by CEA for 120 MW.
Phanchung	Ar.Pradesh	60.00	56.00	India bulls Real Estate Ltd.	DPR submitted to State Govt.
Talong	Ar.Pradesh	300.00	225.00	GMR Energy Ltd.	DPR prepared for 180 MW. Capacity increased to 225 MW. DPR under examination.
Tarangwarang	Ar.Pradesh	30.00	36.00	India bulls Real Estate Ltd.	DPR submitted to State Govt.
Dikhu	Nagaland	140.00	186.00	Manu Energy Pvt. Ltd.	DPR prepared and submitted in CEA.
Mawhu	Meghalaya	120.00	90.00	NEEPCO	DPR prepared for 90 MW
Total		15670.00	12810.00		

50 000 MW Hydroelectric Initiative (Schemes under S&I)

Sl. No	Scheme	State	Installed Capacity (MW)	Agency	Schedule for Preparation of DPR	Remarks
1	Attunli	Ar. Pradesh	500.00	Jindal Steel & Power Ltd.	3/13	MoA signed in Dec'08. S&I in progress.
2	Emra-II	Ar. Pradesh	390.00	Athena Enegy Ventures Ltd.	3/13	Survey & Investigation in progress.
3	Naba	Ar. Pradesh	1000.00	Abir Infra. Pvt. Ltd.	6/12	MoA signed in June'10. S&I in progress.
4	Nalo	Ar. Pradesh	360.00	Coastal Infra. Pvt. Ltd.	12/12	MoA signed in Nov'10. S&I in progress.
5	Oju-I	Ar. Pradesh	700.00	Navayuga Engg. Co. Ltd.	6/13	MoA signed in June'10. S&I in progress.
6	Oju-II	Ar. Pradesh	1000.00	Navayuga Engg. Co. Ltd.	6/13	MoA signed in June'10. S&I in progress.

7	Kameng Dam	Ar. Pradesh	600.00	KSK Energy Ventures Ltd..	2/13	Review of submergence of Seppa town. IC revised to 480 MW.
8	Kapakleyak	Ar. Pradesh	160.00	Energy Dev. Co. Ltd.	5/12 & 5/12	Under S&I. Scheme has been split in three stages as Pachuk-I, Pachuk-II & Pachuk-II lower.
9	Pakke Bung-I	Ar. Pradesh	110.00	Energy Dev. Co. Ltd.	5/12	Allotted as Pakke-I (40 MW) to developer. Under S&I. DPR by Nov., 2011.
10	Papu	Ar. Pradesh	200.00	India bulls Real Estate Ltd.	7/12	S&I in progress. Capacity revised to 90 MW.
11	Emini	Ar. Pradesh	500.00	Reliance Power Ltd.	3/13	Moa signed in March 2009 S&I in progress.
12	Amulin	Ar. Pradesh	420.00	Reliance Power Ltd.	3/13	Moa signed in March 2009 S&I in progress.
13	Mihumdon	Ar. Pradesh	400.00	Reliance Power Ltd.	12/13	Survey & Investigation in progress.
14	Utung	Ar. Pradesh	100.00	KSK Energy Ventures Ltd..	3/13	Survey & Investigation in progress.
15	Simang	Ar. Pradesh	90.00	Adishankar Power Pvt. Ltd.	5/12	To be developed in two stages of Simang-I(67 MW) & Simang-II(66 MW). Developer is facing problem from local people.
16	Mawblei	Meghalaya	140.00	MeECL	12/12	Survey & Investigation in progress.
17	Nongkolait	Meghalaya	120.00	MeSEB	6/14	Survey & Investigation in progress.
18	Selim	Meghalaya	170.00	MeSEB	12/12	Survey & Investigation in progress.
19	Umduna	Meghalaya	57.00	ETA Star Infra. Ltd.	7/12	MOA renewed in Nov.'08/ Survey & Investigation in progress. Level problem with Mawhu resolved.

20	Umjaut	Meghalaya	69.00	ETA Star Infra. Ltd. & GoMe (JV)	7/12	Survey & Investigation progress.
21	Umngi	Meghalaya	54.00	MeECL	6/12	Survey & Investigation in progress.
Total			7140.00			

50 000 MW Hydroelectric Initiative (Schemes held up due to Change in Agency / Non-allotment)

Sl. No.	Scheme	State	Installed Capacity (MW)	First Year Tariff (Rs.)
1	Agoline	Ar. Pradesh	375.00	3.51
2	Ashupani	Ar.Pradesh	30.00	8.75
3	Dengser	Ar.Pradesh	552.00	3.26
4	Duimukh	Ar.Pradesh	150.00	8.50
5	Elango	Ar.Pradesh	150.00	5.00
6	Etabue	Ar.Pradesh	165.00	3.43
7	KurungI&II	Ar. Pradesh	330.00	4.04
8	Mirak	Ar.Pradesh	141.00	3.42
9	Niare	Ar.Pradesh	800.00	2.02
10	Ringong	Ar.Pradesh	150.00	3.61
11	Chanda	Ar.Pradesh	110.00	2.67
12	Sebu	Ar.Pradesh	80.00	3.71
13	Tenga	Ar.Pradesh	600.00	3.52
14	Khongnum Chakka st.-II	Manipur	67.00	4.59
15	Nunglieban	Manipur	105.00	5.16
16	Pabaram	Manipur	190.00	4.33
17	Mawput	Meghalaya	21.00	4.07
18	Nongnam	Meghalaya	50.00	2.44
19	Rangmaw	Meghalaya	65.00	2.32
20	Sushen	Meghalaya	65.00	3.85
21	Tizu	Nagaland	150.00	2.56
22	Yangnyu	Nagaland	40.00	4.48
23	Boinu	Mizoram	640.00	4.83
24	Tlawng	Mizoram	45.00	5.84
Total			5071.00	

50 000 MW Hydroelectric Initiative (Schemes held up due to Non-availability of MoEF Clearance)

SI. No.	Scheme	State	Installed Capacity (MW)	Agency	Status
1	Bhareli-I	Ar.Pradesh	1120.00	NEEPCO	Held up - Pakke wild life sanctuary
2	Bhareli-II	Ar.Pradesh	600.00	Mountain Falls Ltd.	Held up - Pakke wild life sanctuary
Total			1720.00		

**50 000 MW Hydroelectric Initiative (Schemes which are held up
due to Local Agitation / Other Issues)**

SI. No.	Scheme	State	Installed Capacity (MW)	Agency	Status
1	Lungleng	Mizoram	815.00	NEEPCO	Involves International aspect.
Total			815.00		

Annexure 12A

(Item No. 12.4)

Details of Foreign Tours Performed during 2012-13

Sl.No.	Participant(Shri/Smt)	City /Country	Duration /Year
1.	Dr.L.D Papney, Director (TE&TD)	Bonn, Germany	14 th to 25 th May, 2012 (Ex. Journey time)
2.	Smt. Neerja Mathur, CE (IRP)	Germany	4 th to 8 th June, 2012
3.	Alok Saxena, Director (OM)	Punto Del Este (Uruguay)	26 th June to 2 nd July, 2012
4.	R. Saha, Director (SP&PA)	Bangladesh	4 th to 5 th July, 2012
5.	A. K. Rajput, Director (DP&D)	Singapore	31 st July to 3 rd August, 2012
6.	R.K. Verma, CE I/C (DP&D)	Singapore	31 st July to 3 rd August, 2012
7.	Dr. L.D. Papney, Director (TE&TD)	Bangkok, Thailand	30 th August to 5 th September, 2012
8.	Ravinder, Member (PS)	Islamabad, Pakistan	1 st to 4 th August, 2012
9.	K.K. Sharma, Asstt. Director (C&E)	Germany	3 rd to 14 th September, 2012
10.	Manjit Singh, Member (Thermal)	Beijing, China	10 th to 12 th September, 2012
11.	Alok Gupta, Member (H)	Islamabad, Pakistan	18 th to 19 th and 20 th September, 2012 respectively
12.	S.K.Jain, DD (OM)	Germany	8 th to 20 th October, 2012
13.	Ramesh Kumar, Director (IRP)	Germany	8 th to 20 th October, 2012
14.	V.K.Singh, Director (IRP)	Germany	8 th to 20 th October, 2012
15.	S.K. Thakur, CE I/c (TRM)	Alamaty, Kazakhstan	14 th to 15 th November, 2012
16.	Brifflee Lynkhai, SE, NERPC	Sydney Australia	17 th to 25 th November, 2012
17.	T.P. Singh, CE (TRM)	Jakarta, Indonesia	17 th January, 2013
18.	Rahul Raj, DD (TP&P)	Japan	13 th to 30 th January, 2013
19.	Sumit Kumar Gupta, AD-I	Japan	13 th to 30 th January, 2013
20.	Sudhir Jain, AD-I	Japan	13 th to 30 th January, 2013
21.	Vandana Singhal, Director (DP&D)	Singapore	22 th to 25 th January, 2013
22.	Bhai Lal, Director (TRM)	Berlin, Germany	11 th to 14 th February, 2013
23.	R. Saha, Director (SP&PA)	Bangladesh	16 th to 17 th February, 2013
24.	Vivek Goel , Director (DP&D)	Raleigh, USA	11 th to 15 th March, 2013

