ANNUAL REPORT
2014-15

GOVERNMENT OF INDIA
MINISTRY OF POWER
CENTRAL ELECTRICITY AUTHORITY

THE AUTHORITY

Mrs. Neerja Mathur
Chairperson
(Superannuated on 31.12.2014)

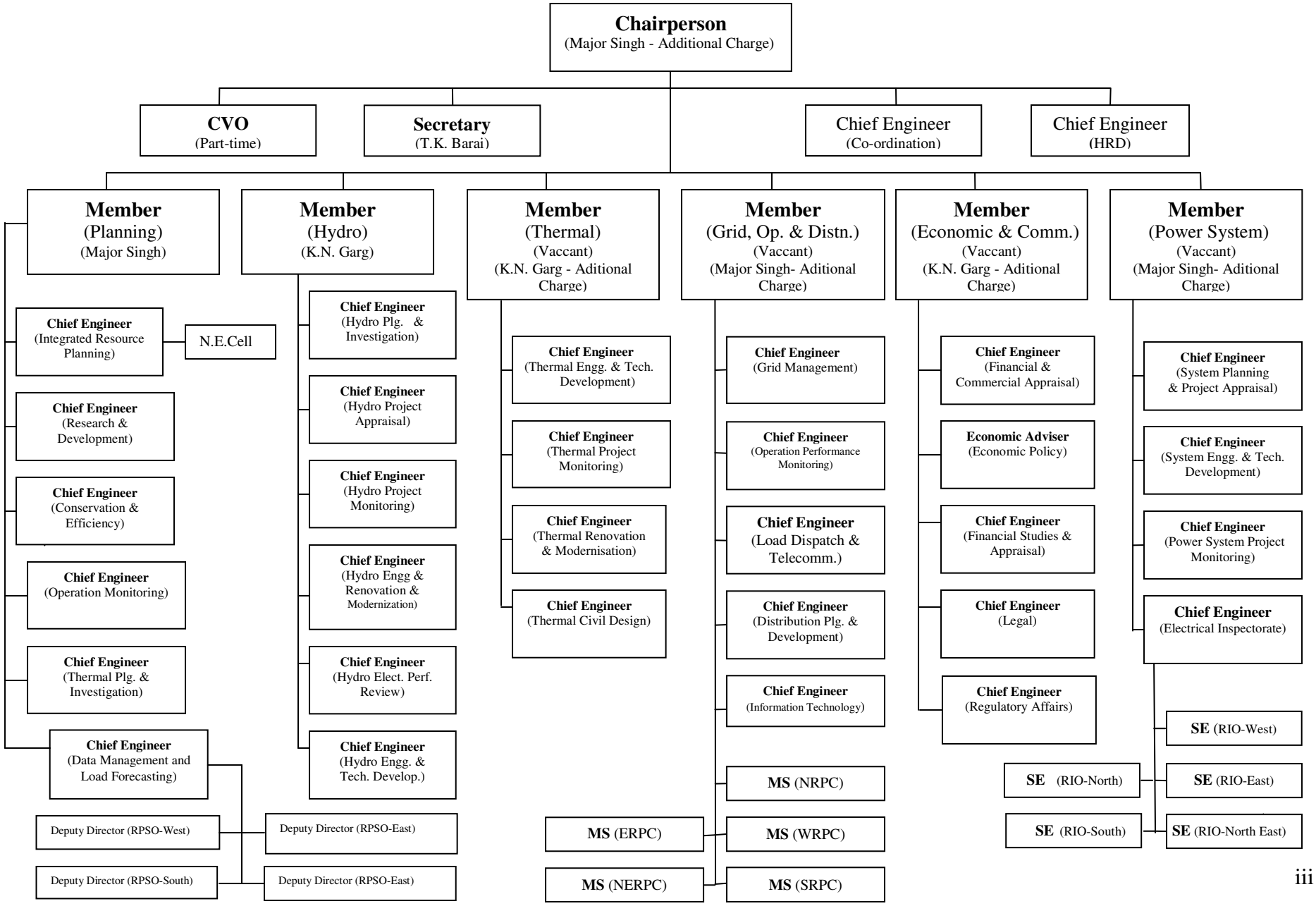
Sh. Major Singh
Chairperson (I/c)
(w.e.f. 01.01.2015)
Member (Planning) &
Additional Charge of
Member (PS) &
Member (GO & D)
(w.e.f. 01.03.2015)

Dr. Jai Pal Singh
Member (E & C)
(Up to 16.01.2015)

Sh. K.N. Garg
Member (Hydro) &
Additional Charge of
Member (Thermal) &
Member (E & C)
(w.e.f. 18.01.2015)

Organisation Chart of CEA

(As on 31.03.2015)



CENTRAL ELECTRICITY AUTHORITY
Sewa Bhawan, R.K. Puram
New Delhi – 110066
CEA Website: www.cea.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 NERPC Complex, 3rd Floor, Dong Parmaw, Lapulang, Shillong-793006.

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, Koramamgala, 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), NERPC Complex, 3rd Floor, Dong Parmaw, Lapulang, Shillong-793006.

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From the Chairperson

Recognizing the emphasis of the Government of India on a sustained growth of the country, initiatives have been taken to increase power generation in the county and to provide reliable and quality power to all. Continuing with the efforts, the Power Sector in India has achieved an addition of 19,685 MW of power generation capacity during the year 2014-15. The gross power generation by various utilities has been 1048 Billion kWh as against the previous year power generation of 967 Billion kWh, thus achieving a growth rate of 8.43 %.

The previous year the generation capacity addition has been mostly in respect of Thermal Projects. The capacity addition of 22,566 MW during the year comprised 20830 MW Thermal and 736 MW Hydro, thus raising the Installed Capacity of generating stations in the country as on 31.03.2015 to 2, 71,722 MW.

Although thrust is being accorded to maximize generation from other conventional and non-conventional sources, coal based generation is excepted to continue being the main stay of electricity generation. Coal based generation is likely to fuel and support the targeted GDP growth envisaged by the Government in years to come. Efforts are therefore being focused on improving the efficiency of coal based generation.

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 2014-15, CEA estimated a total coal requirement of 594 Million Tonne (MT). Out of this, requirement of domestic coal was estimated as 554 MT. Against this requirement, the availability of domestic coal was ascertained around 473 MT. During the year 2014-15, against a import target of 54 MT coal, the power utilities had imported around 48.5 Million Tonne of coal. In addition to above, 42.7 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 25.2 MMSCMD as against requirement of about 89.7 MMSCMD.

Initially nine (9) Ultra Mega Power Projects (UMPP) were proposed to be set up in different states. Out of these 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. All the five units of 800 MW each of Mundra UMPP and all the six units of 660 MW each of Sasan UMPP have been commissioned. Several other Ultra Mega Power Projects are under active consideration. 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 accord concurrence to hydro electric projects. During the years 2014-15, CEA had appraised and accorded concurrence to 6 hydro generation schemes aggregating to 3359 MW capacity.

Besides, the statutory obligations, CEA rendered engineering and consultancy to the utilities in India and in neighboring countries. During the year 2014-15, CEA rendered design and engineering of 2844 MW (approx.) comprising of Six Hydro Electric Projects, which includes projects of NTPC, Meghalaya SEB as well as Punatsangchhu Stg. I of 6x200MW , Stg. II of 6x170 MW and 400 kV Jigmeling Substation of 500MVA in Bhutan and 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, all the four regions are inter-connected in synchronous mode. Total transmission capacity of inter-regional transmission system (110 kV & above) as on 31.03.2015 increased to 45850 MW.

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 2014-15, 267 requests /applications under Right to Information Act were received and all have been disposed off. Further, 15 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. This year, Hindi correspondence percentage achieved in Region "A" is 80%, in Region "B" is 61.6% and in Region "C" 47% respectively. In CEA, most of the officers and employees are trained in Hindi Language. The Hindi Fortnight was organised in CEA from 15.09.2014 to 29.09.2014 and prize distribution ceremony was also held for meritorious services/winners of contests in Hindi on 29.09.2014. During the year, three Hindi workshops were organized till November 2014 in which lectures were delivered by the Guest lecturers on different topics related to official language.

To provide timely and necessary human resource development, the officers/ officials were deputed for various service refresher training programmes, technical courses, workshops, seminars, conferences etc. In addition, 5 Graduate (Engg.), 7 ITI qualified Draftsmen and 5 Technician (Vocational) apprentices have undergone training in CEA under the Apprentice Act 1961 during the year. The programmes organised are for enhancing the technical, financial, managerial and interpersonal skills. Besides, fifteen (15) training institutes /centers were visited and accorded recognition /renewal of recognition in accordance with CEA (Measures Relating to Safety & Electric Supply) Regulation, 2010 during the year 2014-15.

To conclude, 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.

(Major Singh)
Chairperson, CEA

CHAPTER – 1
ORGANISATION

1.1 Organisation of CEA

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

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

1.1.3 CEA is headed by a Chairperson who as the Chief Executive of the Authority largely oversees the development of Power Sector in the country. A Secretary, appointed by the Authority with the approval of the Central Government under section 72 of Electricity Act 2003, assists the Chairperson in discharging of CEA's statutory functions. The Secretary also assists the Chairperson in all matters pertaining to administration and technical matters including 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, Bengaluru, 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 31.03.2015 was 757 against sanctioned strength of 1526 leaving 769 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	328	111	439	204	62	266
CPES GROUP-B	92	17	109	21	04	25
Non CPES Group						
Group-A	54	0	54	38	0	38
Group-B	395	39	434	150	16	166
Group-C	231	60	291	72	43	115
Group-C(MTS)	142	57	199	107	40	147
Total	**1242**	**284**	**1526**	**592**	**165**	**757**

1. UPSC have been requested to appoint candidates through Engineering service Exam – 2013 for filling up of 109 posts of AD Gr.II in CEA. Amongst 109 posts, 25 officials have already joined CEA till 31.03.2015.
2. Based on Engineering service Exam - 2012 and Engineering service Exam -

2013, 7 & 17 officers at Assistant Director (Gr.I) have already joined in CEA respectively.

3. CEA has acute shortage of technical as well as non-technical staff and to cope up with this situation 17 consultants have already hired in CEA during the year 2014-15.
4. 09 Posts of LDCs and 01 post of Steno Gr.II have been filled through SSC in the Sub- office of CEA.
5. Consequent on 3rd Cadre Review of CPE (Gr. A) Service have been notified vide Gazette Notification dated 14.02.2015. After 3rd Cadre Review, the position of CPES Gr.A service is: 2 - HAG, 42 – SAG, 94 – JAG, 160 – STS and 131 – JTS comprising total no. of 429 posts of CPES Gr.A service. In addition, three posts at SAG level for CPE (Gr.A) Service officers have also been created one each at Krishna River Management Board, Godavari River Management Board and Polavaram Project Authority at Hyderabad.

1.4.1 Representation of women in CEA

CEA had a total number of 151 women employees as on 31.03.2015. 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	439	266	25	9.39
CPES GROUP-B	109	25	05	20.0
Non CPES Group				
Group-A	54	38	07	18.41
Group-B	434	166	69	41.56
Group-C	291	115	36	31.30
Group-C(MTS)	199	147	09	6.12
Total	**1526**	**757**	**151**	**19.94**

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 31.03.2015 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*	439	266	54	15	19	02
CPES GROUP-B	109	25	04	04	04	-
Non CPES Group						
Group-A	54	38	04	01	-	-
Group-B	434	166	25	09	10	05
Group-C	291	115	23	06	10	01
Group-C(MTS)	199	147	60	05	05	-
Total	**1526**	**757**	**170**	**40**	**48**	**08**

* Including chairperson & Members.

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.	Smt. N. Mathur, Chairperson (upto 31.12.2014)	Nuclear Power Corp. Ltd.	Director
2.	Sh. K.N. Garg, Member (Hydro) (w.e.f. 30.09.2013)	N.H.P.C	Director
3.	Sh. P.D. Siwal, Chief Engineer (w.e.f. 17.12.2013)	Haryana Power Generation Corpn. Ltd. (HPGCL)	Director
4.	Mrs. A. Chandra, Chief Engineer (upto 03.04.2014)	Haryana Vidyut Prasaran Nigam. Ltd. (HVPNL)	Director
5.	Dr. L.D. Papney, Director (w.e.f. 05.02.2014)	Puducherry Power Corpration Limited	Director

1.6 Annual Budget

During the year 2014-15, against an allocation of Rs. 49.29 Crores (reduced to Rs. 11.28 Crores in the RE 2014-15) under Plan head, no expenditure has been booked upto 31.03.2015 due to non-approval of SFC Memos of the New Plan Schemes by the Ministry of Power and non-approval of on-going Plan schemes for continuation during the 12th Five Year Plan. An expenditure of Rs. 2.12 Crores was booked under Plan head during 2013-14.

On the Non-Plan side, during the year 2014-15 an expenditure of Rs. 73.23 Crores was incurred against an allocation of Rs. 74.56 Crores (Rs. 73.30 Crores after imposing 10% mandatory cut by Ministry of Finance), whereas during the year 2013-14, an expenditure of Rs. 69.39 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 2014-15, CEA rendered consultancy services worth Rs. 1.31 Crores and an amount of Rs. 0.40 Crores was recovered during the year (upto 31.03.2015).

RPCs received revenue of Rs. 10.55 Crores from their constituents during the year 2014-15.

1.7 Progressive use of Hindi in Official Work of CEA

In CEA, the Official Language Implementing Committee (OLIC) meetings are held on regular intervals under the chairmanship of Chairperson, CEA. Required actions are taken on the decisions taken in the meetings. During this year, three quarterly meetings were held in June and September till March, 2015. During the year 2014-15, the percentage of Hindi correspondence remained in Region "A" 80% in Region "B" 61.6% and 47% in Region "C".

All the efforts are being made to promote the use of Hindi in official work in Central Electricity Authority. All incentive schemes recommended by the Department of Official Language are in operation in the authority.

Hindi fortnight was organized from 15.09.2014 to 29.09.2014 in the Authority. Prize distribution ceremony was held on 29.09.2014. Five competitions i.e. Essay, Noting and Drafting, General Knowledge, extempore speech and Hindi Dictation (only for the M.T.S. employees) were held. Number of officials and employees participated in these competitions. Winners of these competitions were given the cash prize. Chairperson, CEA distributed the prizes and appreciation letter to the winners in the function and it concluded with cultural programme. During the fortnight a Mobile Shield was awarded to the I.T. Division and Rajbhasha Shields were also awarded to those five sections/Divisions who did the maximum correspondence in Hindi. 10 employees were awarded cash prize for doing original Noting/Drafting work in Hindi.

Internal Official Language inspections of various sections are performed by the official language Officers from time-to-time so that the shortcomings, if any, could be brought to the notice of officers-in-charge of these section/division. During the period April 2014 to December 2014,13 Section/Divisions of CEA were inspected. In addition, sub-ordinate offices of CEA located in Shillong were also inspected by Deputy Secretary (OL) and Deputy Director (OL).In March, N.R.P.C. Delhi, a subordinate office of CEA was also inspected. Parliamentary official language Committee also inspected the E.R.P.C, Kolkata in February,2015.

During the year, three Hindi workshops were organized till November 2014 in which lectures were delivered by the Guest lecturers on different topics related to official language.

In CEA, most of the officers and employees are either proficient in Hindi Language or having working knowledge of Hindi. Those who does not have knowledge of Hindi are being trained in Hindi Language Courses/Shorthand/Typing classes organized by "Kendriya Hindi Prashikshan Sansthan", Department of Official Language from time-to-time. During the year, names of 17 personnels were forwarded to Hindi Sikshan Yojana office for training in computer.

Under the typing/stenography/language training scheme two Deputy Director (for Pragya level) were nominated for language training. 4 personnel for stenography training and one personnel was nominated for Hindi typing.

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 31.03.2014**	**Physically Challenged Employees**				**Percentage of Physically Challenged**
		VH	**HH**	**OH**	**Total**	
Group A	304	-	1	1	2	0.65
Group B	191	-	-	5	5	2.61
Group C	115	1	-	-	1	0.86
Group D	147	-	-	-	-	-
Total	**757**	**1**	**1**	**6**	**8**	**1.05**

In addition, due care is taken to post persons with Disabilities to disabled friendly offices of CEA for providing the barrier free environment and other Ministries /Departments from time to time in the related matter are regularly forwarded for implementation. The feedbacks of the implementation of related Programme are sent to the Ministry of Power on regular basis.

1.8.2 Welfare of SC /ST /OBC

Sh. S.K.Kassi, Director (TE&TD) has been designated as Liaison Officers in CEA to look after the welfare of Sc/ST/OBC and PwD employees.

During the recruitments years 2014-15 in Group –Á' AD-I, 4 (SC), 1 (ST) and 7(OBC), in Group-B, AD-II, 4(SC), 2(ST) and 4(OBC) also in subordinates offices of CEA, 1(SC) and 3(OBC) have been appointed.

1.8.2.1 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)

39 superannuation cases, 1 VRS case, and 4 death cases have been settled during the year 2014-2015. In addition 40 nos. of Restoration of one-third commuted portion of Pension /Grant of family pension cases were settled. In addition 2 CAT/Court cases are under process.

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. Sensitive posts have been identified and Administration Wing has been asked to report. 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 2014 was observed in Central Electricity Authority and its Subordinate offices from 27th October to 1st November, 2014. The Vigilance Awareness Week was celebrated to highlight the theme "Combating Corruption – Technology as an enabler".

Complaints other than anonymous/ pseudonymous were taken up for investigation promptly and after completion of investigations, reports submitted to the prescribed authority. As on 31.03.2015 one case of disciplinary action was pending under CEA's disciplinary jurisdiction. No new case has been received during the period. Thus at present (as on 31.03.2015) one case is pending finalization. Prescribed periodical Returns were sent to the Ministry of Power in time.

1.10 Electric Power Information Society (EPIS)

The Electric Power Information Society (EPIS) was established in June, 1996 under the aegis of Central Electricity Authority on no-loss-no profit basis for bringing out various CEA publications. These are also available on sale for general public.

During the year 2014-15 the following publications have been brought out:

1. Review of Performance of Thermal power Stations 2012-13.
2. Electricity Tariff & Duty and Average Rates of Electricity Supply in India - March'2014.

1.11 Grievance Cell

To redress the grievances of officers at CEA Head Quarters, in accordance with the instructions of Deptt. of Administrative Reforms and Public Grievances. Shri B. Tiwary, Chief Engineer (HETD), CEA is designated as Director (Grievance). The Grievances dealt by CEA are mainly service matters relating to Pension, Promotion and Non functional upgradation etc. During the financial year, 18 Nos. of grievance cases were received and out of which 17 cases have been settled.

In addition, Public /Individual concerns and matters related to issues of Research and Development /Inventions /suggestions for Power Sector Development are also dealt with.

1.12 Right to Information Act, 2005

Under the Right to Information Act, 2005, the Chief Engineer (Coordination) acts as the Nodal Officer for RTI for the CEA. 267 applications were received, during the year 2014-15, under the Act and were disposed off by various CPIOs in the CEA. Further, 15 applicants filed appeal to the Appellate Authority which were also 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 headed by Shri R.K. Verma, Chief Engineer (DP&D), 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

(A) Works relating to various assignments given below were carried out:

1. Parliament Questions
2. Parliamentary Assurances
3. Oral evidence
4. VIP references
5. Consultative Committees
6. Standing Committee on Energy
7. Material for 'Calling Attention Motion'
8. Material for Economic Survey 2013-14
9. Major Achievements in Power Sector
10. Annual Report of the MoP for 2013-14
11. Estimates Committee
12. Monitorable targets for the year 2013-14 and Achievements
13. Power Ministers' Conference
14. Material for various speeches.
15. International Cooperation with various countries

16. Inputs for regional meeting relating to power matters of the regions
17. Action taken reports were prepared based on the inputs received from various divisions**.**
18. PMO/VIP /MoP references
19. Power Minister's briefing to the press
20. Material for President's Address to both the Houses of Parliament and Finance Minister's Budget Speech.
21. Compilation and processing of material for matters such as:
    - Power sector reform
    - Pvt. Sector participation including action taken reports
    - Notes for Estimates Committee
    - Ministers meeting on power scenario etc

(B) During the year 2014-15 there were four Parliament Sessions and dealt with the Admitted version of Questions as follows:

S. No.	Particulars	Starred Question	Un-starred Question
1.	Budget Session 2014-15	14	108
2.	Monsoon Session 2014-15	30	218
3.	Winter Session 2014-15	22	191
4.	Budget Session 2015-16	8	106

1.14 Monthly Reports

The CEA receives regular data on various aspects of Indian Power Sector, such as generation, transmission and distribution of power. The information received is incorporated in the following regular 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.
- Monthly Executive Summary
- Fortnightly Report for P.M.O.
- Key Infrastructure sectors
- Efficiency Parameter Report
- DO letter from Chairman, CEA to Secy(P)

The Executive Summary is an important reference document containing various information including installed capacity, power supply position, actual generation vis-à-vis the programme, details of the thermal and hydro generating units commissioned during the month, major transmission lines & sub-stations commissioned, status of the coal position.

1.15 Computerization in CEA

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.

1.15.1 Hardware Facilities

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

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), CompDDO 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. being used by different division for carrying out specification function of designing, study, analysis and planning etc.

Specific software have been developed in-house by IT division like IT (Inventory/Complaint /Bill) Management, Canteen Management, IT Store Management, Vigilance Management etc.

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

The Information Management System (IMS), currently implemented in CEA since 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 using web based application. These Data are stored in a centralized Database Server for analyzing, monitoring and reporting purposes. A number of vital power sector reports containing data are published by using this facility.

To upgrade the IT facilities in CEA, a proposal was sent to MoP which comprised of the following:

a. Upgradation of IT infrastructure in CEA.
b. Augmentation of IMS in CEA.
c. Procurement of Planning Model Software.

Subsequently, it was decided by the Authority to split the proposal into three parts and to take the part (a) above on priority. The proposal for part (a) is under process in MoP.

Meanwhile, MoP has directed to create a National Data Hub for Power Sector under Integrated Power Development Scheme (IPDS) scheme. NIC has been assigned the work of studying the requirement and its implementation. Therefore, part (b), i.e. Augmentation of IMS in CEA would not be required, with establishment of National Data Hub.

Part (c), i.e. Procurement of Planning Model Software is being taken up as a separate Plan Scheme. The proposal is under process in MoP.

1.15.4 Other works

1.15.4.1 Digitization of various clearances given by CEA: As per direction of Cabinet Secretariat, clearance given by EI Division has been digitized. Digitization of DPR approvals for concurrence of hydroelectric projects is under process. Digitization of online applications would reduce the time taken in approval and also facilitates developers to track the status of their application.

1.15.4.2 Cyber Security in Power Sector: Director (IT), CEA has been nominated as Chief Information Security Officer (CISO) on behalf of Ministry of Power to co-ordinate the activities related to cyber security in Power Sector. IT Division, CEA, in collaboration with CERT-Thermal, CERT-Hydro and CERT-Trans is working on setting up of Information Sharing and Analysis Centre (ISAC) for Power Sector.

1.15.4.3 NDSAP: Director (IT), CEA has been nominated as Data Controller & Head, National Data Sharing & Accessibility Policy (NDSAP) Cell constituted by Ministry of Power. Other members of NDSAP Cell are representatives from MoP, CPRI, NPTI and BEE. NDSAP Cell is responsible to carry out the activities of sharing the information collected by different organisation in power sector, using public money on Govt. of India portal as per the implementation Guidelines of NDSAP. So far 490 datasets have been uploaded on Data Portal of India (data.gov.in).

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, 2010, and 2013.

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.

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	03.06.2014	Committee to inquire on the technical issues regarding constraints in upstream network leading to curtailment of short term open access as pleaded by SLDC, Gujrat.
2	29.12.2014	Committee for preparation of Energy Plan for Indian Railways.
3	27.01.2015	Project Monitoring Committee to monitor the Digitization work of clearances given by CEA.

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CHAPTER – 2
PLANNING FOR POWER DEVELOPMENT

2. Power Planning

2.1.1 Generation Planning Studies

i) Exercise related to scheme for utilization of stranded gas based generation capacity has been carried out.
ii) Studies regarding Energy mix scenarios for the year 2030 to calculate INDCs (Intended Nationally Determined Contributions) have been carried out in collaboration with NITI Aayog & BEE.

2.1.2 Reports bought out

a) Energy Plan for Indian Railways to optimize cost of buying electricity for the Indian Railways.
b) Analysis for Installed Generating Capacity Vs. Actual Demand Met in country.

2.1.3 Capacity addition during 2014-15

Against a capacity addition target of 17,830 MW, capacity addition of 22,566.31 MW was achieved during 2014-15.

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

i. Shri Ramesh Kumar, Chief Engineer, IRP nominated as Member Secretary in the Committee for preparation of Energy plan for Indian Railways.
ii. Shri Ramesh Kumar, Chief Engineer, IRP nominated as a Member in the Committee for Restructuring of CEA.
iii. Shri Major Singh, Member (Planning) was member of Sub-group of the Working Group for capacity addition constituted by Forum of Regulators.

2.2 Electricity Demand

Electricity demand of the country is projected periodically, 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 the consent of Ministry of Power, by conducting an exhaustive Electric Power Survey (EPS) of India. Electric Power Survey is undertaken by Data Management and Load Forecast Division, CEA by obtaining inputs from Regional Power Survey offices located in various regions, along with data obtained from various organizations/utilities. The electricity demand forecast is the basic input for formulation of National Electricity Policy, Developmental Plans and Programmes & Schemes concerning generation, transmission, trading, distribution and utilization of electricity. The demand forecast qualifies the need for augmentation /optimization of various segments of power sector to orient the specified sectors to planned growth. Electric load forecast also drives the development of transmission highways and optimum transmission network for carrying electricity from generation centres to load centres. Inter-regional transmission links for electricity transmission from surplus region to deficit region is an important input for planning and development of such links. The load projections also facilitate planning of electricity transfer and trading of electricity for the mutual benefits of surplus /deficit regions /States.

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

In fulfillment of its duties and functions under section 73 (i) & (j) and exercising powers vested under Section 74 of the Electricity Act, 2003, CEA publishes following documents containing annual electricity statistics.

2.3.1 All India Electricity Statistics – General Review

In General Review-2014, Nationwide 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 indicate the above information Statewise/ Sectorwise/ Category wise/Modewise etc. In addition, the information on captive generation by about 4059 Nos. HV/EHVindustries are also compiled indicating installed generating capacity and generation by such captive plants. General Review - 2014 containing data for the year 2012-13 was published in May 2015.

2.3.2 Growth of Electricity Sector in India

Publication titled "Growth of Electricity Sector in India from 1947-2015" was published in April, 2015 containing data for 2012-13 and provisional /estimated data for 2013-14 & 2014-15 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, Uprating and Retirement of Installed Capacity of Stations

A Standing Committee is constituted under the chairmanship of Member (Planning) for considering the proposals of de-ration, up-ration & 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 de-ration, up-ration or retirement of the units. During the year 2014-15, various proposals of de-ration, retirement of the generating units were considered by committee and recommendations for retirement of 4 Nos. thermal generating units with aggregate capacity of 162.5 MW were recommended for retirement.

2.5 Implementation of initiative of Working Group III on National Mission on Enhance Energy Efficiency (NMEE) for retirement of old and inefficient Thermal Units in 12th 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 inter-alia 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. A total of 2398MW was retired during 11th Plan. During 12th plan a total of 716.5 MW has been retired till 31 Mar 2015. As per the provisions of National Electricity Plan, a total of 4000 MW has been envisaged for retirement during 12th plan. It is anticipated that a balance of 3283.5 MW is expected to be retired during remaining three years of 12th plan period.

The list of thermal generating units retired by the standing committee during 2013-14 & 2014-15 is given below:

Sl. No.	Name of the Station & unit nos.	Installed capacity (MW)	Utility /Agency	year
1	Satpura U - 2	62.5	MPPGCL	2013 -14
2	Satpura U - 4	62.5	MPPGCL	2013 -14
3	Satpura U - 5	62.5	MPPGCL	2013 -14
4	Satpura U - 1	62.5	MPPGCL	2014 -15

2.6 Crisis & Disaster Management of Power Sector

A document titled "Crisis & Disaster Management Plan for Power Sector" has been brought out by CEA. The document is periodically updated by incorporating the comments/suggestions of various stake holders. It serves as a guide to all utilities involved in generation, transmission, distribution of electricity for formulating the Crisis and Disaster Management Plan for their infrastructure. National Policy on Disaster Management emphasise integrated and holistic approach towards disaster management with emphasis on building strategic partnerships at various levels. Keeping in line with the policy, Standard Operating procedure (SOP) for "restoration of power" was incorporated in National response plan as Power stations constitute critical infrastructure of any country.

As part of disaster preparedness and also keeping in line with the directives of Secretary (Security), Cabinet Secretariat, CEA have issued advisories to utilities to conduct Mock drills. The Mock drill exercises for various scenarios include Black Start and Grid Restoration, Fire, Terrorist threats, Flooding, Land slides,

various chemical and gas leaks, etc. which have been considered to be of prime importance by utilities on account of their vulnerabilities. The details of Mock Drills along with recommendations of the emergency are studied and quarterly reports in this regard are submitted to Ministry of Power to fulfill the objective of refining and to inculcate Disaster Preparedness for quick response.

2.7 Research & Development in Power Sector

2.7.1 R&D activities in Power Sector:-

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. Further, CPSUs like Bharat Heavy Electricals Limited (BHEL), and CPSUs of Ministry of Power like NTPC Ltd., Power Grid Corporation of India Limited (PGCIL), NHPC etc., also carry out R&D activities towards development of technology in areas of operational and application technologies keeping in view 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.

Apart from the above, the Government of India through Ministry of Power has supplemented the efforts of other organisations in the area of R&D through three central schemes namely, Research and Development Scheme under National Perspective Plan (R&D under NPP), Research Scheme on Power (RSoP) & In - house Research Scheme of CPRI. 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. A Standing Committee on Research & Development (SCRD) under the Chairmanship of Chairperson, CEA was constituted to prepare the National Perspective Plan (NPP) for R&D in Indian Power Sector with a view to make an R&D road map for 15 years (upto 2016-17) and provide a standing forum for R&D in the Power Sector. The NPP covers the vision on R&D, areas of research, fund requirement likely benefits, policy and HRD challenges faced by the Power Sector to cater to the need of rapidly changing technology and resource constraints in the country. The NPP schemes are mainly collaborative in nature and are intended to promote innovation by sharing experience and expertise, forge Industry Institute cooperation on cutting edge towards strengthening 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 utilities level, involving academia and the industry. In-house Research Scheme of CPRI constitutes 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.

2.7.2 R&D Schemes being implemented under the Aegis of MoP:

Ministry of Power has approved an outlay (under XIIth Plan) of Rs.45 crores for R&D schemes under NPP, Rs.20 crores for Research Scheme on Power (RSoP) and Rs, 15 crores for In-house Research Scheme of CPRI, totalling to Rs,80 crores.

A. Research & Development Scheme under National Perspective Plan (R&DNPP)

a. The objective 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 manpower for R&D in the 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.

c. NPP Project Proposals – Implementation & Monitoring:

While formulating the National Perspective Plan for (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. 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.

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 organisations.

Central Power Research Institute is the nodal agency to coordinate the proposals received under Research & Development Scheme under National Perspective Plan. The grants from MoP are disbursed through CPRI. On receipt of Proposals various Task Force Committees thoroughly examine the proposals.

Status of NPP Schemes:

i) A total of 8 proposals under NPP scheme were completed during 11th Plan period.
ii) A total of 4 numbers of proposals under NPP scheme under 11th Plan are still continuing in 12th Plan and are at final stage.
iii) 2 proposals are recommended under 12th Plan period while 33 proposals are under review.

B) Research Schemes on Power (RSOP):

Apart from NPP, there is another scheme such as Research Scheme on Power (RSoP) under which MoP provides grant to

R&D Schemes. These schemes are coordinated by CPRI.

During XIth Plan 35 proposals were undertaken out of which 25 are completed and 10 proposals are still being implemented by CPRI, IITs and other Governmental / non-Governmental agencies. As and when such proposals and their status reports on implementation are received, CEA examines the same critically in terms of their technical & financial viability.

During the year 2014-15, a total number of 15 proposals (out of 41 proposals received) were short listed for the approval of Expert Committee on Research Scheme on Power (ECRSoP).

C) In-house R&D Scheme of CPRI

Under this Scheme various Divisions and Units of the CPRI take up Research Projects under the In-house R&D scheme for which fund is provided by Ministry of Power, Government of India. These schemes are fully funded by Ministry of Power. The scheme is aimed at:-

- Augmentation of Research and testing facilities.
- Improvements /New techniques in testing /Diagnostic methods /Research studies.
- Product /Process Improvements.
- Improvement in product standardization.

During XIth Plan there were 34 proposals with an estimated cost of Rs.15.12 crores out of which 27 proposals are completed with an estimated cost of Rs.10.36 crores and 7 proposals are on-going with an estimated cost of Rs.4.75 crores.

During the year 2014-15 total number of 13 proposals (out of 24 proposals received) were approved by the Committee on Research (CoR) with a total outlay of Rs. 746.25 Lakhs.

2.7.3 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.

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

(i) R&D Project in Power Sector; and
(ii) Development of Human Resource relevant to the need of Power Sector. The MoU has since been revised to further strengthen R&D initiative in CEA relevant to the need of Power Sector. The revised MoU has been signed between IIT, Delhi & CEA in July, 2013.

Under the obligation of MOU, two officers, one for M.Tech. and another for PhD have been recommended for admission in the academic year 2015-16 at IIT, Delhi.

2.7.4 Expert Committee for R&D in the Power Sector

In order to synergise the Research& Development (R&D) activities being carried out by the various

Government organisations/ CPUs/ Societies in the power sector and to formulate an action plan for giving fillip to R&D in the power sector, an Expert Committee was constituted by Ministry of Power on 16th December, 2013. The Expert Committee was headed by Chairperson, CEA including Member(Planning), CEA as one of the member of the committee and also members from other organisations / institutions viz., IIT, Kanpur, IIT,Mumbai, IIT,Delhi, Indian Institute of Science,Bangaluru, NETRA(NTPC), PGCIL, BHEL, NHPC, CPRI and DSIR.

The Terms of Reference of the Expert Committee were as under :-

i. To review the R&D efforts being carried out in the field of Power Sector by Government organistaions, CPSUs. /Societies, etc.
ii. To assess the adequacy of the existing R&D infrastructure in the Power Sector and to assess requirement of establishment of a new / up gradation of the existing institutions, for R&D in the Power Sector.
iii. To suggest measures to scale up R&D in the Power Sector in the country.
iv. To suggest measures for aligning thrust areas of R&D in the Power Sector for the R&D activities undertaken by the Government Organisation, CPSUs /Socieities.
v. To evolve effective mechanism for inviting, evaluating /monitoring of proposals /projects and for utilisation of the research outcomes for the Power Sector in the country.

The Expert Committee submitted its report to MoP in June, 2014 and the following major recommendations were made:

i. Inviting quality R&D projects
ii. Intellectual Property Rights Policy
iii. Involvement of end user in research schemes
iv. International Collaboration
v. Support for indigenously developed products.
vi. Human Resource requirement for R&D
vii. Developing of Digital Libraries
viii. Restructuring of CPRI
ix. Inter Sector Collaboration
x. Creation of National Web Portal on R&D
xi. Modification of existing process of inviting /evaluation/approval of MoP funded Research schemes

The recommendations of the Expert Committee are under implementation. The Methodology of approval & constitution of various committees of R&D have been modified. Under new methodology, all the R&D proposals under In-house Scheme of CPRI, RSoP & NPP would now be scrutinised by two External Experts. Thereafter it would be examined by Technical Committee of the specific area. The proposals recommended by Technical Committee would then be deliberated upon and considered by DG, CPRI for the projects costing Rs. 50 lacs or below under RSOP and IHSRD for recommendation to MoP & projects abovce 50 lacs under these two schemes as well as all projects under NPP would be considered by Standing Committee on R&D for final recommendation to SFC of MoP. The process of examination & recommendation would be uniform for all the three schemes. The overall coordination would be done by CPRI as earlier. The constitution of SCRD has been modified to include more experts from different fields.

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 Energy programme (IGEN) is being implemented jointly by M/s GIZ and CEA with the objective to promote energy efficiency and energy conservation in coal fired Thermal 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 carried out and "Guidelines for Auditing of Pulverised Coal/Lignite fired TPS" were prepared and circulated amongst power utilities.

Under Phase II of Indo German Energy Programme (IGEN) (October, 2009 – June, 2015) the following activities were carried out:-

a) 40 numbers of lifetime licenses of Ebsilon Professional diagnostic Software along with laptops were provided to 15 Thermal Power Generating Utilities in various states. Interactive Sessions of CEA, Steag and Power Utilities Engineers for preparing mapping reports using Ebsilon software under IGEN Phase-II activity were conducted. Further a MoU was signed with BEE and additional 15 numbers of Ebsilon Software were distributed to state power utilities on 21st August, 2014.
b) 100 Engineers of state power utilities/CEA were trained for using Ebsilon Professional diagnostic software.
c) Under Model Power Plant concept the mapping activities of unit, implementation of efficiency enhancing measures and adoption of best O&M practices were undertaken at Bhusawal TPS, Mettur TPS, DSTPS & Giral TPS.
d) The state of the art Boiler Performance Optimisation system was installed at 250 MW unit of Suratgarh TPS. The system is in operation in closed loop mode for soot blowing in boiler.

2.8.2 Excellence Enhancement Centre for Indian Power Sector

Under the Indo-German Energy Forum the "Excellence Enhancement Centre for Indian Power Sector" (EEC) was set up in February, 2012.

EEC was 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 (TPE&CC), CEA – Member Secretary
(v) Secretary, CBIP – Member and Treasurer
(vi) MD EEC – Member
(vii) Director (Tech), NTPC – Member
(viii) Shri D.K. Jain, Ex-Director (Tech), NTPC – Member
(ix) M.D., M/s. Steag Energy Pvt. Ltd. - Member

The following technical proposals have been taken up by EEC:

1. Excellence Enhancement Center (EEC) and M/s. NTPC Ltd. have signed an MoU for a joint research project on Computational Fluid dynamics (CFD) Modelling of ESP in one of the generating unit of 500 MW at Ramagundum STPC of NTPC.
2. Two expert groups have been constituted- one for carrying out technical study on combustion optimization in thermal power plants and other group to advise EEC Governing Body on technical matters.
3. A document on "Compendium of best practices in Coal Based Thermal Power Plants" indicating the best practices and procedures as adopted in power utilities of Thermal Power Plants in Germany has been prepared.
4. Technical study on Combustion optimization for coal based plants has been taken up.
5. The proposal survey and study for development of Guidelines for optimisation of water & waste water usage in coal based Thermal Power Plants under RSOP project has been submitted to CPRI, Bangalore as research project for consideration.
6. EEC organized a Conference Workshop on **"**Environment friendly Technologies for Indian Power Sector-CFBC Boiler/ Coal Blending" on 14th November, 2014 at New Delhi. Wherein 50 participants from Center/State power utilities, IPPs and power equipment manufacturers participated.

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 (CO_2).

Central Electricity Authority (CEA) has been publishing a CO_2 database for all Grid connected Power stations in the country since 2006. The objective of this database is to provide the consistent and accurate quantification of CO_2 emissions baseline by CDM project developers in the Indian Power sector. The latest version 10.0 of this document for the year 2013-14 has been uploaded on CEA website www.cea.nic.in in December, 2014.

2.8.4 Environment aspects of electricity generation

CEA collected and compiled the monthly environmental data related to various emissions for the year 2014-15 for thermal power stations in operation. The power stations where stack emissions exceeded the stipulated norms were pursued to take suitable remedial measures viz. retrofitting of ESP etc. so that such emissions are brought within the prescribed norms.

2.9 Performance Awards in Power Sector

2.9.1 Comprehensive Award Scheme for Power Sector

An award scheme was introduced by the Ministry of Power in 1983 for recognizing the meritorious performance of thermal power stations. The scheme was modified over the years in view of evolving requirements. In 2004-05, Comprehensive Award Scheme was introduced by the Ministry of Power covering various facets of power sector with the objective of developing a spirit of competition among the generating stations in thermal, hydro and nuclear generation, transmission & distribution utilities in operation & maintenance and early completion of thermal, hydro and transmission projects. To promote, encourage and recognize the efforts of rural distribution franchisees, an award was introduced in 2007-08. Recognising the need to promote environment protection, a category of award was introduced in 2008-09 to be given to best performing coal/lignite-based thermal power station for environment management. Keeping in view the technological developments in equipment and machinery, construction techniques of power projects and transmission lines, recognizing need to promote environmental protection, to further encourage them to improve performance in operation, huge capacity addition including super critical units, the revised comprehensive award schemes were approved by Ministry of Power for the year 2013-14 onwards. In the revised scheme, two awards for Performance for Thermal Power Stations, three awards for Early Completion of Thermal Power Projects and two awards for Performance for Nuclear Power Stations have been added for the year 2013-14 onwards. The comprehensive award scheme inter-alia aims at encouraging personnel engaged in the power utilities to improve their efficiency & productivity and show better results.

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 2013-14

Based upon the data/inputs furnished by various power utilities, the national awards for power utilities for meritorious performance during the year 2013-14 were presented by Hon'ble Minister of State (I/c)

for Power, Coal and New & Renewable Energy during the function held on 03.06.2015. The lists of Awardees are given at **Annexure -2A**.

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

One environment management award for coal/lignite based thermal power stations was introduced in 2008-09 to promote best strategy and management of environmental issues by coal/lignite based thermal power stations. 38 TPSs have participated and furnished information on various environmental parameters such as CO_2 emission, SPM emissions at stack, Fly Ash Utilization and Effluent Discharge etc. for 2013-14. Based on the evaluation carried out, Budge Budge TPS (750MW) of M/s. CESC was recommended for the Environment Management Award.

2.9.4 National Energy Conservation Awards 2014

MoP gives National Energy Conservation Awards every year to encourage, motivate as well as give recognition to energy intensive Industrial Sectors and other establishments, who have taken extra efforts to reduce energy consumption while maintaining the production levels. This award 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 award scheme started in 1992 on National Energy Conservation Day. Chief Engineer (C&E), CEA is a member of Technical Sub-Committee to finalise awards. During the year 2013-14 proposals received from six industrial sectors viz. Aluminium, Automobile, Dairy, Fertiliser, Textile, and Thermal Power Stations were evaluated by CEA. The awards to the best performing companies in each of the above six sectors were given on National Energy Conservation Day function held in New Delhi on 14th December, 2014.

2.10 Fuel Management and Analysis

Central Electricity Authority (CEA) plays a pivotal role in supply and optimal utilization of available coal for the power sector. It also assisting rationalization of transportation of coal through Rail transport network. In addition to management of coal supply/ movement, CEA monitors supply of Gas to Gas based power station in a gas scarcity scenario. Due to initiatives taken by CEA, a significant capacity addition of 19362.5 MW have been added to the coal based installed capacity, i.e. 13.3% increase over the previous year i.e. 2013-14. 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 2014-15, CEA estimated a coal requirement of 594 Million Tonne (MT). Out of this, requirement of domestic coal was estimated as 554 MT. Against this requirement, the availability of domestic coal was ascertained around 473 MT. In order to bridge the gap between the demand and the domestic availability of coal, the power utilities were advised to import 54 MT coal. Apart from this, 40 MT imported coal was envisaged for power stations designed on imported coal.

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 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 2014-15, hundred 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 2015, coal stock at 12 power stations was having coal stock less than 7 days and amongst these 06 were having coal stock less than 4 days. All India coal stock position as on 31st March 2015 was 26.1 Million Tonne equivalent to 18 days of consumption against the normative level of 22 Days. In order to bridge the gap between demand and availability of coal, Power Utilities were advised 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 and inadequate availability of railway rakes . During the year 2014-15, CIL have supplied around 385.7 MT against a target of 405 MT i.e. 95%.

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 2014-15

2.10.2.1 Coal Availability during the year

For the year 2014-15, coal based generation target was 784.2 BU and accordingly the requirement of coal for the year was estimated to be 594 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 405 Million Tonne coal, in addition to this, 35 MT of coal was assessed from SCCL and 33 MT from captive mines (Bengal Emta, Kemta, ICML, Panem, DVC Emta and Raigarh).

Figures in MT

S. No	Description	2014-15
1.1	Coal requirement for plants designed on domestic Coal	554
1.2	Coal requirement for plants designed on imported coal	40
1.3	Total	594
2.	Coal Availability from domestic sources	
2.1	From CIL Sources	405
2.2	From SCCL	35
2.3	From captive Mines	33
2.4	Total coal availability from domestic sources	473

3.	Shortfall of domestic coal (1.1 – 2.4)	81
4.1	Coal to be imported to meet the shortfall for plants designed on domestic coal	54
4.2	Coal requirement for plants designed on imported coal	40
	Total Import	94

2.10.2.2 Comparative Coal Supply Position for the years 2012-13, 2013-14 and 2014-15

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

(Million Tonne)

STATUS	YEAR		
	2012-13	**2013-14**	**2014-15**
Demand	500	548	594
Availability#	407	441	473
Receipt (domestic coal)	410.2	418.1	461.6
Receipt (Imported coal)	63.2	80.0	91.2
Total Receipt (including Imported Coal)	473	498.1	552.8
Opening Stock (includes Imported coal)	15.6	20.7	22.8
Consumption (includes Imported coal)	454.6	489.4	531.5
Closing Stock@ (includes Imported coal)	20.7	22.8	29.5

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

Coal availability from domestic sources only.

2.10.2.3 Source-wise Receipt of Coal duringthe year 2014-15

During the year 2014-15, source wise break up of coal receipt at the power stations is given below:

(Million Tonne)

	Target/ estimation (MT)	**Actual Receipts (MT)**	**%Receipts**
CIL*	405	384.2	94.9
SCCL	35	39.2	112
Captive Mines	33	31.9	96.7
E auction	0	6.3	
Total (Domestic)	473	461.6	97.6
Import	94	91.2	97
Total	**567**	**552.8**	**97.5**

2.10.2.4 Import of the coal during the year 2014-15

During the year 2014-15, against a import target of 54 MT coal, the power utilities had imported around 48.5 Million Tonne of coal. In addition to above 42.7 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 2014-15

Fig in MT

Sl. No.	Board/Utility	Annual Target of Imported Coal	Coal Imported 2014-15	% Receipt
	1	2	3	4
POWER PLANTS DESIGNED ON INDIGENEOUS COAL				
1	HPGCL	1.000	0.947	95
2	RVUNL	0.250	1.610	644
3	UPRVUNL	0.500	0.000	0
4	MPGCL	1.500	0.376	25
5	Torrent AEC	0.400	0.555	139
6	GSECL	1.500	1.106	74
7	MSPGCL	3.500	2.316	66
8	Reliance	0.600	0.753	126
9	AP GENCO	3.000	1.652	55
10	TANGEDCO	4.500	7.646	170
11	KPCL	1.700	0.916	54
12	DVC	2.500	0.000	0
13	CESC	0.300	0.307	102
14	WBPDCL	1.000	0.000	0
15	NTPC	16.600	16.182	97
16	NTPC(JV)IndGandhi	1.500	0.649	43
17	Reliance (Rosa)	2.000	2.205	110
18	TATA(MAITHONRB)	0.000	0.006	
19	JPL(M. Gandhi)	2.600	0.803	31
20	LANCO(Anpara)	1.500	0.564	38
21	STERLITE ENERGY (Jhasuguda)	1.000	0.296	30
22	J P BINA	0.000	0.082	
23	VEDANTA (Star.)	1.000	0.115	12
24	NTPC(JV) VELLUR	1.800	1.698	94
25	ADANI(Tirora)	2.250	2.326	103
26	NABHA Power	1.000	0.517	52
27	MOSER BEAR	0.500	0.000	
28	Emco Energy	0.000	0.430	
29	NTPC SAIL	0.000	0.456	
30	GMR Kamalanga	0.000	0.559	
31	KAWAI	0.000	3.184	
32	BUTUBURI	0.000	0.284	
	Sub Total	54.000	48.540	90
POWER PLANTs DESIGNED ON IMPORTED COAL				
33	TROMBAY	2.300	2.043	89
34	JSW ENERGY	6.000	6.268	104
35	ADANI POWER*	12.500	14.805	118
36	UDUPPI	3.000	2.698	90
37	MUNDRA UMPP	11.000	10.489	95
38	ESSAR SALAYA	3.000	2.997	100
39	SIMHAPURI	1.000	2.296	230
40	THAMNA PATNAM	0.600	1.104	184

41	IND BARATH(Tuticorin)	0.600	0.000	
	Sub Total	40.000	42.700	107
	TOTAL	94.000	91.240	97
* Includes Mundra Stage - III (1980 MW) designed on 70 domestic: 30 Import basis.				

2.10.2.5 Generation Loss

During the year 2014-15, Power Utilities reported generation loss of 2.7 BU as compare to 8.1 BU previous year i.e. 2013-14, due to shortage of coal.

2.10.2.6 Specific Coal Consumption

Specific coal consumption of power plants designed on domestic coal during the year 2014-15 was 0.68 Kg/Kwh as compared to 0.69 Kg/Kwh during the year 2013-14 This improvement was basically due to improvement in quality of &increase in consumption of imported coal.

2.10.2.7 Coal Quality Issues

Quality of coal is a matter of concern by power utilities. Third party sampling which has been introduce since October, 2013 at loading point could not address quality issue. Ministry of coal had introduced Gross Calorific Value (GCV) based system of grading of coal w.e.f. January 2012. It was observed that after GCV based system of grading of coal, multiple grade slippages are reported .Apart from this it was observed that supply of oversized/ uncrushed coal along with 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 borned 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 vigorous monitoring / interaction with Ministry of Coal , Railways, Coal India Limited and Power Utilities by CEA coal stock i.e. 26.1 MT could be built up on all India basis against 20.3 MT as compared to previous year.
2) Coal linkages to the power plants have been rationalized. This has resulted in considerable saving in the cost of coal transportation as well as improvement in coal and railway rake availability .
3) During the year 2014-15, Power Utilities reported a generation loss of 2.7 BU as compare to 8.1 BU previous year i.e. 2013-14 ,due to shortage of coal which: i.e. reduction of 67% as compare to previous year.
4) During the year 2014-15 as against coal based generation programme of about 784.2 Billion Units (BU), actual generation was around 800.3 BU i.e. 102.1% of the programme and a growth of around 12.1% during the same period last year.

2.10.2.9 Estimated Coal Requirement for the year 2015-16

For the year 2015-16, CEA has estimated the total coal requirement for the year as 611 MT comprising of 569 MT

domestic coal for power stations designed on domestic coal and 42 MT for the power stations designed on imported coal. The total coal availability from domestic sources is expected to be around 505 MT resulting in a shortfall of 64 MT of domestic coal. The Power Utilities, therefore, were advised to import around 42 MT to meet the shortfall.

2.11.1 Gas supply to Gas based Power Stations

Out of total 271722 MW installed generating capacity in the country as on 31st March 2015,. CEA monitored the supply of gas to 56 gas based power stations totaling to a capacity of 21665 MW (excluding liquid fuel based power plants) using gas as the primary fuel. Apart from this, report on Annual Secondary Fuel Oil Consumption (SFOC) for Coal/Lignite based thermal power stations was also compiled.

2.11.2 Gas Requirement and SupplyPosition

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 was not fulfilled. Supply of gas to gas based power plants since 2000-01 had been as under:

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
14	2013-14	**20385.27**	97.9	27.13	70.8
15	2014-15	**21665**	104	25.2	64.3

* 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
10.	2013-14	51.78
11	2014-15	55.8

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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 31-03-2015 was 45850 MW. Recently, the Southern Region has also been synchronously interconnected with rest of the Nation Grid.

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), 13700 MW of inter-regional transmission capacity has been added, taking the total inter-regional transmission capacity (at 132kV 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 three year of the 12th plan, viz., 2012-15, another 18100 MW capacity was added.

Details of the existing inter-regional transmission capacity added up to 31.03.2015 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), POSOCO, representative of Central Sector Generating companies and Regional power Committee. The interstate 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 2014-15 :

Northern Region:

- 34th meeting of the Standing Committee on Power System Planning of Northern Region held on 8th August, 2014 at NRPC, New Delhi.
- 35th meeting of the Standing Committee on Power System Planning of Northern Region held on 3rd November, 2014 at Dehradun, Uttrakhand.

Eastern Region:

- 1st - 2014 Standing Committee Meeting / 16th Standing Committee Meeting on Power System Planning in Eastern Region held on 02.05.2014 at NRPC, New Delhi.

Western Region:

- 37th Meeting of the Standing Committee on Power System Planning in Western Region held on 05.09.2014 at Mumbai.

Southern Region:

- 37th Meeting of the Standing Committee on Power System Planning in Southern Region held on 31st July, 2014 at NRPC, New Delhi.
- 38th Meeting of the Standing Committee on Power System Planning in Southern Region held on 7th March, 2015 at NRPC, New Delhi.

North Eastern Region:

- 4th Meeting of Standing Committee on Power System Planning of North Eastern Region held on 13th December, 2014 at Brahmputra Hotel, Guwahati, Assam.

The transmission systems firmed-up in these meetings are given in **Annexure – 3B**.

3.4 Empowered Committee on Transmission

3.4.1 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 13-4-2006 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. The Empowered Committee on transmission has been re-constituted by Ministry of Power, Government of India vide Office Order dated 13th December, 2013. The Committee is chaired by Member (Power System), CEA and consists of Member (E&C), CEA, Director (Transmission), Ministry of Power, Director (Projects), PGCIL, Advisor (Energy), Planning Commission and two Expert from power sector.

Ministry of Power vide office order dated 4th March, 2015 have re-constituted the Empowered Committee on Transmission by replacing Director (Transmission) by Joint Secretary (Transmission) and also by replacing Advisor (Energy), Planning Commission by Advisor (Energy), NITI Aayog.

Also, Ministry of Power vide letter no. 10/89/2014-PG dated 16th July, 2014 has revised the procedure for allocation of Inter State Transmission Project(s) under Tariff Based Competitive Bidding (TBCB), which states that "For procurement of transmission

services, required for any inter-state transmission Projects, the Chairperson Central Electricity Authority has been authorized by MoP to allocate the Projects to BPCs on the recommendations of Empowered Committee. It will be open for Ministry of Power to review the nomination of BPC at any time."

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

At present, there are eighteen notified schemes that are under implementation by the Transmission Service Providers. In addition, there are thirteen 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 2014-15:

- 33rd Meeting of the Empowered Committee on Transmissionwas held on 30th September, 2014 at CEA, 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 concurrence by CEA

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

Northern Region:

i) Seli HEP by M/s SHPCL (4x100 MW)
ii) Chhatru HEP by M/s DSC (3 x 42 MW)
iii) Kiru HEP by M/s CVPP (4 x 165 MW)
iv) Jelam Tamak HEP by M/s THDCIL (3x36 MW)
v) Bowala Nand Prayag HEP by M/s UJVNL (3x100 MW)
vi) Sach Khas HEP by M/s L&T HHPL (3x86.67+1x7 MW)
vii) Luhri HEP by M/s SJVNL (3x196 MW)
viii) Kirthai –I by M/s JKPDC (4x95+1x10MW)
ix) Sawalkote HEP by M/s JKSPDC (6x225+1x56+2x225 MW)
x) Kwar HEP by M/s CVPP (4x135 MW)
xi) New Ganderwal HEP by M/s JKSPDC (3x31 MW)

Southern Region:
Nil

Eastern Region:

i) Dagmara HEP by M/s BSHPCL (17x7.65 MW)
ii) Chamkarchhu-I HEP in Bhutan by M/s NHPC (4x192.5 MW)
iii) Sankosh HEP in Bhutan by M/s THDC (8x312.5+3x28.33 MW)
iv) Arun-3 HEP in Nepal by M/s SJVNL (4x225 MW)

North Eastern Region

i) Attunli HEP by M/s A.HE Power Com. Ltd. (4x170 MW)
ii) Kamala HEP project (1800 MW)

3.6 Examination of DPR/FR of Transmission Works for processing of clearance by CEA

Eastern Region.

i) Detailed project Report (DPR) for availing Loan from Japan International Cooperation Agency (JICA) for Odisha Transmission projects
ii) Transmission and Distribution works for the area in and around Puri (Odisha)

iii) Transmission works for implementation as Externally Aided Projects (ADB Loan No. 2681-IND) and obtaining approval of DPR for Bihar

iv) Comprehensive Scheme for Strengthening of Transmission & Distribution System in North Eastern Region & Sikkim; (Sikkim Portion)-Modifications

North Eastern Region:

i) DPR for Installation of 2x12.5 MVA 132/33 KV S/S at Moreh with associated 132 KV line in Manipur under NLCPR

ii) DPR for Construction of 4x105 MVA (single phase) 400/132/33 kV Substation at Thoubal in Manipur

iii) DPR for Construction of 400 kV D/C line from Yurembam to Thoubal via Nambol

3.7 Examination and appraisal of Transmission Schemes for approval under Section 68 of Electricity Act, 2003 during 2014-15.

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

Northern Region:

- Two number of 400kV bays at Bhiwani Substation
- Provision of series reactors in NR
- Installation of overhead lines under inter-regional system strengthening schemes in NR and WR.
- Augmentation of transmission capacity at Mainpuri and Sikar
- Creation of 400/220kV Substation in NCT of Delhi during 12th Plan Period
- Provision of 400kV bays for ATS of Tanda TPS
- Establishment of 220/66kV, 2x160 MVA GIS substation at Sec-47 ,UT Chandigarh along with 220kV D/C line from 220/66kV GIS substation at Sec-47 ,UT Chandigarh to 400/220kV Panchkula (PG) Substation by PGCIL .

Eastern Region:

- Eastern Region Strengthening Scheme –XV (ERSS-XV)
- Associated Transmission System for Nabinagar-II TPS (3x660MW)
- Transmission System associated Tilaiya UMPP (4000 MW) in Jharkhand
- Installation of overhead lines of the associated transmission system for the 1800 MW (3x600 MW) of Essar Power (Jharkhand) Ltd. (EPJL)
- Transmission System Strengthening in Indian system for transfer of Power from Mangdechhu Hydroelectric Project, Bhutan
- Eastern Region Strengthening Scheme-XIV (ERSS-XIV)

Western Region:

- Laying of over head transmission line for transmission system associated with Gadarwara STPS (2x800 MW) of NTPC (Part-A).
- Laying of over head transmission line for transmission system associated with Gadarwara STPS (2x800 MW) of NTPC (Part-B).
- Transmission system strengthening for Mundra UMPP.

Southern Region:

- Connectivity for Kundankulam 3&4 (2x1000 MW) with interstate transmission system.
- Constraints in 400kV bays extensions at 400 kV Vemagiri S/s.
- Connectivity lines for Maheshwaram (Hyderabad) 765/400kV Pooling Station.

- Common Transmission System associated with ISGS projects in Nagapattinam/ Cuddalore Area of Tamil Nadu- Part A.
- PGCIL schemes-
  (A) Substation works associated with System Strengthening in Southern Region for import of power from Eastern Region.
  (B) Substation works associated with Hyderabad (Maheshwaram) Pooling Station.
  (C) Wardha-Hyderabad link.
  (D) Common transmission system associated with ISGS projects in Vemagiri area of Andhra Pradesh Part-A.
- Green Energy Corridors (GEC) Inter State Transmission Scheme (ISTS) Part-A to C.

North Eastern Region:

- North Eastern Region Strengthening Scheme-II (NERSS-II) Part A
- North Eastern Region Strengthening Scheme-II (NERSS-II) Part B
- North Eastern Region Strengthening Scheme-III (NERSS-III)
- Radial Interconnection between India (NER) and Bangladesh -Indian Portion
- NER System Strengthening Scheme-IV (NERSS-IV)

3.8 Examination and appraisal of Transmission Schemes for approval under Section 164 of Electricity Act, 2003 during 2014-15.

Northern Region:

- Northern Region System strengthening NRSS-XXIX Scheme .
- Northern Region System strengthening NRSS –XXXI Part-B scheme.
- ATS of Unchahar TPS**.**

North Eastern Region:

- Nil.

Eastern Region:

- M/s Lanco Babandh Power Limited (LBPL)(2x660W) .
- Eastern Region System Strengthening Scheme –VI (ERSS-VI)
- Eastern Region System Strengthening Scheme (ERSS-VII)
- 400 kV D/c Transmission Line from LILO point at Belpahar to 765/400 kV Jharsuguda pooling station at Kenapally Sundergarh .
- Teesta VI - Rangpo Pooling Station (PG) 220 kV D/c (12.44 km) by Lanco Teesta Hydro Power Ltd.

Western Region:

- Part ATS of RAPP U-7 & 8 by RAPP transmission Company Ltd.
- LILO of 400 kV Dehgam-Pirana (PGCIL) Transmission Line at Nicol-2 substation of Torrent Power Limited.

Southern Region:

- System Strengthening in Southern Region for import of power from ER" by Vizag Transmission Ltd.
- Transmission System required for evacuation of power from Kudgi TPS (3x800 MW in Phase-I) of NTPC Ltd.

3.9 Cross-Border power exchange

3.9.1 Indo-Bangladesh Cross Border Interconnection & Power Trade

For cross-border power exchange between India and Bangladesh, a cross border electrical grid interconnection between India and Bangladesh through a

500MW HVDC asynchronous link at Bheramara (Western Part, Bangladesh) and Baharampur (India) – Bheramara (Bangladesh) 400kV D/C line along with establishment of 400kV switching-station at Baharampur(India) by looping in and looping out of Farakka-Jeerat 400kV Single circuit line has been developed and commissioned on 5th October, 2013. The Indian portion of the line was implemented by PGCIL (Powergrid Corporation of India Ltd.) and the portion within Bangladesh was implemented by PGCB (Power Grid Company of Bangladesh Ltd.). Government of India is supplying 250MW from various Central Generating Stations and Bangladesh also procures an additional 250MW from the Indian market through PTC.

In the 8th JSC/JWC meeting held on 9th-10th Oct., 2014 at New Delhi, it was decided that 100 MW power from Tripura would be supplied to Bangladesh through radial interconnection. In this connection, the following Cross Border Links has been planned for the radial interconnection:

Indian side (To be implemented by POWERGRID)

(i) Surjyamaninagar (Tripura) – Bangladesh border 400 kV D/C line (initially operated at 132 kV) - 27 km (Twin Moose Conductor)

Bangladesh side (To be implemented by BPDB / PGCB of Bangladesh)

(i) Indian Border- Comilla (North) 400 kV D/c line (initially operated at 132 kV)– 15 km (Twin Finch Conductor)

(ii) Comilla (North) - Comilla (South) 132kV D/c line – 16km

The above scheme is expected to be completed by Dec., 2015. The PPA for supply of 100 MW power yet to be finalised.

Further, to facilitate import of additional 500 MW power by Bangladesh from India through existing Baharampur (India) – Bheramara (Bangladesh) interconnection, system strengthening on Indian side and Bangladesh side has been approved in 8th JSC/JWC meeting held on 09-10th October, 2014 at New Delhi.

System Strengthening on Indian side (to be implemented by POWERGRID)

1) 400 kV Farakka - Behrampur D/C (HTLS) line (about 70 km.)
2) Removal of the existing LILO of 400 kV Farakka - Jeerat S/c line at Beharampur.
3) LILO of the above Farakka-Jeerat 400 kV S/c line at Sagardighi.
4) LILO of Sagardighi-Subhasgram 400 kV S/c line at Jeerat

System Strengthening on Bangladesh side (to be implemented by PGCB)

(i) Bheramara - Ishurdi 230 kV D/c line – 12 km.
(ii) Additional 500 MW HVDC back-to-back converter unit (2nd module) at Bheramara (Bangladesh).

The above scheme is expected to be completed by June 2017.

Further, a ±800kV HVDC Bi-pole line with multi-polar configuration from Rangia/Rowta in Assam to Barapukuria (Bangladesh) to Muzaffarnagar in Uttar Pradesh has been identified which would enable to supply of additional 500/1000 MW to Bangladesh at Barapukuria from HEPs in Arunachal Pradesh (India). Preparation of DPR has been undertaken.

3.9.2 Indo-Bhutan Cross Border Interconnections & Power Trade

India and Bhutan have terms of cooperation for exchange of power between

the two countries. Bulk of power generated at Hydro Electric Projects at Chukha (336MW), Kurichu (60MW) and Tala (1020MW) in Bhutan, is exported to India after meeting the internal demand of Bhutan. The associated cross- border transmission systems (ATS) for evacuation and transfer of power from these HEPs has been developed and is operated in synchronism with the Indian Grid.

Royal Government of Bhutan (RGoB) has embarked on to harness its huge hydro potential and identified about 75 nos. new HEPs by 2030 at various river basins. About 26534 MW hydro potential would be harnessed by 2030 and out of this, 10334 MW hydro power developments from 14 nos. HEPs have been envisaged to be implemented during 2020. Most of the future generation in Bhutan would be also exported to India, after meeting the internal demand of Bhutan. Considering the above scenario, RGoB has got the National Transmission Grid Master Plan (NTGMP) done for Bhutan through consultancy services given to CEA.

RGoB is in the various phases of developing over 10 GW hydro potential by 2020 of which Punatsangchhu-I (1200MW), Punatsangchhu-II (1020MW) and, Mangdechhu (720 MW) HEPs are ongoing Projects and ATSs are at various stages of implementation as per the NTGMP Plan. Associated cross-border transmission links are also under developmental phase.

3.9.3 Indo-Nepal Cross Border interconnection and Power Trade

3.9.3.1 Existing Cross Border Links

Power exchange between NEA and utilities on the Indian side namely BSPTCL, UPPCL and UPCL has since been taking place on the principle of catering to the power needs of isolated local areas of both of the sides of the border. There are presently about 12 cross border interconnections facilities in operation for bilateral power exchange through 11kV, 33kV and 132 kV transmission lines. The above State utilities export power to Nepal and the quantum of power exchange volume is limited to about 50 MW for which tariff is decided by the Power Exchange Committee (PEC).

In the 10th PEC meeting held on 14-15th Dec., 2011 in New Delhi, it was agreed that tariff at base level (33kV) from July 2011 to March 2012 would be INR 4.65 and rate for the period from April 2012 to March 2013 would be INR 4.91 (incl 7.5% additional at 11kV and 7.5% rebate at 132kV). It was decided that in case next PEC meeting is not held, the tariff would be escalated @ 5.5 % per annum from April, 2013.

India also supplies about 70 MU free power from Tanakpur HEP (120 MW) to Nepal under the Mahakali treaty through the 220kV Tanakpur-Mahendranagar S/C line.

Nepal also used to buy power to the extent of 20-25 MW from India market through PTC.

Further, under the medium term measure for supply of additional power of about 100 MW to Nepal, following system strengthening works are in the process of implementation by MEA through WAPCOS as consultant.

i) New 132 kV Katiya - Kusaha S/C on D/C line with Panther conductor
ii) New 132 kV Raxaul - Parwanipur S/C on D/C line with Panther conductor

The above lines are expected to be completed by Aug., 2015.

3.9.3.2 Status of the cross border 400 kV Muzaffarpur (India)- Dhalkebar (Nepal) D/C line to be initially

operated at 220 kV (Indian portion- 86.43kms by CPTC with share holders of PGCIL-26%,SJVNL-26%, IL&FS-38% & NEA-10%), Nepal portion-39kms by PTCN with share holders of NEA-50%, PGCIL-26%,HIDCL-14% & IL&FS-10%)

Agreements Signed

The Implementation and Transmission Service Agreement (ITSA) has been signed between Nepal Electricity Authority (NEA) and Cross Border Transmission Company (CPTC) and Power Transmission Company Limited (PTCN), Nepal. The respective Share holder agreement (SHA) for the Indian portion and the Nepal portion was signed in July'12.

Status of the Indian Portion (Cost of about Rs. 210 Cr.):

Indian portion comprising of 86.05 km is being implemented by CPTC and is expected to be completed by June 2015.

Status of the Nepal Portion (Cost of about Rs.90 Cr.):

Nepal portion comprising of 39.5 km is being implemented by PTCN and the line and the sub-station is expected to be completed by Nov., 2015.

Power Trading:

Power Sale Agreement (PSA) between NEA and PTC has been signed for import of 150 MW for 25years.

3.9.3.3 Constitution of Joint Working Group (JWG) and Joint Steering Committee (JSC) on Indo-Nepal Co-operation in Power sector

Pursuant to Article-V of Agreement between government of Nepal and Government of the Republic of India on Electric Power Trade, cross Border Transmission Inter-Connection and Grid Connectivity concluded on 21st Oct., 2014 at New Delhi, the JWG and JSC were constituted. The first meeting of JWG and JSC took place at New Delhi on 20th Nov. 2014.

3.9.3.4 Hydro Electric Generation Capacity addition Plan and Programme in Nepal and associated Transmission system requirements.

JWG and JSC in their first meeting held on 20th Nov., 2014 at New Delhi decided that a long term integrated transmission plan is required to be prepared for evacuation of power from the hydro power stations in Nepal and related Cross border inter-connections between the two countries. The perspective plan will cover the generations likely to come up by 2035 and a detailed action plan will be prepared for the projects coming up to 2025.

A Joint Technical Team (JTT) has been constituted comprising of experts from Nepal and India in this regard. The JTT will study the feasibility of new high capacity cross border transmission inter connections in a holistic manner corresponding to 10-15 years time frame and transmission grid master plan of Nepal.

3.9.3.5 Additional Cross Border Transmission link.

In the next 7-10 years, hydro power projects in Nepal such as Upper Marsyangdi (600MW) Upper Karnali (900 MW), Arun-III (900MW), Tamakoshi (800 MW) etc., are likely to be materialized. NEA would have huge surplus for export to India after meeting their internal load demand. In order to evacuate and transfer of power to India, additional high power density 400 kV AC

(Quad) cross border links in Upper Karnali-Berilly, Upper Marsyangdi – Gorakhpur, Arun-III- Muzaffarpur, Butwal-Gorakhpur corridors are being planned to be developed, matching with the commissioning of the above HEPs in Nepal.

3.9.4 India-Sri Lanka Cross-Border link/proposal

Memorandum of Understanding has been signed among Govt. of India, Govt. of Sri Lanka, PGCIL and Ceylon Electricity Board on 9th June 2010 for carrying out feasibility study for interconnection of India – Sri Lanka Electricity Grid. PGCIL, India and CEB, Sri Lanka has been appointed as executive agencies for the above project with 1000MW, ±400kV HVDC bi-pole line from India (Madurai) to Sri Lanka (Anuradhapura).

In a meeting between the officials of India and Sri Lanka regarding Feasibility Study for interconnection of India-Sri Lanka Electricity Grids on 28-29 May, 2012, it was decided that all possible efforts would be made to reduce the cost of the project so as to make it economically viable.

PGCIL/CEB has completed the technical study and various financial options. PGCIL is working on a revised proposal including the under sea cable connectivity to bring the cost down and make the project viable.

3.9.5 India - Pakistan Cross-Border link/proposal

At At present, no transmission link exists between India and Pakistan. Pakistan grid is at 500kV AC whereas the voltage adopted in the Indian grid is 400kV and 765kV AC.

For interconnecting India and Pakistan, an asynchronous link with a 400kV D/C AC inter-connecting transmission line between Amritsar (India) and Lahore (Pakistan) with 500MW HVDC back to back converter station at Lahore (Pakistan) has been identified.

In the third meeting of the Expert Groups between the two countries was held on 5th March 2014 in New Delhi. The proposal for establishment of the above link was inter alia discussed bilaterally.

3.9.6 India – Afghanistan Cross-Border link/proposal

PGCIL has constructed 220 kV D/C Kabul – Pul-e-Khumri transmission line and also 220/110/20 kV Chimtala Sub-Station in Afghanistan. The project was commissioned on May, 2009. All the works pertaining to 220 kV D/C Kabul - Pul-e-Khumri transmission line and also 220/110/20 kV Chimtala Sub-Station in Afghanistan have been completed to the satisfaction of DABS, Afghanistan and the assets have been taken over by MEW, Afghanistan in the month of March 2012.

Further, for construction of 220/20 kV Doshi and Charikar substations in Afghanistan, award was placed on M/S BHEL by PGCIL on December, 2011. The project is expected to be completed by September, 2015.

3.9.7 India – Myanmar Cross-Border link/proposal

Power Supply of 2-3 MW to Myanmar

Supply of 2-3 MW power would be from 33/11 kV Moreh S/S, Manipur, India to Myanmar. A dedicated 11 kV feeder from 33/11 kV Moreh S/S to India-Myanmar border would be constructed by MSPDCL. The boder point would be mutually decided by MSPDCL and ESE.

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3.10 Miscellaneous works

3.10.1 Technical Appraisal and vetting of PGCIL projects costing more then Rs 1000 crore

1. Installation of Stat COM in Western region-Estimated cost Rs.1136.54 cr. including IDC of Rs. 68.38cr. at Aug 2013 Price level.
2. Inter regional system strengthening scheme in WR-NR (Part –B)-Estimated cost Rs. 6395.16 cr. including IDC cost of Rs. 391.89 cr. at Feb. 2014 Price level.
3. Wardha- Hyderabad 765kV link – Estimated cost Rs 3541.22cr including IDC cost of Rs. 233.40 cr. at Feb. 2014 Price level.
4. Green Energy Corrdors- Part A – Estimated cost Rs. 1374.80 cr. including IDC of Rs. 57.79 cr. at Feb 2014 Price level.
5. Green Energy Corrdors- Part B – Estimated cost Rs. 3724.21 cr. including IDC of Rs. 217.16 cr. at Feb 2014 Price level.
6. Green Energy Corrdors- Part C – Estimated cost Rs. 2356.02 cr. including IDC of Rs. 138.20 cr. at Feb 2014 Price level.
7. Interconnecting lines from North Karanpura STPP to the Pooling Station at Ranchi and Gaya – Estimated cost Rs. 1166.70cr. including IDC of Rs. 85.78 cr. at June 2014 Price level.
8. Creation of 400/220kV substation in NCT of Delhi – Estimated cost Rs. 1392.36cr. including IDC of Rs. 72.28 cr. at October 2014 Price level.

3.10.2 Examination of DPRs of Transmission projects of Foreign Countries for Appraisal

(i) Line of Credit project for US$ 52 million for power transmission project in Togo for setting up of 161kV transmission lines.

(ii) Power transmission and distribution project in Republic of Liberia at a cost of US$ 144 million.

(iii) Power Transmission improvement project in Kenya at a cost of US$ 61.6 million.

(iv) Power transmission line project in Lao PDR at a cost of US$ 75.0 million.

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

3.11.1 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 including for finalizing the power evacuation system for Ghatampur TPS (3x660 MW), Uttar Pradesh.

3.12 Examination of EFC/PIB Memos

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

3.13 Consultancy services and assistance to various utilities

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

220kV and 132kV Transmission System covered under Hon'ble Prime Minister's Reconstruction Plan (HPMRP) which includes number of Transmission Lines and Substations of 220kV and 132kV voltage levels.

(ii) **Damodar Valley Corporation:**

Design of 220kV and 33kV multi circuit (4 circuit) Towers.

(iii) **Assistance to CPRI**

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

a) Upgradation of Short circuit Test Facilities including Addition of 2500 MVA Short Circuit Generator at CPRI, Bangalore.
b) Establishment of new testing facilities and augmentation of existing CPRI facilities at different locations.

(iv) **Transmission System for Mangdechhu HEP, Bhutan**

As a part of consultancy work various documents, drawings, test reports, bill of material, guaranteed technical particulars, soil investigation reports, vendor documents, Proto assembly inspection reports, tower schedules and profiles, Manufacturer Quality Plan, Sag Tension calculations, Price Variation Clauses etc pertaining to the project were examined. CEA officers were deputed for factory inspection of tower material. Co-ordination meetings between BPC & WAPCOS were held to discuss various issues related to the project.

(v) **India-Nepal Power Transmission Inter Connection Strengthening**:

CEA is rendering consultancy service to WAPCOS Ltd. (A Govt. of India Undertaking) as Project Manager-cum- Consultant(PMC) for strengthening of India-Nepal Power Transmission Inter-connection funded through Ministry of External Affairs(MEA), Govt. of India.

During the year 2014-15 tenders for transmission lines and bay extension work at substations for strengthening of India-Nepal Power Transmission Interconnection were floated. Technical and financial evaluation of tenders received from various contractors were examined/ evaluated by CEA.

3.13.1 Representation / Nomination in the Committees

(a) A The Standing Committee constituted as per provision of Electricity Act taking representation from various power utilities in the Country, under the Chairmanship of Chief Engineer(SETD), investigates causes of failure and suggests 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

Standing Committee meetings are organized on regular basis to discuss the failures intimated by various power utilities and remedial measures to minimize such failures in future are recommended.

(b) SETD officers are represented in

(i) Various Committees of CBI&P 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 arrestor, switchgear, transformer,

HVDC, power electronics, high voltage engineering, battery etc.)

(iii) CE(SETD) represents CEA on Electro-technical Division Council and Indian National Committee-International Electro-technical Commission.

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

3.14.1 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 were carried out. On request from RRVPNL, assessment of causes of failure of 132kV lines was also taken up.

Failure of towers of various transmission lines of 765kV, 400kV, 220kV and 132kV voltage class (765kV-31 No. of towers, 400kV-53 No. of towers, 220kV-68 No. of towers & 132kV-10 No. of towers) of various utilities intimated to CEA viz. Powergrid, RRVPNL, DTL was investigated. Out of the total 28 cases of tower failures of various utilities, 6 were of 765kV, 8 were of 400kV, 10 were of 220kV and 4 were of 132kV levels. Standing Committee had met to discuss tower failure of above transmission lines and gave its recommendations. Separate reports on DTL lines, RRVPNL lines and a common report of all lines were prepared and sent to utilities for taking follow up actions on the recommendations.

3.14.2 Substation Equipment

a) As a part of activity of "Standing Committee of Experts to Investigate the Failure of Equipment at 220 kV and above Substations", investigation in respect of 8 nos. transformers, 26 nos. lightning arresters, 14 nos. PTs/CVTs, 13 nos. CTs, 11 nos. circuit breakers and one no. wave trap of the various utilities such as BBMB, PGCIL, APTRANSCO, TANTRANSCO, MPPTCL, RVPNL, KPTCL, KPCL, CSPTCL etc. was carried out, meeting of Standing Committee was conducted on 26.06.14 & 09.01.15 and recommendations of the Committee were sent to the concerned utilities.

b) Officers of SETD Division visited Bamnauli substation of DTL and Bawana Power Plant of Pragati Power Corporation Ltd. in Delhi for investigating the causes of failures of 400 kV XLPE cables (straight through joints and termination joints) and 220.6 MVA, 400/16.2 kV Generator Transformer respectively, prepared the report and sent to concerned utility.

3.15 Emergency Restoration System (ERS) requirement:

After HUD HUD cyclone in Andhrapradesh, requirement of ERS for various power transmission utilities was assessed for early restoration of transmission lines under such devastating situation. Utilities were directed to take necessary action for procurement of such assests as early as possible and number of utilities have already initiated the action for procurement of ERS for their transmission system.

3.16 Seminar on New Generation High Performance Conductors

A National Seminar on "New Generation High Performance Conductors" organized by IEEMA in association with CEA was held on 04.12.2014 in Delhi for the benefit of power utilities and organizations in the Country. About 200 delegates had attended the seminar.

3.17 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 to ensure evacuation of power from new Generating Stations as well as to strengthen the existing network required for transmission of power to load centers.

For the year 2014-15, an RFD programme for commissioning of 20,882 Ckm of transmission lines comprising of 6551 Ckm of 765 kV, 9112 Ckm of 400 kV and 5219 Ckm of 220 kV transmission lines was envisaged.106% of this target had been achieved by Commissioning 22,101 Ckm of transmission lines, whose break-up is 7548 Ckm of 765 kV , 9992 Ckm of 400 kV and 4561 Ckm of 220 kV.Details of Transmission lines Commissioned/completed during 2014-15 are given in **Annexure-3E**.

In respect of transformation capacity for the year 2014-15, RFD programme was to add 47,871 MVA of transformation capacity comprising of 30,000 MVA at 765 kV, 9340 MVA at 400 kV and 8531 MVA at 220 kV. 137% of this target had been achieved by Commissioning 65,554 MVA capacity comprising of 38,500 MVA at 765 kV, 14,970 kV at 400 kV and 12,084 at 220 kV. Details of Sub station Commissioned/completed during 2014-15 are given in **Annexure-3F**.

Voltage-wise/Sector-wise actual achievement vis-à-vis RFD programme for the year 2014-15 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 2014-15

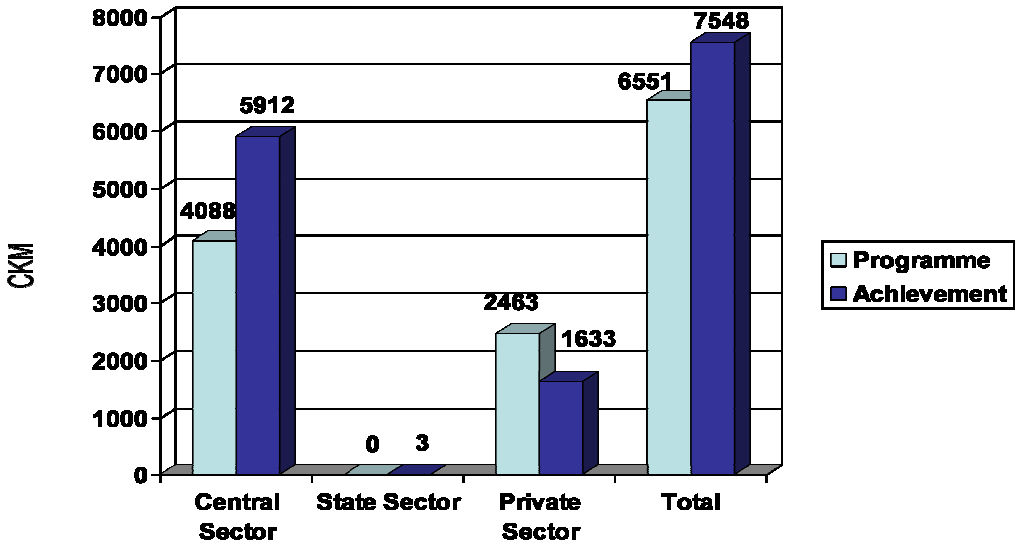


Chart ll
Programme/Achievement of 400 kV Transmission Lines in 2014-15

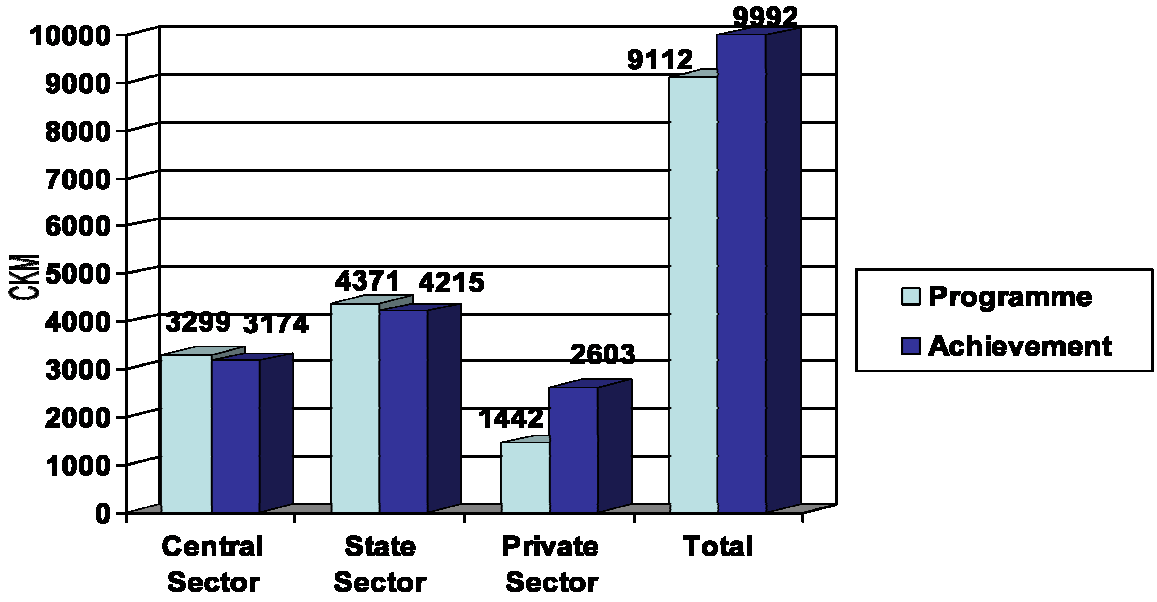


Chart lll
Programme/Achievement of 220 kV Transmission Lines in 2014-15

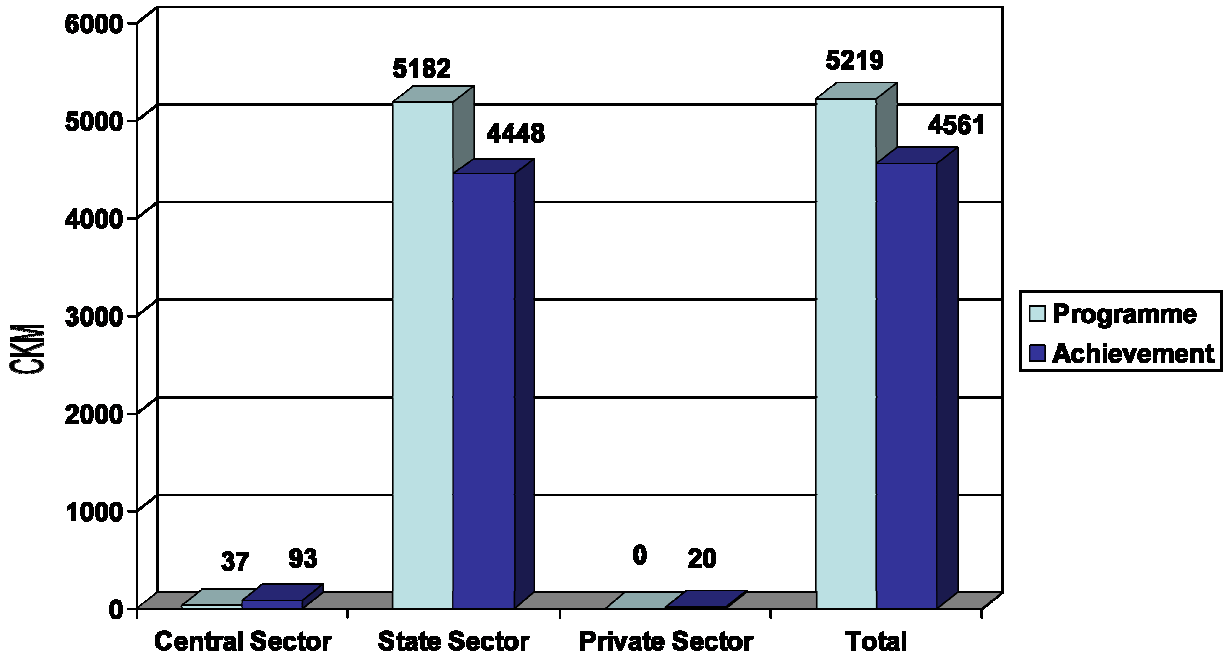


Chart IV
Programme/Achievement of 765 kV Sub Stations in 2014-15

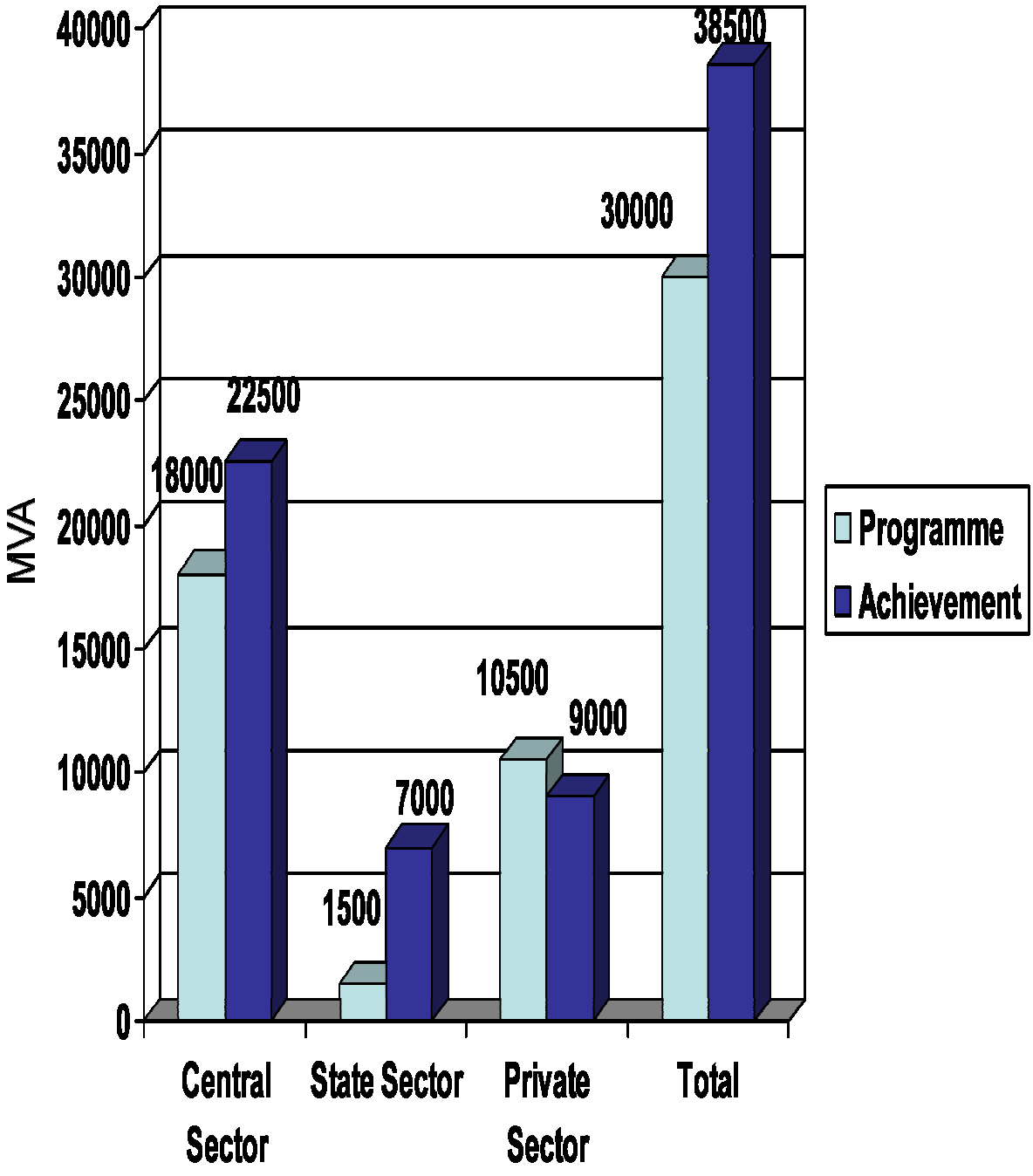


Chart V
Programme/Achievement of 400 kV Sub Stations in 2014-15

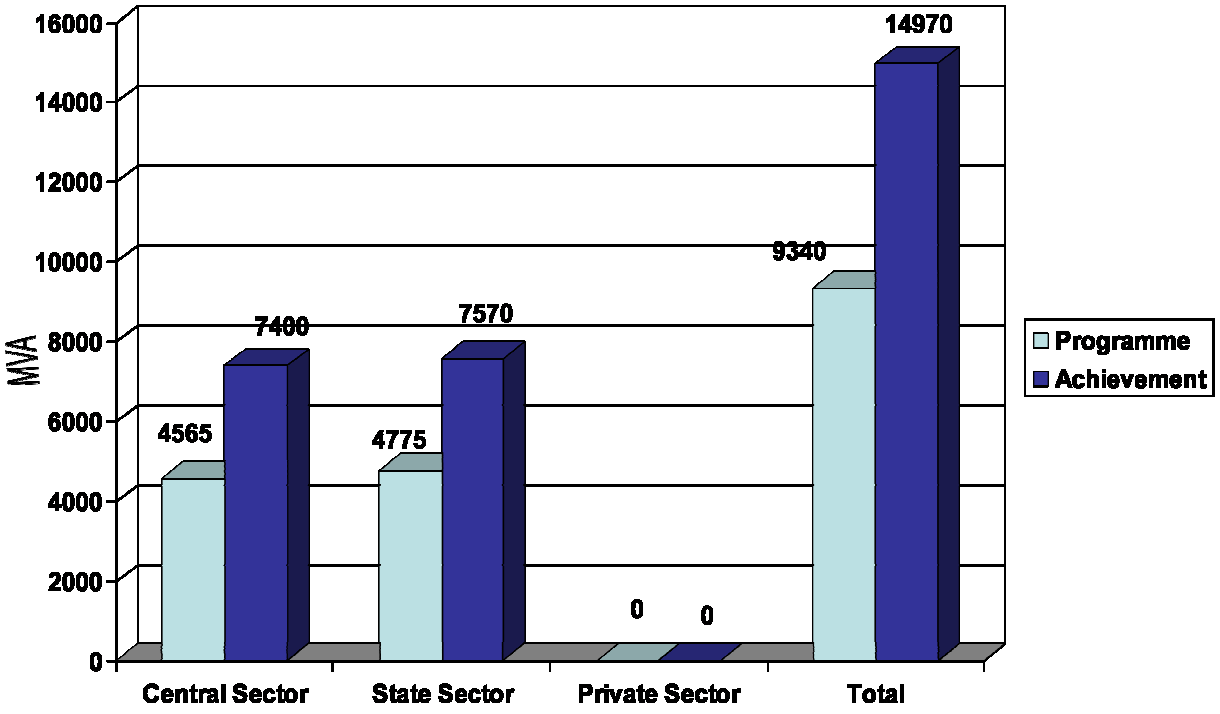
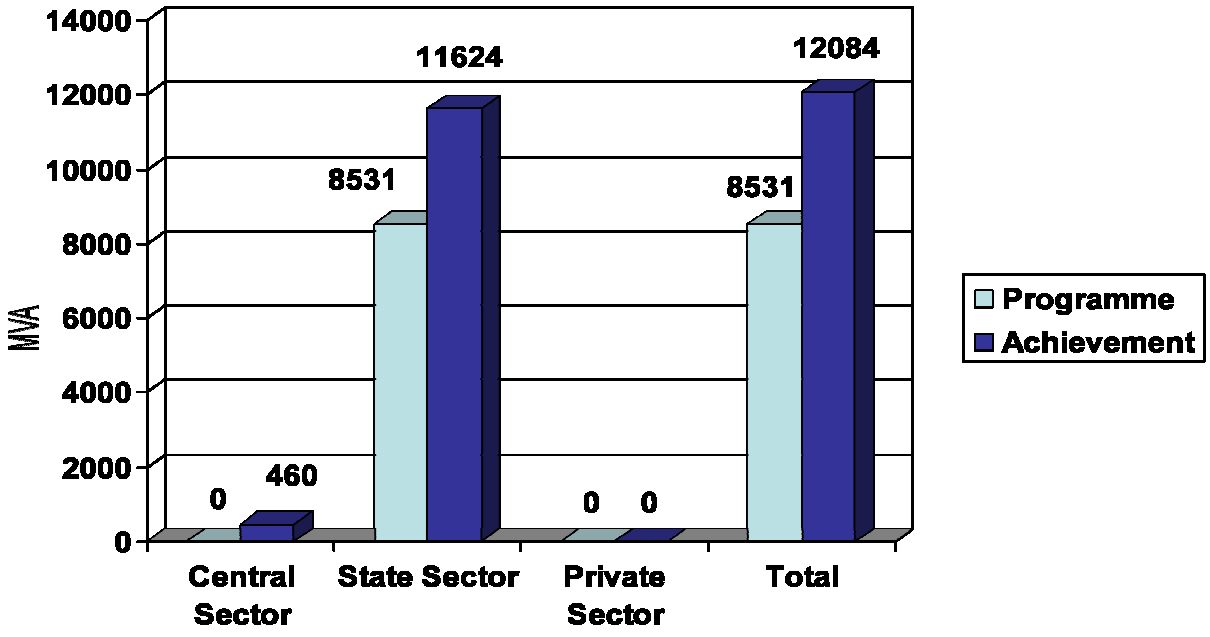


Chart VI
Programme/Achievement of 220 kV Sub Stations in 2014-15



3.18 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 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) with Headquarters 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 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.

(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.

(g) Updation or amendment in the safety regulations namely 'Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010' in consultation with State Governments and other stakeholders.

2. RESUME OF INSPECTION WORK DONE

The Electrical Inspectorate Division and its five Regional Inspectorial Organisations inspected a number of installationscomprising of**246616 Eq. MV** during 2014-15, the region wise break up of which is given below:

RIO	Eq. MV installations (Nos.)	
	2013-14	**2014-15**
N Delhi	52400	43871
Chennai	62496	48213
Mumbai	58348	64414
Shillong	23081	32035
Kolkata	64947	58083
Total	**261272**	246616

3. MAJOR ACHIEVEMENT IN TERMS OF INSPECTION DURING THE YEAR 2013-14 (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 at Angul, Ranchi, Dhule, Satna, Indore, Durg, Gwalior, Sagar, Kurnool, Trivalum, Nellore, Bareilly, Lucknow, and 400kV Substations at Madurai & Trivendrum, Bongaigaon, Basi, Chaksu etc.

b) Transmission lines: 765kV Lines: S/C Bhopal – Indore, Satna-Gwalior, Dhule-=Aurangabad, Satna-Vindyachal, Kotra-Champa, Raigarh-Champa, Angul-Sundargarh, Rihand-Vindhyachal, Sasan-Vinndyachal, D/C Raipur-Wardha, 400KV (Quad) Balipara-Bongaigaon (Nalbari Section), 400 KV D/C Silchar – Imphal etc.

c) Generating Units: Sasan Unit – I, V & VI (660 MW each), KSK Mahanadi power Company Ltd. Unit – 4 (600MW), GMR Chhattisgarh Energy Ltd., Raipur Unit – I & 4 (685 MW each), Jaypee Nigrie super Thermal Power Project, Singrauli Unit – II (660 MW), NLCTTPL, Tirunelveli, Tamil Nadu, Unit – II (500 MW), NTPL TNEL, Vallur, Tamil Nadu Unit – I, II, II (500 MW each) IL&FS TNPCL, Cuddalore, Tamil Nadu, Unit – II (250 MW), Rampur HEP, NTPC Ltd. Koldam Unit – I & II, NLCTTPL Tirunelveli Unit – II (500 MW), NTPC BARH Unit #5(660MW) etc.

d) Steel Plants: Vizag, Bokaro, Rourkela, Bhillai.

e) Refineries: Manglore (MRPL), Paradip (IOCL).

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

Major installations inspected:

a) Generating Plants: NTPC TNEL, Vallur, KAPL Kaiga, CGPL (TPC), Gulf Oil Corporation Ltd. etc.

b) Substations: PGCIL 400 KV S/S Mysore, Karur and 765 / 400 KV S/S Kurnool, PGCIL 132/33 KV Nirjuli Substation, Installations of IOCL, BPCL, HPCL, GAIL, NTPC Unchahar PGLIL, NALCO, SAIL, NSPCL, CPWD, Adani-sami etc.

4. Amendment to the Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulation, 2010:

To intrtoduce the provision of Self-Certification of the electrical installations by the utilities/owners, the proposal for the amendment of Regulation 5, Regulation 30, Regulation 43 and Regulation 44 along with the amendments of some of the other regulations of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010 has been finalized in consulation with the State Governments and other stake holders and sent to the Ministry of Power for notification after approval of the Authority.

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CHAPTER – 4
GRID MANAGEMENT

4.1 Organizational Structure in Grid Operation and Management

Central Government has establishedRegional Power Committee (RPC) in each of the five regions 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 at 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, Commercial Sub Committee, Protection Sub Committee, System Studies Sub Committee and Technical Coordination Sub Committee. The Operation Sub Committee meets every month to review the grid operation in the previous month and plan grid operation for the next month. The Commercial Sub Committee discusses commercial issues e.g. energy accounting related matters, matters pertaining to SEMs, settlement of dues, etc. The Protection Sub Committee discusses and analyses various trippings which took place since its last meeting and recommends/monitors the corrective actions to avoid similar trippings. It also finalises protection schemes including protection coordination. The System Studies Sub Committee meets periodically for the purpose of System Studies. The Technical Coordination Sub Committee (TCC) meets before the Regional Power Committee for putting up matters for decision in the Regional Power Committee. The RPCs play an important role in planning grid operation, since they are responsible for protection coordination, outage planning of generating units and transmission system, planning reactive compensation etc. Member (GO&D), CEA is also a Member of the Regional Power Committees and guides the Committees to arrive at amicable solutions in case of disputes between Members of the Committees through unbiased decisions. To evolve a common approach to issues related to reliability and security of the grid, National Power Committee (NPC) has been established vide Ministry of Power (MoP) order dated 25th March, 2013.

CEA monitors the power supply position in the country, prepares the all-India monthly power supply position, coordinates all matters of grid operation and management between the five Regions, coordinates enquiry of grid disturbances, recommends to the Ministry of Power the quantum of allocation from Central Generating Stations and also coordinates the implementation of the allocation through the Regional Power Committees. The anticipated Power Supply Position for the next year known as Load Generation Balance (LGBR) Report is also prepared every year.

4.2 Power Supply Position

The Central Electricity Authority brings out the All India Power Supply Position on a monthly basis, both in terms of energy and peak giving the requirement, availability and shortage in Million Units (MUs) as well as in percentage and the peak demand, peak met and peak shortage both in terms of Mega Watt (MW) and percentage. The total energy requirement in the country during 2014-15 was 10,68,923 Million Units (MUs) as against 10,02,257 MUs during the

previous year, registering an increase of 6.7%. The total energy availability in the country during 2014-15 was 10,30,785 MUs as against 9,59,829 MUs during the previous year, registering an increase of 7.4%. The energy shortage during the year 2014-15, therefore, reduced from 42,428 MUs to 38,138 MUs with percentage shortage reduction from 4.2% to 3.6%, as compared to previous year. The peak demand during the year 2014-15 was 1,48,166 Mega Watt (MW) as against 1,35,918 MW during the previous year, registering an increase of 9.0%. The peak demand met during 2014-15 was 1,41,160 MW as against 1,29,815 MW during the previous year, registering an increase of 8.7%. The peak shortage registered a marginal increase from 6103 MW to 7006 MW. So percentage shortage increased to 4.7% in 2014-15 as compared to 4.5% in 2013-14. An overview of power supply position in terms of energy and peak demand for the period from 1997-98 to 2014-15 is presented in **Exhibit-I** and **Exhibit-II** respectively. The State/ Region-wise power supply position during the year 2014-15 is enclosed at **Annexure-4A**.

Exhibit-I

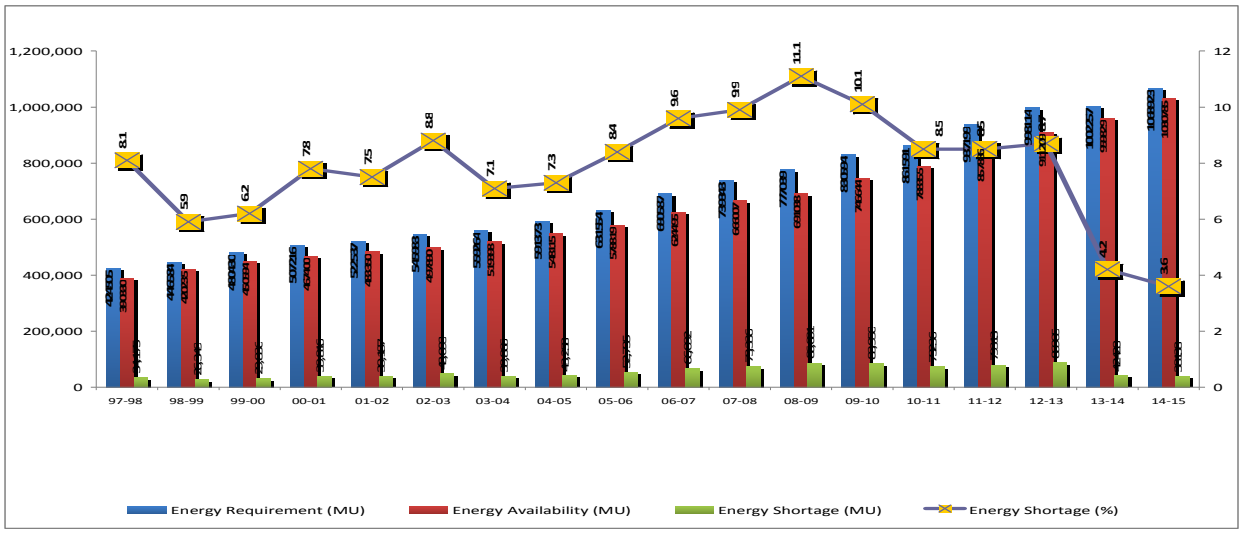
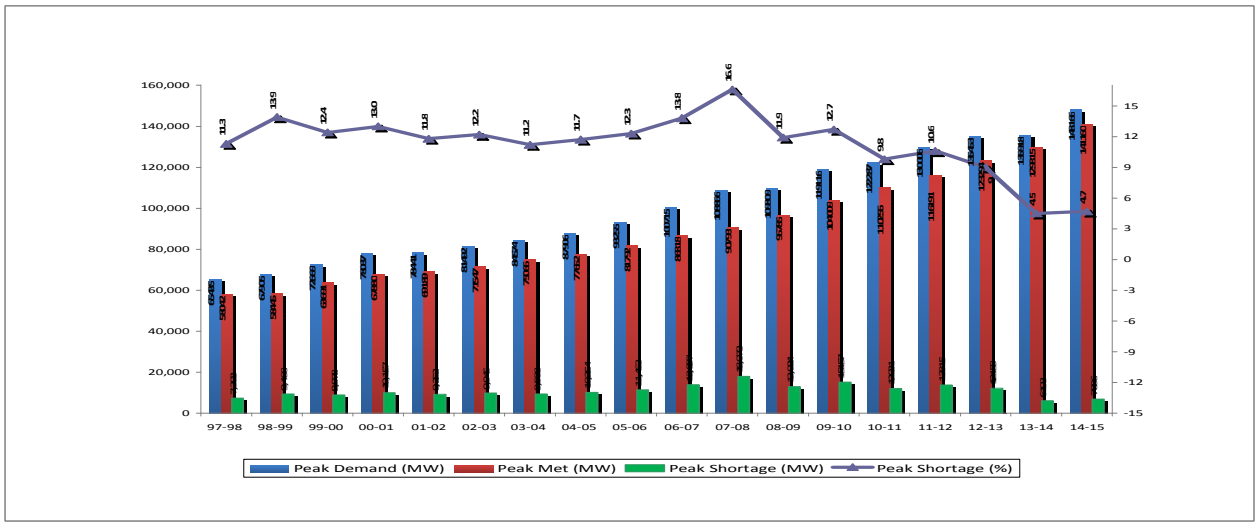


Exhibit-II



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

Since 31st December, 2013, all the regional grids in India are operating in synchronism catering now the peak load of over 1,41,000MW in the country. The integrated all India electricity grid would provide optimum utilisation of resources in the country. The diversity of load in different parts of the country provides an opportunity to manage load –generation balance with optimum utilisation of generation resources. The inter-state/ inter-regional transfer of power through various market mechanisms is of vital importance in maximisation of the benefit of diversity of load in the country. The inter-regional transfer of power takes place through Long term PPAs with allocation by MoP, Long-Term Access and Medium and Short- Term Open Access (LTA/MOTA/STOA) from surplus region to power deficit region.

4.3.1 Allocation of unallocated Power

Govt. of India (GOI) has set up Central Generating Stations (CGS) through Central Public Sector 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 CGSs is allocated to various states. Normally, 85% power is allocated as firm allocation (including home state share). This allocation is normally fixed and changes only when a beneficiary State surrenders its share or in case of regulation of power due to non-payment of dues. 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 exigencies, 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 etc. 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 done by Ministry of Power through the Regional Power Committees. Details of the state-wise allocation in the country as on 31.03.2015 are given in **Table – I.**

Table-I

Details of total share of the states from central generating stations

(As on 31.03.2015)

S.No.	Region / State	Firm power	Unallocated (UA) Power					Total MW share from CGS	Total MW share from CGS as % of CGS in the country
		Firm Share from CGS (MW)	Unallocated power from regional pool (MW)	% of the regional pool of unallocated power	% of the national pool of unallocated power	Allocation from other Region / Bhutan (MW)	Total allocation of unallocated power (MW)		
1	Chandigarh	110	52	2.4	0.8	14	66	176	0.26
2	Delhi	3695	0	0.0	0.0	30	30	3725	5.40
3	Haryana	2459	91	4.3	1.4	15	106	2565	3.72
4	Himachal Pradesh	1243	106	5.0	1.6	0	106	1349	1.96
5	Jammu & Kashmir	1544	351	16.4	5.4	118	469	2013	2.92
6	Punjab	2152	128	6.0	2.0	30	158	2310	3.35
7	Rajasthan	2531	425	19.9	6.6	52	477	3008	4.36
8	Uttar Pradesh	5517	775	36.3	12.0	60	835	6352	9.21
9	Uttarakhand	828	104	4.9	1.6	0	104	932	1.35
10	Railways	0	100	4.7	1.5	0	100	100	0.14
11	PowerGrid	0	2	0.1	0.0	0	2	2	0.00
	Northern Region	**20079**	**2134**	**100.0**	**32.9**	**319**	**2452**	**22532**	**32.66**
12	Chhattisgarh	1189	25	1.4	0.4	0	25	1214	1.76
13	Gujarat	3608	0	0.0	0.0	0	0	3608	5.23

14	Madhya Pradesh	4284	485	26.2	7.5	0	485	4769	6.91
15	Maharashtra	6467	527	28.5	8.1	0	527	6994	10.14
16	Daman & Diu	183	137	7.4	2.1	0	137	320	0.46
17	Dadar Nagar Haveli	289	610	33.0	9.4	0	610	899	1.30
18	Goa	472	50	2.7	0.8	0	50	522	0.76
19	PowerGrid	0	3	0.2	0.0	0	3	3	0.00
20	HWP of DAE	0	0	0.0	0.0	0	0	0	0.00
21	BARC Facilities	0	10	0.5	0.2	0	10	10	0.01
	Western Region	**16489**	**1848**	**100**	**28.4**	**0**	**1848**	**18338**	**26.58**
21	Andhra Pradesh	1788	215	14.0	3.3	0	215	2003	2.90
22	Karnataka	1838	309	20.2	4.8	0	309	2147	3.11
23	Kerala	1651	207	13.5	3.2	0	207	1858	2.69
24	Tamil Nadu	4558	462	30.2	7.1	0	462	5020	7.28
25	Pondicherry	1956	192	12.5	3.0	0	192	2148	3.11
26	Lakshadweep	276	140	9.1	2.2	0	140	415	0.60
27	NLC	100	0	0.0	0.0	0	0	100	0.14
28	PowerGrid	0	6	0.4	0.1	0	6	6	0.01
	Southern Region	**12167**	**1531**	**100.0**	**23.6**	**0**	**1531**	**13697**	**19.86**
29	Bihar	2380		60.3	7.3	12	484	2864	4.15
30	DVC	5968	472	5.4	0.6	8	50	6018	8.72
31	Jharkhand	444	42	17.2	2.1	5	140	584	0.85
32	Orissa	1688	135	7.2	0.9	6	62	1750	2.54
33	West Bengal	1465	56	8.3	1.0	18	83	1548	2.24
34	Sikkim	145	65 13	1.7	0.2	1	14	159	0.23
	Eastern Region	**12090**	**783**	**100.0**	**12.1**	**50**	**833**	**12923**	**12090**
36	Arunachal Pradesh	119	5	2.7	0.1	9	14	133	0.19
37	Assam	603	68	37.2	1.0	106	174	777	1.13
38	Manipur	107	16	8.7	0.2	0	16	123	0.18
39	Meghalaya	101	62	33.9	1.0	42	104	205	0.30
40	Mizoram	50	16	8.7	0.2	8	24	74	0.11
41	Nagaland	72	6	3.3	0.1	1	7	79	0.11
42	Tripura	95	10	5.5	0.2	0	10	105	0.15
	North-Eastern Region	**1147**	**183**	**100.0**	**2.8**	**166**	**349**	**1496**	2.17
	Grand Total	**61972**	**6479**		**100**	**535**	**7013**	**68986**	**100.00**

Excludes capacity of central sector units which have been commissioned but yet to be declared under commercial operation.

Note : 1. Firm share includes capacity of dedicated CS stations, merchant power (75 MW in NER) and capacity allocated / diverted from other stations located within / outside the region.
2. Above allocation is for evening peak hours only. Allocation during off-peak hours may vary.
3. Grand Total power does not include power allocated to Bangladesh. Total Power allocated to Bangladesh = 250 MW (100 MW each from NR and WR unallocated power and 50 MW from ER NTPC stations' unallocated power.

4.4 Operation of Regional Grids

4.4.1 Northern Regional Grid

The Northern Region has an installed capacity of 71031.39 MW as on 31-03-2015 consisting of 45187.75 MW thermal, 17066.78 MW hydro, 1620.00 MW nuclear and 7156.86 MW from renewable energy sources. The Northern Grid faced an energy shortage of 6.3% and a peaking shortage of 8.3% during the year 2014-15 as compared to energy and peak shortages of 6.0% and 6.9% respectively during previous year. Power was transferred from Eastern Region to Northern Region over HVDC back-to-back station at Sasaram, Muzaffarpur-Gorahkpur 400 kV D/C line with TCSC, Patna – Balia 400 kV D/C line, Biharshariff – Balia 400 kV D/C line, Barh-Balia 400 kV D/C line, Sasaram-Fatehpur 765 kV S/C line, Gaya-Balia 765 kV S/C line and Dehri-Sahupuri 220 kV S/C line. Northern Region is also connected to Western Region through Mundra-Mohindergarh HVDC link, Agra – Gwalior 765 kV line 1&2, Kankroli-Zerda 400kV D/C Line, Kota-Ujjain 220 kV D/C line, Auraiya-Malanpur 220 kV D/C line and HVDC back to back link at Vindhyachal.

With the commissioning of transmission lines such as 765 kV Bina – Gwalior line (3rd Ckt), LILO of 2nd Ckt of 400 KV Lucknow - Bareliiy line (PG) at Shahjahanpur, 400 KV Koldam – Ludhiana line, 220 KV Lalitpur TPS – Jhansi line etc. in the year 2014-15, the stability of the grid has improved and also this has facilitated

enhanced flow of power from the surplus areas to deficit areas.

4.4.2 Western Regional Grid

The Western Grid has an installed capacity of98822.44MW(as on 31-03-2015)consisting of76739.90MW thermal, 7,447.5MW hydro,1,840MW nuclearand 12795.04MW from renewable energy sources. The Western Grid faced an energy shortage of0.8%and a peaking shortage of 2.3%during the year 2014-15 as compared to energy and peak shortages of1.0%and2.4%respectively during the previous year. Western region is connected with Northern region through 765 kV Gwalior-Agra D/C, 500kV Mundra-Mohindergarh HVDC, 400 kV Zerda-Kankroli, 400 kV Zerda-Bhinmal, 220 kV Malanpur- Auraiya, and 220 kV Badod-Kota/Morak. The East–West corridor is linked through 220 kV T/C Budhipadar-Korba, 400 kV D/C Rourkela-Raipur with series compensation, 400 kV D/C Ranchi-Sipat with series compensation and 400 kV D/C Rourkela-Raipur (2^{nd}) without series compensation. The Southern region is connected through 765 kV Raichur-Sholapur 2xS/C line and Chandrapur HVDC back to back.

4.4.3 Southern Regional Grid

The Southern Region has an installed capacity of 65079.83 MW (as on 31-03-2015) consisting of 36244.6 MW thermal, 11398.03 MW hydro, 2320 MW nuclear and 15117.20 MW from renewable energy sources. The Southern Grid faced an energy shortage of 4.1% and a peaking shortage of 5.2% during the year 2014-15 as compared to energy and peak shortages of 6.8% and 7.6% respectively during previous year. The Talcher Stage-II Super Thermal Power Station (4X500 MW) of NTPC in Eastern Region is a dedicated power station for the Southern Region except for 200 MW power allocation to the home state of Orissa in ER. The Southern Region is connected with the Eastern Region through upgraded Talcher-Kolar HVDC bipole link, HVDC back-to-back link at Gazuwaka and Balimela-Upper Sileru 220kV S/C. Southern Region is also connected with Western Region through HVDC back to back link at Chandrapur in addition to 2xS/C 765kV Sholapur- Raichur, and 220kV Kolhapur-Chikkodi D/C line.

4.4.4 Eastern Regional Grid

The Eastern Region has an installed capacity of 33337.57 MW (as on 31-03-2015) consisting of 28790.07 MW thermal, 4113.12 MW hydro and 434.38 MW from renewable energy sources. The Eastern Region faced an energy shortage of 1.6% and a peaking shortage of 0.6 % during the year 2014-15 as compared to energy and peak shortages of 1.3% and 1.8% respectively during previous year.

Eastern Region is connected directly to all other Regions and it exported energy to all other regions. It is connected to Northern Region through Muzaffarpur - Gorahkpur 400 kV D/C line with TCSC, Patna – Balia 400 kV D/C line, Biharshariff – Balia 400 kV D/C line and Sasaram – Allahabad/ Varanasi 400 kV D/C line bypassing HVDC back-to-back link at Sasaram ; to 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 – Binaguri 400 kV 2x D/C lines and Birpara – Salakati 220 kV D/C lines.

4.4.5 North-Eastern Regional Grid

The North-Eastern Region has an installed capacity of 3369.82 MW as on 31-03-2015 consisting of 1865.44 MW thermal, 1242.00 MW hydro and 262.38 MW from renewable energy sources. The North-Eastern Grid faced an energy shortage of 8.7% and a peaking shortage of 12.9%

during the year 2014-15 as compared to energy and peak shortages of 6.5% and 5.4% respectively during the previous year , mainly on account of transmission and distribution constraints. North Eastern Regional Grid is connected directly only to the Eastern Regional Grid and any import/export of power to the other Regions has to be wheeled through the Eastern Regional Grid. The power transfer from North-Eastern Region to Eastern Region is taking place over Bongaigaon – Binaguri 400 kV 2x D/C lines and Birpara – Salakati 220 kV D/C lines.

4.5 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 of new office complex at NERPC, Shillong has been completed and the NERPC Secretariat has shifted to new office complex and is operating from there w.e.f.1st , November, 2014. The balance work of construction is under progress and likely to be completed by 2016-17.

4.6 National Power Committee (NPC)

With the commissioning of first circuit of Raichur-Sholapur 765kV s/c line on 31-12-2013, Southern Region is now synchronized with rest of the country i.e Northern Region, Western Region, Eastern Region and North-Eastern Region forming single National Grid operating at one frequency. The planning of generation and transmission capacity addition is also getting national perspective. With the development of Ultra Mega Power Projects (UMPPs) and Independent Power Producers (IPPs), with generating stations located in one region and beneficiaries in other regions, coordination and consultation among RPCs is 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 process for formation of National Power Committee (NPC) which Ministry of Power established vide order dated 25th March, 2013. Secretariat services to NPC are being provided by Grid Management Division, CEA and Chief Engineer (GM) is Member Secretary of NPC. Chairperson, CEA is Chairperson of NPC. Member Secretaries and Chairpersons of all RPCs, Chairpersons of all TCCs in five regions and Member (GO&D), CEA are members of NPC.

Three meetings of the NPC since its formation have been held till 31st March, 2015 and important decisions like uniform methodology for Under Frequency Relay (UFR) based load shedding scheme across the regions, including uniform uplifting the first stage of UFR operation at 49.2 Hz all over the country were taken by NPC. NPC also impressed upon ensuring the healthiness of protection system of the entire power system of the country. The healthiness of protection system has assumed greater importance and states are rectifying the deficiencies as found out during protection audits.

4.7 Grid Study Committee :

In pursuance of the 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 had

formed a Task Force under the chairmanship of Sh. V. Ramakrishna, Retd. Member (Power System), CEA for power system analysis under contingencies. Director (Grid Management) was Member Secretary of Task Force. Representatives of POSOCO, CTU, ABB India, Tata Power Delhi Distribution Ltd & Electrical Engineering Deptt., IIT(K) & Electrical Engineering Deptt., IIT(B) were members of Task Force. The Task Force had detailed deliberations on issues concerning safe and secure operation of the grid and submitted its report to the Ministry of Power in September, 2013.

As per the recommendations of the above Task Force, the process of appointment of consultants to conduct the study/analysis to ensure secure and reliable operation of the National Grid is under way. One consultant will carry out the protection audit at the identified substations, suggest methodology for arriving at the relay settings, ascertain status of implementation of the protection audit recommendations etc. The other consultant will study the methodology of calculation of Total Transfer Capacity/Available Transfer Capability, suggest improvements in the regulatory framework to ensure secure and efficient grid operations, etc. A Grid Study Committee under the chairmanship of Member (GO&D), CEA with representatives from POSOCO, CTU, STUs has been formed to facilitate the Consultant's study/analysis.

4.8 Power System Development Fund (PSDF):

i. PSDF was initially established under CERC (PSDF) Regulations 2010, vide notification dated 3rd June, 2010. The Regulations stipulate that the balances in regulatory pool accounts such as Congestion Charges, Congestion Revenue, Unscheduled Interchange Charges, and Reactive Energy Charges shall be periodically transferred to PSDF for custody, management and eventual disbursements towards approved development projects and schemes. However in the absence of procedures, no disbursement of fund took place.

ii. Ministry of Power, vide letter No. 29/9/2010-R&R (Vol-II) dated 10th January, 2014 circulated a scheme regarding operationalization of the Power System Development Fund (PSDF) and utilization of funds deposited therein. As per this scheme, NLDC has been designated as the Nodal Agency for implementation of this scheme and PSDF has been declared Public money. Therefore, money lying in the PSDF account is being regularly transferred to Public Account. The total fund available in PSDF as on 31.03.2015 is Rs.10082.5 Crores.

iii. Subsequently CERC has also notified CERC (PSDF) Regulations, 2014 vide notification dated 9th June 2014 in line with the above scheme after repealing its earlier PSDF regulations, 2010. As per this notification, the PSDF will be utilized for the following purposes:

a) Transmission system of strategic importance based on operational feedback by Load Despatch Centres for relieving congestion in inter-state transmission system (ISTS) and intra-State system which are incidental to the ISTS.
b) Installation of shunt capacitors, series compensators and other reactive energy generators including reactive energy absorption and dynamic reactive support devices like Static VAR Compensator (SVC) and Static Synchronous Compensator (STATCOM) for

improvement of voltage profile in the Grid.

c) Installation of System Protection Schemes, pilot and demonstrative projects, standard protection schemes and for setting right the discrepancies identified in the protection audits on regional basis.
d) Renovation and Modernisation (R&M) of transmission and distribution system for relieving congestion.
e) Any other scheme/project in furtherance of the above objectives such as technical studies, capacity building, installation of PMUs, etc.

iv) A three tier structure has been created under the scheme for operationalisation of PSDF as mentioned below:

a) Appraisal Committee headed by Chairperson, CEA has been constituted for scrutiny (techno-economic appraisal) and prioritisation of the various project proposals for funding from PSDF.
b) After scrutinizing the proposals, the Appraisal Committee shall submit its Appraisal Report and recommendations in writing to the Central Commission and to the project entity who has submitted the proposal.
c) A Monitoring Committee headed by Secretary, Ministry of Power will consider the projects for sanction based on Appraisal Report and regulatory approval of the Central Commission in accordance with the extant rules/instructions for sanction/approval and release of funds.

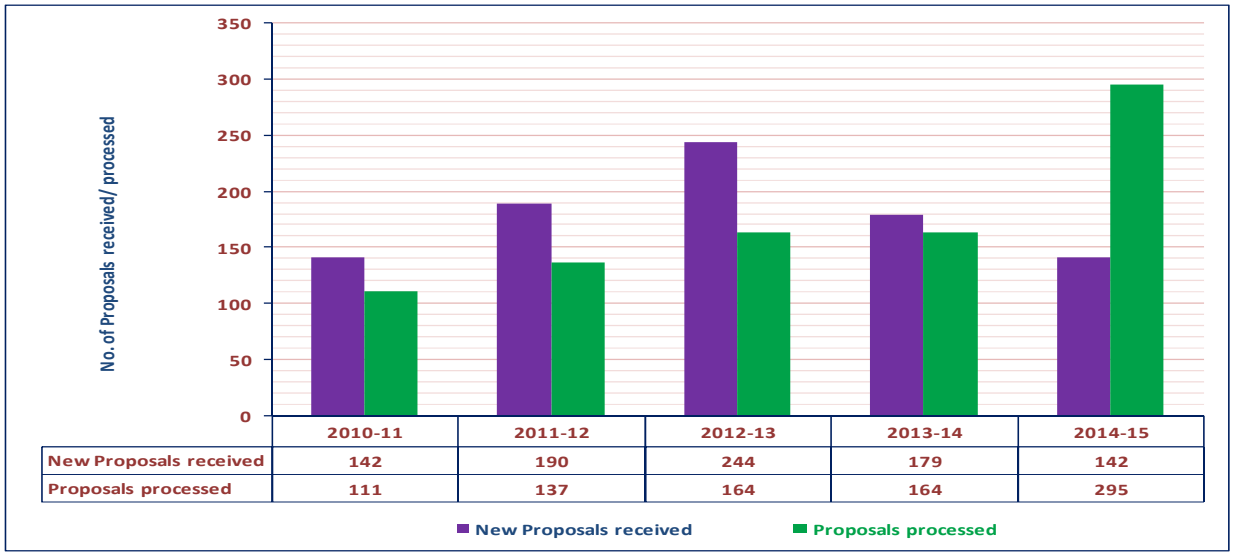
As per the approved guidelines / procedures for the disbursement of PSDF, Thirteen (13) schemes from different entities viz. POWERGRID, Kerala, Rajasthan (two schemes), West Bengal, Assam, Odisha, Nagaland, Karnataka, Bihar, Uttar Pradesh (two schemes) and Gujarat with an overall estimated cost of Rs. 1954 crore have been approved by the Monitoring Committee / MoP, upto 31st March 2015 for sanctioning a total grant of Rs. 1422 crore from PSDF. Most of the schemes are for renovation and upgradation of the protection system.

4.9 Power & Telecommunication Co-ordination Committee (PTCC)

LD&T Division, CEA continued to follow up cases to expedite 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. The divisionalso 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, two Central PTCC meetingswere held viz. 98th Central PTCC meetingon 30/05/2014 at Shillong and 99th Central PTCC meeting on 27/11/2014 at Jabalpur. The meeting at Shillong was chaired by Chief Engineer (LD&T), CEA and the meeting at Jabalpur waschaired by Chief General Manager, BSNL, Inspection Circle, Jabalpur. The meetings were attended by the senior officers of CEA, Central/State Power Utilities, 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.

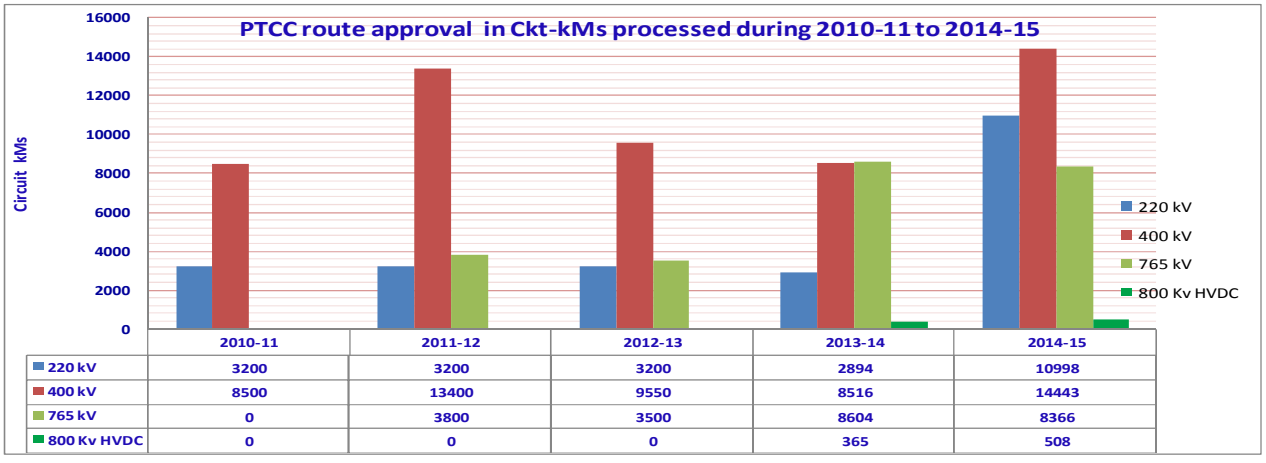
During the financial year 2014-15,142new cases of EHT power lines (220 kV and above) were received for processing of PTCC route approval. A bar chart indicating the number of cases received for PTCC route approval during the last five financial years is given below:



	2010-11	2011-12	2012-13	2013-14	2014-15
New Proposals received	142	190	244	179	142
Proposals processed	111	137	164	164	295

During 2014-15, computation of Induced Voltage (I.V.) likely to be developed on the communication/ railway circuits in proximity of EHT lines under single line to earth fault current conditionsin respect of 295 PTCC Route Approval (RA) proposalswere forwarded to BSNL& Railways for issuing thePTCC route approval.It included about 10998 Circuit kilometers of 220 kV lines, about 14443 Circuit kilometers of 400 kV lines, about 8366 Circuit kilometers of 765 kV lines and about 508 Circuit kilometers of ±800 kV DC lines.It is pertinent to mention that during 2014-15, due care has been taken to process PTCC cases of those transmission lines which were required to be charged on urgent basis and with the result there has been no delay of charging of any line for want of PTCC approval.

A bar chart indicating the Circuit kilometers of 220kV, 400kV, 765 kV and ± 800 kV HVDC transmission lines for which PTCC route approval was accorded during the last five years is given below:



	2010-11	2011-12	2012-13	2013-14	2014-15
220 kV	3200	3200	3200	2894	10998
400 kV	8500	13400	9550	8516	14443
765 kV	0	3800	3500	8604	8366
800 Kv HVDC	0	0	0	365	508

It may be seen from the above graph that PTCC approval in terms of Circuit kilometers of 765 kV lines has increased manifolds and overall PTCC approvals in Circuit kilometers terms has crossed record 30,000 mark.

4.9.1 Computerization of PTCC Process

Cabinet Secretariat direction for digitization of PTCC route approval process is by the department who issues final

clearance. BSNL issues final PTCC clearance.CEA has therefore withdrawn its project of PTCC computerization.

4.10 Reliable Telecommunication & Data Acquisition System for Power Sector at 66kV & 33kV level

Ministry of Power has entrusted to CEA the work of coordination with States/UTs in preparation of Detailed Project Report (DPR) on reliable communication and data acquisition system at 66kV and 33kV Substations in the country.

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

LD&T Division 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 of power utilities in the country.

LD&T Division took up with the concerned agencyfor early frequency allocation in respect of PLCC links of Eastern Region, Western Region,Northern Regionof POWERGRID, Athena Chhattisgarh Power Limited (ACPL), Gujarat State Electricity Corporation Limited (GSECL) & DANS for their new power lines.

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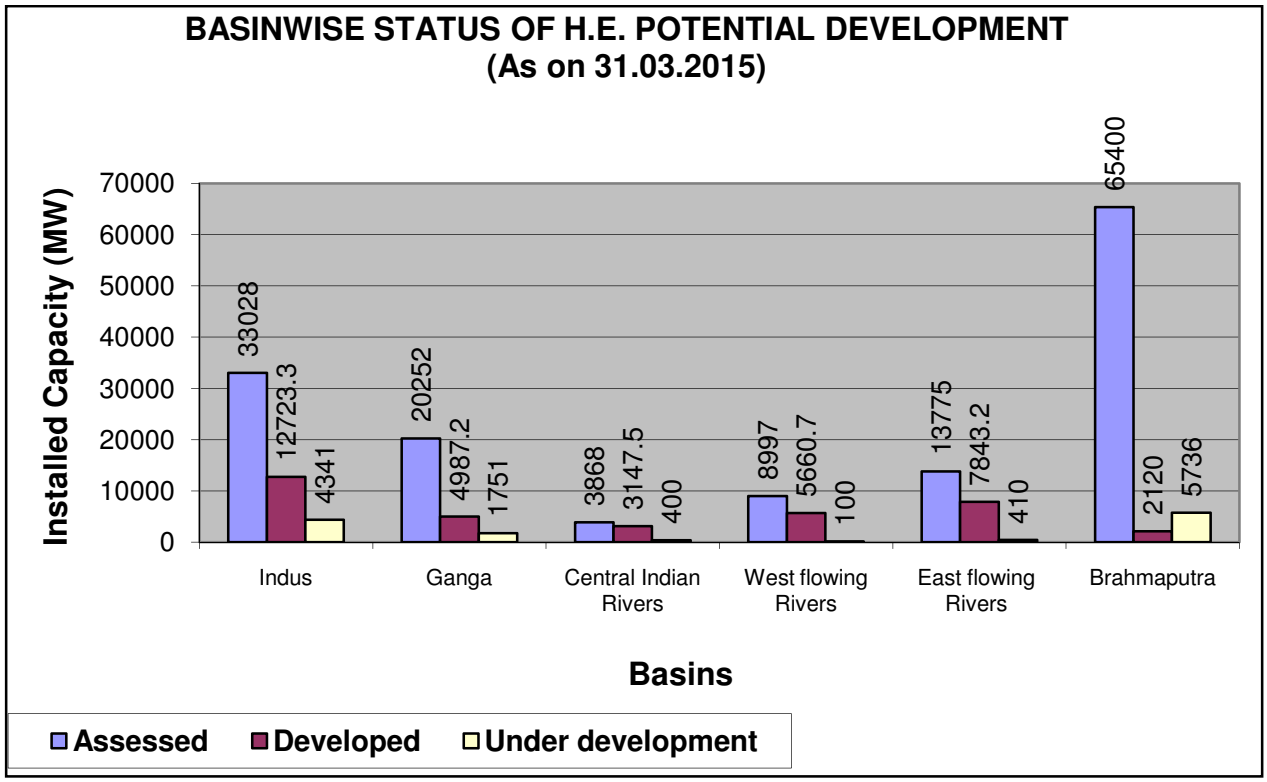
CHAPTER – 5
HYDRO POWER DEVELOPMENT

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 31.03.2015, the hydro-electric schemes in operation account for only 25.1% and those under execution for 8.77% of the total potential in terms of installed capacity. Thus, the bulk of the potential (66.13%) remains to be developed.



The re-assessment studies have also identified 56 sites for Pumped Storage Schemes (PSS) with probable total installation of about 94,000 MW. At present, 9 Nos. Pumped Storage Projects having total installed capacity of 4785.60 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

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 40 schemes (21317 MW) have already been prepared and 8 schemes (2656 MW) are under Survey & Investigation for preparation of DPRs. Further, the work of preparation of DPRs of remaining 114 schemes (23957 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 monitoring the progress of construction of hydro power projects in pursuance of Section 73 (f) of Electricity Act, 2003. The progress of each project is monitored continuously through site visits, interaction with the developers, critical study of monthly progress reports. Chairperson, CEA holds review meetings with the developers and other stakeholders to sort out the critical issues.

5.4 Hydro additions during 2014-15:

Hydro capacity addition achieved, 736 MW against the targets of 842 MW for the year 2014-15. Project-wise details are given at **Annexure-5B**.

5.4.1 Hydro capacity programme during 2015- 16

Hydro Capacity Addition Monitorable Targets planned for the Year 2015-16 is 1691 MW (590 MW in Central Sector, 575 MW in State Sector, and 526 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 progress of survey and investigation of all the hydro schemes by conducting periodical review meetings with developers.

In addition the consultation meetings are held by CEA, CWC, GSI and CSMRS with project developer and guidance is provided for making a good quality DPR.

5.5 Project Planning & Optimization Studies

- During the year, preparation of Chapter on Revised Power Potential Studies considering environmental releases for Kalez Khola H.E. Project (2x26 MW) in Sikkim have been completed.

- Preparation of Chapter on Power Potential Studies for Tuipui H.E. Project (2x20 MW) in Mizoram have been completed.

- Review of Power Potential Studies considering environmental releases for Umngot H.E Project (3x80 MW) in Meghalaya have been carried out.

- Revised Power Potential Studies due to relocation of power house have been taken up for Kolodyne-I H.E Project in Mizoram.

5.6 Studies & Other Activities Related to Hydro Power Planning

- The terms of reference for Basin wise review of Hydro Electric potential in the country were finalized by the monitoring committee of CEA, CWC, GSI, SOI, NRSC, and MOEF.
- Comments were prepared on draft note for the Cabinet on amendment in the tariff policy with regard to the proposal of continuation of the exemption from tariff based competitive bidding for Hydro-Electric Projects upto 31st March 2022.
- Comments were prepared on draft report of Ganga River Basin Management Plan by consortium of Seven IITs.
- Draft report of the Competent Authority notified in CWP No. 13690 of 1994- Pyarelal and others constituted with reference to orders of High Court of Punjab & Haryana.
- Comments were provided on draft guidelines for National Plan Conservation of Aquatic eco-system (NPCA).

- **Indus Water Treaty (IWT) Matters**

a) Adequacy of Pondage of Sawalkote, Kirthai-I, & Kwar H.E Projects in J&K and Duggar & Chhatru H.E Project in Himachal Pradesh, as per IWT was examined.

b) Inter Ministerial meetings to discuss the issues related to Kishenganga H.E project (330 MW) were attended. In addition, Joint meetings with CWC & NHPC were also held in CEA for review of Pondage at Kishenganga in line with the Award on Kishenganga Arbitration.
110th & 111th Meetings of Permanent Indus Commission were attended.

- **Issues of importance in North Eastern Region**

a) Associated with Cumulative Impact and Carrying Capacity Study of HEPs in Siang, Subansiri, Lohit, Kameng & Dibang basins in Arunachal Pradesh being carried out by CWC through Consultants.
b) Represented on a Committee/group constituted by MoEF to supervise, guide and monitor the river/river basin carrying capacity studies.
c) Represented on a Technical Advisory Committee constituted by CWC for conducting Environmental Impact Assessment studies of Subansiri and Siang sub basins including Downstream Impacts of River basins in Arunachal Pradesh.
d) Examined and commented upon the Cumulative impact Assessment and Carrying Capacity Study Reports in respect of Siang and Subansiri Basin.
e) Action Taken Report (ATR) on the comments raised in the 63rd Plenary of North Eastern Council (NEC) was examined and a presentation was made.
f) Matters relating to mitigating downstream impact of H.E Projects especially Subansiri Lower H.E Project in Arunachal Pradesh was dealt with.
g) Prepared note on Funding of Flood Moderating Components in Hydro Electric Projects.

h) Base Paper of CWC regarding Provision of Storage in Brahmaputra Basin for Flood abatement and its Cost Implications was examined and commented upon.

i) References relating to Downsream impact of Lower Subansiri and also other projects in neighbouring countries (China and Bhutan) were dealt with.

- **Issues of importance in Jammu & Kashmir**

a) Meetings of the Technical Committee, constituted by Ministry of Power under the Chairmanship of Member (Hydro) were held to examine & to suggest as to how to resolve issues involved in 2nd Phase of Dulhasti & Uri-I-Stage-II H.E. projects to be implemented by CVPPL & a Report has been prepared in this regard.

b) Study for Re-conciliation and Reassessment of the hydro electric potential of J&K has been carried out & a Report has been prepared.

c) Dealt with studies relating to impact of change in MDDL due to reduction in Pondage carried out by M/s GVK for Ratle HEP.

- **Other issues:**

a) Carried out analysis of reasons for fluctuations in hourly discharge at Hathnikund Barrage on River Yamuna at the request of UYRB.

b) Extended assistance to WAPCOS in connection with consultancy for Turga Pumped Storage Project in West Bengal.

5.7 Hydro Capacity Addition during the 12th Plan

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

During the year, following works were handled in connection with development of water resources of the common rivers of India and neighboring countries of Nepal, Bhutan and Myanmar for mutual benefits:

- Draft Trade Power Agreement submitted by Ministry of Energy, Nepal in connection with Electric Power Trade and Cross Border Transmission interconnection was examined.
- Draft Declaration of Eighteenth South Asian Association for Regional Cooperation (SAARC) Summit held in Kathmandu (Nepal) was examined.
- Proposal for World Bank financing for Govt. of Nepal's Project in connection with Power Sector Reform and Sustainable Hydropower Development Project under World Bank Operational Policy (OP) 7.50 Project on International Waterways was examined.
- Rendering Consultancy Services for Preparation/ Updation of Detailed Project Report of Pancheshwar Multipurpose Project (PMP) including Re-regulating dam at Rupaligad in Nepal.
- Being represented on Working Group on Water Resources and Power Cooperation under Sub-regional Co-operation between India, Bhutan, Bangladesh and Nepal & draft agreement between India, Bhutan, Bangladesh and Nepal and Terms of Reference (TOR) of Joint

Working Group (JWG) for Jointly Developing and Implementing projects under Sub-regional Co-operation was examined.

- Meeting of Sub-Group under India-Bangladesh Joint Rivers Commission on Tipaimukh H.E. Project was attended.
- Meeting of Expert Level Mechanism between India and China to discuss issues relating to Trans-border Rivers including exchange of hydrological data of Brahmaputra River was attended.

5.8.1 International Cooperation

The matters relating to co-operation with the countries like China, Kazakhstan, Belarus, Slovakia, Colombia, Georgia, Tajikistan, Russia and Azerbaijan have been dealt.

5.9 Hydro Power Plants Performance & Operation Monitoring

❖ Performance of 659 units in 189 Hydro Stations having capacity above 25 MW with aggregate Installed Capacity of 41267.42 MW was analyzed in respect of their outages & generation and report on the review of HE stations for the year 2014-15 was finalized.

❖ Mid term review of generation performance of hydro electric stations of the country for the year 2014-15 was carried out in Dec., 2014 after withdrawal of South-West monsoon by interaction with Power Utilities. The generation targets were reviewed for the remaining part of the year 2014-15.

❖ Month-wise/station-wise hydro generation targets in respect of hydro power generation having capacity above 25 MW for year 2015-16 were drawn in consultation with various utilities and fixed at 128000 MU which was about 2.98 % more than generation targets for the year 2014-15.

5.10 Hydel Generation Performance during year 2014-15

The region wise summary of Hydel Generation performance in the country is as follow:

Region	**Target MU**	**Generation MU**	**Deviation (+/ -)**	
			MU	**(%)**
Northern	61804	65993.25	4189.25	6.78
Western	15918	15657.40	-260.60	-1.64
Southern	31603	31855.11	252.11	0.80
Eastern	10884	12195.82	1311.82	12.05
N-Eastern	4088	3542.11	545.89	-13.35
All India	**124297**	**129243.68**	**4946.68**	**3.98**

Against target of 124297 MU, the actual energy generation during the year 2014-15 was 129243.68 MU which is 3.98 % more than the target. Hydel Generation was more than the target in all regions except Western and North-Eastern Region in the country.

5.11 Renovation & Modernisation 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 X 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 7755MW 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) & accrued a benefit of 2351 MW through Life Extension, Uprating and Restoration. During XI 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, Uprating and Restoration.

5.12.1.1 Achievement during the year 2014-15

Six Hydro R&M schemes namely, Sabarigiri (1x55 MW) of KSEB, Khandong (1x25 MW) and Kopili (2x50 MW) of NEEPCO, Supa (2x50 MW) of KPCL, Pathri (3x6.8 MW) of UJVNL and Lower Jhelum (3x35 MW) of J&KSPDC having an aggregate installed capacity of about 405.40 MW have been completed during the year 2014-15 at an actual cost of Rs.298.40 Crores and accrued benefit of 65.40 MW through Uprating and Life Extension.

5.12.1.2 Programme for the year 2015-16

For the year 2015-16, it is programmed to complete following 7 schemes having an installed capacity of 1042.50 MW. On completion of these schemes, there will be a benefit of 257.90 MW through Renovation & Modernisation, Uprating and Life Extension at an estimated cost of about Rs.368.96 Crores.

S. No.	Name of Scheme	Agency	I.C. in MW
1	Chenani	J&KSPDC	5x4.66
2	Sumbal Sindh	J&KPDC	2x11.3
3	Matatila	UPJVNL	3x10.2
4	Srisailam RB	APGENCO	7x110
5	Bhadra River bed	KPCL	2x12
6	Poringalkuthu	KSEB	4x8
7	Periyar	TANGEDCO	4x35

5.12.2 12th and 13th Plan Programme:

During XII Plan, a total of 26 hydro R&M schemes (4 in Central Sector and 22 in State Sector) having an installed capacity of about 3793 MW and which will accrue benefit of about 1408 MW through uprating, life extension and restoration are expected to be completed at an estimated cost of about Rs. 2136 Crores. A total of 30 schemes having an installed capacity of about 6862 MW are programmed to be taken up in XII Plan (2012-17) and will accrue benefit of 2621 MW during XIII Plan (2017-22) & beyond. Out of the 26 schemes expected for completion during XII Plan, 2 schemes in Central Sector and 10 schemes in State Sector with an installed capacity of about 1916 MW have been completed till March, 2015 and have accrued a benefit of 231 MW through Uprating & Life Extension.

Summary of Hydro R&M Schemes (As on 31.03.2015)

I Hydro R&M schemes completed up to XI 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.	VIII Plan Schemes completed	2	11	13	1282.00	125.57	127.37	429.00 [39.00(U) +336.00(Res.) +54.00(LE)]
2.	IX Plan Schemes completed	8	12	20	4892.10	597.84	570.16	1093.03 [339.00(U) +331.03(Res.) + 423.00(LE)]
3.	X Plan Schemes completed	5	27	32	4336.60	1016.31	1028.97	829.08 [123.40(U) + 701.25 (LE) + 4.43(Res.)]
4.	XI 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 programmed for completion during XII Plan:

Sl. No.	Description of Status of Scheme	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	7105.40	5405.85	-	3344.25 [182.05(U)+15(Res.)+ 3147.20(LE)
	Revised	4	22	26	3792.90	2136.27	1298.26	1407.70 [133(U) + 1259.70(LE) +15(Res.)]
b)	Completed	2	10	12	1916.00	599.02	547.48	231.40 [11 (U)+205.40 (LE)+15(Res.)]

c)	Under Implementation	1	11	12	1764.90	1286.56	689.82	1064.30 [122(U) + 942.30(LE)]
d)	Under Tendering	1	1	2	112.00	250.69	60.96	112 (LE)

III Candidate Hydro R&M schemes to be taken up during the XII Plan and programmed for completion in the XIII Plan & beyond

Sl. No.	Description of Status of Scheme	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	4	26	*30	6862.10	4722.42	191.91	2620.55 [84.05(U) + 2536.50(LE)]
b)	Under Implementation	1	2	3	1875.00	238.07	148.51	315 [15 (U)+ 300 (LE)]
c)	Under Tendering	-	15	15	2881.35	3224.57	35.06	1219.55 [53.80 (U) + 1165.75 (LE))
d)	Under DPR Preparation	3	8	11	2045.75	1259.78	8.34	1026 [15.25(U) + 1010.75 (LE)]
e)	Under RLA Studies	-	1	1	60.00	-	-	60 [60(LE)]

Abbreviations: MW – Mega Watt; Res. – Restoration; U – Uprating; LE – Life Extensio
* Out of these 30 schemes, 19 schemes have been rescheduled for completion from XII Plan to XIII Plan & beyond.

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.490(E) dated 28th Jan, 2014 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.1000 Crores for any other scheme not covered by clauses (a) & (b) above.

5.14 Techno-Economic Appraisal / Concurrence of Hydro Schemes:

During the year 2014-15 CEA appraised and accorded concurrence to 06 Nos. Hydro Generation schemes aggregating capacity of 3359 MW as detailed below:

Hydro Electric Schemes Accorded Concurrence by Central Electricity Authority during 2014-15

S No.	Name of scheme	State	Executive Agency	Installed Capacity (MW)	Date of concurrence by CEA
1	New Ganderwal	J&K	JKSPDC	3x31 = 93	10.6.2014
2	Chhatru	HP	DSC	3x42 = 126	15.1.2015
3	Kalai-II	Ar. Pradesh	Kalai PPL	5x190+1x190+1x60 = 1200	27.3.2015
4	Kynshi – I	Meghalaya	AKPPL	2x135 = 270	31.3.2015
5	Chamkarchhu-	Bhutan	NHPC	4x192.5 =770	29.12.2014
6	Arun – 3	Nepal	SJVNL	4x225 = 900	09.6.2014

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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. Sites 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- 6x660 MW
iv) Tilaiya Ultra Mega Power Project in Jharkhand- coal pithead- 6x660MW
v) Ultra Mega Power Project in Chhattisgarh- coal pithead- 4000 MW
vi) Ultra Mega Power Project in Orissa - coal pithead- 4000 MW
vii) Cheyyur 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. All the five units of 800 MW each of Mundra UMPP and all the six units of 660 MW each of Sasan UMPP have been commissioned. For Tiliaya UMPP, JIPL (Reliance Power Ltd.) have issued Notice of Termination to the procurers on 28.04.15 under provision of PPA. For Krishnapatnam UMPP, the developer has stopped the construction on account the Project being not viable due to increase in cost of imported coal. The procurers had issued termination notice. The matter is subjudice. In Maharashtra and Karnataka the alternate sites for UMPPs are yet to be firmed up as the work at original site could not be taken up due to resistance by local people. The bidding process for Chhatisgarh UMPP was withdrawn due to its coal blocks falling under No-Go Area declared by MoEF. MoC has identified new coal blocks at Batati Kolga which are also not suitable for UMPP. The matter has been taken up for resolution. For Odisha and Cheyyur UMPP bidding process was started but have been terminated on 29.12.14 due to bidders except NTPC and NHPC have withdrawn from bidding process on the ground that the revised Standard Bidding Documents (SBDs) do not fully address their concern.

In addition to nine UMPPs originally identified, following additional UMPPs are at different stage of development:

i. **First additional UMPP in Odisha**: The site has been identified in Bhadrak Distt. Captive coal block namely, Bankhui has been allocated. Feasibility studies are being carried out.

ii. **Second additional UMPP in Odisha**: The site has been identified in Kalahandi Distt. Feasibility studies are to be carried out. Coal block for UMPP yet to be allocated. Consent of State Govt. is awaited.

iii. **Second UMPP in Gujarat**: Site yet to be identified by State Govt.

iv. **Second UMPP in Jharkhand**: Site identified in Deogarh Distt. Water availability studies are under progress. Ministry of Coal allocated the coal block.

v. **Second UMPP in Tamil Nadu**: Information about the alternate site awaited from Govt. of Tamil Nadu.

vi. **UMPP in Bihar**: Site identified in Banka Distt. and approved by State Govt. Site related studies taken up. Ministry of Coal has recommended the coal block for Bihar UMPP.

vii. **UMPP in UP**: Response of UP Govt. about the site identified is awaited.

The sites for the two additional UMPPs in Odisha, one UMPP in Jharkhand and 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. Regarding second UMPP in Andhra Pradesh, MoP vide letter dated 02.01.2014 has informed that GoAP has decided not to proceed further with the project. MoP has decided to close the project and requested PFC to take necessary actions in this regard.

6.2 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 in 2005. 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 24,300 MW since 2005 are enclosed as **Annexure-6A**. 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 10th Plan 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 three years of the 12th plan, capacity of 32,426.5 MW (Thermal- 32,257.5 MW & Hydro- 169 MW) has already been commissioned upto 31.3.2015 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 25,911 MW (Thermal- 22,795 MW & Hydro- 3,116 MW) is under construction in private sector. In addition to above a capacity of 18,925 MW (Thermal- 17,060 MW & Hydro- 1,865 MW) is also under construction in private sector to give benefits beyond 12th Plan.

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 prioritized 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.

6.3 Coal Block Allocation

The Hon'ble Supreme Court of India in its judgment dated 25.8.2014 and Order dated 24.9.2014 had declared allocations of 204 Coal blocks out of 218 coal blocks made since 1993 as illegal. In case of 42 coal blocks (37 producing and 5 likely to come under production) cancellation would take effect from 31.3.2015. Implications of the above judgement were studied with respect to thermal power plants linked with the cancelled blocks. Ministry of Power /Ministry of Coal were apprised of the implications.

In compliance to the above Supreme Court order dated 24.9.2014, 9 nos. Coal Mines for Power sector for the linked End Use Power Plant have been allotted through e-Auction to the winning bidders (developers). In addition to above, 37 nosCoal Mines for linked End Use Power Plant have also been allotted through e-Allottment to Central/State Sector.

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 achieved during the year 2012-13, 16767 MW and 20830.3 has been achieved during the 2013-14 and 2014-15 respectively. During 2012-13 commissioned capacity of 20121.8 MW also includes an additional capacity of 3802.5 MW which is not included in the 12th Plan capacity addition target. During 2013-14 & 2014-15 commissioned capacities of 16767 MW & 20830.3 MW also includes an additional capacity of 4386 MW & 8246.6

MW respectively which were not included in the 12th Plan capacity addition target.

CEA closely monitors the progress of various constructional activities of thermal power projects under construction 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 of under construction thermal power projects.

6.5 Thermal Capacity Addition Programme

6.5.1 Capacity addition achieved during 2014-15.

The thermal capacity addition target for the year 2014-15 was 14988.3 MW, out of which a capacity of 10228.3 MW has already been commissioned till 31.03.2015.Additionally 10602 MW capacity has also been commissioned outside the programme till 31.03.2015.Out of 10602 MW capacity 8246.6 MW capacity was commissioned outside the 12th plan target which was not preferably kept in yearly target. Preference was given to 12th plan targeted units. As such the capacity was not kept in the target of the year 2014-15. Thus, the total capacity commissioned during the year 2014-15 was 20830.3 MW. The details of programme and achievement during 2014-15 are as follows:

SECTOR	**THERMAL** (In MW)	
	Target	Actual
CENTRAL	2818.3	2659.2
STATE	6770	4886.1
PRIVATE	5400	13285
TOTAL	14988.3	20830.3* (includes additional capacity of 10602 MW)

The details of the projects are given at **Annexure-6B**. Some of the main reasons identified for slippage include non-readiness of power evacuation system, balance of plants and non- sequential supply of equipment, slow civil works along with interfacing problems with equipment erection, Law and Order problems, contractual dispute between project developer and contractors and their sub vendors, delay in land acquisition etc.

6.5.2 Capacity Addition Programme (Tentative) for the year 2015-16:

A thermal capacity addition programme (Tentative) of 17346.1 MW was finalized for the year 2015-16.The details of programme are as follows:

SECTOR	THERMAL (MW)
	Target
CENTRAL	2106.1
STATE	8120
PRIVATE	7120
TOTAL	17346.1

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

6.6 Thermal Technology Development and Design & Engg.

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 12th Plan and beyond. Though, initial supercritical units were designed with steam parameters of 247 kg/cm^2, 537/565 deg C, higher steam parameters of 247 kg/cm^2 , 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. With a view to provide initial orders to the indigenous manufacturers bulk tendering of 11 nos. 660 MW supercritical units for NTPC & DVC and 9 nos. 800 MW supercritical units for NTPC were approved by the Govt. of India (GOI) and undertaken by NTPC. These bulk orders require mandatory indigenization of manufacturing of supercritical units by the successful bidders as per a pre-agreed Phased Manufacturing Program (PMP). A Committee under Member (Thermal), CEA has been set up to monitor the progress of phased manufacturing program.

6.7 Important Activities

Following activities were also undertaken:

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

b) CEA has been associated with MNRE with the work of development of geothermal energy.

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

i. Director (TE&TD) was nominated to the Committee set up by CERC on 'Implementation of FGMO in generating Units'.

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

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

iv. Director (TE&TD) is a member of the water tube boiler Sub-Committee constituted by Central Boiler Board.

v. CE (TE&TD) 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) & Bulk tender- II (800 MW).

vi. Director (TE&TD) 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.

vii. Director (TE&TD) was nominated as a Member on Board of Directors of Puducherry Power Corporation Limited, Puducherry.

viii. CE (TE&TD) is a member and nodal officer for 'Study on Review of Institutional Capacity and Implementation of Capacity Strengthening Interventions at CEA' being conducted by TRM Division.

ix. Director (TE&TD) was nominated as a member of Committee 'B' constituted by HPGCL to arrive at reserve price for disposal of Faridabad TPS.

x. Director (TE&TD) was nominated as member in 'Expert Group on Combustion Optimisation' constituted by EEC to improve the performance of combustion system for 200/ 210 MW units.

xi. Director (TE&TD) was included as a member by MoP in the 'Task Force to formulate & Recommend the Intended Nationally Determined Contributions (INDC)' constituted for power sector.

xii. Director (TE&TD) was included as a member of the 'Expert Group' constituted by Puducherry Power Corporation Limited (PPCL) for repair of gas turbine generator at Karaikal CCPP through M/s BHEL-GE Gas turbine Services Pvt. Ltd.

Visits:

i. Officer from TETD visited following training institute in connection with recognition / renewal of recognition.
   (1) Synergem, Nagpur
   (2) Jindal Institute of Power Technology, Chhattisgarh
   (3) EDC NTPC, Korba
   (4) EDC PGCIL, Hyderabad
   (5) EDC NTPC, Ramagundam
   (6) EDC NTPC Farakka

ii. Officer from TETD Division visited DVC, Kolkatta for participation in negotiation process for CHP including Stacker- Reclaimer of Bokaro "A".

iii. Officers from TETD division visited Harduaganj TPS site to review various technical & Layout issues related to the proposed 1x660 MW Extension unit.

iv. Officers from TETD division visited Anpara TPS in connection with investigation of failure of Generator Transformer -5B & Generator Transformer -4R.

v. Officer from TE&TD Division was deputed to Japan from 2nd to 10th December, 2014 for study tour on Clean Coal Technology (CCT) Transfer Programme under CEA-J-Coal cooperation project on 'Efficiency and Environmental Improvement of Coal fired Power Stations'.

vi. Officer from TETD division visited Amarkantak TPS for investigation of fire incidence in Unit #3 (120 MW) occurred on 12.01.2015.

vii. Officer from TETD division visited Pragati Gas turbine station, Bawana, Delhi on 27.03.2015 for investigation of fire/ failure of Generator Transformer.

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 Renovation and Modernisation (R&M) and Life Extension Programme (LEP) from 7th Plan onwards till 11th Plan

R&M Programme in a structured manner was initiated in 1984 as a centrally sponsored programme during 7th Plan. The programme continued during the two Annual Plans 1990-91 & 1991-92 and during the 8th , 9th , 10th and 11th Plan. The Plan wise achievements are given below:-

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

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

135 thermal generating units with aggregate capacity of 29367 have been identified for implementation of R&M/LE works during 12th Plan period. Out of this a total of 70 nos. thermal generating units with aggregate capacity of 12066 MW for LE works and 65 nos. thermal generating units with aggregate capacity of 17301 MW for R&M works have been identified for the 12th Plan. Break-up summary of LE and R&M works of 29367 MW to be taken up during 12th Plan in terms of Central/State sector-wise is furnished below:-

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

6.9 Achievement of R&M/LE Works:

R&M and LE works on 8 thermal generating units with aggregate capacity of 901.76 MW were completed in FY 2014-15. R&M and LE works on 24 thermal generating units with aggregate capacity of 2741.26 MW have been completed during 12th Plan period (Upto 31.03.2015). Out of this, R&M works on 9 nos. thermal generating units with aggregate capacity of 1060.5 MW and LE works on 15 nos. thermal generating units with aggregate capacity of 1680.76 have been completed during 12th Plan period. The Year wise achievements of R & M Projects during 12th Plan (upto 31.03.2015) is furnished at **Annexure-6D**.

6.10 Monitoring of R&M Projects

To review the progress of R & M and LE works being implemented at Thermal Power units are being monitored by carrying out site visits, holding the review meetings and Monthly / Quarterly Status of the projects. Based on the data/information collected Quarterly Review Report on status of R&M projects were prepared.

6.11 Details of Thermal units under shut down for R&M and LE works

The following 8 Units were under shut down for execution of R&M and Life Extension works:-

S.No.	Name of the TPS	State/Utility	Unit No.	Capacity (MW)
1.	Patratu	Jharkhand/JSEB	9	110
2.	Obra TPS	U.P/UPRVUNL	10	200
3.	Obra TPS	U.P/UPRVUNL	11	200
4.	Obra TPS	U.P/UPRVUNL	7	100
5.	Harduagunj	U.P/UPRVUNL	7	110
6.	Barauni	Bihar/BSPGCL	6	110
7.	Barauni	Bihar/BSPGCL	7	110
8.	Bandel	W.Bengal/WBPDCL	5	210
			Total	**1150**

6.12 Technical Appraisal of DPR for R&M works of Bulawayo Thermal Power Station of Zimbabwe.

A Feasibility Report was prepared by WAPCOS (Consultant) on use of Circulating Fluidized Bed Combustion (CFBC) Technology at Bulawayo Thermal Power Station in Zimbabwe for replacement of existing Boilers with CFBC Boilers as well as refurbishment of existing Steam Turbines and Generators under the Line of Credit (LoC) of US $ 87 million to the Government of Zimbabwe for upgradation of Bulawayo Thermal Power Station. The report was examined by CEA and comments/ observations on the Feasibility Report were sent to MoP and WAPCOS on 08.10.2014.

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

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 among the three other issues. The development of Standard Documents was envisaged to be done in two phases.

The MoP nominated CEA as Project Implementing Agency in December 2009 to carry out the Phase-II Activity. M/s Lahmeyer International (India) Pvt. Ltd has been appointed as consultant w.e.f 16-03-2012 for "Development of the Tender Procedures and Model Contract for the R&M of Fossil Fuel based Power Plants in India" under Phase-II Activity.

The Draft Model Documents and Draft Phase-II Activity Report were submitted by M/s. Lahmeyer by June, 2014. The Draft Model Documents and Draft Phase-II Activity Report were accepted by CEA on 26.12.2014. The final Documents and final Phase-II Activity Report submitted by M/s. Lahmeyer on 29.09.2014 are under examination in CEA.

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

M/s Evonik/ Steag 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 physical Progress of the programme is as under:-

i) Nasik TPS

The DPR for Unit-3 (210 MW) prepared by the consultant, has been accepted by CEA and the same has been sent to MAHAGENCO on 12.12.2014.

ii) Kolaghat TPS

The DPRs for Unit-1,2& 3 (3x210 MW) of Kolaghat TPS, WBPDCL prepared by the consultant have been accepted by CEA and the same have been sent to WBPDCL on 12.12.2014.

iii) Bokaro 'B' TPS

The revised DPRs for Unit-1, 2& 3 (3x210 MW) of Bokaro 'B' TPS prepared by the consultant. have been accepted by CEA and the same have been sent to DVC on 12.12.2014.

6.13.2 Development of the Tender Procedures and Model Contract for the R&M of Fossil Fuel Based Power Plants in India." Funded by KfW Development Bank– Germany . (Phase –II Activity)

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. It is intended to apply the documents for the Energy Efficiency Programme financed by KfW.

A Task Force on "Development of Tender Procedures and Model Contracts for the Renovation & Modernization (R&M) of Fossil Fuel Based Power Plants in India" under the chairmanship of Member (Thermal), CEA has been constituted vide MoP letter no. 5/33/2009-S.Th. dated 29/10/2009 comprising the members from MOP,CEA, NTPC and various power utilities to carry out the Phase-II Activity. M/s Lahmeyer International India Pvt. Ltd has been appointed as a consultant w.e.f 16-03-2012 for carrying out the Phase -II Activity. The present status of the above consultancy job is as follows:

A. The fifth meeting of the Task Fore on Developing of Tendering Procedure and Model contract for the R&M of fossil Fuel Based Power Plant in India was held in CEA on 14.5.2013. Based on the comments and discussions in the Task Force Meeting the following documents have been finalized:-

1. Model Document on Feasibility Report
2. Model Document on Detailed Project Report,
3. Model Document on RLA/CA Report
4. Model Document on Energy Audit Report

B. M/s Lahmeyer have submitted the Draft Model Tender Documents for selection of R&M contractors for the following packages:-

1. Boiler & Auxiliaries
2. Turbo Generators & Auxiliaries
3. BoP Packages
4. Coal Handling Plant
5. Ash Handling Plant
6. Electrical BoP

C. Model Tender Document for R&M consultant as well as the Implementation Support Consultant have also been prepared and submitted by M/s Lahmeyer (India).

6.13.3 "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 implementation of Energy Efficient R&M of 640 MW capacity comprising Bandel TPS Unit-5(210 MW) of WBPDCL, 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 US $ 7.5 million GEF grant for the Component-2.

6.13.4 World Bank funded EE R&M Pilot Projects

i) <u>Bandel TPS, (Unit-5, 210 MW)</u>

WBPDCL issued Letter of Award (LOA) to M/s Doosan Heavy Industries & Construction Co. Ltd and their associate on January 10, 2012 and the contract was signed on 29th February, 2012**.** Unit Shut Down has been taken on November 17, 2013 and Zero Date of R&M works of BTG package was declared as 2nd Dec, 2013. Erection work of Boiler & its Auxiliaries have been complete. Boiler Hydro Test was carried out successfully on 02.12.2014. Light up of Boiler was done on 26.12.2014. Turbine works have also been completed. The unit is now expected to be synchronized by 15th July, 2015.

ii) <u>Koradi TPS, (Unit-6,210 MW)</u>

Mahagenco issued the Letter of Award to M/s BHEL Ltd. on May 31, 2013. The contract has been signed on December 18, 2013. The project is in design and engineering phase. Drawing approvals, Vendors approvals, Quality Plan approvals,BBU approvals etc. are in process. Execution of R&M works is scheduled from 25th August 2015 to 21st April, 2016.

6.13.5 Technical Assistance to CEA

CEA is implementing the project on "Technical Assistance to CEA for Addressing the Barriers to Energy Efficient R&M of Coal Fired Generating Units in India". The consultants appointed for the above project are namely, ABPS Infrastructure, M/s KPMG, M/s Mercados Energy Market India and M/s WAPCOS Ltd. Brief Status of various consultancies under Technical Assistance.

Sl No	Name of Study	Current Status
1.	Implementation Support Consultancy (ISC)	CEA has appointed ABPS Infrastructure Advisory Private Limited as Implementation Support Consultant (ISC) on October 28, 2010. The consultant is assisting in analysing & providing comments on the outputs of other consultants under the project. ABPS has also assisted in conducting the in-house technical & management training by KPMG.
2.	Review of Institutional Capacity and	M/s KPMG have been appointed to carry out the study on 16-07-2012. KPMG has already submitted report on Customer Expectation Survey which has been accepted by CEA. The draft

	Implementation of Capacity Strengthening Interventions at CEA	report on Capacity Strengthening Plan of CEA was submitted on 16.05.2014 which is under finalisation.
3.	Reduction of barriers to R&M interventions in thermal power plants in India	M/s Mercados Energy Market India was appointed as a consultant on 02.04.2012. The Study Report has been accepted by CEA in January, 2014 and the same has been sent to various stakeholders in the power sector.
4.	Developing Markets for Implementation of R&M scheme in thermal power stations in India	M/s Mercados Energy Market India was appointed as a consultant on 14.05.2012. The Study Report has been accepted by CEA in January, 2014 and the same has been sent to various stakeholders in the power sector.
5.	Review of experience from Pilot R&M interventions in thermal power stations in India	M/s WAPCOS Ltd. has been has been appointed as a consultant w.e.f. 23-07-2012. They have submitted the revised draft report on Procurement Experience on 03.12.2013. The revised draft report on Review of experience in strengthening of O&M Practices was submitted by WAPCOS in January, 2015. Draft report on Review of Post R&M Experience in O&M from Pilot R&M intervention in thermal power stations in India is under preparation by WAPCOS. The revised draft report from WAPCOS on O&M Practices and Implementation Experience was received in March, 2015.

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

A MOU between Central Electricity Authority and Japan Coal Energy Centre (JCOAL) for preliminary study of Efficiency and Environment improvement study in coal fired power plants was signed on 30.4.2010 to carryout necessary diagnostic activities in few candidate coal-fired power plants pertaining to Energy Efficient Renovation & Modernisation works and finding out measures to overcome barriers for promoting R&M, towards carrying out efficiency and environmental improvement of coal-fired power plants in India.

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)of DVC and one unit each from Badarpur TPS and Unchahar TPS of NTPC were selected for studies during the 2nd phase. JCOAL team visited these stations during December, 2012. The final report for carrying out study for energy efficiency oriented R&M activities was submitted on 15th April, 2013.

During the 2014-15 a workshop was held on 13.11.2014 on "Project on Efficiency and Environmental Improvement of Coal Fired Power Stations – Towards sustainable, stable and low carbon supply of electricity.

Under Clean Coal Technology (CCT) Transfer Programme three study tours to Japan were organized during 2014-15 to visit Sub-critical and Ultra

Supercritical power stations in Japan for exposure to various applicable technologies and equipment as well as O&M techniques through exchange of experiences. 43 Officers from MoP, CEA and Power utilities had participated in the study tours.

Recognising the importance of the bilateral co-operation, 3rdMoU is intended to be signed between CEA and JCOAL The draft of the 3rd MoU to be signed between CEA & JCOAL was under finalization.

6.15 Fly Ash Generation & Utilization

6.15.1 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 are prepared. The Reports are submitted to Ministry of Power and Ministry of Environment and Forest. The said report is now also being uploaded on web site of CEA for bringing the information in public domain.

6.15.2 MoE& F's Notifications on Fly Ash Utilization

To address the problem of pollution caused by fly ash and to reduce the requirement of land for disposal of fly ash, MoEF has issued notification dated 14th September, 1999 on fly ash utilization and subsequently issued amendments to said notification on 27th August, 2003 and again on 3rd November, 2009 stipulating targets for utilization of the fly ash so as to achieve 100% utilization by all thermal power stations in a phased manner.

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

6.15.3 Fly Ash as a Resource Material

Traditionally, ash (Fly ash and bottom ash) generated at coal/lignite based thermal power stations has been disposed off in ash ponds as waste material. Ash has now been recognized as a 'resource material' and 'useful commodity' capable of being utilized in most of the civil construction activities in an eco-friendly manner. Fly ash has pozzolanic properties and has large number of applications in various construction activities.

6.15.4 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, 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.

6.15.5 Status of Ash Generation & Utilization for the Year 2013-14 & 1st Half of the Year 2014-15

During 2014-15, data on fly ash generation and utilization for the year 2013-14 and 1st half of 2014-15 bringing out the status of fly ash generation and its utilization including status of compliance of MoEF's notification were prepared.

(A) Brief Summary

As per data for the year 2013-14 and 1st half of the year 2014-15 received from coal/lignite based thermal power stations, the present status of fly ash generation & utilization is given in the table below:

Description	2013-14 (in million tone)	1st Half of the year 2014-15 (in million tone)
Nos of Coal/Lignite based Thermal Power Stations from which data was received	143	146
Data received for an installed capacity (MW)	1,33,381.30	1,33,708.80
Coal consumed (Million tons)	523.52	272.70
Ash content (%)	33.02	33.65
Fly Ash Generation (Million tons)	172.87	91.77
Fly Ash Utilization (Million tons)	99.62	48.65
Percentage Fly Ash utilization	57.63	53.01

It may be seen from above that about 57.63% and 53.01% of total ash produced at coal/lignite based thermal power stations has been gainfully utilized in various construction activities and other modes of utilization during 2013-14 and 1st half of 2014-15 respectively.

(B) Modes of Ash Utilization during 2013-14 & 1st half of the year 2014-15.

The major modes in which ash was utilized during the year 2013-14 and 1st half of year of 2014-15 are given in table below:

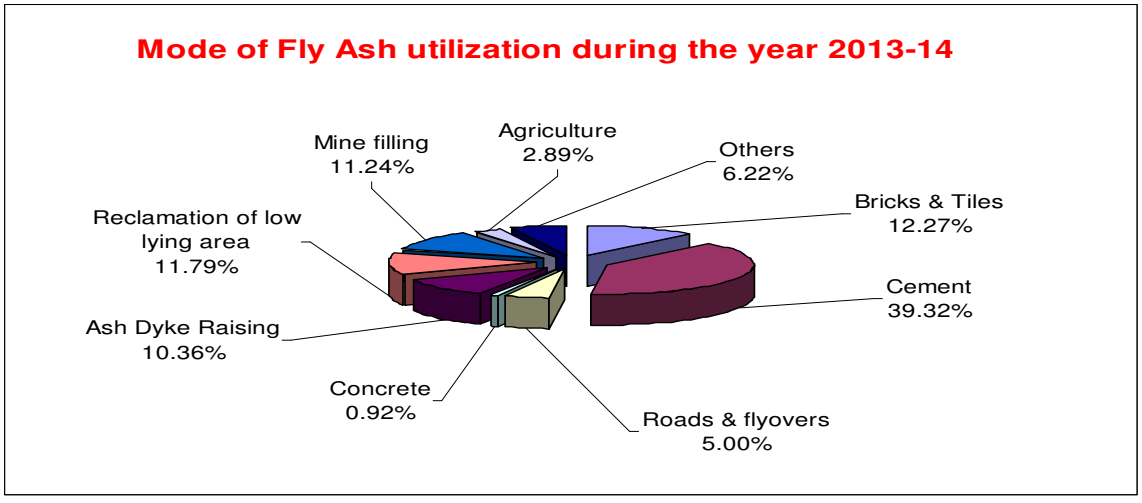
MAJOR MODES OF FLY ASH UTILIZATION DURING THE YEAR 2013-14 and 1st Half of the year 2014-15

Sl. No.	Modes of utilization	2013-14		1st Half of the year 2014-15	
		Utilization in (Million-ton)	Percentage utilization	Utilization in (Million-ton)	Percentage utilization
(1)	(2)	(3)	(4)	(5)	(6)
1	Cement	39.17	39.32	21.27	43.73
2	Bricks & Tiles	12.23	12.27	4.92	10.10

Sl. No.	Modes of utilization	2013-14		1st Half of the year 2014-15	
		Utilization in (Million-ton)	Percentage utilization	Utilization in (Million-ton)	Percentage utilization
(1)	(2)	(3)	(4)	(5)	(6)
3	Reclamation of low lying area	11.75	11.79	5.06	10.41
4	Mine filling	11.20	11.24	6.44	13.24
5	Ash Dyke Raising	10.32	10.36	4.25	8.73
6	Roads & flyovers	4.98	5.00	1.39	2.86
7	Agriculture	2.88	2.89	1.07	2.19
8	Concrete	0.91	0.92	0.37	0.77
9	Others	6.19	6.22	3.88	7.98
Total		**99.62**	**100.00**	**48.65**	**100.00**

i) Modes of Fly Ash Utilization during 2013-14

The utilization of fly ash in various modes in percentage during 2013-14 in the form of a Pie diagram is given below:

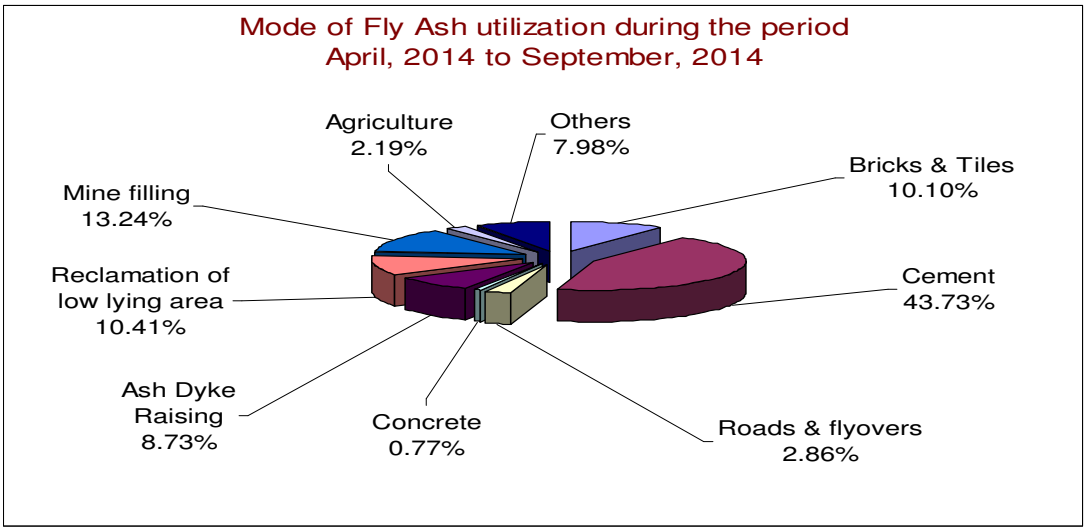


The maximum utilization of fly ash during 2013-14 to the extent of 39.32 % has been in Cement sector, followed by 12.27 % in making of bricks & tiles, 11.79 % in reclamation of low lying area, 11.24 % in mine filling,10.36% in ash dyke raising, 5.0% in roads & embankments etc.

(ii) Modes of Fly Ash Utilization during 1st half of 2014-15

The utilization of fly ash in various modes in percentage during 1st half of 2014-15 in the form of a Pie diagram is given below:

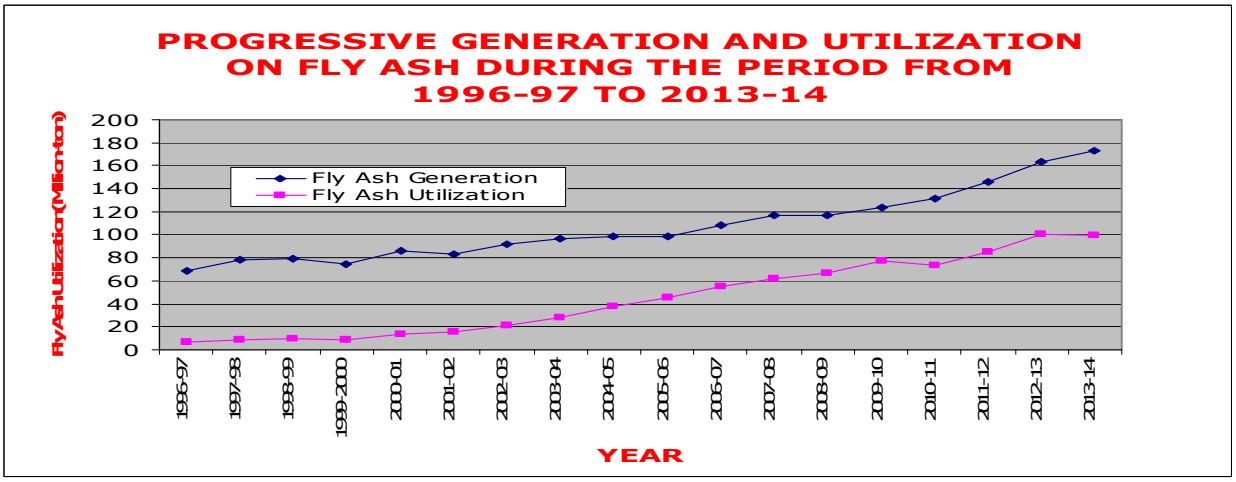
Mode of Fly Ash utilization during the period
April 2014 to September, 2014
(In Percentage)



The maximum utilization of fly ash during 1st Half of the year 2014-15 to the extent of 43.73 % has been in Cement sector, followed by 13.24% in mine filling, 10.41% in reclamation of low lying area, 10.10 % in bricks & tiles, 8.73% in ash dyke raising, 2.86% in roads & Embankment etc.

6.15.6 Progressive Fly Ash Generation & Utilization during the Period from 1996-97 to 2013-14

The fly ash utilization has increased from 6.64 million ton in 1996-97 to a level of 99.62 million ton in 2013-14. A graph showing progressive ash generation and its utilization for the period from 1996-97 to 2013-14 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 2010-11 which has picked up during 2011-12 and 2012-13 and again shows slight drop during 2013-14.

6.15.7 Conclusion

Overall utilization of fly ash during 2013-14 and the 1st half of the 2014-15 has been about 57.63 % and 53.01 % respectively against 61.37 % during 2012-13. However, the utilization level in terms of percentage is hovering around 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.

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CHAPTER – 7
DISTRIBUTION AND RURAL ELECTRIFICATION

7.1 Progress of preparation of state specific 24 X 7-Power for all documents (PFA):

Government of India have taken a joint initiative with respective state Govt. for preparation of State specific documents for providing 24 X 7 power supply to all households/homes, industrial & commercial consumers and adequate supply of power to Agricultural consumer as per state policy. This initiative aims at ensuring uninterrupted supply of power to existing consumers and providing access to electricity to all unconnected consumers in a phased manner.

An assessment of energy requirement to provide 24X7 power for all, adequacy of availability of power to the state from various sources, adequacy of Inter State Transmission System (ISTS), Intra state Transmission System and distribution infrastructure to ensure 24x7 power in the states is being made in the document. The development of renewable energy plan and energy efficiency potential in the state is also being included in the document.

Based on the requirement, an action plan is being drawn which will be executed by the State Govt. with the support of Govt. of India, wherever necessary, as per their approved plans, schemes and policies. This joint initiative of Government of India and State Government aims to enhance the satisfaction levels of the consumers, improve the quality of life of people, and increase the economic activities resulting into inclusive development of the States.

A central team was constituted by MOP under chairmanship of Chief Engineer (DP&D),CEA to guide and oversee/supervise the preparation of state specific documents. The central team constitute members from MOP, Ministry of coal, MNRE, BEE, REC, PFC, PGCIL & PTC etc. The work of the Central team is being overseen by Member (GO&D), CEA and is being coordinated by OM division of MOP. Each state Govt. has also been requested to nominate their representative for assisting in preparation of PFA document for the respective state.

Central team under Chairmanship of C.E.(DPD) held various meetings with the respective State Team for preparation of State Specific document. To begin with, documents for the State of Rajasthan and Andhra Pradesh have been prepared by DPD Division with the help of State Officers.

For preparation of state specific documents for other states, the states/UTs have been divided in three packages and three consultants i.e. M/s Crisil, M/s Mecon & M/s Deloitte have been appointed one for each package in Feb-March,2015. DPD Division was involved for preparation of 'Request for proposal (RFP) document for selection of Consultants. DPD Division was also involved in the evaluation process for appointment of Consultants for preparation of State specific documents. After the detailed evaluation PFC appointed three Consultants i.e. M/s CRISIL, M/s. MECON and M/s. DELLOTTIE.

The preparation of state documents for the states of Uttarakhand, Goa, U.P., Meghalaya, Odisha, Bihar, Telangana, Haryana, Assam, Jharkhand, Arunachal Pradesh and Maharashtra have been taken up in the initial phase. The consultants would complete the preparation of all the state specific documents within one year period in a phased manner.

The kick off meetings in the State of Uttrakhand, Goa, UP, Bihar and Jharkhand were taken up in the States wherein the DPD Division was involved in detailed discussion with the States for preparation of State specific documents. The meetings were also arranged with Secretary (Power) of the respective States for collection of data for preparation of the documents. DPD Division also circulated a detailed format to all the States for furnishing the data by all the States to the consultants for preparation of the documents of their State. The agreed programme for preparation of State specific document by the Consultant is as under :

TIME LINE FOR PREPARATION OF 24X7 PFA DOCUMENTS

Consultant	**Phase I (by June, 2015)**	**Phase 2 (by August, 2015)**	**Phase 3 (by October, 2015)**	**Phase 4 (by December, 2015)**
M/s Crisil Team Leader Mr. S.K. Sanyal	Uttrakhand	Meghalaya	Uttar Pradesh	Tripura
	Goa	Chhattishgarh	Madhya Pradesh	Daman & Diu
			Karnataka	Puducherry
			Odisha	
M/s Mecon Team Leader Mr. V.K. Singh		Bihar	Gujarat	Nagaland
		Telangana	Punjab	Manipur
		Haryana	Kerala	Mizoram
			Delhi	Lakshadweep
				Dadra & Nagar Haveli
				Chandigarh
M/s Deloitte Team Leader Mr. S Patnaik		Jharkhand	West Bengal	Himachal Pradesh
		Assam	Sikkim	J&K
		Maharashtra	Tamil Nadu	A&N Islands
		Arunachal Pradesh		

The central and state governments would meet regularly to review the progress of the programme and would strive to achieve the objectives of the programme by taking the necessary steps as envisaged in the PFA document. MoP has already started monitoring of the PFA progress of Rajasthan & Andhra Pradesh.

Ministry of Power is monitoring implementation of action plan for providing 24x7 Power For All (PFA) in respect of Andhra Pradesh and Rajasthan States. Monthly review meetings are conducted by MoP wherein representatives from CEA, Concerned States, related Ministries (Coal, MNRE, MoEF, Railway, Finance) and concerned CPSUs participate in the meeting.

7.2.1 National Smart Grid Mission

Division of CEA assisted in preparation of a draft proposal for National Smart Grid Mission and based on the draft proposal, Govt. of India has launched '**National Smart Grid Mission (NSGM)' on 27th March,2015** for planning, monitoring and implementing policies and programmes related to smart gridsin India.

The NSGM has a three-tier structure. The highest level is the Governing Council,

headed by the Minister of Power. The Council, composed of secretary-level officers of concerned Ministries and departments as members, will approve all policies and programmes for implementing the smart grid.

The second level is the Empowered Committee, composed of joint secretary level officers of concerned Ministries and departments as members, and is headed by the Power Secretary. The empowered committee will provide policy inputs to the governing council and approve, monitor and review specific smart grid projects.

The lowest tier comprises a Technical Committee headed by the chairperson of the Central Electricity Authority. The Technical Committee, comprised of Director level officers of concerned Ministries and departments, and representatives from industries and academia, will support the Empowered Committee on technical aspects, standards development, technology selection guidelines and other technical matters.

7.2.2 Development of Indian Standards on Smart Meters

Govt. of India had constituted a Committee with Chairperson, CEA as the Chairman of the Committee to review the functional requirements/specification of single phase smart meters framed by an earlier Committee. The Committee had submitted its Report in June, 2013. Since pilot Projects on Smart Grid have been taken up in various parts of the country and Smart Meters are one of the essential components of Smart Grid, need was felt for development of standards on Smart Meters since as per Central Electricity Authority Regulations on Installation & Operation of Meters, all types of meters should comply with the relevant Standards of Bureau of Indian Standards.

Since the standardization process is being dealt by Bureau of Indian Standards, the process of development of Smart Meter Standards was taken up by ET 13 Sectional Committee of BIS which deals with Equipment for 'Electrical Energy Measurement, Tariff and Load Control'. Functional requirement/specifications of Smart Meters developed by CEA was taken as the base document for development of the Standards on Smart Meters. A separate Panel P4 was constituted out of this Sectional Committee consisting of Members from CEA, CPRI, Secure Meters, L&T, Kalkitech Communication Technologies, Landis & Gyr, HPL etc. for preparation of Smart Meter Standards. Several meetings of this Panel were held and officers of Distribution Planning & Development Division of CEA have been actively participating in the meetings of ET13/P4 and the Standards are near finalization.

7.2.3 Evaluation of Award Schemes for Meritorious Performance of Distribution Companies and Rural Distribution Franchisees

AWARD SCHEME FOR DISTRIBUTION COMPANIES

Govt. of India has instituted award schemes for various segments of the Power Sector out of which one of the award schemes is linked to the performance of Distribution Companies based on various parameters such as:

- AT&C losses
- Financial Turnaround
- Metering including DT and consumer Metering
- Reliability
- Consumer Indexing
- Demand Side Management.

Comprehensive Award Scheme for Distribution Companies was instituted from the year 2004-05 onwards. The scheme is

reviewed every year and after incorporation of the modifications, the scheme is sent for approval of Chairperson, CEA. On the basis of the final approved scheme, data is requested from Distribution Companies across the country. The data received is analysed and evaluation of the performance of Distribution Companies is done on the basis of various parameters listed above. Under the scheme, for the year 2013-14, data was received from 23 Distribution Companies which was analyzed by Distribution Planning & development Division of CEA and awards were finalized. The recommendations for awards were sent to TPM Division which is the Coordinating Division for Performance Award Scheme under various categories.

AWARD SCHEME FOR RURAL DISTRIBUTION FRANCHISEES (RDFs)

From the year 2007-08 onwards, another award scheme was instituted by Ministry of Power in the area of Distribution for giving awards to Rural Distribution Franchisees for their performance based on various parameters such as:

- Type of Activity undertaken by RDF
- Metered service connections
- Revenue Management
- AT&C Losses.

This scheme is also reviewed every year and the modifications proposed are sent for the approval of Chairperson, CEA. On the basis of final approved scheme, data is requested from Distribution Companies across the country. Award scheme for the consideration year 2013-14 was sent to various Distribution Companies by CEA requesting them to send data/information on various parameters outlined in the Award Scheme. Data was received in respect of 4 Rural Distribution Franchisees which was analyzed by Distribution Planning & Development Division of CEA and awards finalized. The recommendations for awards were sent to TPM Division which is the Coordinating Division for Performance Award Scheme under various categories.

7.2.4 RESEARCH & DEVELOPMENT PROJECTS IN THE DISTRIBUTION SECTOR

- Projects approved under National Perspective Plan during 11th Plan

Following projects were approved under NPP during 11th plan. Distribution Planning & Development Division of CEA in association with CPRI, Bangalore monitors the progress of the above projects. Status of the Projects is as below:

1. Development of DVR based voltage source stabilizers for process Industry

   - Project completed in December, 2014.
   - Technical Report has been received which is under review.

2. A study on Stability & Reliability of power system with large penetration of wind power

   - Project completed in December, 2014.
   - Technical Report has been received which is under review.

3. Design and Development of High Temperature Superconducting Fault Current Limiter (FCL)

   - Phase I completed in December, 2013
   - Phase II completed in May, 2015.
   - Prototype developed and evaluated successfully.
   - Technical Report received which is under review.
   - Field Trials are pending.

4. Integrated sustainable power generation from short rotation

forestry "enhanced bio-mass" in rural and semi urban areas within clean development mechanism

- First installment of grant of amount Rs. 38 Lakhs released in April 2015.
- Quarterly Progress Reports yet to be received.

CPRI and CEA jointly organized a one day National Workshop in association with C-DAC on 23rd December, 2014 on projects completed in the area of Distribution and Distributed Generation under the National Perspective Plan of Ministry of Power, Govt. of India for Research & Development in the Power Sector. During this workshop, the following presentations were made on the completed Projects which were approved during 11th Plan:

- Presentation by C-DAC on their Project "Development of DVR Based voltage source stabilizers for process Industry".
- Presentation by CPRI (Power Systems Division) on their project "Study on stability of the power system with large penetration of wind power".
- In addition to above, following lectures were also delivered during the workshop:
- Grid Integration of large wind generation (CPRI).
- Experience of TANGEDCO on large scale integration of wind power.

- Project proposals under National Perspective Plan during 12th Plan

No Project proposal has been taken up under the National Perspective Plan in the area of Distribution and Distributed Generation during 12th Plan.

7.3 Integrated Power Development Scheme (IPDS):

DP&D Division of CEA was associated in preparation of draft concept paper & draft scheme of the IPDS .The draft scheme was considered by MOP and subsequently the Central Government sanctioned "Integrated Power Development Scheme" (IPDS) on 3rd December, 2014 for urban area for:

(i) Strengthening of sub-transmission and distribution networks in the urban areas.
(ii) Metering of distribution transformer/feeders/consumers in the urban areas.
(iii) IT enablement of distribution sector and strengthening of distribution network, for completion of the targets laid down under R-APDRP for 12th and 13th Plans by carrying forward the approved outlay for R-APDRP to IPDS.

The components at (i) and (ii) above have an estimated outlay of Rs. 32,612 crore including a budgetary support of Rs. 25,354 crore from Government of India during the entire implementation period.

The scheme of R-APDRP as approved by Govt. for continuation in 12th and 13th Plans has been subsumed in this scheme as a separate component relating to IT enablement of distribution sector and strengthening of distribution network [component (iii) above] for which Govt. has already approved the scheme cost of Rs. 44,011 crore including a budgetary support of Rs. 22,727 crore. This outlay will be carried forward to the new scheme of IPDS in addition to the outlay indicated above.

PFC is the nodal agency for the operationalization of IPDS in the country.

The scheme will cover works relating to strengthening of sub-transmission

& distribution system, including provisioning of solar panels, metering of distribution transformers/feeders/consumers in the urban areas, and IT enablement of distribution sector.

Present status of R-APDRP:

- Under Part-A of R-APDRP, 1412 projects at an estimated cost of Rs 5472.05 Crores have been approved for 31 States/UTs and Rs 2679 Crores have been disbursed till date.
- Part-A SCADA projects for 72 towns of 20 states/UTs have also been sanctioned at an estimated cost of Rs 1556.23 Crores and Rs 435.50 Crores have been disbursed.
- Under Part-B of R-APDRP, 1259 projects at an estimated cost of Rs 32215.78 Crores have been approved for 27 StatesUTs and Rs 4565.77 Crores have been disbursed.
  (**Source**:R-APDRP website)

In the monitoring committee meeting under Chairmanship of Secretary(P)held on 19/2/2015, IPDS projects for 6 states at an estimated cost of Rs.3268.33 crores have been sanctioned.

7.3.1 REPORT ON STATUS OF METERING IN INDIA

The Government of India constituted an 'Advisory Group on Power' under the Chairmanship of Sh. Suresh Prabhu for integrated Development of Power, Coal and Renewable Energy. In one of the meetings, the Advisory Group decided that an exercise be undertaken by Central Electricity Authority (CEA) in association with PFC and REC to assess the status of electricity metering in the Country under various categories of consumer. Accordingly DP&D Division collected the data and published the report on status of Metering in India.

CEA Regulations mandate that all Meters should be of static type. However as per the report on status of Metering in India, only 68.64% of the consumers in the Country have static meters,21.83% have electro-mechanical meters and balance 9.54% are unmetered.

7.3.2 CONSULTANCY TO WAPCOS FOR PREPARATION OF ELECTRICITY MASTER PLAN FOR NOIDA FOR 2021-2031

CEA is associated with WAPCOS for undertaking the Master Plan studies for development of electrical network which would be suitable to cater the power requirement of the area covered under NOIDA (New Okhla Industrial Development Authority) upto the year 2021/31. MoU with WAPCOS was signed by CEA to this effect on 3.12.14 and the work is in progress.

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

- Officers from DPD division were associated as a member of the Central Team constituted under Team Leader JS(MHA)/ JS(Min of Agriculture) 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 / Ministry of Agriculture 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 Andhra Pradesh, Karnataka, UP, Odisha, Haryana, Arunachal

Pradesh, Gujarat, for on-the-spot assessment of the damages caused by natural calamities including cyclone, flood, hailstorm, draught etc was submitted to MHA.

- Chief Engineer (DPD) along with Member (GO&D) visited Vishakhapatnam immediately after damages caused by Hud-hud cyclone. They camped there for 5 days and had discussion with the State Government Officers, CPSUs officers (NTPC & PGICL) and assisted in overseeing the arrangement regarding restoration of power supply in affected areas. The report on the matter was also submitted to MOP.

7.5 AMENDMENT IN EXISTING REGULATIONS

DP&D Division reviewed the existing Regulation of CEA and carried out the following amendments:

- Central Electricity Authority (Installation & Operation of Meters) Amendment Regulations 2015 to include metering for renewable energy plants were notified on 26th November 2014 in Govt. Gazette.

- Central Electricity Authority (Technical Standard for construction of eletrical plants and electric lines) Amendmnet Regulations 2015 for making the regulations in line with amended Indian standard on distribution transformer (IS 1180 2014) and introducing new technologies in distribution line conductors were notified on 6th April 2015 in Govt Gazette.

7.6. WORKS RELATED TO UNION TERRITORIES (UT)

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

- Technical clearance of 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 etc.
- Advise to UT Administration on specific technical, organizational and staff matters as and when referred to.
- Technical Assistance to various agencies like NDMC and National Capital Region Planning Board (NCRPB) etc.

The following main works regarding UTs were completed during 2013-14

7.6.1 UT of Daman & Diu

1. The following schemes of UT of Daman & Diu were accorded technical clearance during the year–

   - Scheme for Normal Development & Release of Service Connections (ND&SC) in UT of Daman & Diu during 2014-15.
   - Scheme for shifting of 66 KV D/c Diu –Una transmission line to nearby place on the request of Diu Administration.
   - Scheme for supply, Installation, testing and Commissioning of 6 MW grid connected Solar PV system at Diu
   - Scheme for augmentation of 66/11 KV Bhimpora S/S from 30 MVA to 50 MVA in UT of Daman & Diu

2. The following schemes were examined and comments were furnished to UT Administration-

- Scheme for augmentation of 66/11 KV Kachigam, Dalwada & Dabhel S/Ss in UT of Daman & Diu during 2014-15
- Examination of the scheme for replacement of 4Nos. of old Power Transformers at 66/11 kV Kachigam, Dabhel and Ringanwada Sub-station, Daman.

7.6.2 UT of Andaman & Nicobar Islands

- Matter received from PMO regarding representation from M/s Suryachakra Power Corpn. Ltd was examined and comments were furnished.
- Scheme for renovation and up-gradation of T&D system and control switchgears at Diglipur, North Andaman, in UT of A&N Islands was examined and comments were furnished.

7.6.3 UT of Chandigarh

Examination of the Proposal for providing Single Circuit Line from 220 kV Grid Sub Station Sector 80, Mohali to 66 kV grid Sub-Station, Sector 47, UT Chandigarh.

7.6.4 Examination of distribution schemes of States

- Technical Vetting of Electrical Packages of New Core Capital City of State of Jharkhand at Ranchi.
- Examination of the transmission & Distribution works for the area in and around Puri in Odisha – ref received from Planning Commission

7.6.5. Assistance to Ministry of External Affairs examination of distribution schemes of foreign countries

The following DPRs received from Ministry of External Affairs for Line of Credit of Govt of India for foreign countries were examined and comments were furnished-

- DPR for Line of Credit for Electricity Expansion Project for Greater Banjul Area(GBA) in Republic of the Gambia
- DPR for Line of Credit for development of Transmission & Distribution Projects in Kansai provinces of Democratic Republic of Congo
- DPR for Line of Credit for development of Power Distribution Projects in Bandundu provinces of Democratic Republic of Congo

7.6.6 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(DP&D Division), 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.

7.6.7 WORKS RELATED TO MINISTRY OF DEVELOPMENT OF NORTH EASTERN REGION (DONER)

The following DPRs received from DONER were examined and comments were furnished-

Arunachal Pradesh

The scheme for construction of 33 kV S/C Transmission Line from Kimin to Dollungmukh & C/o 2x5 MVA, 33/11 kV Sub-station at Tanio village in Arunachal

Pradesh to be funded under NLCPRwas examined and comments furnished.

7.7 Rural electrification

7.7.1 Status of Rural Electrification in the Country:

During 2014-15, 2403 number of inhabited villages have been electrified and 740526 pump sets have been energized. Cumulatively, 578957 inhabited villages constituting 96.9 % out of a total of 597464 inhabited villages (as per 2011 census) have been electrified and 20132221 pump sets have been energized in the country.

It is observed that:

- 15 States namely Andhra Pradesh, Telangana, Madhya Pradesh, Goa, Gujarat, Himachal Pradesh, Karnataka, Haryana, Kerala, Maharastra, Punjab, Sikkim, Tamilnadu, Uttarakhand & West Bengal have almost achieved 100% (more that 99%) village electrification and all UTs except Andaman & Nicobar islands have also achieved 100% village electrification.

- 4 States namely Jammu & Kashmir, Rajasthan, Tripura & Uttar Pradesh have achieved more than the National Average of village electrification (96.9%).

- 10 States namely Arunachal Pradesh, Assam, Chhattisgarh, Bihar, Jharkhand, Manipur, Meghalya, Mizoram, Nagaland & Orissa 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 31.03.2015 are enclosed.

7.7.2 Deendayal Upadhyaya Gram Jyoti Yojna" (DDUGJY):

DP&D Division of CEA was associated in preparation of draft concept paper and draft scheme of DDUGJY.The draft scheme was considered by MOP and subsequently the Government of India launched Deendayal Upadhyaya Gram Jyoti Yojna" (DDUGJY) on 3rd December, 2014 for rural area for –

(i) Separation of agriculture and non-agriculture feeders facilitating judicious restoring of supply to agricultural & non-agriculture consumers in the rural areas; and

(ii) Strengthening and augmentation of sun-transmission & distribution infrastructure in rural areas ,including metering of distribution transformers/feeders/consumers.

(iii) Rural electrification for completion of the targets laid down under RGGVY for 12th and 13th Plans by carrying forward the approved outlay for RGGVY to DDUGJY.

The components at (i) and (ii) of the above scheme will have an estimated outlay of Rs. 43033 crore including a budgetary support of Rs. 33453 crore from Government of India during the entire implementation period.

The scheme of RGGVY as approved by Govt. for continuation in 12th and 13th Plans has been subsumed in this scheme as a separate rural electrification component for which Govt. has already approved the scheme cost of Rs. 39275 crore including a budgetary support of Rs. 35447 crore. This outlay will be carried forward to the new scheme of DDUGJY in addition to the outlay of Rs.43033 crores.

REC is the nodal agency for the operationalization of DDUGJY in the Country.

DDUGJYProjects for 6 states at an estimated cost of Rs.8853.12 crores have been sanctioned by Monitoring Committee headed by Secretary(P) in the meeting held on 19-2-2015. The sanctioned cost includes funding for feeder Separation, electrification of unelectrified villages, households, Metering and system strengthening.

7.7.3 Status of RE component of DDUGJY (RGGVY)

Under Rajiv Gandhi Grameen Vidyutikaran Yojna (RGGVY), electrification of 109524 number of un-electrified villages & 314958 number of partially electrified villages and electricity connections to 2.18 crores BPL households have been achieved and Rs.36022 Crores has been released to the states upto 31.03.2015.

7.7.4 DDG Projects under RE component of DDUGJY (RGGVY)

Under RGGVY, there is a provision of capital subsidy of Rs 1000 Crores for Decentralized Distributed Generation (DDG) projects during 12^{th} and 13^{th} plan period. 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. During 12^{th}& 13^{th} Plan RGGVY, DDG projects have also been extended to those grid connected areas where power supply is available less than six hours a day.

Status of DDG project sanctioned under RGGVY:

Under DDG Projects of RGGVY, 775 projects covering 1290 un electrified villages/ hamlets in 12 states (Chhattisghar, Uttarakhand, Andhra Pradesh, Madhya Pradesh , Bihar, U.P., Jharkhand, Rajasthan, Meghalaya,Odisha, Kerala & Karnataka) at an estimated cost of Rs. 327.56 crores have been sanctioned and out of which 182 projects have been commissioned.

7.7.5 Preparation of monthly progress report for village electrification & Pumpset energisation:

The data in respect of achievement of rural electrification and energisation of pumpsets in the country was collected from State Government and compiled to issue the monthly progress report on village electrification and pumpset energisation .The updated report is put up on website of CEA regularly.

7.7.6 Status of Rural Electrification in the North Eastern States under RGGVY:

During 2014-15, 589 numbers of inhabited villages have been electrified in North Eastern States and Cumulatively, 13491 inhabited villages have been electrified .

7.8 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".

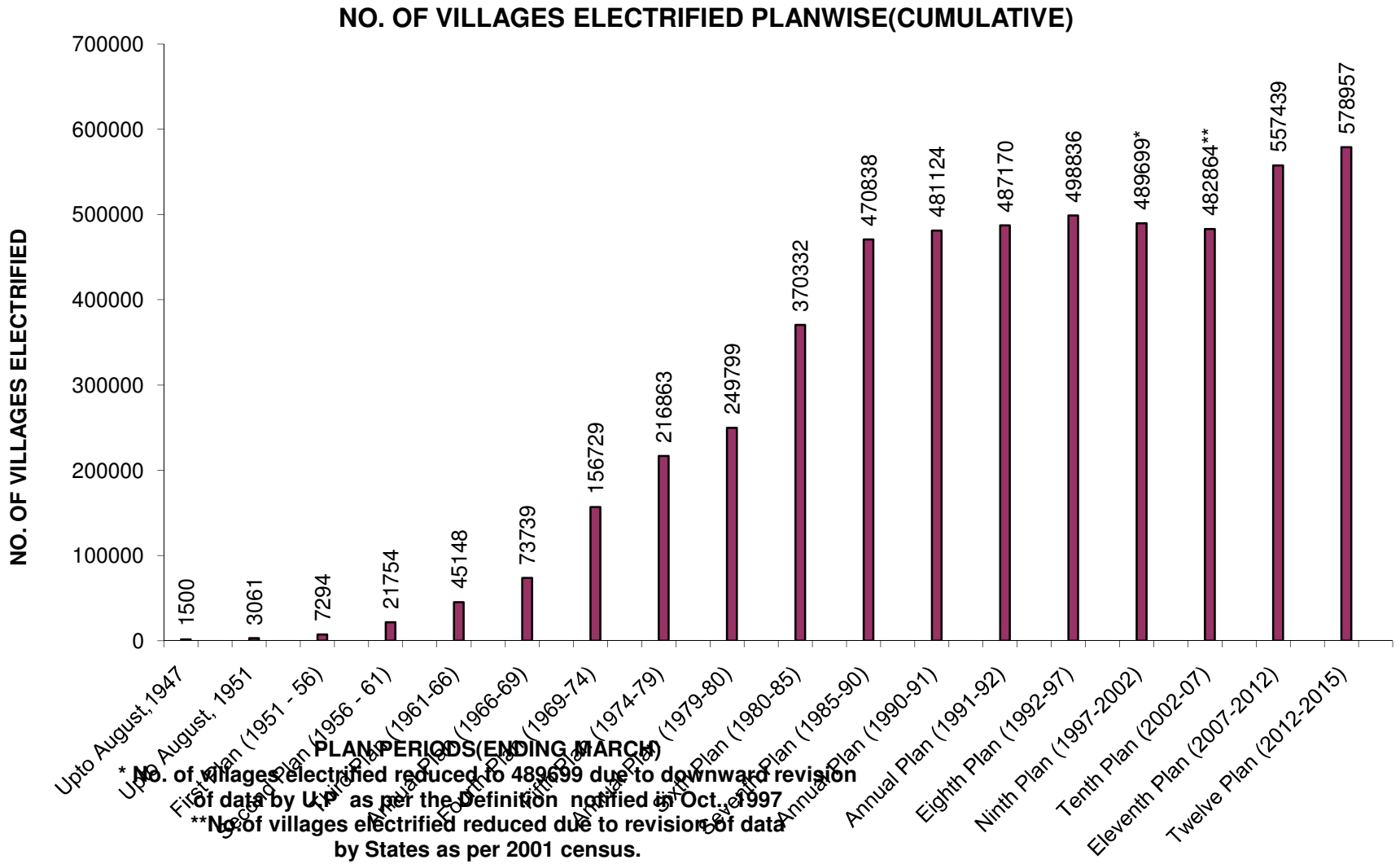
Accordingly, the matter was taken up with all the SERCs to furnish the data of Reliability Index for all the distribution licensees under their jurisdiction covering all cities and towns up to the District Headquarter towns as also for rural areas for last 5 years to enable CEA to publish the data accordingly.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

7.9 GENERAL - PREPARATION OF MATERIAL REGARDING AT&C LOSSES, RURAL ELECTRIFICATION AND OTHER DISTRIBUTION RELATED ISSUES

- Attended Monitoring Committee meetings taken by Secretary (Power) to review DDUGJY and IPDS projects and various meetings held under the aegis of Smart Grid Task Force , Smart Grid Forum, quarterly performance review meeting of REC,PFC , Ease of doing Business, World Bank, Feeder segregation etc. during the year.
- Officers of DP&D division attended various meetings in BIS as a member under various technical committees.
- Officers of this Division attended high level discussions and participated in various meeting held at MOP regarding the Steel Quality Control order issued by Ministry of Steel for implementation of mandatory BIS certification of CRGO.
- As decided in the Monitoring Committee of RGGVY, visit of the state of J&K, Manipur, Assam & Jharkhand were taken up by DPD officers for finalization of RGGVY 12th plan DPRs for these states and the report was submitted to MOP.
- Furnished material for framing reply to Parliament Questions, VIP references, Annual Report of MOP, Standing Committee on Energy, Consultative committee on Power etc regarding AT&C losses, rural electrification and other distribution related issues.
- Material furnished for various speech/questionnaire/news item for Hon'ble Minister of Power/ MOS(P) / Secretary(P) and Chairperson, CEA
- Material furnished for calling attention motion raised by Shri Jai Prakash Narayan Yadav, MP regarding electricity connection to BPL, installation of 63 to 100KVA transformer and three phase line in Bihar in 12th plan.
- Material furnished for calling attention motion raised by Shri Bhairo Prasad Mishra,MP regarding Power problem in U.P.
- Material furnished on RGGVY for the review meeting on the progress of Prime Minister Reconstruction Plan(PMRP).
- Material furnished for the conference of Power Minister of States/UTs held on 9th September,2014-regarding
- Material furnished for examination of the subject 'Implementation of RGGVY and review of functioning of Power exchanges'.
- Material on policies and programmers of MOP for Parliament for Improvement of distribution sector furnished to MOP.
- Material for COS meeting to be held on 16-2-2015 reg. SAARC Summit
- Material on 10th Session of Indo Czech Joint Commission on Economic Cooperation (JEC) held on 27-28 January 2015 - Follow up Action
- Material on 5th India –US Strategic Dialogue – follow up –reg.
- Material on record of discussions held during the meeting taken by Hon'ble MOS(I/C) for Power, Coal

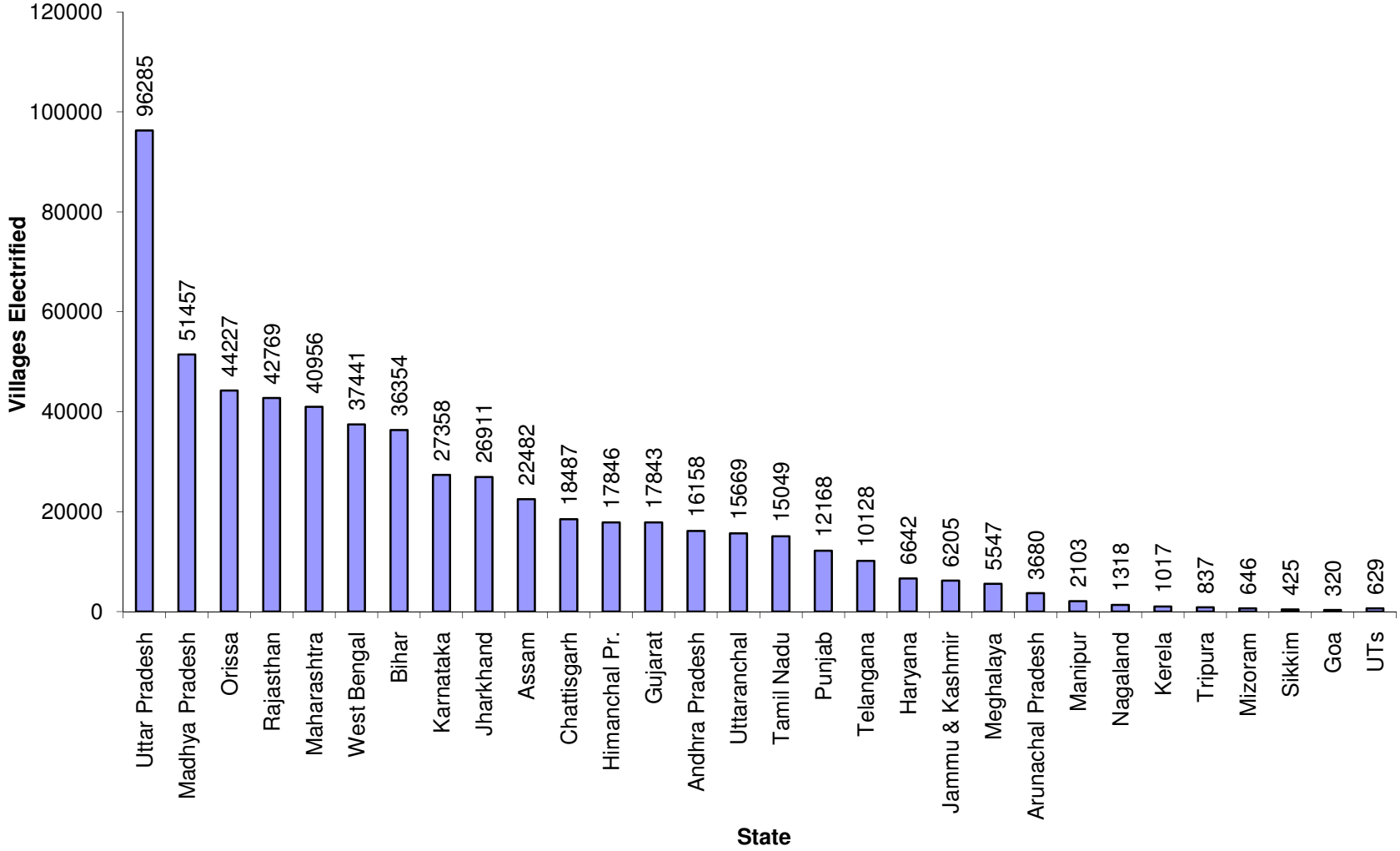
and NRE with Ambassador of Sweden on 2nd July 204 –Reg.

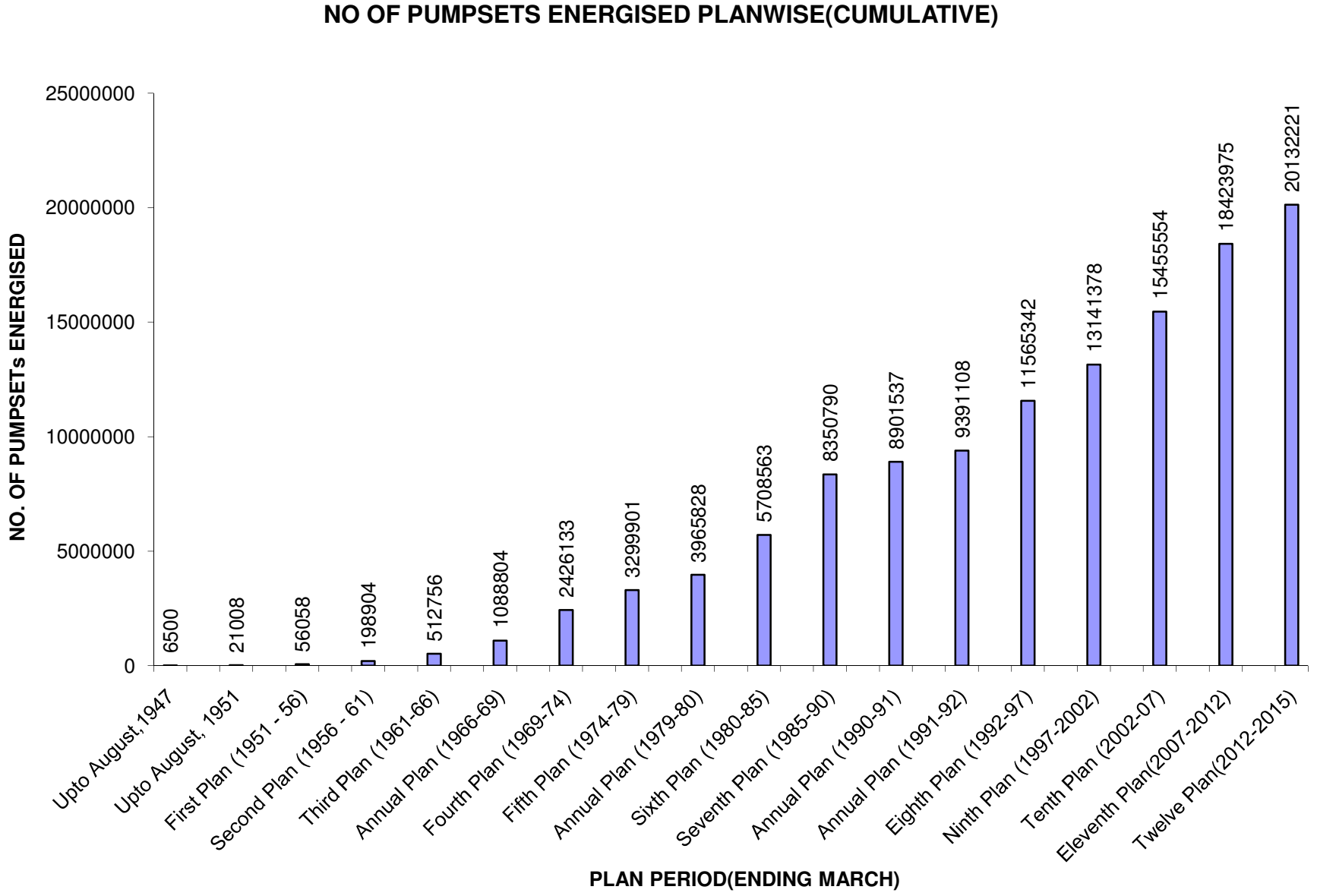
- Material for preparing Agenda Note for Power Ministers Conference
- Material for Economic Survey 2015
- Material for the meeting of the Committee on Specific Commitments (CSC) at WTO-Classification of new services
- Material on action taken /proposed to be taken on recommendations of Second report of High Level Committee on financing Infrastructure by Sh Deepak Parikh was furnished.
- Comments sent on letter received from Dr.J.P.Gupta,CMD, Nirvana Biosys Pvt .Ltd. regarding "Make in India-Made in India".
- Comment sent on notice for cut motion demand No.77 of Ministry of Power for 2014-15
- Comments on more effective use of space technology in power sector
- Comments on Roundtable Theme-6 Energy Water Nexus for CEM-5-Distribution sector furnished to MOP.
- Comments on the FOR Report on 24x7 – Power for All
- Review offormats prescribed under CEA (furnishing of Statistics , returns and Information) regulations 2007 pertaining to distribution
- Examination of the issues on which TSECL, Tripura requires assistance from Central Government pertaining to generation, transmission, distribution, system operation, protectionetc.
- Examination/ furnishing of the material regarding RTI / Redressal of Grievance representation retained from internet (CPGRAMS) addressed to Ministry of Power
- Examination of Request to abolish Entry Barrier in Smart grid Pilots under MRTP Act- MOP ref.
- Examination of the matter reg. BHEL GIS – indigenous component in GIS tendering
- Examination of the Memorandum handed over to Prime Minister by Chairman, LAHDC,LEH during PM's visit to Kargil on 12.8.2014
- Examination of the Road map for India Solar and Wind beyond 13th plan period
- Examination of matter on Shree Shakti paper Mills reg unsold renewable energy certificates
- Examination of the Letter received from Sh D R Dogra , MD & CEO, Credit Analysis & Research Ltd reg a paper on power industry, titled 'Indian Power Sector: On the cup of Change?
- Examination of matter reg. note given by Sh Neiphiu Rio, MP Lok Sabha Nagaland to Hon'ble Minister of Power, Coal & RES (I/C)
- Examination of the Report on Research Project entitled "Empirical Study of Psychology & Mindset of Electricity Consumers and the Social Impact of Power Losses in the State of J&K: Performance, Challenges & Opportunities.. forwarded by SERC, J&K"
- Examination of the issues for the Development of Power Sector in Manipur towards providing 24x7 power supply – Letter received from Chief Minister, Manipur.

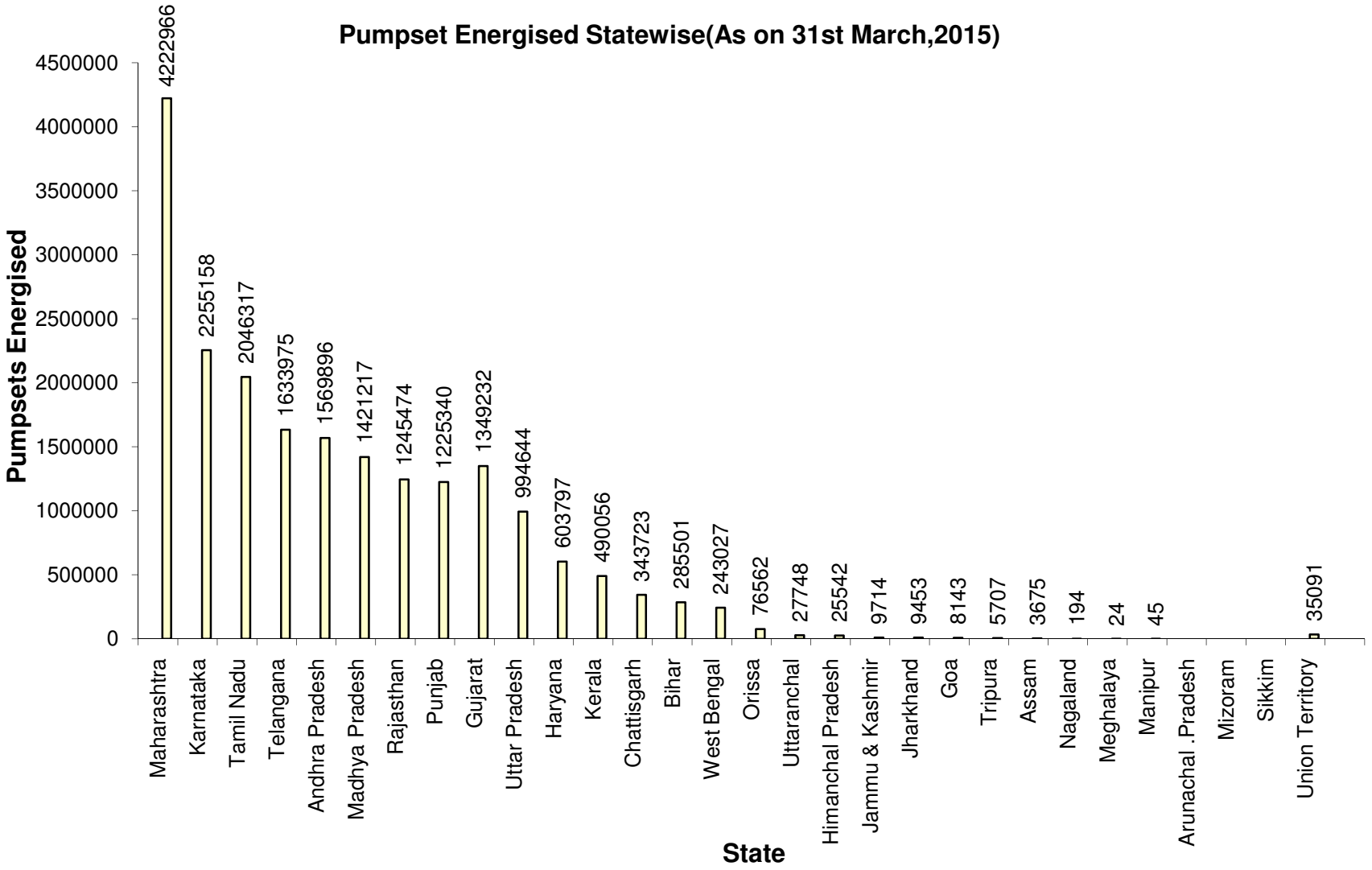


*** No. of villages electrified reduced to 489699 due to downward revision of data by U.P as per the Definition notified in Oct., 1997**

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


Villages electrified statewise(as on 31st March,2015)
Villages Electrified
120000
100000
80000
60000
40000
20000
0
96285
51457
44227
42769
40956
37441
36354
27358
26911
22482
18487
17846
17843
16158
15669
15049
12168
10128
6642
6205
5547
3680
2103
1318
1017
837
646
425
320
629
Uttar Pradesh
Madhya Pradesh
Orissa
Rajasthan
Maharashtra
West Bengal
Bihar
Karnataka
Jharkhand
Assam
Chattisgarh
Himanchal Pr.
Gujarat
Andhra Pradesh
Uttaranchal
Tamil Nadu
Punjab
Telangana
Haryana
Jammu & Kashmir
Meghalaya
Arunachal Pradesh
Manipur
Nagaland
Kerela
Tripura
Mizoram
Sikkim
Goa
UTs
State


NO OF PUMPSETS ENERGISED PLANWISE(CUMULATIVE)
NO. OF PUMPSETs ENERGISED
25000000
20000000
15000000
10000000
5000000
0
6500
21008
56058
198904
512756
1088804
2426133
3299901
3965828
5708563
8350790
8901537
9391108
11565342
13141378
15455554
18423975
20132221
Upto August,1947
Upto August, 1951
First Plan (1951 - 56)
Second Plan (1956 - 61)
Third Plan (1961-66)
Annual Plan (1966-69)
Fourth Plan (1969-74)
Fifth Plan (1974-79)
Annual Plan (1979-80)
Sixth Plan (1980-85)
Seventh Plan (1985-90)
Annual Plan (1990-91)
Annual Plan (1991-92)
Eighth Plan (1992-97)
Ninth Plan (1997-2002)
Tenth Plan (2002-07)
Eleventh Plan(2007-2012)
Twelve Plan(2012-2015)
PLAN PERIOD(ENDING MARCH)


Pumpset Energised Statewise(As on 31st March,2015)
Pumpsets Energised
4500000
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
4222966
2255158
2046317
1633975
1569896
1421217
1245474
1225340
1349232
994644
603797
490056
343723
285501
243027
76562
27748
25542
9714
9453
8143
5707
3675
194
24
45
35091
Maharashtra
Karnataka
Tamil Nadu
Telangana
Andhra Pradesh
Madhya Pradesh
Rajasthan
Punjab
Gujarat
Uttar Pradesh
Haryana
Kerala
Chattisgarh
Bihar
West Bengal
Orissa
Uttaranchal
Himanchal Pradesh
Jammu & Kashmir
Jharkhand
Goa
Tripura
Assam
Nagaland
Meghalaya
Manipur
Arunachal .Pradesh
Mizoram
Sikkim
Union Territory
State

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CHAPTER – 8
DESIGN & ENGINEERING SERVICES

8.1 Design & Engineering of Hydro Electric Projects

Central Electricity Authority (CEA) renders design & engineering services for Hydro Electric Projects under execution in the Country in Central / State Sectors and neighbouring countries. CEA is fully equipped to provide consultancy for conventional type hydro generating units, bulb/tubular type units, pumped storage schemes with a underground / surface power stations having unit capacity upto 250 MW. Design & Engineering includes complete design, techno-economic analysis, preparation of Technical 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 55 years since 1960. Till date, a total of eighty (80) hydro electric projects in India & neighbouring countries, having an aggregate installed capacity of over 17203 MW were designed/ commissioned and are in successful commercial operation (details as per Annexure-8A).

8.2 During the year 2014-2015, the design and engineering consultancy of electro-mechanical works of the following HE Projects were carried out:

(a) Within India

S. No.	Project/ Substation	State/ Executing Agency	Capacity (MW)
1.	Tapovan Vishnugad	Uttarakhand/ NTPC	4x130
2.	Ganol	Meghalaya/ MePGCL	3x7.5
3.	New Umtru	Meghalaya/ MePGCL	2x20

(b) Neighbouring Countries

S. No.	Project/ Substation	Country/ Executing Agency	Capacity (MW/ MVA)
4.	Punatsangchhu St.I	Bhutan/ PHPA-I	6x200
5.	Punatsangchhu St.II	Bhutan/ PHPA-II	6x170
6.	400 kV Jigmeling Substation	Bhutan/ BPCL	500 MVA*
7.	Salma	Afghanistan/ WAPCOS	3x14

*500 MVA capacity is a substation not generation.

8.3 R&D in Hydro Power sector

i) The following proposal received under 12th Plan under National Prospective Plan (NPP) of Ministry of Power has been recommended by SCRD and now in advance stage:

SI. No.	Project Title	Status
	Proposal under SFC memo	
1.	Development of a Selection Methodology for Road Header and Tunnel Boring Machine in Different Geological Conditions for Rapid Tunneling by Dr. A. K. Raina, CIMFR, Nagpur	In Process

The following five new proposals related to hydro power project have also been submitted by various institutes. These proposals were sent to various organizations such as CPRI, CWC, NHPC, BHEL, SJVNL, THDC and PGCIL etc for their comments/observations on technical & commercial aspects. Subsequently Task Force meetings were held with Chief Engineer (HE&TD) as convenor and task force members, project leaders and team members.

	Fresh Proposals	
1.	Development of Corrosion Resistant Coating for hydro Turbine Components by Dr. R. Jayaganthan, Assoc. Prof., IIT Roorkee	Under Consideration of Task Force
2.	Development of Nanostructure Hydrophobic coating for the protection of Outdoor HV insulator used in Electrical Power System by Dr. Ramesh Chandra, Assoc. Prof., IIT Roorkee	Under Consideration of Task Force
3.	Development of Nano Structure Coating to mitigate silt erosion in Hydro Turbine components: A case study for Pelton needles by Dr. Ramesh Chandra, Assoc. Prof., IIT Roorkee	Under Consideration of Task Force
4.	Development of Power Converter System Technology for Variable Power Generation and Variable Speed Drive for Pumped Storage Hydro by Dr. S.P. Singh, Professor, IIT Roorkee	Under Consideration of Task Force
5.	Development of Erosion Resistant Bainitic Steel for Hydro Turbine Components by Dr. Sandip Ghosh Chowdhury, Senior Principal Scientist, CSIR-NML, Jamshedpur	Under Consideration of Task Force

ii) The following two proposals were also received under Research Scheme on Power (RSOP) from CBIP:

a) Latest Technologies and Best Practices in Geological land Geotechnical Investigations of Hydro-electric Projects.
b) Innovative Approaches to Counter Problems Faced during Execution of Underground Works of Hydro-electric Projects

8.4 Scrutiny/Examination/Preparation of DPRs of HE Projects

a) Chapters on electro-mechanical equipments, related drawings and bill of quantities of 26 nos (25nos. in India+ 1 no. in Bhutan) of DPR of new H.E Projects aggregating to 13216 MW including clarifications/ drawings/ documents etc. as received from time to time were examined and commented upon.. General layout Plan/Salient features of new HEPs (Total 13 nos) under S&I at pre-DPR stage aggregating to about 9123 MW were examined & commented upon. Also bill of quantities (BoQs) of E&M equipment as per TEC vis-a-vis as executed of 13 nos. HEPs aggregating to 5228 MW, whose concurrence from CEA already accorded, were also examined / commented upon. A list of these Hydro Electric Projects is given at appendix-I.

b) Preparation of electromechanical chapter, drawings and related bill of quantities for the following projects were under progress:

i) Kirthai-II HEP, (6x140+2x35+2x10 MW), J&K
ii) UJH Multipurpose HEP (3x62 + 1X24 + 1x2 MW), J&K
iii) Kalez Khola HEP(2x26MW), Sikkim
iv) Tuipui HEP (2x20MW), Mizoram

(A) **Appendix-I**

S. No.	Project Name	State/ Executing Agency	Capacity (MW)
(a) Hydro Projects (India)			
1.	Luhri	H.P.	601
2.	Seli	H.P.	400
3.	Sachkhas	H.P.	267
4.	Chhatru	H.P.	126
5.	Dugar	H.P.	421
6.	Chirgaon Majhgaon	H.P.	60
7.	Sawalkote	J&K	1856
8.	UJH Multipurpose	J&K	212
9.	Jamrani	J&K	14
10.	Kirthai-I	J&K	390
11.	Kiru	J&K	660
12.	Kwar HEP	J&K	560
13.	New Ganderbal	J&K	93
14.	Bowala Nand Prayag	Uttarakhand	300
15.	Ken Betwa Link Project Phase-I	M.P.	78
16.	Demwe Upper	Ar. P.	1080
17.	Attunli	Ar. P.	680
18.	Heo	Ar. P.	240
19.	Tato-I	Ar. P.	186
20.	Kamla	Ar. P.	1800
21.	Nyukcharong chu	Ar. P.	96
22.	Loktak D/S	Manipur	66
23.	Kynshi	Meghalaya	270
24.	Lower Kopli	Assam	120
25.	Kulsi Multipurpose	Assam	55
(b) Foreign Projects			
26.	Sankosh	Bhutan	2585
TOTAL			**13216**

(B)

Survey & Investigation Reports			
1.	Thana Plaun	H.P.	191
2.	Reoli Dugli	H.P.	420
3.	Nakhtan	H.P.	460
4.	Subhansiri Upper	Ar. P.	1800
5.	Subhansiri Upper	Ar. P.	2000
6.	Anjaw	Ar. P.	270
7.	Yamne-I	Ar. P.	111
8.	RHO	Ar. P.	93
9.	Pauk	Ar. P.	145
10.	Oju Subansiri	Ar. P.	1878
11.	Attunli	Ar. P.	680
12.	Maphew	Meghalaya	75
13.	Turga PSP	W. B.	1000
TOTAL			**9123**

(C)

Examination/ comments on Bill of Quantities in Revised cost estimates of following Projects:			
1.	Chamera-III	H.P.	231
2.	Uri	H.P.	240
3.	Alakhnanda	Uttarakhand	300
4.	Nimo-Bazgo	J&K	45
5.	Sewa-II	J&K	120
6.	Kishanganga	J&K	330
7.	Pare	Ar. P.	110
8.	Kameng	Ar. P.	720
9.	Turial	Mizoram	60
10.	Teesta Low Dam-III	W. B.	132
11.	Punatsangchhu-I	Bhutan	1200
12.	Punatsangchhu-II	Bhutan	1020
13	Mangdechhu	Bhutan	720
TOTAL			**5228**

8.5 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. Some of the proposals received are as listed below:

i) Follow Up report of Protocol 3rd session of India – Hungary Joint commission (JCEC) on Economic Co-operation.
ii) Information for cooperation in the field of hydro sector for the first meeting of the India – Colombia joint working group (JWG) on investment and trade.
iii) Agenda preparation for indo Czech JWG proposed in mid September 2014, Department of Heavy Industry, Udyog Bhawan, New Delhi.
iv) Inter-Ministerial Preparation meeting for 29th Session of India-Russia Working Group on Trade and Economic Cooperation (IRWGTEC) at Udyog Bhawan, New Delhi.
v) Inter-Ministerial Meeting preparatory to India-Canada Foreign Office Consultations (FOCs)-regarding
vi) Release of position paper by European Business Group – reg.

8.6 Scrutiny of Innovative Proposals /Schemes for Hydro Power generation

Various Innovative Proposals/Schemes as received from R&D Division examined. Some of the proposals received are as listed below:

i) Innovative proposal on a system for converting Electrical Power into rotational energy power through driving vehicles-reg.
ii) Innovative proposal regarding Electricity Generation through milking of gravitational energy.
iii) Innovative scheme regarding twin generators on single turbine common shaft.
iv) Innovative proposal regarding system for converting Electrical Power into Rotational Energy Power .
v) Redressal of grievance pertaining to innovative schemes regarding power generation..

8.7 Other Miscellaneous Works

i) Participation in committee meetings for composing guidelines on planning of structure of hydro power project on sediment management.
ii) Presentation by Director (HE&TD) in National Water Academy (NWA), Pune on :
   a) Pumped Storage Hydro Power Plant
   b) Scope of modernization in electro-mechanical equipment of hydro power plant.
iii) 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.

8.7.1 Design and Engineering of Thermal Projects

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

a. Review consultancy for HPGCL's Hisar Thermal Power Project (2x600 MW)

b. Review consultancy for DVC's Raghunathpur Thermal Power Project (2x600 MW)

c. Review consultancy for HPGCL's Yamunanagar Extn. TPP (1x660MW)

d. Review consultancy for UPRVUNL's Harduaganj 1x660MW supercritical unit.

e. Scrutiny of 'Model Tender document for selection of R&M consultants, R&M Fossil fuel based power plants in India' prepared by TRM Division.

f. Assisting TP&I Division for grant of Project Authority Certificates (PACs) for exemption of excise duty for Ultra Mega, Mega and provisional Mega Power Projects.

8.7.2 Consultancy and Technical Support in PTCC

CEA provided consultancy and technical support in PTCC to the projects and others on following schemes:

a) Telecommunication consultancy assignment for Punatsangchhu –I Hydroelectric Project (6X200MW), Bhutan.
b) Consultancy assignment for Jigmeling 400kV GIS Substation, Bhutan – Technical Specification for PLCC System.

8.8 Design and Consultancy Assignments (Civil Aspects) for Thermal/ Hydro/ Power Transmission Projects during 2014-15

TCD Division of CEA carried out the following specific works in respect of thermal/hydro/power transmission projects during 2014-15:

8.8.1 Thermal Power Projects

a) Harduaganj Thermal Power Station Extension-II (1x 660 MW Supercritical units) at Harduaganj, U.P.

Price bid and Technical deviations (civil) of the bidders have been examined and observations communicated to Project Authorities

8.8.2 Hydro Power Projects

a) Punatsangchhu-I HEP (6 X 200 MW), Bhutan

Designs/drawings pertaining to layout of pothead yard, civil and structural drawings of pertaining to GIS hall and cable supporting structures have been examined and observations communicated to Project Authorities.

b) Punatsangchhu-II HEP (6 X 170 MW), Bhutan

Designs/drawings pertaining to layout of pothead yard, Structural Designs and drawings of Powerhouse EOT Cranes, Butterfly Valve House EOT Crane and GIS Hall EOT Crane were examined and observations communicated to Project Authorities.

8.8.3 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

- 132 kV D/C Badampora-Bandipora Line
- 132 kV D/C Ramban-Khelani-Kishtwar Line
- 132 kV D/C Thathri- Bhalessa Line

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

Various reports pertaining to soil investigation, benching proposal coarse/fine aggregates etc examined and observations communicated to Project Authorities.

c) Project Management cum Consultancy Services to MEA for strengthening of India-Nepal Power Transmission Interconnection:

Technical deviations of the bids for transmission lines and substations examined and observations communicated to M/s WAPCOS Ltd.

d) 400KV ICT GIS Substation at Jigmeling, Bhutan of BPC

Technical specification and schedule of quantities prepared, prebid queries examined and observations communicated to Project Authorities.

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CHAPTER – 9
ECONOMIC AND COMMERCIAL ASPECTS OF POWER INDUSTRY

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

9.1 Performance of State Electricity Boards/ State Power Utilities

9.1.1 Average realization vis-à-vis Average Cost of Supply

The Table below gives the average cost of supply and average realization covering all sectors in the country on the basis of the data made available by various SEBs /Utilities:-

Average Cost of Supplyand Average Realisationof Electricity From All Sectors

(in paise / unit)

Year	Average Cost of Supply	Average Realization	Gap.
2010-11	398.00	303.00	95.00
2011-12	455.00	330.00	125.00
2012-13	501.00	376.00	125.00

Source: PFC Reports on the performance of the State Power Utilities for the years 2010-11 to 2012-13

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 20010-11 to 2012-13 are indicated below: -

Aggregate Losses (without subsidy) of Power Utilities

Year	Losses (Rs. Crores)
2010-11	75,297
2011-12	1,02,411
2012-13	1,05,070

Source:PFC Report on the performance of State Power Utilities for the years 2010-11 to 2012-13

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 Government 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 working of SEBs also effectively blocked investments 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 programmers.

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 payment/dues as on 30.9.2001 was waived and the rest of the dues were securitized through tax-free bonds issued by respective State Government.

9.1.4 Trend in Outstanding Dues Payable to CPSUs by SEBs / Utilities

CEA has been monitoring the status of the outstanding dues payable by the SEBs / Power Utilities to CPSUs. The total outstanding dues payable by various power utilities to Central Public Sector undertakings (CPSUS), based upon the information / data received in CEA from these CPSUs upto 31.03.2015, is Rs.18891.59 crores. Details of outstanding dues payable by power utilities to CPSUs is given in **Annexure- 9A**.

9.2 Electricity Tariff & Duty and Average Rates 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 tilted "Electricity Tariff & Duty and Average Rates of Electricity Supply in India". The latest edition (March, 2014) contains information on retail electricity tariff applicable in various States / Utilities effective during the year 2013-14.

The publication provides assimilation of regulatory data on notified tariffs of various States, the estimated data on average rates of electricity supply & electricity duty for different categories of consumers, as well as summarized data on power supply schemes for special categories of consumers. The estimated average rates of electricity published herein have been computed on the basis of tariff notifications and tariff orders received from various State Power Utilities / State Regulatory Commissions.

The effective rates for different consumer categories have been worked out assuming different energy consumption for various sanctioned load keeping in view the urbanization, increase in usage of electricity appliances and improvement in the standard of living. In this edition, tariff revisions subsequent to the last edition of the publication have been incorporated. Tariff applicable in about 45 States / Utilities have been indicated.

The sanctioned load and monthly energy consumption have been assumed for each category of consumer. Considering the tariff notified by the State Government / SERCs, the total amount payable by a particular category of consumer of the

assumed load and monthly energy consumption is worked out. Taxes and Duties are then added to arrive at the total average estimated rate of electricity Supply in terms of Paise / Kwh.

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 important 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 comments / recommendations of CEA were sent to MoP / Concerned departments.

(i) Draft note for the cabinet on amendments in Electricity Act, 2003.
(ii) Monitoring of Infrastructure Sectors and finalization of Infrastructure targets for 2014-15.
(iii) Suggestions / Comments of consumer Education & Resources Centre-Ahmedabad to improve the power sector in India.
(iv) Alignment of Results Frame Work Document (RFD) 2014-15 with president's address.
(v) Inter Ministerial preparatory meeting for 20th session of India-Russian Working Group on Trade & Economic Cooperation (IRWGTEC) on 23rd September, 2014 at Udyog Bhawan, New Delhi.
(vi) Standing Committee on Energy (2014-15) selection of subject for detailed examination during the year 2014-15.
(vii) Sixth Trade Policy Review of India, visit of WTO-TPR team to Delhi & Mumbai from 19-25th November, 2014.
(viii) Trade Policy Review of Japan.
(ix) Rules of origin under the ongoing negotiation of the proposed India-Canada Comprehensive Economic Partnership Agreement(CEPA).
(x) Information regarding benefits / Grants applicable for setting up new Super Critical Power Project under Government Sector at Kalisindh & Banswara, Rajasthan Rajya Vidyut Utpadan Nigam Ltd.

9.4 Financial Restructuring Plan (FRP) for State DISCOMS:

A Scheme was notified by MoP vide OM dated 05.10.2012 to ensure turnaround of State owned DISCOMS having accumulated losses and facing difficulties in financing operational losses. Initially Discoms of four states i.e. Tamil Nadu, Uttar Pradesh, Rajasthan and Haryana participated in the scheme. Central Government vide notification dated December 13, 2013 then further extended the cut-off date for reckoning the eligible amount of Short Term Liability (STL) to cover Andhra Pradesh / Telengana, Jharkhand and Bihar States.

The Central Government is to provide incentive by way of (a) grant equal to the value of the additional energy saved by way of accelerated AT&C loss reduction beyond the loss trajectory specified under RAPDRP and (b) capital reimbursement support of 25% of the principal repayment by the State Government on the liability taken over by the State Government under the scheme. The incentive is available only if certain mandatory conditions are abided by them.

Two levels of monitoring committees are constituted, one each at the Central and State level. They are the Central Level Monitoring Committee (CLMC) and the State Level Monitoring Committee (SLMC). The SLMC will monitor the quarterly performance of each state Discoms on status of its mandatory conditions. The

SLMC will meet every quarter and send its report to CLMC till the Discoms achieve financial turn-around. The CLMC will verify these performances and recommend the grant of incentives to the states.

The Central Electricity Authority (CEA) has been mandated to work as Secretariat of CLMC and appoint an agency for Third Party Verification along with fixing the Terms of Reference (TOR). The Third Party Agency (TPA) will do the verifications of the achievements of the respective participating States for the Central Level Monitoring Committee (CLMC) and submit its verification report on an annual basis. The CLMC will review the performances and recommend the grant of incentives to the states as per the scheme.

CEA in the process of appointment of TPA after publishing the 'Notice Inviting Tender' in four news papers and also placing the same on the website of CEA as well as on the Central Procurement Portal(CPP) along with the Request For Proposal(RFP). The appointment of Third Party Agency is in process.

Though the scheme was notified with the cut-off date for reckoning the eligible amount of STL as 31.3.12, the issue of bonds was delayed due to delay in processing by Financial Institutions. Due to delay in issue of bonds, the state owned Discoms have further accumulated huge losses. In this regard, some of the states have requested to consider the following:

(i) The scheme may be extended by at least 2 years;
(ii) Loan amounting to 50% of the losses during the delay in implementation may be made available ; and
(iii) The interest on the additional loan amount may be reduced by at least 4%.

CEA has recommended to MoP to consider the issues raised by States/Discoms favourably.

9.5 Nomination of officers to the following Committees:

a) Ministry of Water Resources has constituted a committee to review the present Benefit-Cost Ratio (B.C. Ratio) criteria in view of the latest Land Acquisition Act-2013. Chief Engineer (F&CA division), CEA has been nominated as member of the above committee in place of Chief Engineer (HPA Division), CEA.

b) Ministry of Coal has constituted a Study Group to consider the question of revision of rates of royalty on coal and lignite in all its aspects. Chief Engineer (F&CA division), CEA has been nominated as member of the above Study Group.

c) CEA has constituted a Bid Evaluation Committee for appointment of third party in regard to verification of mandatory conditions under the FRP scheme. Chief Engineer (F&CA division), CEA has been nominated as the chairman of the above committee.

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, material for the President's Address to both the Houses of the Parliament during the Budget Session for 2014-15 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, 2005 and the Tariff Policy, 2006.

9.9 Monitoring of National Electricity Policy, 2005

The position on NEP implementation is reported by Assam, Chhattisgarh, Goa, Karnataka, Jharkhand, Madhya Pradesh, Maharashtra, Punjab, Rajasthan and Telengana.

- **Rural Electrification:** 5 States report the percentage coverage, which ranges from about 74% in the case of Chhattisgarh to 100% in the case of Goa.
- **Capacity added and peak demand met**: The position is reported by 5-7 States.
- **Transmission network added by the non-Central sector** is reported by 5 States.
- **Ring-fencing of SLDCs:** State load despatch centres continue to be under the supervision of the state transmission utilities. Himachal Pradesh and Tripura report ring-fencing, while few others report separation of accounts.
- **Metering:** Consumer metering is almost complete in most States, barring agricultural/ BPL consumers, but reported only by 7. Chhattisgarh has achieved 100%coverage.
- **Open access:** Open Access to bulk consumers of over 1 MW has been allowed in most States, but 7 report the number of applications received and disposed off.

9.10 Monitoring of National Tariff Policy (NTP) – 2006

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

(i) **Procurement of Power:** As per the Tariff Policy, all future requirement of power should be procured competitively by distribution licensees. Procurement of power through competitive bidding has been started in 12 States.

(ii) **Operating Norms:** Operating norms in distribution have been notified in 20 States whereas they are not notified in the 3 States. Status has not been reported by the remaining 6 States.

(iii) **Multi Year Tariff (MYT):** MYT tariff in 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 10 States (Arunachal Pradesh, Goa, Haryana, Mizoram,

Nagaland, Punjab, Sikkim, Tripura, Uttar Pradesh and Uttarakhand). Status has not been reported by the remaining 4 states.

(iv) **Availability Based Tariff (ABT):** ABT has been introduced in 12 States (Arunachal Pradesh, Assam, Delhi, Goa, Gujarat, Himachal Pradesh, Nagaland, Orissa, Rajasthan, Tripura, Uttar Pradesh, and West Bengal) and not introduced in 14 States whereas Maharashtra, Manipur and Meghalaya have not reported the status.

(v) **Time of Day (ToD) Tariff for peak and off peak hours**: ToD tariff has been introduced in 15 States (Assam, Bihar, Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Nagaland, Odisha, Punjab, Tamil Nadu, Tripura, Uttarakhand and West Bengal). Status has not been reported by Maharashtra, Manipur and Meghalaya.

(vi) **Renewable Purchase Obligation (RPO)**: RPO has been notified in all the States except Sikkim whereas status has not been reported by the State of Manipur.

(vii) **Fixation of Solar RPO**: RPO is yet to be fixed in the State Sikkim whereas status has not been reported by the State of Manipur.

(viii) **Key Performance Indicator**: Key Performance Indicators (KPI) have been specified in 12 States viz. Andhra Pradesh, Assam, Chhattisgarh, Delhi, Gujarat, Jammu & Kashmir, Madhya Pradesh, Maharashtra, Odisha, Punjab, Uttarakhand and West Bengal.

(ix) **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. Tariff ranges within $\pm$20% in the States of Assam, Bihar, Goa, Haryana, Himachal Pradesh, Mizoram and Odisha.

(x) **Grant of Subsidy Committed by the State Government:** To ensure financial viability of the utilities, 15 States (Andhra Pradesh, Assam, Delhi, Gujarat, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Mizoram, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, and West Bengal) are releasing subsidy to the utilities in advance.

9.11 National Electricity Fund

(i) The NEF instituted in March 2012, provides interest subsidy of Rs.8, 466 crores on loans of Rs. 25,000 crore sanctioned by financial institutions during 2012-14 to the public and private utilities/ distribution companies for improving the distribution infrastructure. It excludes the RGGVY & RAPDRP projects (subsumed in IPDS & DDUGJY). The REC is the nodal agency. The reforms-linked eligibility preconditions include operationalization of SERCs, business plan for fiscal turnaround of utilities, re-organization of SEBs, release of subsidy by State Governments, submission of audited annual accounts and timely filing of tariff petitions. The interest subsidy is linked to the progress in the reforms, namely, reduction in AT&C losses and in the revenue gap, return on equity and notification of multi-year tariffs. Eligible utilities are assigned marks on the basis of the reform parameters and depending on

the scores, are judged eligible for subsidy rates of 5 - 7% in Special category & focused and 3 - 5 % in others.

(ii) The NEF Steering Committee approved 307 State proposals worth Rs.10954 crores in 2012-13, 707 proposals worth Rs. 15667 crore in 2013-14 and Rs.1530 cr. worth of proposals above the ceiling, presuming under-utilization by utilities for various reasons. It sanctioned interest subsidy of Rs. 4 lakhs for 2012-13 and Rs. 747 lakhs for 2013-14.

9.12 Expenditure in the power sector

Investment expenditure in the sector, 2012-13 to 2014-15, is shown in the table.

Investment Expenditure in power, all-India

(crore)

Sector/ Segment	2012-13	2013-14	2014-15
CENTRE	**50398.00**	**52126.59**	**29799.41**
Thermal	23970.38	25567.06	24605.47
Hydro	5872.55	6340.13	5169.96
Transmission	20507.83	20137.75	0
Distribution	47.24	81.65	23.98
STATE	**56308.65**	**60698.95**	**22621.36**
Thermal	22405.36	26610.18	17167.19
Hydro	1557.75	1105.3	712.05
Transmission	12141.54	14020.81	0
Distribution	20204	18962.66	4742.12
PRIVATE	**91517.43**	**66977.85**	**44372.69**
Thermal	86242.14	62869.21	41810.2
Hydro	3149.64	1910.22	1164.34
Transmission	NA	NA	NA
Distribution	2125.65	2198.42	1398.15
GRAND TOTAL	**198224.1**	**179803.4**	**96793.46**
Thermal	132617.9	115046.5	83582.86
Hydro	10579.94	9355.65	7046.35
Transmission	32649.37	34158.56	0
Distribution	22376.89	21242.73	6164.25

Note:

- Data for 2012-13 and 2013-14 is provisional and partial for 2014-15.
- Investment in captive power & nuclear plants, non-conventional & renewable energy plants excluded.
- Data on private investment is incomplete;
- Transmission data
  - Investment in state transmission is anticipated, not actual;
  - No data is available from some Eastern, North-Eastern States;
  - Private projects data is from the Expert Committee on Private Investment report, no update;
- Distribution data in Central Sector is for the UTs.

9.13 The Electricity Act, 2003 and follow-up:

9.13.1 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 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.

9.13.2 Electricity (Amendment) Bill, 2014

Electricity (Amendment) Bill, 2014 has been introduced by the Government in the Lok Sabha on 19th December, 2014 after obtaining the approval of the Cabinet.

Salient Features:

- Providing for National Renewable Energy Policy in addition to the existing National Electricity Policy and Plan.
- Setting up of Renewable Energy Generating Station and provision for spinning reserve.
- To grant separate license for Distribution & Supply and for specific exemptions to promote Renewable Energy.
- To amend sections 29, 33, 142 & 146 of the said Act so as to enhance the penalty for non-compliance of directions by the concerned Load Dispatch Centres.
- To prescribe the manner of collection and realization of any dues under the relevant laws for the time being in force in that State, along with the Electricity dues.
- To insert new parts VI A and VI B in the said Act relating to supply of electricity and other provisions relating to Distribution and Supply of Electricity, respectively.
- To promote Hydro Power and reduction in regulatory assets.
- To insert a new section 109 A in the said Act relating to "Review of performance of Appropriate Commission" to constitute a Committee for reviewing the performance of the said Commission.

9.13.3 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.
x. Technical Standards for connectivity of the Distributed Generation Resources, notified on 07.10.2013.
xi. Technical Standards for connectivity to the Grid ,Amendment Regulations, 2013 notified on 15.10.2013.
xii. Installation & Operation of Meters Amendment Regulations, 2014 ,notified on 26.11.2014

9.14 Status of Power Sector Reforms

9.14.1 Restructuring of State Electricity Boards /Electricity Departments/ Power Departments

All the States having State Electricity Boards (SEBs) prior to enactment of Electricity Act, 2003, unbundled their State Electricity Boards (SEBs).

The Electricity Act, 2003 is silent about State Power Departments. Though, State of Tripura has created Tripura State Electricity Corporation Limited (TSECL) as a single Corporation to look after generation, transmission and distribution, trading and SLDC operations. Manipur recently unbundled and corporatized it's Electricity Deptt. into 2 State owned functionally independent entities- (i) Manipur State Power Company Limited (MSPCL) as State transmission and generation utility and (ii) Manipur State Power Distribution Company Limited (MSPDCL) as distribution licensee w.e.f. 01.02.2014. In the States of Goa, Sikkim, Arunachal Pradesh, Mizoram and Nagaland, all matters relating to generation, transmission and distribution of electricity are managed by the respective Power Departments/ Energy Department.

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.

9.14.2 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. A separate JERC for Goa and Union Territories has been constituted. All the SERCs are functional.

9.14.3 Constitution of Special Courts

So far, 26 States viz. Assam, Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Manipur, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Telangana, Tamil Nadu, Tripura, Uttar Pradesh, Uttrakhand, West Bengal and Delhi have set up Special Courts for expeditious disposal of cases relating to the theft of electricity.

9.14.4 Constitution of Consumer Grievances Redressal Mechanism

Consumer Grievances Redressal Forums (CGRF) have been constituted in 28 States by various distribution licensees for redressal of grievances of consumers, namely Assam, Andhra Pradesh, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka,

Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Manipur, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Telangana, Tamil Nadu, Tripura, Uttar Pradesh, Uttrakhand, West Bengal and Delhi.

Ombudsmen have been appointed in 28 States to look into the non-redressal of grievances by the CGRF , listed as follows Assam, Andhra Pradesh, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Manipur, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Telangana, Tamil Nadu, Tripura, Uttar Pradesh, Uttrakhand, West Bengal and Delhi.

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

- Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
- Andhra Pradesh Re-organization Act, 2014- Advisory under Section 86(2) of Electricity Act
- Nuclear Safety Regulatory Authority Bill, 2014
- Standing Committee on Energy- Examination of the subject " Electricity (Amendment) Bill, 2014. – regarding.
- Issues raised by WTO Secretariat pertaining to Energy sector.
- Report of Advisory Group for integrated development of Power, Coal and Renewable Energy.
- Draft MOU between Govt. of People's Republic of Bangladesh and GMR Upper Karnali Hydro Power Ltd. – regarding.
- Electricity (Amendment) Bill, 2014 (Amendment of Section 135) by Shri Feroze Varun Gandhi, M.P – regarding.
- Electricity (Amendment) Bill,2014- Representation from CII for treating Cogeneration at par with Renewable Energy in view of its excellent environmental benefits and protection- regarding.
- Recommendation of the panel of experts on Reforms in CPSEs
- PMO reference regarding petition filed by Shri Padneesh Gupta.
- Proposal from Ministry of Shipping regarding Jawaharlal Nehru Port Trust (JNPT) from the purview of Electricity Act 2003
- Auction of materials pertaining to Ministry of Power for closing year 2014 -15.
- Meeting of the states for furnishing of Rules/Regulations under Act of Parliament administered by the MOP.
- VIP reference received from Chairman, Parliamentary Committee on energy regarding power agreements between Nepal and Bhutan.
- Powers Purchase Agreements (PPA) for Nepal Projects.
- Ministry of Power to monitor the progress of various provisions of National Tariff Policy (NTP), National Electricity Policy (NEP) & Progress of Reform Measures as per the Electricity Act, 2003.
- 10th Session of Indo- Czech Joint Commission on Economic Cooperation (JEC) to be held on 27-28 January 2015 seeking ATR on the

Protocol of the 9th session and New Agenda points is Discussion on the 10th Session of JEC.

- Ministry of Power constituted Reform Monitoring Unit (RMU) to monitor the progress of various provisions of National Tariff Policy (NTP), National Electricity Policy (NEP) & Progress of Reform Measures as per the Electricity Act, 2003.

- Regarding in the matter of Petition No. 526/2014 filed by Noida Power Company Ltd Vs Power Grid Corporation of India Ltd and others before CERC.

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

- In the matter of Petition of Smt. Rajni Singh , Advocate, Delhi High Court regarding cost of Electricity, Fixed charges , Electricity Tax, and other related issues.

- In the matter of issues raised under Rule 377 by Shri Tamradhwaj Sahu, Hon'ble Member of Parliament regarding providing free Electricity for operation of motor pumps for supply of drinking water in state of Chhattisgarh.

- Suggestions from NTPC regarding Amendment in Tariff, Parity Policy and CERC Regulation.

- Action plan in the SLC meeting minutes dated 27.06.2014 & coal linkage to 2x660 M W Karcham T.P.P.

- Mumbai Metro line 3 (Colaba-Baandra- Seepz) land green proposal – reference from WRPC Mumbai.

- Enquiry into serious violation of CEA's techno economic clearance by Jai Prakash Group implementing 1000 MW Karcham Wangtoo Hydro Project in Arunachal Pradesh.

- Installation of two additional unit of 830 MW each at GPL Madras.

- Request for restoration of linkage coal supply from SECL to Lanco Amarkantak Power LTD (LAPL) to generate and supply power from unit# 2 (300MW).

9.17 Court Cases

Number of Court Cases has been dealt with throughout the year, of which more important ones are briefly given below:

- Writ Petition No.5940/2014- Steel Traders V/s U.O.I. & Ors. filed before the Hon'ble High Court of Delhi regarding implementation of Quality Control 2nd Order S.O. 415 (E) dated 12th March, 2012 issued by Ministry of Steel mandating BIS Certification for import of Electrical Steel (CRGO) & Steel Products effective from 01st October, 2013

- Writ Petition (C) No. 1172/2014 filed before the High Court of Delhi at New Delhi by Sh. R.P.Sharma Vs. Govt. of NCT of Delhi & others.

- Writ Petition No. 104 of 2014 filed by BSES Rajdhani Power Ltd. Vs Union of India and others before Hon'ble Supreme Court of India.

- Writ Petition No. 105 of 2014 filed by BSES Yamuna Power Ltd. Vs Union of India and others before Hon'ble Supreme Court of India

- Application/Appeal No. 102/2014 filed by M/s Sandplast (India) Ltd. and others Vs Ministry of Environment & Forest & Ors. before the National Green Tribunal , New Delhi under section 18(1) read with section 14,15 & 19 of National Green Tribunal Act.,2010.

- Writ Petition (Civil) No. 5765/2014 filed by Shri Lauv Kumar Vs Union Of India and Others before Hon'ble High Court of Delhi under Article 226 of the Constitution

- Civil Appeal No. 5841/2014 filed by Mr. Bharat Jhunjhunwala Vs Uttar Pradesh Electricity Regulatory Commission & Ors. before Hon'ble Supreme Court of India, Delhi

- W.P. (C) N. 3047 of 2014 filed by GMR Chhattisgarh Energy Limited Vs Union of India pending before Hon'ble High Court of Delhi.

- Petition No. 187/MP/2014 filed before CERC, New Delhi by Tata Power Trading Company Limited (TPTCL) vs. National Load Dispatch Centre and others.

- Appeal No. 233 of 2014 and IA Nos. 370,371,372 of 2014 filed by M/s Sasan Power Limited Vs CERC against CERC's Order dated 08/08/2014 in Petition No. 85/MP/2013 before Hon'ble Appellate Tribunal of Electricity , Delhi

- Appeal (C) Nos. 2841 of 2015 with Prayer for Interim relief in Supreme Court of India by the M/s Ramco Cements Ltd. Vs. Andhra Pradesh Electricity Regulatory Commission(APERC) & others

- Appeal (C) Nos. 2689 of 2015 with Prayer for Interim relief in Supreme Court of India by the M/S Andhra Sugars Ltd. Vs. Andhra Pradesh Electricity Regulatory Commission (APERC) & others

- PIL No. 64 of 2014 filed by Janapaalana Party in the Hon'ble High Court at Hyderabad.

- Application No. 196/2014 filed by Smt Rashmi Singh & Sh Dev Kumar Kaneri Vs NTPC & others. before Hon'ble National Green Tribunal , Central Zone Bench .

- Writ Petition (Civil) No. 71 of 2014 filed before the High Court of Chhattisgarh.

- CWP No. 6648/2013 filed by Kala Amb Chamber of Commerce and Industry vs Union of India before the Hon'ble High Court of Himachal Pradesh at Shimla.

- Special Civil Application No. 7117-19 of 2014 filed in the Hon'ble High Court of Gujarat at Ahmedabad.

- Application No. 19/2014 filed before the Hon'ble National Green Tribunal, Western Zone, Pune – MoP was the Respondent.

- Civil Appeal No. 1795 of 2013 filed in the Supreme Court of India by M/s Allain Duhangan Hydro Power Limited

- Special Leave Application (SCA) No. 100 of 2014 filed by Shri Janaksingh Jaswantsinh Gohil Vs UOI and others including Bhopal Dhule Transmission Co. Ld. as Respondent No. 3 before the Hon'ble High Court of Gujarat at Ahmedabad.

- Special Civil application (SCA) Nos. 18419 & 18420 of 2013 filed before

the Hon'ble High Court of Gujarat at Ahmedabad.

- Public Interest Litigation (PIL) No. 223 of 2014 (A.S) Suo Moto filed by the Hon'ble High Court of Bombay.

- Civil Writ Petition No. 8882 of 2014 titled Narain Chand V/s Central Electricity Authority filed before the Hon'ble High Court of Himachal Pradesh at Shimla.

- PIL No. 87 of 2014 filed in the Hon'ble High Court of Maharashtra, Nagpur Bench by Yograj Hardeo Jarad and Ors. v/s Union of India.

- Special Civil Application Nos. (SCA) No. 16283 of 2014 & 16284 of 2014 filed by Shri Pravinsinh Jashwantsinh Gohil & Shri Janaksinh Jashwantsinh Gohil respectively Vs UOI and others before the Hon'ble High Court of Gujarat at Ahmedabad.

- Special Civil Application No. 14269 of 2014 filed by Kasham Isup Mohtat vs Union of India before Hon'ble High Court of Gujarat at Ahmedabad.

- Special Civil Application(SCA) No. 408 of 2015 filed by Gomanbhai Motiabhai Vasava & Pratapbhai Ramubhai Patel V/s Union of India & others before the Hon'ble High Court of Gujarat at Ahmedabad.

- Writ Petition (Civil) No. 2565 of 2014 file by Shri Jogeshwar Prasad Patel & others before the Hon'ble High Court of Chhattisgarh at Bilaspur.

- Suit (Misc. Case No. 32/2014) filed by Shri Naresh Chandra Adhikary Vs Union of India & others before the Hon'ble Court of District Judge of Jalpaiguri.

- Civil Writ Petition (CWP) No. 20562/2012 – Mawana Sugars V/s State of Punjab & others filed before the Hon'ble High Court of Punjab & Haryana at Chandigarh.

- Writ Petition No. 31985 of 2014 - M/s Aruna Alloy Steels (P) Vs The TANGEDCO and others filed before Hon'ble Madras High Court.

- Writ Petition No. 26925,20803 & 21423 of 2014 -RBA Exports Private Ltd. Vs The TANGEDCO and others filed before Hon'ble Madras High Court.

- Writ Petition No. 31985 of 2014 - Sonal Vyaper Ltd. Vs The TANGEDCO and others filed before Hon'ble Madras High Court.

- Writ Petition No. 22083 & 22084 of 2014- G. V. Anand Bhushan Vs Union of India filed before Hon'ble Madras High Court.

- Writ Petition No. 23391 of 2014 - TECHSUN Energies & Engineering Vs CEA filed before Hon'ble Madras High Court.

9.18.1 Technical Committee for Smart Grid Regulations

A Technical Committee for Smart Grid Regulationswas constituted by CERC on 11th October 2013. The Committee continued to work in the year 2014-15, making presentations before the Forum of Regulators. Chief Engineer, Regulatory Affairs, CEA was one of the Members of the Committee, also being Chair of Working Group -6 on "Policy and Regulation" in the India Smart Grid Forum (ISGF). Chief Engineer (F&CA) was also invited as a Special Invitee of the Working Group of

Forum of Regulators on "Model Regulations on Smart Grid".

9.18.2 Sub-committee of the Central Advisory Committee (CAC) on Congestion in Transmission

Chief Engineer, Regulatory Affairs, CEA, as Member Secretary of the National Reliability Council for Electricity (NRCE),was nominated as a Member of the Sub-committee of the Central Advisory Committee (CAC) on Congestion in Transmission.

9.19 National Reliability Council for Electricity

CERC, vide their Order dated 11.12.2013 in the matter of calculation of Total Transfer Capability (TTC), Available Transfer Capability (ATC) and Transmission Reliability Margin (TRM) directed CEA to constitute a National Reliability Council, with participation from CTU, CEA, RPCs/ State Representatives and IITs, which shall approve computation of TTC of various Transmission corridors for the month, for the purpose of reliable operation of the Grid. Accordingly, National Reliability Council for Electricity (NRCE) was constituted on 21.2.2014, which would look into all aspects of reliability of the National Grid. The work is of continuing nature.Since the calculation of TTC, ATC and TRM are related to system reliability, the functions of NRCE also included looking after all aspects of reliability, including grid or system protection schemes.

The NRCE held five meetings. It also constituted a Working Group to help the NRCE. The Working Group also held five meetings. It has since issued "Operational Guidelines for determination of TTC, ATC and TRM for the short-term horizon (0-3 months)" in February 2015.

The scheme for funding for the NRCE is under approval. The proposal basically has two components, one for hiring of consultants/for conducting system studies of Total Transfer Capability (TTC), Available Transfer Capability (ATC) and Transfer Reliability Margin on a monthly basis, hiring of consultants for carrying out studies on power system stability of the studies of power system stability: i.e Transient rotor angle stability; Small-signal rotor angle stability; and Voltage stability and the protection of the entire national grid on a periodic basis, in-house capacity building & any others matters related to Reliability of the Grid, and the other for conducting meetings of the NRCE and its sub group on monthly basis.

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CHAPTER – 10
POWER GENERATION

10.1 Power Generation

Generation of power by the utilities & IPPs was about **1048673** million units during the Year 2014-15. This represents a growth of about 8.43% over the same period during previous year 2013-14 as per details given below:

Power Generation during 2014-15

Category	Programme (MU)	Actual (MU)	Shortfall (-)/ Excess(+)	% of Programme	Growth(%) with w.r. to previous year Actual Gen.
Thermal	858603	878320.01	19717.01	102.3	110.83
Nuclear	35300	36101.54	801.54	102.27	105.47
Hydro	124297	129243.68	4946.68	103.98	95.84
Bhutan Imp	4800	5007.74	207.74	104.33	89.46
TOTAL	1023000	1048672.9	25672.9	102.51	108.43

Note: Generation from stations having installed capacity upto 25MW 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 2014-15 are as under:

- Gross annual generation of the country was 1049 BU.
- The annual growth in the energy generation during the year was 8.43%.
- Thermal and Nuclear achieved a growth rate of 10.83%, 5.47% whereas Hydro generation and Import from Bhutan reduced by 4.16% and 10.54% respectively. The electricity generation during the year 2014-15 from coal based thermal power stations was 800.333 BU showing a growth rate of 12.12% against 8.28% over same period last year.
- Growth of thermal generation was high on account of improved coal supply.
- In North East region the growth in thermal generation was 28.58% highest amongst all other regions.
- The national average PLF was 64.46% and out of total 167 no. of Coal/Lignite stations, 74 Stations with an aggregate installed capacity of 85,130 MW, achieved PLF above national average.

8 number of thermal power stations with an aggregate installed capacity of 6740 MW operated above 90% PLF.

The sector wise PLF Generation during 2014-15 is given below:

Category / Sectors	Programme (MU)	Actual (MU)	PLF (%)
CENTRAL SECTOR			
THERMAL	310289	308048.75	73.96
NUCLEAR	35300	36101.54	80.74
HYDRO	47828	50959.83	
TOTAL	**393417**	**395110.12**	
STATE SECTOR			
THERMAL	302656	299258.32	59.83
HYDRO	65142	67544.69	
TOTAL	**367798**	**366803.01**	
PVT. SECTOR IPP			
THERMAL*	223119	249427.98	60.2
HYDRO	9907	9297.66	
TOTAL	**233026**	**258725.64**	
PVT. SECTOR UTL.			
THERMAL	22539	21584.96	65.07
HYDRO	1420	1441.5	
TOTAL	**23959**	**23026.46**	
TOTAL PVT	**256985**	**281752.1**	
BHUTAN IMP	4800	5007.74	
ALL INDIA REGION			
THERMAL	858603	878320.01	64.46
NUCLEAR	35300	36101.54	80.74
HYDRO	124297	129243.68	
BHUTAN IMP	4800	5007.74	
TOTAL	**1023000**	**1048672.9**	

***Includes import form some of the Captive Plant

10.2 Plant Load Factor of Thermal & Nuclear Power Stations

During the year 2014-15 the average PLF of thermal was 64.46 %.

74 thermal power plants achieved PLF higher than the All India average PLF of 64.46% as per details given in the table below:

List of Thermal Power Stations which have achieved PLF above National Average of 64.46% during the year 2014-15

S. No.	Name of Station	Installed capacity (MW)	Sector	State	PLF (%)
1	TORANGALLU TPS(SBU-I)	260	PVT	KARNATAKA	97.85
2	TORANGALLU TPS(SBU-II)	600	PVT	KARNATAKA	97.25

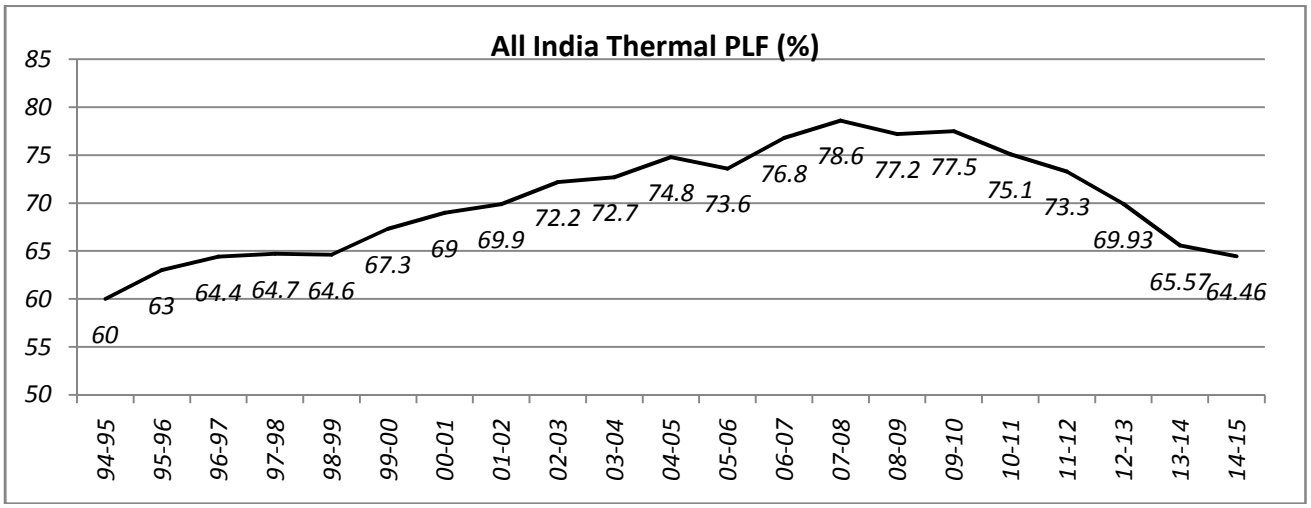
S. No.	Name of Station	Installed capacity (MW)	Sector	State	PLF (%)
3	TALCHER (OLD) TPS	460	CENTRAL	ORISSA	93.90
4	KAKATIYA TPS	500	STATE	TELANGANA	93.75
5	OP JINDAL TPS	1000	PVT	CHHATTISGARH	92.61
6	NEYVELI (EXT) TPS	420	CENTRAL	TAMIL NADU	92.00
7	DAHANU TPS	500	PVT	MAHARASHTRA	91.26
8	TALCHER STPS	3000	CENTRAL	ORISSA	90.18
9	RAMAGUNDEM STPS	2600	CENTRAL	TELANGANA	89.75
10	BUDGE BUDGE TPS	750	PVT	WEST BENGAL	89.08
11	SABARMATI (D-F STATIONS)	340	PVT	GUJARAT	88.19
12	KORBA STPS	2600	CENTRAL	CHHATTISGARH	88.08
13	BAKRESWAR TPS	1050	STATE	WEST BENGAL	87.09
14	NEYVELI TPS-II	1470	CENTRAL	TAMIL NADU	86.44
15	SIMHADRI	2000	CENTRAL	ANDHRA PRADESH	85.76
16	DSPM TPS	500	STATE	CHHATTISGARH	85.59
17	NIWARI TPP	45	PVT	MADHYA PRADESH	85.53
18	CHAKABURA TPP	30	PVT	CHHATTISGARH	84.89
19	SOUTHERN REPL. TPS	135	PVT	WEST BENGAL	83.73
20	KOTHAGUDEM TPS (NEW)	1000	STATE	TELANGANA	83.69
21	NEYVELI TPS(Z)	250	PVT	TAMIL NADU	83.48
22	TUTICORIN TPS	1050	STATE	TAMIL NADU	83.42
23	SIPAT STPS	2980	CENTRAL	CHHATTISGARH	83.41
24	Dr. N.TATA RAO TPS	1760	STATE	ANDHRA PRADESH	82.95
25	SINGRAULI STPS	2000	CENTRAL	UTTAR PRADESH	82.86
26	UNCHAHAR TPS	1050	CENTRAL	UTTAR PRADESH	82.86
27	KORBA-WEST TPS	1340	STATE	CHHATTISGARH	82.06
28	TANDA TPS	440	CENTRAL	UTTAR PRADESH	82.02
29	KOTA TPS	1240	STATE	RAJASTHAN	81.99
30	ROSA TPP Ph-I	1200	PVT	UTTAR PRADESH	81.73
31	SIMHAPURI TPS	600	PVT	ANDHRA PRADESH	81.27
32	RIHAND STPS	3000	CENTRAL	UTTAR PRADESH	80.91
33	JOJOBERA TPS	360	PVT	JHARKHAND	80.46
34	TITAGARH TPS	240	PVT	WEST BENGAL	80.11
35	ANPARA C TPS	1200	PVT	UTTAR PRADESH	79.34
36	VINDHYACHAL STPS	4260	CENTRAL	MADHYA PRADESH	79.25
37	SAGARDIGHI TPS	600	STATE	WEST BENGAL	78.09
38	RAYALASEEMA TPS	1050	STATE	ANDHRA PRADESH	77.88
39	JALIPA KAPURDI TPP	1080	PVT	RAJASTHAN	77.71
40	DADRI (NCTPP)	1820	CENTRAL	UTTAR PRADESH	77.05
41	SURATGARH TPS	1500	STATE	RAJASTHAN	76.82
42	KAHALGAON TPS	2340	CENTRAL	BIHAR	76.19
43	NASIK TPS	630	STATE	MAHARASHTRA	76.14
44	IB VALLEY TPS	420	STATE	ORISSA	76.07
45	MUNDRA UMTPP	4000	PVT	GUJARAT	75.85
46	KASAIPALLI TPP	270	PVT	CHHATTISGARH	75.04
47	MUNDRA TPS	4620	PVT	GUJARAT	74.93
48	SURAT LIG. TPS	500	PVT	GUJARAT	74.58
49	ANPARA TPS	1630	STATE	UTTAR PRADESH	74.15
50	BHILAI TPS	500	CENTRAL	CHHATTISGARH	74.00
51	METTUR TPS	1440	STATE	TAMIL NADU	73.19

S. No.	Name of Station	Installed capacity (MW)	Sector	State	PLF (%)
52	RAICHUR TPS	1720	STATE	KARNATAKA	72.87
53	FARAKKA STPS	2100	CENTRAL	WEST BENGAL	72.73
54	JSW RATNAGIRI TPP	1200	PVT	MAHARASHTRA	72.68
55	MAITHON RB TPP	1050	PVT	JHARKHAND	72.67
56	BARKHERA TPS	90	PVT	UTTAR PRADESH	71.28
57	KHAPARKHEDA TPS	1340	STATE	MAHARASHTRA	70.37
58	KOTHAGUDEM TPS	720	STATE	TELANGANA	70.21
59	BUTIBORI TPP	600	PVT	MAHARASHTRA	69.34
60	NEYVELI TPS- I	600	CENTRAL	TAMIL NADU	69.09
61	EMCO WARORA TPS	600	PVT	MAHARASHTRA	68.78
62	UTRAULA TPS	90	PVT	UTTAR PRADESH	68.39
63	KUNDARKI TPS	90	PVT	UTTAR PRADESH	68.09
64	KAWAI TPS	1320	PVT	RAJASTHAN	68.03
65	SABARMATI (C STATION)	60	PVT	GUJARAT	67.79
66	KHAMBARKHERA TPS	90	PVT	UTTAR PRADESH	66.92
67	MAQSOODPUR TPS	90	PVT	UTTAR PRADESH	66.92
68	PARAS TPS	500	STATE	MAHARASHTRA	66.90
69	YAMUNA NAGAR TPS	600	STATE	HARYANA	66.89
70	BELLARY TPS	1000	STATE	KARNATAKA	66.29
71	KOLAGHAT TPS	1260	STATE	WEST BENGAL	65.22
72	SASAN UMTPP	3960	PVT	MADHYA PRADESH	65.21
73	CHHABRA TPP	1000	STATE	RAJASTHAN	65.07
74	TENUGHAT TPS	420	STATE	JHARKHAND	64.70

It may be seen from the above table that 8 number thermal power stations with an aggregate installed capacity of 6740 MW had the distinction of achieving PLF above 90% .

All India Sector-wise/Organization-wise, generation, target & actual generation, PLF for the year 2014-15 is at the **Annexure-10A.**

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

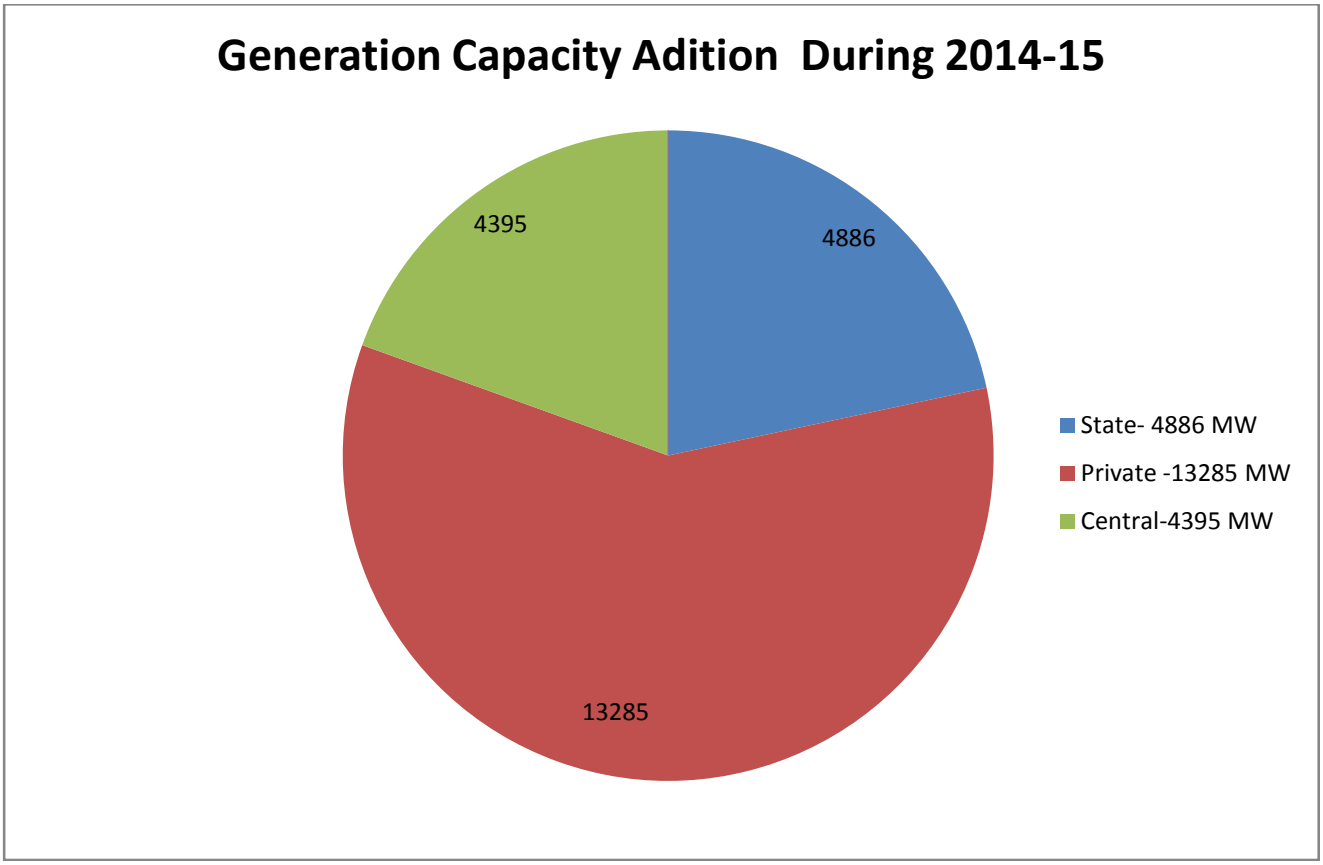


10.3 Generating Capacity Addition

During the year, a total of 22566 MW generation capacity was added (excluding addition due to Renewable Energy Sources). The capacity addition during the last 9 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
2013-14	2766	3063	13856	19685
2014-15	4395	4886	13285	22566

Sector-wise generating capacity addition during 2014-15 is also shown in the chart below:



10.4 Installed Electricity Generation Capacity

Total All India Installed Electricity Generation Capacity as on 31.03.2015 is 271722.17 MW comprising of Thermal 188897.78 MW, Hydro 41267.43 MW, Nuclear 5780.00 MW and 35776.96 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	11091.43	27482.00	2694.00	41267.43
THERMAL	55649.73	65677.53	67570.52	188897.78
NUCLEAR	5780.00	0	0	5780.00
RES	0	1919.31	33857.65	35776.96
Total	72521.16	95078.84	104122.17	271722.17

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 in the country is shown in the table below:

(Capacity in MW)

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
March, 2014	168255	4780	40531	29462	243028
March, 2015	188898	5780	41267	35777	271722

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

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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 2954 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 31.03.2015)

Region / State	Identified potential as per Re-assessment Study (MW)		Capacity Developed (Above 25 MW)	Capacity Under Construction (Above25MW)
	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
Ar. Pradesh	50328	50064	405	2854
Mizoram	2196	2131	0	60
Total(NER):	**58971**	**58356**	**1242**	**2954**

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 Hydro Electric Projects planned in North-Eastern Region

A total of 121 H.E. Projects (above 25 MW capacity) with aggregate capacity of 54284 MW have been allotted by respective State Govt. in N.E. Region to Central and Private Sector for implementation in the near future and are yet to be taken up for construction. In addition, Lower Kopili (120 MW), Upper Borpani (60 MW) in Assam & Umngot (240 MW) in Meghalaya are being developed in State Sector. Category-wise, these schemes are summarized below:

Name of State	Central		Private		Total	
	No.	I.C. (MW)	No.	I.C. (MW)	No.	I.C. (MW)
Ar. Pradesh	6	14230	100	34967	106	49197
Assam	-	-	-	-	-	-
Manipur	2	1566	-	-	2	1566
Meghalaya	2	325	5	944	7	1269
Mizoram	4	1986	1	80	5	2066
Nagaland	-	-	1	186	1	186
Total (NER)	**14**	**18107**	**107**	**36177**	**121**	**54284**

11.3.1 Status of development

Some of the major Hydro Electric Projects being planned in the North Eastern Region is as under:

S. No.	Name of Project	Basin	Agency	State	Present Status
1	Tawang-I (600 MW)	Tawang	NHPC	Arunachal Pradesh	Concurrence accorded by CEA on 10.10.2011. Environment clearance accorded on 10.06.2011. Forest clearance awaited.
2	Tawang-II (800 MW)	Tawang	NHPC	Arunachal Pradesh	Concurrence accorded by CEA on 22.09.2011. Environment clearance accorded on 10.06.2011. Stage-I Forest clearance accorded on 08.01.2014 and Stage-II Forest clearance awaited.
3	Nyamjungchu (780 MW)	Tawang	Bhilwara Energy Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 24.03.2011. Environment clearance accorded on 19.04.2012. Stage-I Forest clearance accorded on 09.04.2012 & Stage-II Forest clearance awaited.
4	Naba (1000 MW)	Subansiri	Abir Infrastructure Pvt. Ltd.	Arunachal Pradesh	Under S&I.
5	Niare (800 MW)	Subansiri	Coastal Infrastructure Pvt. Ltd.	Arunachal Pradesh	Under S&I.
6	Dengser (552 MW)	Subansiri	Coastal Infrastructure Pvt. Ltd.	Arunachal Pradesh	Under S&I.

7	Nalo (635 MW)	Subansiri	Coastal Infrastructure Pvt. Ltd.	Arunachal Pradesh	Under S&I.
8	Oju (1878 MW)	Subansiri	Navayuga Engg. Co. Ltd.	Arunachal Pradesh	Under S&I.
9	Subansiri Middle (Kamala) (1800 MW)	Subansiri	Kamala HECL (Jindal Power Ltd.)	Arunachal Pradesh	DPR is under examination in CEA.
10	Subansiri Upper (2000 MW)	Subansiri	KSK Energy Ventures Pvt. Ltd.	Arunachal Pradesh	Under S&I.
11	Siang Upper St.I (6000 MW)	Siang	JV of NHPC & NEEPCO	Arunachal Pradesh	DPR to be prepared.
12	Siang Upper St.II (3750 MW)	Siang	NEEPCO	Arunachal Pradesh	Under S&I.
13	Tato-II (700 MW)	Siang	Tato Hydro Power Pvt. Ltd. (Reliance Energy Ltd.)	Arunachal Pradesh	Concurrence accorded by CEA on 22.05.2012. Environment clearance accorded on 27.06.2011. Forest clearance awaited.
14	Naying (1000 MW)	Siang	D.S. Construction Ltd	Arunachal Pradesh	Concurrence accorded by CEA on 11.09.2013. Environment & Forest clearance awaited.
15	Siang Lower (2700 MW)	Siang	Jaiprakash Associates Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 16.02.2010. Environment & Forest clearance awaited.
16	Siyom (Siang Middle) (1000 MW)	Siang	SIYOM Hydro Power Pvt. Ltd. (Reliance Energy Ltd.)	Arunachal Pradesh	Concurrence accorded by CEA on 17.12.2013. Environment clearance accorded earlier on 11.3.2005 transferred in the name of SHPPL on 31.01.2008. & Forest clearance awaited.
17	Hirong (500 MW)	Siang	Jaiprakash Associates Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 10.04.2013. Environment & Forest clearance awaited.
18	Dibang (3000 MW)	Dibang	NHPC	Arunachal Pradesh	Concurrence accorded by CEA in Jan., 2008. Environment clearance accorded on 16.09.14. Forest clearance accorded on 23.09.14.Letters awaited.

19	Emini (500 MW)	Dibang	Emini Hydro Power Pvt. Ltd. (Reliance Energy Ltd.)	Arunachal Pradesh	Under S&I.
20	Etalin (3097 MW)	Dibang	Jindal Power Ltd. (JV with HPDCAPL) - Etalin H.E. Power Co. Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 12.07.2013. Environment & Forest clearance awaited.
21	Attunli (680 MW)	Dibang	Jindal Power Ltd. (JV with HPDCAPL) - Attunli H.E. Power Co. Ltd.	Arunachal Pradesh	DPR is under examination in CEA.
22	Kalai-II (1200 MW)	Lohit	Kalai Power Pvt. Ltd. (Reliance Power Ltd.)	Arunachal Pradesh	Concurrence accorded by CEA on 08.01.2014. Environment & Forest clearance awaited.
23	Hutong- II (1200 MW)	Lohit	Mountain Fall India Pvt. Ltd.	Arunachal Pradesh	DPR returned in May, 2012. DPR to be revised considering the project as Storage scheme.
24	Kalai-I (1352 MW)	Lohit	Mountain Fall India Pvt. Ltd.	Arunachal Pradesh	DPR returned in May, 2012. DPR to be revised considering the project as Storage scheme.
25	Demwe(Lower) (1750 MW)	Lohit	Athena Energy Venture (P) Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 20.11.2009. Environment clearance obtained in Feb., 2010. Stage-I & Stage-II Forest clearance accorded on 01.03.2012 & 03.05.2013 respectively. Case has been filed with NGT. Financial closure to be revalidated.
26	Demwe (Upper) (1080 MW)	Lohit	Athena Energy Venture (P) Ltd.	Arunachal Pradesh	DPR returned by CEA in March, 2015 for resubmission after finalization of dam type.
27	Tipaimukh (1500 MW)	Barak	JV of NHPC, SJVNL & Govt. of Manipur	Manipur	Concurrence accorded by CEA on 02.07.2003. Environment clearance obtained on 24.10.2008. Forest clearance awaited. Based on the studies

					carried out by NHPC for 20 meter reduction in dam height, suggested by MoEF, project does not work out as commercially viable proposition & may need to be reviewed.
28	Lungreng (815 MW)	Tyao	NEEPCO	Mizoram	DPR to be prepared.
29	Chhimtuipui (Boinu) (635 MW)	Boinu	NEEPCO	Mizoram	DPR to be prepared.

11.3.2 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 8-9th 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. MoEF vide letter dated 29.08.2013 has not recommended diversion of forest land as recommended by FAC on 11.07.2013. MoEF has directed that if user egency desires, it can explore phisibility of smaller dams involving diversion of smaller forest area in commensurate with their power generating capacity.

MoEF vide letter dated 29.08.2013 has declined diversion of 22777.50 ha forest land falling in Manipur for the project. MoEF vide letter dated 26.09.2013 has rejected diversion of 1551.30 ha of forest land falling in Mizoram for the project.

MoP has desired NHPC may explore viability of the project with reduction in dam height. The same is being examined by NHPC.

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.

11.3.3 Dibang Multipurpose Project- (12x250 = 3000MW) – Arunachal Pradesh

Dibang Multipurpose Project - (12x250 = 3000MW) – Arunachal Pradesh

Dibang MPP 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 22.09.2008 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. Public hearing was held on 11.03.2013 & 13.03.2013.

Forest land involved is 5056.5 ha. Forest proposal was 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 desired that State Govt. may demarcate the sites for Compensatory afforestation, provide enumeration list of trees in sample plots, etc. Site inspection shall be carried out again, after furnishing this information.

Site inspection was carried out again on 25.04.13 and 28.04.13. The proposal was discussed in FAC meeting on 12.07.13. FAC recommended for rejection of forest proposal. NHPC has requested DIG MoEF on 01.08.2013 for reconsideration of project and also requested Chief Secretary, GoAP and PCCF, GoAP on 05.08.2013 to take up the matter of reconsideration of project with MoEF. Meetings were held between Minister of State (I/C), MoEF and Hon'ble Minister of State (I/C) of Power on 06.08.2013 and between Secretary MoEF and MOP on 13.08.2013, wherein the issue of forest clearance was discussed. Hon'ble Minister of State (I/C) of Power vide letter dated 27.09.2013 requested Minister of State (I/C), MoEF to reconsider forest proposal of the project. Draft CCI note for re-consideration of forest proposal was circulated by MoP on 10.10.2013.

MoEF vide OM dated 21.10.2013 has submitted its comments on Draft Note for the Cabinet Committee on Investment in respect of obtaining Forest Clearance of Dibang Multipurpose Project to MoP, wherein MoEF inter alia concluded that NHPC may re—examine the project parameters with a view to reduce requirement of forest land and submit revised proposal to obtain forest clearance to the project. MoEF vide letter dated 25.11.2013 addressed to principal Secty. (Forests).GoAP, desired NHPC may explore possibility to reduce forest land requirement and submit a revised proposal to MoEF. Various alternatives of project parameters for reducing the landrequirement have been examined/studies by NHPC and a letter dated 27.12.2013 has been sent to the Secretary (MoEF) along with the results of various alternative studied for consideration of the FAC.

Revised forest proposal was discussed by FAC in its meeting on 22.09.2014. As per MoM posted on website of MoEF & CC, FAC has recommended the forest proposal for the project for diversion of 4577.84 ha forest land with reduction in dam height by 10m. FAC has also recommended that the recommendation of FAC be placed before Competent Authority only after receipt of Compliance of Forest Right Act (FRA), 2006 from State Govt. State forest Dept. vide letter dated 27.2.15 has forwarded the compliance under FRA 2006 to MoEF & CC for accord of forest clearance (stage-I).

MoEF & CC vide letter dated 05/2/15 has intimated that Environment clearance for the project has been approved by competent Authority and Environment clearance letter will be issued on production of forest clearance (stage – I) letter.

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

11.4.1 Central Sector Projects

(A) Sanctioned Projects

NEEPCO Project (Hydro):

(i) 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 3353 Gwh in a 90% dependable year. The environmental and forest clearance was obtained on 29.03.2001 & 03.8.2000 respectively. The proposed revised cost of the project is Rs. 6476.34 crores.

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 4 units of 150 MW each. All the civil, HM & EM works have been awarded. Civil, HM & E&M works are under progress.

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

(ii) Pare HEP (2x55 = 110 MW), 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 4.12.2008 at an estimated cost of Rs. 573.99 crores. The project would generate annual energy of 506.42 Gwh. The proposed revised cost of the project is Rs. 1487.49 crores.

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 India Ltd. Civil, HM & E&M works are under progress.

The project is scheduled for commissioning in year 2015-16.

(iii) Tuirial HEP (2x30= 60 MW), Mizoram

Tuirial HEP is located in the border of Aijwal, district of Mizoram and Cachar district of Assam The project envisage a 75 m high earth filled dam, two diversion tunnel of Dia 6.8 m, Head Race Tunnel - Modified Horse Shoe Type 6.25m Dia.160m Long, Penstock – 176m Long, Dia 6.2m bifurcating into 4.3m Dia each 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 by July, 2006. Original approved project cost (at June, 1997 PL) was Rs368.72 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 and subsequent increase in project cost.

The CCEA approval of the revised cost estimate of the project (Rs913.63 Crs. at March, 2010 PL) has already been accorded on 14.01.2011. The proposed revised cost of the project is Rs. 1381.71 crores.

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

NHPC Projects (Hydro)

(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 Hydraulique, 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. Civil works of Dam, HRT, surge tunnel, presume shaft, Power House etc. are in progress.

Work stopped since 16.12.2011 due to agitation launched by various activists in Assam against construction of Subansiri Lower HE Project. In this regard, meetings with Expert Group of Assam on 10.12.2014 and with various Stakeholders of Subansiri Lower Project on 11.12.2014 were held to discuss the issues. The meetings were Co-chaired by Hon'ble MOS (I/C) for Power, Coal and New & Renewable Energy and Hon'ble MOS (I/C) for Skill Development, Entrepreneurship, Youth Affairs & Sports.

As decided in stakeholders meeting on 11.12.2014, a Project oversight Committee (POC) has been constituted vide MoP's OM dated 13.01.2015. 5 meetings of the POC has been held so far. Consensus amongst members is yet to be arrived. 6thMeeting of the POC to prepare an Integrated Report is likely to be held in July, 2015.

Four units of the project are now scheduled for commissioning in year 2018-19 and next four units in 2019-20.

(B) CEA Cleared Projects

i) Tuivai H.E. Project (3x70=210 MW) in Mizoram cleared in 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 was 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 MoEF on 21.09.2011.

Project was discussed by FAC on 02.04.12 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 05.06.12 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.

NEHU has submitted Draft Study report to State Govt. in Sept.2014. The report is under examination by State Govt.

State Govt. has constituted a committee to review the basin report. A meeting was conducted by State govt. on 27.11.2014 to discuss the report wherein a presentation was made by NEHU wherin the Project proponents were requested to submit their comments.

State Govt. on 11.12.2014 has forwarded the comments received from NHPC, Sew Green Energy Ltd. And Energy

Developments Co. Ltd. JV NEHU for incorporative in the report. After finalized of study report the same shall be submitted to MoEF & CC by the State Govt. thereafter the forest proposal shall be considered by FAC for accord of forest clearance stage-I.

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

The project was concurred by CEA on 22.9.2011 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.

MoEF vide letter dated 08.01.2014 has accorded Forest Clearance (Stage – I) for diversion of 116.62 ha forest land for the project.

Approval for payment of NHPC & CA by NHPC board is in progress. Compliance report shall be submitted after completion of Basin Study.

An amount of Rs. 12 Crore towards the cost of NPV (Rs.8.70 Cr) & CA (Rs3.30Cr.) was deposited in State CAMPA on 12.06.2014.

State Forest Dept. on 17.06.2014 has raised additional demand on Rs 39.57 due to revision of CA cost norms which was also deposited on 8/11/2014.

Sub Divisional Committee under FRA 2006 has been constituted by State Govt. vide notification dated 11.08.2014 .

A reminder has also been sent by Deputy Commissioner, Tawang to the concerned ADCs on 28.10.2014 regarding constitution of committee at Gram Sabha level.

Gram Sabha level committees have been constituted by District Authorities on 31.10.2014 and 15.12.2014. Meetings are yet to be conducted and the matter is being regularly pursed with district authorities.

In compliance to FAC, basin study covering all aspects was awarded by State Forest Deptt., Govt of Arunanchal Pradesh to NEHU, Shillong. NEHU has submitted Draft Study report to State Govt. in last week of Sept. 2014. The report is under examination by State Govt.

State Govt. has constituted a committee to review the basin report. A meeting was conducted by State govt. on 27.11.2014 to discuss the report wherein a presentation was made by NEHU wherein the project proponents were requested to submit their comments. Comments have been submitted by State Govt. to NEHU. Report is under finalization.

(iv) Kolodyne-II H.E Project (4x115=460MW) in Mizoram by NTPC.

Project was accorded concurrence on 14.9.2011 at an estimated cost of Rs. 5188.13 crores (including IDC & FC) at October, 2010 price level.

Projects being executed by NTPC Ltd. doesn't require CCEA approval since NTPC is a Maharatna company.

Terms of Reference (TOR) was cleared on 10.07.2009. EIA studies were awarded to WAPCOS Ltd. on 14.09.2010 and the same are under finalization and shall be submitted after incorporation of land details to SPCB for public hearing. The land details yet to be finalized.

Revised TOR cleared on 09.04.12.

Forest proposal was 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 26.6.12 respectively. However, all the proposals were returned to concern DFOs for further clarifications.

Form-A part-1 was submitted by NTPC to respective Distt. Authorities. A meeting was held with Addl. Principle Chief Conservator of Forest, Nodal Officer and Distt forest officers on 10.07.13 and all shortcomings have been sorted out except clearance from Forest Right Act (FRA) for Social and Welfare Deptt, Aijwal.

Forest proposal sent to MoEF in March, 2014.

11.4.2 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 9.11.2000 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 of the project through various agencies was being pursued by the State Govt. On the request of State Govt., validity of TEC had been extended six times, last one being up to 8.11.2007.

Govt. of Mizoram on 21.08.2007 requested for further extension of TEC. CEA did not consider it appropriate to grant further extension of validity of TEC. The Govt. of Mizoram was informed accordingly vide CEA letter dated 1.10.2007.

(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). Estimated cost of the project was Rs. 226.40 crores. The latest revised cost of the project is Rs. 461.27 crores.

The Project envisages modification of existing dam, horseshoe type HRT, penstock, Deep set 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 works of the project are in progress.

The project is likely to be commissioned in year 2016-17.

11.4.3 Private Sector Projects

A) CEA Concurred Projects:

i) Demwe Lower HE Project (5x342 + 1x40=1750 MW), Arunachal Pradesh by M/s ADPL

Demwe Lower HE Project was accorded concurrence by CEA on 20.11.2009 for an estimated cost of Rs. 13144.91 Crores (Completion Cost).

MoEF has accorded environmental clearance to the project on 12.2.10. Clearance from Wildlife angle by Standing Committee of NBWL, MoEF was accorded on 11th Feb, 2012. Subsequently, "In-Principle" forest clearance (Stage-I) was accorded by MoEF on 1st March, 2012. Payments for NPV and compensatory Afforestation was made and proposal for stage-II Forest clearances was forwarded by State Govt. to MOEF on 22.03.2013.

ii) 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 MoEF. MoEF on 03.08.10 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.

Additional studies w.r.t downstream Impact Assessment were carried out and draft report submitted to State Pollution Control Board in July, 2011. Public hearing scheduled on 17th, 18th& 20th April, 2012 in three districts could not be held due to law and order problem.

The project was accorded TOR on 3.8.10 and 2 years period ended on 2.8.12. The MoEF & CC again subsequently granted 1 year extension forTOR which again ended on 1.8.13 .

MoEF & CC again granted further period of 1 year extension for TOR for the project.

MoEF states that , the TOR validity period is extendable by 1 year over and above the initial period of 3 years so available tome limit has been exhausted fully, there is no further scope for extension. EC awaited.

Forest proposal is being processed at State Govt. level.

Revised proposal for diversion of forest land was submitted to Nodal officer of State Government in Feb. 2010, who forwarded the case to three DFOs for site verification and report submission. All three DFOs submitted their reports to Conservator of Forest who forwarded these to Nodal Officer, Itanagar on 13.04.2011. Nodal officer raised certain observation and case has been referred to DFOs for clarifications.

DFO West Siang Distt has issued letter certifying non-availability of non-forest land for compensatory afforestration. Draft R&R plan have been submitted to Distt Administration & State Forest Deptt.

iii) 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 4.02.2009 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.

MoEF has accorded environmental clearance to the project on 23.7.2012.

Forest clearance (Stage-I) was accorded by MoEF on 7th Feb, 2012. Stage – II awaited

iv) Nafra H.E. Project (2x60=120 MW)- Arunachal Pradesh by M/s SEW Nafra Power Co. Pvt. Ltd.

Nafra H.E. Project (2x60=120MW) in Arunachal Pradesh to be executed by M/s SEW Nafra Power Corporation Private Limited (M/s SNPCPL) was accorded concurrence by CEA on 11th Febuary,2011 at an Estimated completed cost of 848.22 Crores including IDC & FC of 106.60 Crores and 5.94 Crores.

Project was accorded environmental clearance by MOE&F on 17.01.2011 and Forest clearance in June, 2012.

v) 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).

MoEF accorded environmental clearance on 19.04.2012. Forest clearance (Stage-I) was accorded by MoEF on 9.4.2012.Stage – II awaited

vi) 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 THPPL has been accorded concurrence by CEA on 22nd May, 2012 at an Estimated completed cost of Rs. 5616.20 Crores.

MoEF accorded environmental clearance to the project on 27.6.2011.

The proposal for the forest clearance was considered by Forest Advisory Committee (FAC) on 31.05.2011 and on 17.09.12. The committee took note that basin cumulative study for Siang basin is being done by CWC and since the Siyom basin is a part of Siang 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.

vii) **Gongri H.E Project (2x72=144MW) in Arunachal Pradesh By M/s DEPL**

Gongri H.E. Project (2x72=144MW) in Arunachal Pradesh to be executed by M/s DEPL in Private Sector was accorded concurrence by CEA on 4th Feb, 2013 at an estimated completed cost of Rs. 1436.27 Crores.

MoEF accorded Environmental Clearance on 19.03.2013 and Forest clearance on 07.09.12.

viii) Hirong HE Project (4x125 = 500MW)in Arunachal Pradesh By M/s JAPL

Hirong H.E. Project (4x125=500MW) in Arunachal Pradesh to be executed by M/s JAPL was accorded concurrence by CEA on 10thApril , 2013 at an estimated completed cost of Rs. 5532.63 Crores.

Public were hearing conducted on 18th May, 2011. The updated EIA & EMP report was submitted to MoEF for environment clearance on 11th June, 2011.

The proposal for forest land diversion was submitted to Nodal officer of State Government in Aug. 2010. The field work for site verification has been completed by DFO and preparation of report is in progress.

ix) Etalin HE Project (10x307+1x9.6+1x7.4 = 3097MW)in Arunachal Pradesh by M/s EHEPCL

Etalin H.E. Project (10x307+1x9.6+1x7.4 = 3097MW) in Arunachal Pradesh to be executed by M/s EHEPCL has been accorded concurrence by CEA on 12thJuly , 2013 at an Estimated completed cost of Rs. 25296.95 Crores.

ToR for installed capacity of 4000 MW was issued on 30.11.2009. Revised TOR for installed capacity of 3097 MW was obtained on 26.04.13.

Draft EIA/EMP reports submitted to APSPCB by developer vide their letter dated 19.8.2014 for conduct of public hearing.

Proposal for diversion of forest land was submitted by developer to State Forest

Department vide letter dated 10.11.2012. Clearance is yet to be obtained.

x) Talong Londa HE Project (3x75 = 225MW)in Arunachal Pradesh By GMR

Talong Londa H.E. Project (3x75=225MW) in Arunachal Pradesh to be executed by M/s GMR was accorded concurrence by CEA on 16th Aug , 2013 at an estimated completed cost of Rs. 2172.88 Crores.

EIA-EMP reports were submitted to SPCB in Dec, 2011 for public hearing.
EC under consideration in EAC in MoEF.

Forest case was submitted to GoArP in Nov,2010.

FC sent to MoEF by State Govt. on 22.1.2014.

xi) Naying HE Project (4x250 =1000MW)in Arunachal Pradesh by NDSCPL

Naying H.E. Project (4x250=1000 MW) in Arunachal Pradesh to be executed by M/s NDSCPL was accorded concurrence by CEA on 11th Sept, 2013 at an estimated completed cost of Rs. 9301.11 Crores.

Final EIA / EMP Report of the project as well as the proceedings of the public hearing conducted by State Pollution Control Board on 11.05.2012 were submitted to the MoEF, GoI during July, 2012. Report was discussed in 66th meeting of EAC on 04.05.2013. Replies of the observations made by EAC are yet to be submitted.

Application for diversion of 644 Ha of Forest Land was submitted to Conservator of Forest on 4.1.11. Request for Land survey, assessment and proposed acquisition of 644 Ha of project land was submitted to Deputy Commissioner, West Siang Distt. Report of DFO sent to CCF, Passighat on 31.07.2012, which was further transmitted to Nodal officer (FC) Itanagar on 12.10.2012. Additional basic impacts desired by Nodal Officer were sent on 08.06.2013.

xii) Siyom HE Project (6x166.67 = 1000MW)in Arunachal Pradesh by SHPPL

Siyom H.E. Project (6x166.67=1000MW) in Arunachal Pradesh to be executed by M/s SHPPL in Private Sector was accorded concurrence by CEA on 17th Dec , 2013 at an estimated completed cost of Rs. 12100.00 Crores.

MoEF accorded environment clearance on 11.03.2005 for NHPC with validity for 5 years. Environment clearance was transferred to SHPPL on 31.01.2008.

Proposal of diversion of forest land submitted to state forest deptt. in May 2010. Proposal forwarded to DFO in Oct. 2010.

xiii) Kalai – II HE Project (6x200 = 1200MW)in Arunachal Pradesh By KPPL

Kalai – II H.E. Project (6x200=1200MW) in Arunachal Pradesh to be executed by M/s KPPL in Private Sector was accorded concurrence by CEA on 27th March , 2015 at an estimated completed cost of Rs. 14199.64 Crores.

EC & FC are yet to be obtained.

xiv) Kynshi – I HE Project (2x135 = 270MW)in Meghalya By AKPPL

Kynshi – I H.E. Project (2x135=270MW) in Meghalya to be executed by M/s AKPPL in Private Sector was accorded concurrence by CEA on 31st March , 2015 at an estimated completed cost of Rs. 3154.37 Crores.

EC & FC are yet to be obtained.

11.4.4 H.E. Projects Allotted for implementation

A total of 121 H.E. Projects (above 25 MW capacity) with aggregate capacity of 48401.5 MW have been allotted in N.E. Region to Central and Private Sector for implementation in the near futureand are yet to be taken up for construction. In addition, Lower Kopili (120 MW), Upper Borpani (60 MW) in Assam &Umngot (240 MW) in Meghalaya are being developed in State Sector. 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)
Arunachal Pradesh	4	8150	102	35164.5	106	43314.5
Assam	-	-	-	-	-	-
Manipur	2	1566	-	-	2	1566
Meghalaya	2	325	5	944	7	1269
Mizoram	4	1986	1	80	5	2066
Nagaland	-	-	1	186	1	186
Total (NER)	**12**	**22027**	**109**	**36374.5**	**121**	**48401.5**

11.5 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. Central Sector

(a) Bongaigaon TPP (3 x 250 MW) by M/s. NTPC

The project is being executed by M/s. NTPC. The main plant order was placed on M/s. BHEL in February, 2008 with 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 frequent bandhs, violence and mass exodus of labours from the site, heavy monsoon and poor performance of the main plant civil agencies of M/s. SPML. Due to poor performance of M/s SPML, civil works for unit 2 & 3 were offloaded to M/s Punj Lloyd Limited in July, 2011. There after due to the poor performance of both the civil agencies, their contracts were also terminated. For the balance civil and structural works NTPC placed orders on M/s NBCC on 29/09/2014 and NBCC further placed orders for civil work, structural work etc. These agencies started work at site. Unit-1 Boiler lighted up on 29/11/14 & SBO started in 02/15 and was in progress (Stage-I completed). TG boxed up in 01/15. Oil flushing started on 16.01.15 and was in progress. Barring gear was expected in 05/15 and synchronisation by end of June, 2015. Full load the unit-1 was expected by June, 2015. Commissioning of unit-2 & 3 were expected in the year 2016-17. The original cost of the project is Rs.4375.35 Crores and Rs. 5138 Crores had been spent on this project till March., 2015.

Critical Issues:

- Law and order and Frequent bandhs
- Frequent bandhs, Shifting of BTPS School outside NTPC Township and
- Acquisition of balance land for railway siding.

(b) Monarchak Gas Based Power Project (101 MW) in Tripura by NEEPCO

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. Erection of all major equipments completed. Erection of STG, HRSG etc. were in progress. Gas supply pipe line work had been completed and gas supply made available at site on 05.02.15. Gas turbine synchronised in open cycle on 11.03.15 and full load achieved on 30.03.15. The commissioning of ST was expected by 07/15. The revised cost of the project is Rs. 994.8 Crores and Rs. 898.22 Crs had been spent on this project till 03/15.

Critical Issues:

- Readiness and completion of balance work of BoP's.

(c) AGTP CC Extension Project (51MW) at Agartala by NEEPCO

The project is being executed by NEEPCO in Tripura. LOA for the main plant was placed on M/s. Thermax Ltd. on 12.09.2012. The project has two modules. Each module consists of two HRSGs and one STG. Civil work in most of the area was completed. All 4 chimneys erected. Switch yard work also completed. Generator transformer erection completed. STG-2 synchronized on 10.02.2015 and full achieved on 22.03.15. ST-1 synchronized with HRSG-2 in March, 2015 and full load was expected by 06/15. Work on HRSG-1 was in progress. The revised cost of the project is Rs.382.41 Crores and Rs. 309.52 Crs. had been spent on this project till 03/15.

B. State Sector

1. Namrup CCGT (70 MW GT + 30 MW ST) – Assam by APGCL

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, civil work was stopped since 01.08.2013. BHEL/NBPPL terminated civil contract on 05.09.2013. BHEL awarded freshcivil contract on 13.03.14 & work was started in 05/14. BHEL also terminated NBPPL order for 12 EPC packages on 22.11.14. Now, on the request of BHEL, NBPPL has been again engaged to complete the balance work of these EPC packages. There are 126 non turnkey packages on M/s NBPPL. Out of 126 non turnkey packages, 125 packages were already awarded by NBPPL and balance one package was expected to be awarded by 03/15. GT& GTG placed on foundation. HRSG insulation work almost completed. Commissioning of GT was expected in 03/16 and ST by 06/16. The revised cost of the project is Rs.694 Crores and Rs. 329.10 Crs. had been spent on this project till Dec., 2014.

Critical issues:

- Outstanding payment of BHEL with project developer. - Project Authority
- Slow progress of mechanical, electrical and Instrumentation contractors. - BHEL

11.6 Detailed Status of New Thermal Power Projects Proposed in North-eastern States

Bongaigaon TPP Unit-IV NTPC

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 during 12th plan. 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.

Garo Hills TPP (Meghalaya) - by M/s NEEPCO

NEEPCO has a proposal to set up a coal based thermal Power Plant at Garo Hills in Meghalaya. NEEPCO have applied for coal linkage to Min. of Coal. As informed by NEEPCO, MoA between State Govt. and NEEPCO has been signed in 17th March,2011 for implementation of the project. The project was not prequalified for coal linkage as 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 .

Lakwa Replacement TPP by M/S APGCL

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 and Environment Clearance is stated to be already available from the existing units. DPR has been prepared.

Equity Amount approved by Govt. Of Assam Approval of Tender document and NIT obtained from Asian Development Bank on 17.12.2014. NIT issued on 18.12.2014. Technical Bid evaluation report (TBER) has been sent to ADB on 20.04.2015 for approval. After getting approval of TBER from ADB Financial Bid will be opened. PPA is yet to be signed with Assam Power Distribution Company Limited.

Golaghat TPP by M/S APGCL

M/s APGCL has a proposal to set up a gas based Power Plant in Golaghat District. DPR is under preparation. Tie up of Land and fuel is under process. Water is stated to be sourced from borewell in the plant area.

Award for main plant equipment will be placed after finalization of DPR.

Cachar TPP by APGCL

M/s APGCL has a proposal to set up a gas based Power Plant in Cachar District. PFR prepared. DPR will be prepared once fuel tie up is established. Tie up of Land and fuel is under process. Water is stated to be sourced from borewell in the plant area.

Margherita TPP by APGCL

M/S Assam Power Generation Corporation (APGCL) had a proposal to set up a 500 MW Thermal Power Project at Margherita in Assam for which APGCL had applied for coal linkage vide application dated 23.11.2009 to Min. of Coal. Subsequently APGCL has revised the Unit configuration to 1x660 MW. APGCL vide letter dated 18.12.2014 and have furnished tie up of inputs namely Land, Water, & Terms of Reference (ToR) for the revised configuration of 1x660 MW. DPR is under preparation.

MoP vide letter dated 9.10.2014 had requested Min. of Coal to consider grant of coal linkage for 1x660 MW Margherita TPP in Assam state.

Amguri TPP by APGCL

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 and gas linkage is under process.

Award for main plant equipment will be placed after finalization of DPR.

Tripura Gas Based Power Project Monarchak by M/s NEEPCO - Revised Cost Estimates

NEEPCO vide letter dated 16.02.2015 had submitted Revised Cost estimates at December 2013 Price level.along with phasing of expenditure. CEA vide letter dated 27.02.2015 had intimated to MoP that the Revised Cost Estimates were generally in order.

As directed by MoP the Revised Cost Estimates are under updation at Current Price Level by NEEPCO and shall be submitted to CEA for concurrence..

11.7 R&M Schemes (Hydro) of North Eastern Region

The R&M activities of two schemes having installed capacity of 125 MW planned for completion during XII Plan (2012-17) have been completed in 2014-15 at an actual expenditure of Rs. 75.27 Crores to accrue a benefit of 25 MW through Life Extension. The two schemes planned for completion in XIII Plan (2017-22) are under implementation and are likely to accrue a benefit of 171 MW through Uprating & Life Extension. The status of R&M works of the hydro schemes of North Eastern Region as on 31.03.2015 is given hereunder:

A. Schemes Completed

S. No.	Name of Scheme, Agency, State	Installed Cap. (MW)	Actual cost (Rs. Crs.)	Benefits (MW)	Status
1.	Kopili, NEEPCO Assam	2x50	50.22	-	R&M works and refurbishment of units 1 & 2 completed in 2014-15.
2.	Khandong, NEEPCO, Meghalaya	1x25	25.05	25 (LE)	RM&LE works completed in 2014-15.

B. Ongoing – Under Implementation

S. No.	Name of Scheme, Agency, State	Installed Cap. (MW)	Est. cost (Rs. Crs.)	Benefits (MW)	Status
3.	Kyrdemkulai (Umium St.III) MePGCL, Meghalaya	2x30	344	60(LE) + 6(U)	DPR approval and fund tie-up in process. Likely to be completed in XIII Plan.
4.	Loktak, NHPC	3x35	-	105 (LE)	DPR under preparation. Likely to be completed in XIII Plan.

Abbreviations: MW – Mega Watt; Res. – Restoration; U – Uprating; LE – LifeExtension

11.8 Installed Capacity in the N.E. Region

The total installed capacity in the Region is as under:

Sector	Installed Capacity (MW)
Hydro	1242
Thermal	1865.44
RES	256.67
Nuclear	-
Total	**3364.1**

11.9 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 6 Hydro Electric schemes with total installed capacity of 1852 MW in N.E. Region.

11.10 Hydro Power Generation Performance

Hydro Power generation during the year 2014-15 in the North Eastern Region was 3542.11 MU against a target of 4088 MU, which is 13.35 % less.

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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 CBIP, ISTM, IIT Kanpur, IIT Delhi, and ESCI.

The officers/officials were deputed for various in service refresher training programmes, technical courses, workshop, seminars, conferences etc at ISTM, CBIP, NPTI, ESCI, CIGRE, CPU, IEEE, IIT 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.

Induction training for fresh graduate engineers who joined CEA as Assistant Director-I was organized at NPTI, Bangalore for 2 weeks**.**

The Man days for these programmes (including in house training) were 979.

12.3 In-house training programme

The following in house training programmes were organized by CEA during 2014-15.

1. Presentation on Solar Variability Analysis in the state of Gujarat was held in April-2014 where 65 participants attended**.**
2. A programme on Covered conductors and Ampact conductors was organized on 18th February, 2015 in CEA lecture hall.

12.4 Foreign visits / Training Programmes for CEA Officers.

Foreign training programmes were planned, processed and conducted during the year 2014 -15 for CEA engineers. The details of officers who visited foreign countries during the year 2014-15 are given in **Annexure 12A.**

12.5 Training Under Apprentice Act, 1961

5 Graduate (Engg.), 7 ITI qualified Draftsmen and 5 Technician (Vocational) apprentices have undergone training in CEA under the Apprentice Act 1961 during the year 2014-15.

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 15 nos. Training institutes/Centers were inspected and recommended for recognition/renewal of recognition to MoP during the year 2014-15.

S. No.	Name of Institute
1.	NPTI (NER)), Guwahati
2.	Thermal Powertech, Nellore
3.	Power Engineers' Training and Research Centre, Moolamattom , Kerala
4.	Chennai Power and Desalination Training Institute, Chennai
5.	NPTI, Badarpur
6.	Plant Training Centre,Titagarh Generating Station, CESC, Kolkata
7.	O&M Training Institute CESC, Kolkata
8.	Plant Training Centre, Southern Generating Station, CESC, Kolkata
9.	PSTI, Bangalore
10.	NHPC training Institute, Chamera
11.	GETRI, Barodara Gujarat
12.	Versova TTC, Mumbai
13.	Reliance Energy Management Institute, Goregaon, Mumbai
14.	Power Distributing Training Centre, MP State Govt. Bhopal
15.	Essar Power Learning Centre, Jamnagar, Gujarat

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 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 12-3-2013 to 26-4-2013.

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

12.10 Recreation and Sports:

During 2014-15, the CEA Sports team participated in various sports events like Carrom, Kabaddi, and Volley ball, Badminton, Table Tennis etc. and Vidyut Jal Tarang team participated in various Inter-CPSU/Inter D Ministry tournaments.

1. The Carrom Team (Male & Female) participated in the 17th CPSU Carrom Tournament organized by NHPC Ltd. from 16th to 19th December 2014 at Thayagraj Sport Complex, Thayagraj Stadium, INA Colony, New Delhi and won Gold Trophy in Team Event(Male).

2. CEA's Vidut Jal Tarang Team participated in the Inter-Ministry Music Dance & short play competition 2014-15 held at CSOI auditorium, Vinay Marg, New Delhi w.e.f. 17.02.2015 to 20.02.15 and won Bronze Medal in Western Solo.

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ANNEXURE

Annexure-2A
(Item No. 2.9.2)

Awardees for the Year 2013-14 under Comprehensive Award Scheme

Sl. No.	Awarded Station/ Project/ Company	Organisation	Award Category	Scheme Code
A. GOLD SHIELD WINNERS				
1.	O.P. Jindal Super Thermal Power Project, Unit-2 (600 MW)	Jindal Power Limited	Early completion of Thermal Power Projects	Th-2
2.	Baspa-II Hydro Electric Plant (3x100 MW)	Jaiprakash Power Ventures Limited (JPVL)	Performance of Hydro Power Stations	Hy-1
3.	Rampur Hydro Electric Project, Unit-5 (68.67MW)	SJVNL	Early completion of Hydro Power Projects	Hy-2
4.	Nimoo Bazgo Hydro Electric Project, Unit-3 (15MW)	NHPC Limited	Early completion of Hydro Power Projects	Hy-2
5.	Odisha Power Transmission Corporation Limited (OPTCL) (220 kV & above system)	Odisha Power Transmission Corporation Limited	Transmission system Availability	Tr-1
6.	POWERGRID (132 kV & above system)	POWERGRID	Transmission system Availability	Tr-1
7.	Rajpura – Dhuri 400 kV D/C Transmission Line	Punjab State Transmission Corporation Limited	Early completion of Transmission Projects	Tr-2
8.	Kakrapar Atomic Power Station (440 MW)	NPCIL	Performance of Nuclear Power Stations	Nu-1
9.	Jamshedpur Utilities & Services Company Limited (JUSCO), Jharkhand		Performance of Distribution Companies	Rf-1
10.	NPCL (West-II), Noida Power Company Limited, Greater Noida, Uttar Pradesh		Performance of Rural Distribution Franchisees	Rf-2
B. SILVER SHIELD WINNERS				
1.	Pillaiperumalnallur Combined Cycle Gas Turbine Station (330.5 MW)	PPN Power Generation Company Private Limited	Performance of Thermal Power Stations	Th-1
2.	Dadri Combined Cycle Gas Turbine Station (829.78 MW)	NTPC Limited	Performance of Thermal Power Stations	Th-1
3.	Toranagallu-II Thermal Power Station (600 MW)	JSW Energy Limited	Performance of Thermal Power Stations	Th-1
4.	O.P. Jindal Super Thermal Power Project, Unit -1 (600 MW)	Jindal Power Limited	Early completion of Thermal Power Projects	Th-2
5.	Omkareshwar Hydro Electric Power Station (8x65 MW)	NHDC	Performance of Hydro Power Stations	Hy-1

6.	Rampur Hydro Electric Project, Unit-2 (68.67MW)	SJVNL	Early completion of Hydro Power Projects	Hy-2
7.	Transmission Corporation of Andhra Pradesh Limited (APTRANSCO) (220 kV & above system)	APTRANSCO	Transmission System Availability	Tr-1
8.	765/400 kV, Dhule Sub-station (2x1500 MVA)	BDTCL (Sterlite Grid Limited)	Early completion of Transmission Projects	Tr-2
9.	Rajasthan Atomic Power Station (1080MW)	NPCIL	Performance of Nuclear Power Stations	Nu-1
10.	The Tata Power Company Limited, Maharashtra		Performance of Distribution Companies	Rf-1
11.	NPCL (East), Noida Power Company Limited, Greater Noida, Uttar Pradesh		Performance of Rural Distribution Franchisees	Rf-2
12.	Budge Budge Thermal Power Station (750 MW)	CESC Limited	Environment Management Award Scheme for Coal Based Thermal Power Stations	En-1
C. BRONZE SHIELD WINNERS				
1.	Ramagundam Super Thermal Power Station (2600 MW)	NTPC Limited	Performance of Thermal Power Stations	Th-1
2.	Korba Super Thermal Power Station (2600 MW)	NTPC Limited	Performance of Thermal Power Stations	Th-1
3.	Budge Budge Thermal Power Station (750 MW)	CESC Limited	Performance of Thermal Power Stations	Th-1
4.	Badadarha Thermal Power Project, Unit – 1 (600 MW)	DB Power Limited	Early completion of Thermal Power Projects	Th-2
5.	Karcham Wangtoo Hydro Electric Plant (4x250 MW)	Jaiprakash Power Ventures Limited (JPVL)	Performance of Hydro Power Stations	Hy-1
6.	Kaiga Generating Station (880MW)	NPCIL	Performance of Nuclear Power Stations	Nu-1
7.	Torrent Power Limited, Surat, Gujarat		Performance of Distribution Companies	Rf-1
8.	Akanksha Power and Infrastructure Private Limited - Khaira, NESCO, Odisha		Performance of Rural Distribution Franchisees	Rf-2
D. Certificate of Merit				
1.	Anta Combined Cycle Gas Turbine Station (419.33 MW)	NTPC Limited	Performance of Thermal Power Stations	Th-1
2.	Vindhyachal Super Thermal Power Station (4260 MW)	NTPC Limited	Performance of Thermal Power Stations	Th-1
3.	Trombay Thermal Power Station (750 MW)	The Tata Power Company Limited	Performance of Thermal Power Stations	Th-1
4.	Guru Hargobind Thermal Plant,	PSPCL	Performance of Thermal	Th-1

	Lehra Mohabbat I&II (920 MW)		Power Stations	
Shield Awards proposed are 30 as against 38 Shield Awards as per scheme. In addition to this four Certificates of Merit are given.				

NPCL	Noida Power Company Limited
NTPC Limited	National Thermal Power Corporation Limited
BDTCL	Bhopal Dhule Transmission Company Limited
SJVNL	Satluj Jal Vidyut Nigam Limited
NHPC Limited	National Hydroelectric Power Corporation Limited
NPCIL	Nuclear Power Corporation of India Limited
CESC Limited	Calcutta Electric Supply Corporation Limited
APTRANSCO	Transmission Corporation of Andhra Pradesh Limited
NHDC	Narmada Hydroelectric Development Corporation
PSPCL	Punjab State Power Corporation Limited

Annexure-3A
(Item no. 3.2)

Details of Inter-Regional Transmission – Existing as on 31-03-2015

(Transmission capacity in MW)

Details of Inter-Regional Transmission Lines		At the end of 10th Plan	At the end of 11th Plan	At the end of 2014-15
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
Sasaram–Fatehpur 765kV S/C line-2				2100
Gaya–Balia 765kV S/C			2100	2100
Sasaram: (i) HVDC back to back (ii) Bypassing of HVDC back-to- back to establish Sasaram-Allahabad/Varanasi 400kV D/C line		500	1000	1000
ER-NR total		**3430**	**12130**	**14230**
ER – WR :				
Rourkela-Raipur 400kV D/C		1000	1000	1000
TCSC on Rourkela-Raipur 400kV D/C		400	400	400
Budhipara-Korba220kV D/C+S/C		390	390	390
Ranchi-Sipat 400kV D/C (40% SC)			1200	1200
Ranchi-Rourkela-Raipur 400kV D/C with fixed series capacitor, TCSC in parallel line			1400	1400
Ranchi- WR(Bilaspur)Sipat Pooling Point 765kV S/C via Dharamjaigarh during 12th plan				2100
Jharsuguda-Dharamjaigarh-765kV D/C				4200
ER-WR total		**1790**	**4390**	**10690**
ER - NER :				
Birpara-Salakati 220kV D/C		260	260	260
Malda-Bongaigaon 400kV D/C		1000	1000	1000
Bongaigaon-Siliguri 400kV D/C Quad (to be LILOed at Alipurduar in 12th/13th plan)				1600
ER-NER total		**1260**	**1260**	**2860**

Details of Inter-Regional Transmission Lines		At the end of 10th Plan	At the end of 11th Plan	At the end of 2014-15
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
Mundra-Mahendragarh + 500kV 2500 MW HVDC bipole line				2500
NR-WR total		**2120**	**4220**	**8720**
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
Raichur-Sholapur 765kV S/C #1				2100
Raichur-Sholapur 765kV S/C #2				2100
WR-SR total		**1720**	**1720**	**5720**
TOTAL ALL INDIA (200kV & above), in MW		**13450**	**27150**	**35450**
132kV/110kV Inter-Regional links 4xD/C + 4XS/C = 12 ckts	**$**	**600**	**600**	**-**
TOTAL ALL INDIA (110/132kV & above), in MW		**14050**	**27750**	**45850**

Note:

@ - 200 MW HVDC Monopole is currently not in operation.

$ - 132/110kV lines are operated in radial mode from time to time (not be included in 12th plan onwards).

Annexure-3B
(Item no. 3.3.2)

ISSUES PERTAINING TO TRANSMISSION SYSTEM PLANNING TAKEN UP DURING 2014-15

34th Standing Committee Meeting on Power System Planning in Northern Region.

1 LILO of one circuit of RAPP – Kankroli 400 kV D/c line at Chittorgarh (RVPN)

1. Kishenganga Transmission System – Use of Multi-circuit Towers
2. Extension of 400 kV Malerkotla under NRSS-XXXI (Part-B).
3. Implementation of 765/400 kV GIS Substation at Orai
4. Line Reactors for Agra – Sikar 400 kV D/c line at Agra end.
5. Finalisation of bus reactors at Gorakhpur & Sultanpur.
6. Baraisiul-Sarna 210 kV D/C line.
7. Augmentation of Transformation Capacity at Mainpuri and Sikar 400/220 kV substations, diversion of load from Raebareli 220/132 kV substation.
8. Strengthening for overloading in Singrauli – Anpara 400 kV line:
9. Setting up of 400KV Inter State Grid Sub-Stations in Delhi.
10. LILO of 220 KV Dhauliganga-Pithoragarh (Chandak) PGCIL line for Construction of Proposed 220KV GIS S/s at Jauljibi, Pithoragarh.
11. Requirement of 3 Nos. 220 KV Bays at 220 KV S/s Pithoragarh (PGCIL) for proposed 220 kV D/c Almora-Pithoragarh Line and 220/132KV GIS S/s Almora in Kumaon region.
12. Regarding Re-planning of UITP Network for Alaknanda Basin.-
13. LILO of 765 KV D/C Tehri-Meerut PGCIL line at proposed 765/400 KV Substation Rishikesh (PTCUL)
14. Reactive compensation associated with ISTS under Green Energy Corridors
15. Establishment of 220/66kV, 2x160MVA GIS S/s at Sector 47, UT Chandigarh along with 220kV D/C line from Sector 47 to 400/220kV Panchkula substation of Powergrid as a inter state line.
16. LILO of one circuit of 400kV Sikar- Neemrana PGCIL D/c line at Babai (RVPN) substation.
17. Provision of 400/220 kV ICTs at Parbati Pooling Station.
18. Establishment of 400/220 kV substation at Greater Noida.
19. Transmission Line Constraints in Northern Region.
20. Establishment of new 400/220 kV substations in NR.
21. Reactive compensation associated with Inter-Regional system strengthening scheme for WR and NR part-B.
22. Koldam – Ludhiana 400 kV D/C and Parbati –Koldam (excluding Parbati – II to Parbati – III section).

35th Standing Committee Meeting on Power System Planning in Northern Region.

1. Conversion of the existing non-switchable Line reactor at Jhatikara end of Kanpur-Jhatikara line which is to be LILOed at Aligarh into switchable line reactor.
2. 220kV lines for connectivity of new 400/220kV ISTS substations under ISTS strengthening.
3. LILO of Koteshwar Pooling Station- Meerut 765 KV D/c line at proposed 765/400 KV Substation Rishikesh.

4. LILO of 220kV Dhauliganga- Pithoragarh(PG) for construction of Proposed 220kV GIS S/s at Jauljibi, Pithoragarh & Proposed 2x100 MVA, 220/132kV GIS S/s at Almora in Kumaon region.
5. Re-planning of UITP Network for Alaknanda Basin.
6. Evacuation of Ghatampur TPS (3x660 MW), Uttar Pradesh.
7. 220 kV Underlying System from the Central Sector 400 kV S/S proposed in UP.
8. Transmission works at 765, 400 and 220kV to be undertaken by UPPTCL.
9. Creation of new 400kV substations in Gurgaon area and Palwal area as a part of ISTS-Agenda by HVPN.
10. LILO of Sikar-Neemrana 400kV D/c line at Babai (RRVPNL).
11. Requirement of 2 nos. 220 kV bays at PGCIL's 400/220kV GSS Sikar.
12. Implementation of Koldam – Ludhiana 400 kV D/C and Parbati – Koldam (excluding Parbati – II to Parbati – III section)
13. Stringing of second circuit of Dulhasti-Kishenpur Line in Forest Stretches.
14. Power evacuation from 2x50 MW Sainj HEP.

1st 2014/16th Meeting of the Standing Committee on Power System Planning in Eastern Region

1. Modification in Transmission System associated with Phase-I IPPs in Sikkim
2. Modification in Transmission System for development of pooling station in Northern part of West Bengal and transfer of power from Bhutan to NR/WR
3. Transmission System for evacuation of power from Punatsangchhu-I (1200MW), Punatsangchhu II (990MW), Mangdechhu (720MW) and Wangchhu (570MW) HEPs in Bhutan
4. Conversion of 50 MVAr Line Reactor presently installed at Jeerat end of Bahrampur - Jeerat 400 kV line to Bus Reactor in parallel with existing Bus Reactor at Jeerat
5. Modification in scheme for installation of 125 MVAr Bus Reactor at Jeypore (already approved in SCM on 08-02-2012).
6. Additional Reactive Compensation in Eastern Region
7. Evacuation of power from new sub-stations under Eastern Region Strengthening Scheme-III (ERSS-III)
8. (A) Transmission System associated with Odisha UMPP (4000 MW)
   (B) 765kV System Strengthening Scheme in Eastern Region
9. Augmentation of Transformation capacity at 400/220kV Baripada S/S (PG)-Addition of 1x500 MVA, 400/220 kV ICT with GIS bays at Baripada 400/220/132kV sub-station of POWERGRID
10. Replacement of 1X100 MVA 220/132kV, 3rd ICT with 1X160 MVA, 220/132 kV ICT at Purnea 220/132 kV sub-station of POWERGRID, along with necessary bay eqpt/protection system
11. Augmentation of transformation capacity of 220/132 kV Birpara (PG) and Silliguri S/s (PG)
12. Modification of 132kV bus arrangement at 220/132kV Purnea Substation with GIS
13. Construction of 4 nos. 220 kV line bays at Kishanganj sub-station of POWERGRID/ Construction of down linking Transmission network for drawl of power from Kishanganj 400/220 kV Sub-Station of POWERGRID

    &

    Installation of 3rd 400/220 kV ICT (500 MVA) at Kishanganj
14. Modification of 132kV Bus arrangement at 220/132kV Birpara Sub-station of POWERGRID
15. Transmission System for Phase-I Generation Projects in Sikkim
16. Connectivity / Open Access for Phase-II Generation Projects in Sikkim

17. Transmission System for Phase-I Generation Projects in Jharkhand
18. Common Transmission System for Phase-II Generation Projects in Odisha
19. Immediate Evacuation System for OPGC (1320 MW) Project
20. Charging of LILO of one circuit of Talcher - Meramundali 400 kV D/c line at Angul
21. Proposal for establishment of 132 KV system at 400 KV Baharampur switching station of POWERGRID with 3 x 200 MVA, 400/132 kV ICTs
22. Proposal of NTPC for 400kV D/C interconnection between Nabinagar STPP (3x660MW) and Nabinagar TPP (4x250MW) for start-up power arrangement for New Nabinagar STPP (3x 660 MW)
23. Proposal of ERPC to establish a 132kV Banka (PG)(new) - Deoghar D/C line (about 40 kms) to feed Deoghar S/S(JSEB) for reliable and uninterrupted power supply to Railways load.

37th Standing Committee Meeting of the Standing Committee on Power System Planning in Western Region.

1. Procurement of one no. 333 MVA, 765/400 kV and two nos. of 500 MVA, 765/400kV ICTs for Western Region – POWERGRID proposal.
2. Procurement of spare 765 kV reactors for Western Region – POWERGRID proposal.
3. Procurement of spare 125 MVAR, 400 kV reactors for Western Region – POWERGRID proposal.
4. Contingency arrangement for transmission lines emanating from Champa 765/400 kV pooling station- Agenda by POWERGRID.
5. Proposal of Series Reactors in Western Region- Agenda by POWERGRID.
6. Bus Splitting of Kahalgaon STPS Stage I and Stage II – Agenda by WRPC.
7. Contingency arrangement for Kala 400/220 kV substation of POWERGRID.
8. Creation of 6th 220 kV bay at Omkareshwar HEP switchyard.
9. Installation of additional 2x500MVA, 400/220kV Transformer at Indore (PG) 765 kV Substation - Agenda by MPPTCL.
10. Installation of additional 1x315MVA, 400/220kV Transformer at Itarsi (PG) 400 kV Substation – Agenda by MPPTCL.
11. Installation of additional 1x315MVA, 400/220kV Transformer at Itarsi (PG) 400 kV Substation – Agenda by MPPTCL.
12. Laying of cable in DGEN- Vadodara 400 kV D/C line at DGEN end.
13. Evacuation of Renewable energy generations located in WR and NR to Northern region states.
14. System for increasing capacity of Inter-State Transmission system for import of power into SR up to 2018-19.
15. New transmission schemes in Gujarat for RES generation.
16. Inter-regional System Strengthening Scheme for NR & WR.
17. Delinking of Associated Transmission System of Krishnapatnum with commissioning of Krishnapatnum UMPP in Western Region.
18. LILO of Raipur (PGCIL) – Urla 220 kV line at proposed Borjhara 220 kV substation- Agenda by CSPTCL.
19. New Transmission schemes in South Gujarat area- Agenda by GETCO.
20. Commissioning of 2X80 MVAR 400 kV line reactors associated with Aurangabad – Boisar 400 kV Quad line as bus reactors at Aurangabad.
21. Commissioning of 240 MVAR, 765 kV Line Reactors as Bus Reactor at Jabalpur pool substation.

37th Meeting of the Standing Committee on Power System Planning in Southern Region

1. TANGEDCO/TANTRANSCO proposals including ATS for ENNORE SEZ (NCTPS Stage-IV), NCTPS Stage III, ETPS Replacement, OPG Power generation Ltd.
2. Constraints in 400kV bays extensions at 400kV Vemagiri S/S.
3. System for increasing capacity of Inter-State Transmission system for import of power into SR up to 2018-19.
4. Dedicated power supply to Pumping Stations at Myadaram, Choppadandi, Ramadugu, Malakpet
5. 400kV Bays in Dharmapuri (Salem) 765/400kV SS for terminating 400kV DC line from Rasipalayam 400kV SS.
6. Transmission System for evacuation of power from 2x500 MW Neyveli Lignite Corp. Ltd. TS-I (Replacement) (NNTPS) in Neyveli, Tamil Nadu.
7. Connectivity for Kudankulam 3&4 (2x1000MW) with interstate transmission system.
8. Requirement of Additional 125 MVAR Bus Reactor at Kaiga
9. Reactive Compensation for Various Transmission Schemes approved in previous SCMs.
10. Establishment of 2x500 MVA, 400/230kV GIS S/S at Tirunelveli Pooling Station
11. Issues regarding transmission system for evacuation of power from Cheyyur Ultra Mega Power Project (UMPP) of 4000 MW capacity
12. APTRANSCO's Proposal regarding evacuation scheme for procurement of 1050 MW from three Inter-State Generating stations located in AP
13. Issues regarding augmentation of Talcher-II Transmission System
14. Operational feedback on Transmission constraints
15. Additional Agenda related to Vemagiri-Khammam-Hyderabad corridor

38th Meeting of the Standing Committee on Power System Planning in Southern Region

1. Augmentation of Transformer Capacities in SR
2. Issues regarding transmission System for Coastal Tamil Nadu Power Ltd. (4000 MW) Cheyyur UMPP in Kanchipuram of Tamil Nadu.
3. Converting Fixed Line Reactors into Switchable Line Reactors in Over Compensated lines in Southern Region.
4. Reactive compensation at Vemagiri S/S
5. Termination of Narendra-Madhugiri line under TBCB
6. Charging for Kurnool - Thiruvalam 765kV D/c at 400kV
7. Re-orientation of Nellore –Vijayawada 400kV D/c line
8. Tapping of Uravakonda- Jammalamadagu D/c Quad line with Gooty –Madhugiri 400kV D/c line.
9. YTPS- Providing start-up power for Boiler light up and commissioning activities of unit 1.
10. Evacuation of SEPC IPP(1x525 MW) –Proposed by TNEB.
11. Modifications for the Pulianthope 400/230kV S/s.
12. New 400kV Load Substation at Usilampatty.
13. Issues regarding Edayarpalayam 400/230-110kV S/s under the scope of TANTRANSCO.
14. Issues regarding construction of 400kV Quad D/C line from UPCIL (Karnataka) to Kasargod(Kerala).
15. Start up power requirement of under construction NCC PPL Power Plant.
16. Cost impact of new and ongoing transmission schemes in Southern Region.
17. Transmission system for evacuation of power from Ghani/Panyam Solar project (1000 MW) and in Aspiri Wind project (1000 MW) in Andhra Pradesh.

18. Transmission system for evacuation of power from NP Kunta Solar project (1500 MW) in Andhra Pradesh.
19. Modification for the System Strengthening-XXIV in Southern Region – GIS for Cuddapah 765kV S/s.
20. ATS Tuticorin JV (2x500 MW) TPS of M/s NTPL
21. Change in SCCL Evacuation scheme.
22. Modifications in the scope of Raigarh – Pugalur – Kerala 6000 MW HVDC transmission system.

4th Standing Committee on Power System Planning in North Eastern Region

1. Procurement of spare transformers and Reactors in NER
2. Radial Interconnection between India (NER) and Bangladesh
3. High Capacity multi-terminal HVDC bi-pole line interconnecting North-Eastern Region (NER), India, Northern Region (NR), India and Bangladesh.
4. Augmentation of Transformation Capacity at 400/220/33 kV Misa substation of POWEWRGRID.
5. Kameng Basin – Dinchang Pooling Station.
6. North Eastern Region Strengthening Scheme – II (NERSS-II).
   (i) NERSS-II: Part-A (to be implemented by POWERGRID)
   (ii) NERSS-II: Part-B (to be implemented through TBCB Route)
7. Up gradation of Silchar-Imphal 400 kV D/C line to its rated voltage
8. Extension of Imphal-New Kohima 400 kV D/C line to Misa.
9. Loktak Downstream HEP (2x33=66MW)
10. Expansion of Agartala GBPP (4x21MW) of NEEPCO
11. Additional Reactive Compensation at Balipara & Bongaigaon
12. By passing of Bongaigaon sub-station

Annexure – 3C
(Item 3.4.2)

Details of the Schemes notified through Tariff Based Competitive Bidding (TBCB)

(a) Schemes presently under implementation by the Transmission Service Providers:

1. 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)
2. Talcher-II Augmentation System. (Reliance Power Transmission Company Ltd)
3. System strengthening common for WR and NR (Sterlite Transmission Projects Private Ltd.)
4. System Strengthening for WR (Sterlite Transmission Projects Private Ltd.)
5. Transmission system associated with IPPs of Nagapattinam / Cuddalore Area – Package A (Power Grid Corporation of India Ltd.)
6. Transmission System associated with IPPs of Vemagiri Area- Package A (Power Grid Corporation of India Ltd.)
7. Vizag Transmission System (Power Grid Corporation of India Ltd.)
8. Transmission System required for evacuation of power from Kudgi TPS (3x800 MW in Phase-I) of NTPC Limited. (L&T Infrastructure Development Projects Limited)
9. Transmission System for Patran 400 kV S/S(Techno and Electric Engineering Company Limited)
10. Part ATS of RAPP U-7&8 in Rajasthan (Sterlite Grid Ltd.)
11. Eastern Region System Strengthening Scheme – VI (Essel Infraprojects Limited)
12. Eastern Region System Strengthening Scheme – VII (Sterlite Grid Ltd)
13. ATS of Unchahar TPS (Power Grid Corporation of India Limited)
14. Northern Region System Strengthening Scheme, NRSS-XXIX (Sterlite Grid Ltd.)
15. Northern Region System Strengthening Scheme, NRSS-XXXI (Part-A) (Power Grid Corporation of India Limited)
16. Northern Region System Strengthening Scheme, NRSS-XXXI (Part-B) (Essel Infra projects Limited)
17. Transmission System strengthening associated with Vindhyachal- V
18. Transmission System associated with DGEN TPS (1200 MW) of Torrent Power Ltd

(b) Schemes under bidding process by the Bid Process Coordinators:

1. ATS for Tanda Expansion TPS (2x660 MW)
2. Transmission system associated with Gadarwara STPS (2x800 MW) of NTPC (Part -A)
3. Transmission system associated with Gadarwara STPS (2x800 MW) of NTPC (Part - B)
4. Connectivity lines for Maheshwaram (Hyderabad) 765/400kV Pooling S/s,
5. Additional System Strengthening for Sipat STPS
6. Northern Region System Strengthening Scheme – XXXV
7. System strengthening for IPPs in Chhattisgarh and other generation projects in Western Region
8. Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B
9. Additional inter-Regional AC link for import into Southern Region i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765kV
10. Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha
11. Strengthening of transmission system beyond Vemagiri
12. NER System Strengthening scheme –II
13. Transmission system Strengthening in India for transfer of power from new HEP's in Bhutan.

Annexure – 3D
(Item 3.4.3)

Issues Pertaining to Transmission System Planning taken up in Empowered Committee on Transmission during 2014-15

33rd Meeting of the Empowered Committee on Transmission

1. Revised procedure for allocation of Inter State Transmission Project(s) under Tariff Based Competitive Bidding (TBCB)
2. Cost estimates for the transmission projects to be implemented through tariff based competitive bidding (TBCB)
3. Annulment of bidding process for Transmission System for connectivity for NCC Project (1320 MW) and Baira Suil – Sarna 220 kV D/C transmission line
4. Abeyance of bidding process for Northern Region System Strengthening Scheme –XXXIII
5. New Schemes Notified by MoP.
6. New transmission schemes to be taken up through Tariff Based Competitive Bidding (TBCB)
   - Inter State Transmission System for Renewable in Northern Region
   - Creation of 400/220 kV substations in NCT of Delhi during 12th plan Period
   - Establishment of 220/66kV, 2x160MVA GIS S/s at Sector 47, UT Chandigarh along with 220kV D/C line from Sector 47 to 400/220kV Panchkula substation of Powergrid as a inter state line.
   - Shongtong Karcham HEP in Himanchal Pradesh
   - Northern Region System Strengthening Scheme(NRSS)-XXXIV
   - Constraints in 400kV bays extensions at 400 kV Vemagiri S/S
   - System for increasing capacity of Inter-State Transmission system for import of power into SR up to 2018-19
     - Additional inter-Regional AC link for import into Southern Regioni.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765kV link
     - HVDC Bipole link between Western region (Raigarh, Chhattisgarh) and Southern region (Pugalur, Tamil Nadu)
     - Strengthening of transmission system beyond Vemagiri
   - Connectivity for Kudankulam 3&4 (2x1000MW) with interstate transmission system.
   - Proposal of Electricity Department, Puducherry for erection of 230 kV line to Karaikal
   - NER System Strengthening Scheme – II
   - Transmission system for phase-I generation projects in Arunachal Pradesh
   - Common Transmission System for Phase-II Generation Projects in Odisha
   - Immediate Evacuation System for OPGC (1320 MW) Project in Odisha
   - Transmission System Strengthening in Indian System for transfer of power from new HEPs in Bhutan
7. Proposed Modification in the transmission schemes already notified for implementation through TBCB route
   - Additional System Strengthening for Sipat STPS
   - Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B
   - Transmission system associated with Gadarwara STPS (2x800 MW) of NTPC (Part - A)
   - Transmission System for evacuation of power from 2x500 MW Neyveli Lignite Corp. Ltd. TS-I (Replacement) (NNTPS) in Neyveli, Tamil Nadu
8. Constitution of the Bid Evaluation Committees (BEC's) for the new transmission schemes
9. Briefing by BPCs on the schemes under bidding proce

Annexure-3E
(Item no. 3.17)

TRANSMISSION LINE COMMISSIONED / READY FOR COMMISSIONING DURING 2014-15

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	Bina - Gwalior line (3rd Ckt)	S/C	PGCIL	231	MAY-14
2	Champa Pooling Station - Dharamjaygarh / Near Korba Switching Station line	S/C	PGCIL	62	MAY-14
3	Champa Pooling Station - Raipur Pooling Station line	D/C	PGCIL	298	MAY-14
4	Indore - Vadodara	S/C	PGCIL	320	MAY-14
5	Kurnool - Raichur (IInd Ckt)	S/C	PGCIL	118	JUN-14
6	Rihand - Vindhyachal Pooling Station (1st Ckt)	S/C	PGCIL	31	JUN-14
7	Jharsuguda Pooling Station Dharamjaygarh line.	D/C	PGCIL	300	JUL-14
8	Wardha - Aurangabad-I	D/C	PGCIL	690	JUL-14
9	Satna - Gwalior line (60 Km D/C Portion) Ckt-II	D/C+S/C	PGCIL	300	AUG-14
10	Kurnool - Nellore	D/C	PGCIL	602	OCT-14
11	Kurnool - Thiruvalam line	D/C	PGCIL	710	NOV-14
12	Raipur Pooling Station - Wardha line	D/C	PGCIL	736	NOV-14
13	Sholapur - Pune	S/C	PGCIL	268	FEB-15
14	Angul Pooling Station - Jharsuguda Pooling Station line-II	S/C	PGCIL	274	MAR-15
15	Vindhyachal Pooling Station - Satna line (2 Km D/C Portion) Ckt-II	D/C+S/C	PGCIL	271	MAR-15
16	Wardha - Aurangabad -II	D/C	PGCIL	701	MAR-15
Total of CENTRAL Sector				**5912**	
PVT SECTOR					
17	Raichur - Sholapur line	S/C	RSTCL	208	JUN-14
18	Akola - Aurangabad line ckt-I	S/C	APL	219	AUG-14
19	Aurangabad - Dhule (BDTCL)	S/C	SGL	192	OCT-14
20	Bhopal - Indore (BDTCL)	S/C	SGL	176	OCT-14
21	Dhule - Vadodara (BDTCL)	S/C	SGL	263	FEB-15
22	Tiroda - Koradi - Akola - Aurangabad line ckt-II	S/C	APL	575	MAR-15
Total of PVT Sector				**1633**	

STATE SECTOR					
23	Anpara C - Anpara D	S/C	UPPTCL	3	JUN-14
Total of STATE Sector				**3**	
Total of 765 kV				**7548**	
400 kV					
CENTRAL SECTOR					
24	Aurangabad (PG)-Aurangabad (MSETCL)	D/C	PGCIL	118	APR-14
25	LILO of Teesta-V Siliguri line at Rangpo (1 D/C & 1.5 M/C)	D/C	PGCIL	7	APR-14
26	Nellor - Thiruvalam (Quad) line	D/C	PGCIL	352	APR-14
27	LILO of 2nd Ckt of Lucknow - Bareliiy line (PG) at Shahjahanpur	D/C	PGCIL	25	JUN-14
28	LILO of Neyveli - Trichy at Nagapattnam Pooling station	S/C	PGCIL	46	JUN-14
29	Thiruvalam - Sholinganallur line	D/C	PGCIL	228	JUL-14
30	Anuppur (Moser Baer) - Jabalpur Pooling Station	D/C	PGCIL	492	AUG-14
31	Dadr-Loni (Harsh Vihar)	S/C	NTPC Ltd.	108	SEP-14
32	Koderma - Gaya (Balance part)	D/C	PGCIL	152	SEP-14
33	Maithon -Gaya line (Balance part)	D/C	PGCIL	130	SEP-14
34	Balipara - Bongaigaon	D/C	PGCIL	609	OCT-14
35	LILO of Both Ckt Jamshedpur - Rourkela line at Chaibasa	D/C	PGCIL	56	OCT-14
36	LILO of Nathpa Jhakri - Nalagarh at Rampur (2nd Ckt balance)	D/C	PGCIL	2	OCT-14
37	LILO of Teesta-V Siliguri line at Rangpo (2nd ckt balance)	D/C	PGCIL	5	OCT-14
38	LILO of Navsai - Boisar at Magarwada	D/C	PGCIL	16	NOV-14
39	Bokaro TPS Extn.- Koderma TPS	D/C	PGCIL	200	DEC-14
40	Sagardighi - Baharampur	D/C	PGCIL	52	DEC-14
41	Bachou - Varsana line	D/C	PGCIL	20	JAN-15
42	LILO of both ckts of Tuticorin JV - Maduri at Tuticorin Pooling station	D/C	PGCIL	9	JAN-15
43	Sikar - Ratnagarh line	D/C	PGCIL	156	JAN-15
44	LILO of Parli - Pune at Pune	D/C	PGCIL	39	FEB-15
45	LILO of Dehar - Panipat at Panchkula	D/C	PGCIL	18	MAR-15
46	Silchar - Imphal (New) line (to be charged at 132KV)	D/C	PGCIL	334	MAR-15
Total of CENTRAL Sector				**3174**	
JOINT SECTOR					
47	Koldam - Ludhinana (JV Portion)	D/C	PKTCL	301	SEP-14
48	Parbati -II- Koldam line -II	S/C	PKTCL	76	SEP-14
49	Parbati- II - Koldam line-I	S/C	PKTCL	81	OCT-14
Total of JOINT Sector				**458**	

PVT SECTOR					
50	LILO of ACBIL-Baraari (Bilaspur) PS at Bandakhar (Maruti Clean Coal)	D/C	MCCPL	6	JUN-14
51	Byrnihat - Azara (2nd Ckt) (Part of Silchar - Azara)	S/C	NETC	42	JUL-14
52	Bhopal - Bhopal (BDTCL)	D/C	SGL	17	JUL-14
53	DB Power (Baradarha) - Raigarh (Kotra) Pooling Station	D/C	DBPCL	36	AUG-14
54	LILO of one ckt of Bhadravati (PG) - Parli at Dhariwal	D/C	DIPL	31	AUG-14
55	Derang - Angul Pooling Station	MC+D/C	JPL	154	AUG-14
56	Dhule (IPTC) - Dhule (MSETCL) (BDTCL)	D/C	SGL	35	SEP-14
57	Bongaigoan - Siliguri Line (ENICL)	D/C	SGL	443	NOV-14
58	Kamalanga (GMR) - Angul pooling station	D/C	GMR ENERG	60	DEC-14
59	Haldia - Subhasgram line	D/C	CESC	178	JAN-15
60	Dhariwal TPS -Channdrapur II (2nd Ckt)	S/C	DIPL	10	JAN-15
61	Tamnar TPP - Raigarh (Tamnar) Pooling Station	2xD/C	JPL	44	JAN-15
62	Bina TPS - Suitable location (along Bina (PG) - Bina (MPPTCL)	D/C	JV(PG&JP)	40	JAN-15
63	Azara - Bongaigaon (2nd Ckt)	D/C	NETC	159	JAN-15
64	Amravati - Akola (Bableshwar) - II	D/C	IBPL	207	MAR-15
65	Satpura - Ashta	D/C	KPTL	482	MAR-15
66	Azara - Bongaigaon	D/C	NETC	201	MAR-15
Total of PVT Sector				**2145**	
STATE SECTOR					
67	Moga- Nakodar	D/C	PSTCL	128	APR-14
68	LILO of Waluj - Bhusawal at Thaptitanda	D/C	MSETCL	154	MAY-14
69	Thaptitanda (Aurangabad -II) - Ektuni	D/C	MSETCL	9	MAY-14
70	Nakodar - Makhu line	D/C	PSTCL	105	MAY-14
71	Rajpura Thermal - Nakodar	D/C	PSTCL	279	MAY-14
72	Babhaleshwar - Aurangabad II	D/C	MSETCL	254	JUL-14
73	Mukatsar -Makhu	D/C	PSTCL	191	JUL-14
74	Karaikudi - Kayathar	D/C	TANTRANSCO	390	JUL-14
75	Pugalur - Ottiyambakkam - Kalivanthapattu (Melakottaiyur)	D/C	TANTRANSCO	727	JUL-14
76	Kosamba-Chorania line	D/C	GETCO	460	AUG-14
77	Talwandi Sabo-Mukatsar	D/C	PSTCL	201	SEP-14
78	Chhegaon - Julwania	D/C	MPPTCL	225	NOV-14
79	LILO of Muzaffarnagar -Vishnuprayag at Srinagar	D/C	UPPTCL	7	NOV-14
80	LILO of Palatana - Bongaigaon at Azara S/S	D/C	AEGCL	7	JAN-15
81	Chhabra TPS - Anta (Baran)	D/C	RVPNL	179	JAN-15

82	MTPS Stage-III - Thiruvalam	D/C	TANTRANSCO	204	JAN-15
83	LILO of Panki - Muradnagar at Aligarh	D/C	UPPTCL	66	JAN-15
84	Bonapally - Chittoor (Quad)	D/C	APTRANSCO	196	FEB-15
85	LILO of Mundra - Chorania at Halvad S/S	D/C	GETCO	4	FEB-15
86	a) Jujjuru - Sattenapalli (b) LILO of VTS - Srisailam line at Sattenapalli	D/C	APTRANSCO	134	MAR-15
87	Mundra - Zerda line (Terminated at Varsana)	D/C	GETCO	161	MAR-15
88	Bara - Meza line	D/C	UPPTCL	65	MAR-15
89	LILO of Panki - Obra at Reewa Road	D/C	UPPTCL	1	MAR-15
90	Reewa Road - Meza line	D/C	UPPTCL	68	MAR-15
Total of STATE Sector				**4215**	
Total of 400 kV				**9992**	
220 kV					
CENTRAL SECTOR					
91	Gola - Ramgarh	D/C	DVC	74	MAY-14
92	LILO of Ckt-II Jullandhur - Hamirpur at Hamirpur (PG)	D/C	PGCIL	19	FEB-15
Total of CENTRAL Sector				**93**	
PVT SECTOR					
93	GEPL -MIDC S/S	D/C	GEPL	20	SEP-14
Total of PVT Sector				**20**	
STATE SECTOR					
94	LILO of Moga - Ferozepur at Talwandi Bhai	D/C	PSTCL	4	APR-14
95	LILO of Debari - Banswara at Madri (Udaipur)	D/C	RVPNL	34	APR-14
96	LILO of Arasur-Ingur at Karamadai S/S	D/C	TANTRANSCO	5	APR-14
97	LILO of Muradnagar - Modipuram at Faridnagar	S/C	UPPTCL	31	APR-14
98	Dhuri (Bhalwan) - Dhanaula	D/C	PSTCL	75	MAY-14
99	LILO of Dhuri - Bangan at Chhajali (Loop out)	S/C	PSTCL	27	MAY-14
100	Nakodar - Nurmehal	D/C	PSTCL	30	MAY-14
101	Ajari - Bhadla line	D/C	RVPNL	48	MAY-14
102	Bap-Ajari line	D/C	RVPNL	57	MAY-14
103	LILO of Ratangarh -Bikaner at Bandnu	D/C	RVPNL	42	MAY-14
104	Narasaraopet - Parchur	D/C	APTRANSCO	106	JUN-14
105	Makhu - Dharam kot	D/C	PSTCL	42	JUN-14
106	Patti - Algon (2nd Ckt)	S/C	PSTCL	20	JUN-14
107	LILO of Khodri - Rishikesh at Dehradun	D/C	PTCUL	5	JUN-14
108	Lalitpur TPS - Jhansi	D/C	UPPTCL	185	JUN-14

109	Terminating tower point - HSR Layout (Cable work)	UG Cable	KPTCL	3	JUL-14
110	LILO of Baja khana - Mukatsar at Kotkapura	D/C	PSTCL	3	JUL-14
111	Kashipur - Mahuakheraganj	D/C	PTCUL	34	JUL-14
112	LILO of Kayathar - Anuppankulam at Kayathar	D/C	TANTRANSCO	4	JUL-14
113	LILO of Kayathar - Pasumalai at Kayathar	D/C	TANTRANSCO	4	JUL-14
114	LILO of Thudiyalur - Othakalmandapam at Coimbatore	D/C	TANTRANSCO	10	JUL-14
115	Korba -Vishrampur	S/C	CSPTCL	153	AUG-14
116	LILO of Raigarh - Jindal (Tamnar) at Girwani	D/C	CSPTCL	15	AUG-14
117	Shalimar bagh - Wazirpur, U/G,1000 mm, 200 MW	D/C	DTL	8	AUG-14
118	LILO of GAVASAD - SLPP at Karjan	D/C	GETCO	23	AUG-14
119	LILO of Karamsad-Vartej at Dhuvaran CCPP-III	D/C	GETCO	78	AUG-14
120	LILO of Dausa -Alwar at Alwar	D/C	RVPNL	9	AUG-14
121	LILO of Mandawar-Alwar (MIA) at Alwar	D/C	RVPNL	1	AUG-14
122	LILO of Thiruvalam - Kanchipuram SP Koil at Thiruvalam	D/C	TANTRANSCO	10	AUG-14
123	LILO of Harduagani - Hathras at Khair	D/C	UPPTCL	75	AUG-14
124	LILO of Rewan Road - Fatehpur at Sirathu	S/C	UPPTCL	6	AUG-14
125	Hura - Raghunathpur	D/C	WBSETCL	67	AUG-14
126	BTPS-Agia-Sarusajai (2nd Circuit, Balance portion)	S/C	AEGCL	65	SEP-14
127	LILO of Budidampad - Bhongiri at Weddekothapally	D/C	APTRANSCO	14	SEP-14
128	Kanti - Darbhanga (2nd Ckt)	S/C	BSEB	68	SEP-14
129	LILO of Bawana-Najafgarh at Kanjhawla	D/C	DTL	6	SEP-14
130	Maharani Bagh- Gazipur (0.5kM cable on Maharani Bagh side & 8.5kM OH line)	D/C	DTL	19	SEP-14
131	LILO of New Pallom- Kayamkulam at Punnapra	D/C	KSEB	36	SEP-14
132	Khaperkheda - Butibori -I	D/C	MSETCL	126	SEP-14
133	Purti - Butibori - III	D/C	MSETCL	78	SEP-14
134	Bhawad - Bhopalgarh	D/C	RVPNL	93	SEP-14
135	Ghazipur - Rasra	S/C	UPPTCL	59	SEP-14
136	LILO of Obra - Allahabad II Ckt at Mizrapur	D/C	UPPTCL	8	SEP-14
137	LILO of Thiruvalam - Singarapet at Thiruvalam	D/C	TANTRANSCO	20	OCT-14
138	LILO of Moradabad - CB Ganj at Rampur	D/C	UPPTCL	24	OCT-14
139	LILO of Muzaffarngr - Nara -II ckt at Jansath	D/C	UPPTCL	20	OCT-14
140	Puricha - Jhansi	D/C	UPPTCL	14	OCT-14
141	Manubolu - Sullurpeta	D/C	APTRANSCO	136	NOV-14
142	LILO of one ckt of Badshahpur - Bhiwadi at HSIIDC Bawal	D/C	HVPNL	36	NOV-14

143	Daloda - Mandsaur	D/C	MPPTCL	14	NOV-14
144	LILO of Jabalpur (Sukha) - Birsinghpur / Amarkantak at Panagar	D/C	MPPTCL	7	NOV-14
145	LILO of Jeur - Karkambh at Shinde SKS	D/C	MSETCL	5	NOV-14
146	Aau-Baithwasia	D/C	RVPNL	93	NOV-14
147	Bhawad-Baithwasia	D/C	RVPNL	66	NOV-14
148	Jaipur (South -PG) - Vatika line	D/C	RVPNL	56	NOV-14
149	LILO of Ajmer -Beawer line at Ajmer	D/C	RVPNL	38	NOV-14
150	LILO of Bhilwara -Bali at Bamantukda	D/C	RVPNL	26	NOV-14
151	LILO of Duni - SEZ(220 KV GSS) line at Jaipur (south)(PG)	D/C	RVPNL	55	NOV-14
152	Ramgarh (GTPP) - Chandan	D/C	RVPNL	194	NOV-14
153	Harduaganj - Jahangirabad	D/C	UPPTCL	99	NOV-14
154	LILO of Tanda - Sultanpur at Tanda(New)	D/C	UPPTCL	8	NOV-14
155	LILO of Morbi - Lalpar at Sartanpar	D/C on M/C	GETCO	17	DEC-14
156	LILO of Tappar - Nani Khakhar at Mokha	D/C	GETCO	21	DEC-14
157	220 kV Apta - Kalwa line at Loc. No 647& 652 & 220 kV Kalwa - Taloja at Loc. No. 652 to 654 for Metra Rail Depot	S/C	MSETCL	4	DEC-14
158	Khadaki (VSNL - Dighi) - Theur-II line from Lonikand -I to Lonikand-II S/S	S/C	MSETCL	1	DEC-14
159	LILO of Hinjewadi - Infosys line at Pegasus	D/C	MSETCL	6	DEC-14
160	LILO of Kolhapur II - Mumewadi at Ghorpade	D/C	MSETCL	7	DEC-14
161	Shifting & height raising of 220 kV Kalwa - Taloja & 220 kV Kalwa - Apta line Loc. 652-653-654 for Metro rail Depot and Loc. No 647 to 652 metro rail at Panchananda	S/C	MSETCL	4	DEC-14
162	Tap on 220 kV Bhigwan-Kurkumbh at 220 kV Shirsuphal	S/C	MSETCL	5	DEC-14
163	Tarapur - Boisar line	S/C	MSETCL	1	DEC-14
164	Tarapur - Borivali line	S/C	MSETCL	1	DEC-14
165	Mendhasal-Bidanasi	D/C	OPTCL	62	DEC-14
166	LILO of 2nd Ckt of Patiala - Patran at Rajla	D/C	PSTCL	12	DEC-14
167	Sarna - Sujanpur line	D/C	PSTCL	9	DEC-14
168	Chandan - Dechu	D/C	RVPNL	202	DEC-14
169	LILO of Both ckt Viramgam - Bhat at Sanand	D/C	GETCO	22	JAN-15
170	Gurgaon Sector-72- Gurgaon Sector-20	D/C	HVPNL	24	JAN-15
171	LILO of Badod - Kota line & Badod - Modak line at Bhanpura	D/C	MPPTCL	4	JAN-15
172	LILO of Bina - Bhopal line at Ganjbasoda	D/C	MPPTCL	11	JAN-15
173	LILO of Narsinghpur - Itarsi at Pipariya	D/C	MPPTCL	9	JAN-15

174	Kadaperi - Kalivanthapattu line	S/C	TANTRANSCO	38	JAN-15
175	LILO of K.R.Thoppur-Deviakurichi at Singapuram	D/C	TANTRANSCO	14	JAN-15
176	Gonda - Basti	S/C	UPPTCL	105	JAN-15
177	LILO of Botad - Vartej at Vallabhipur	D/C	GETCO	2	FEB-15
178	Gurgaon Sector-72- Gurgaon Sector-20 (2nd Ckt)	D/C	HVPNL	24	FEB-15
179	Ashta - Berchha (2nd Ckt)	D/C	MPPTCL	45	FEB-15
180	Ashta - Indore - II (Jetpura)	S/C on D/C	MPPTCL	199	FEB-15
181	Berchha - Shajapur -I	D/C	MPPTCL	20	FEB-15
182	LILO of Pandharpur - Malinagar at karkambh	D/C	MSETCL	3	FEB-15
183	LILO of Ras - Merta line at Jethana	D/C	RVPNL	39	FEB-15
184	CBE - Mandapam	D/C	TANTRANSCO	10	FEB-15
185	LILO of Kundha PH III - PUSHEP at Karamadai	D/C	TANTRANSCO	1	FEB-15
186	LILO of Dhanki - Veramgam at Dhanki	D/C	GETCO	1	MAR-15
187	LILO of Halvad - Bhimasar at Chardva	D/C	GETCO	2	MAR-15
188	LILO of Kadana - Dhansura at Modasa	2xD/C	GETCO	22	MAR-15
189	LILO of Navsari -Bhilad at Atul S/s	D/C	GETCO	9	MAR-15
190	LILO of one ckt Kosamba-Mobha line at Suva	D/C	GETCO	115	MAR-15
191	Hiriyur - Gowribidanur	D/C	KPTCL	241	MAR-15
192	Berchha - Shajapur -II	D/C	MPPTCL	20	MAR-15
193	Gwalior (PGCIL) - Gwalior-II	D/C	MPPTCL	3	MAR-15
194	Amravati - Badnera line (2 Ckt)	S/C	MSETCL	30	MAR-15
195	LILO of Gangapur - Malegaon (Satana) at Sakri (Shivajinagar)	D/C	MSETCL	55	MAR-15
196	LILO of Monga - Jagron at Himatpura	D/C	PSTCL	56	MAR-15
197	Mukatsar - Ghubaya	D/C	PSTCL	81	MAR-15
198	Nakodar - Kartarpur	D/C	PSTCL	55	MAR-15
199	Barmer - M/s Carins	S/C	RVPNL	23	MAR-15
200	Heerapura -Nala Power House (Upgradation)	D/C	RVPNL	12	MAR-15
201	LILO of one ckt of Bapp - Bhadla at Badisid	D/C	RVPNL	29	MAR-15
202	Sujangarh - Tehendesar (GSS)	S/C	RVPNL	53	MAR-15
203	LILO of Lucknow - Sitapur at BKT	D/C	UPPTCL	3	MAR-15
204	Lalitpur TP - Lalitpur S/S	D/C	UPPTCL	19	MAR-15
Total of STATE Sector				**4448**	
Total of 220 kV				**4561**	

Annexure-3F
(Item no. 3.17)

SUB-STATION COMPLETED DURING 2014-2015

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**
765 kV					
CENTRAL SECTOR					
1	Dharamjaygarh/ Korba Pooling station	765/400	PGCIL	1500	JUN-14
2	Kurnool S/S	765/400	PGCIL	3000	JUN-14
3	Aurangabad ICT-II	765/400	PGCIL	1500	JUL-14
4	Dharamjaygarh/ Korba Pooling station ICT -II	765/400	PGCIL	1500	JUL-14
5	Jharsuguda Pooling Station	765/400	PGCIL	1500	JUL-14
6	Jharsuguda (2nd ICT)	765/400	PGCIL	1500	OCT-14
7	Nellore I & II - ICT	765/400	PGCIL	3000	OCT-14
8	Sholapur (GIS) S/S	765/400	PGCIL	3000	FEB-15
9	Angul Pooling Station. S/S (4x1500)	765/400	PGCIL	1500	MAR-15
10	Bareilly (ICT-II)	765/400	PGCIL	1500	MAR-15
11	Thiruvalam S/S (2x1500)	765/400	PGCIL	1500	MAR-15
12	Vindhyachal Pooling Station (2x1500)	765/400	PGCIL	1500	MAR-15
Total of CENTRAL Sector				22500	
PVT SECTOR					
13	Agaria (Bhopal) (2x1500)	765/400	SGL	3000	JUL-14
14	Dhule S/S (BDTCL) (2x1500)	765/400	SGL	3000	SEP-14
15	Koradi - III S/S	765/400	APL	3000	MAR-15
Total of PVT Sector				9000	
STATE SECTOR					
16	Anpara D. S/S	765/400	UPPTCL	1000	JUN-14
17	Anta (Distt. Banra) Pooling Station	765/400	RVPNL	3000	FEB-15

18	Phagi (jaipur South) (2x1500) S/S	765/400	RVPNL	3000	FEB-15
Total of STATE Sector				7000	
Toatl of 765 kV				38500	
400 kV					
CENTRAL SECTOR					
19	Rangpoo (GIS)	400/220	PGCIL	315	APR-14
20	Lakhisarai S/S (2nd Trf)	400/132	PGCIL	200	MAY-14
21	Rangpo (2nd ICT) S/S	400/220	PGCIL	315	MAY-14
22	Rangpo 3rd & 4th ICT	400/220	PGCIL	630	JUN-14
23	Shahajanpur	400/220	PGCIL	315	JUN-14
24	Navsari S/S	400/220	PGCIL	500	JUL-14
25	Rangpo ICT - V	400/220	PGCIL	315	JUL-14
26	Wanpoo ICT-II	400/220	PGCIL	315	JUL-14
27	Sahajahanpur (ICT-II) S/S	400/220	PGCIL	500	SEP-14
28	Allahabad (Aug.) S/S	400/220	PGCIL	315	OCT-14
29	Bassi (Aug.) S/S	400/220	PGCIL	500	OCT-14
30	Meerut (Aug.) S/S	400/220	PGCIL	500	OCT-14
31	Chaibasa S/S	400/220	PGCIL	315	NOV-14
32	Magarwada S/S	400/220	PGCIL	630	NOV-14
33	Boisor (Aug.) S/S	400/220	PGCIL	500	DEC-14
34	Chaibasa (ICT-II) S/S	400/220	PGCIL	315	JAN-15
35	Subhashgram (ICT) S/S	400/220	PGCIL	500	JAN-15
36	Wagoora S/Stn. 4th ICT (3x105) (Spare)	400/220	PGCIL	105	JAN-15
37	Bhadrawati (Aug.)	400/220	PGCIL	315	MAR-15
Total of CENTRAL Sector				7400	
STATE SECTOR					
38	Neelmangla (Addl. 3rd Trf.)	400/220	KPTCL	500	APR-14
39	Nakodar (1st Trf.)	400/220	PSTCL	315	APR-14
40	Nakodar(2nd Trf.)	400/220	PSTCL	315	MAY-14
41	Almathy (3rd ICT)	400/230	TANTRANSCO	315	MAY-14
42	Sungavarchatram 4th ICT	400/110	TANTRANS	200	JUN-14

			CO		
43	Kayathar S/S	400/230	TANTRANSCO	315	JUL-14
44	Thiruvalam S/S	400/230	TANTRANSCO	315	JUL-14
45	Kayathar (Addl.) S/S	400/110	TANTRANSCO	200	AUG-14
46	Galwel S/S	400/220	APTRANSCO	315	SEP-14
47	Harsh Vihar (Loni) GIS (2x315)	400/220	DTL	630	SEP-14
48	Mukatsar (2x315)	400/220	PSTCL	630	SEP-14
49	Kayathar (2nd ICT)	400/220	TANTRANSCO	315	SEP-14
50	Greater Noida (Extn.)	400/132	UPPTCL	185	OCT-14
51	Hoody (3rd Trf) S/S	400/220	KPTCL	500	NOV-14
52	Julwania S/S	400/220	MPPTCL	630	NOV-14
53	Barmer (Aug) S/S	400/220	RVPNL	315	NOV-14
54	Chitorgarh S/S	400/220	RVPNL	315	NOV-14
55	Thiruvalam (2nd ICT)	400/230	TANTRANSCO	315	NOV-14
56	Madakkathara (3rd Trf.)S/S	400/220	KSEB	315	JAN-15
57	Ashta New (2nd Trf.)	400/220	MPPTCL	315	JAN-15
58	Vadavi S/S	400/220	GETCO	315	FEB-15
Total of STATE Sector				7570	
Toatl of 400 kV				14970	
220 kV					
CENTRAL SECTOR					
59	Rangpoo (GIS)	220/132	PGCIL	100	APR-14
60	Rangpo (2nd ICT) S/S	220/132	PGCIL	100	MAY-14
61	Rangpo 3rd ICT)	220/132	PGCIL	100	JUN-14
62	Purnea S/S	220/132	PGCIL	160	SEP-14
Total of CENTRAL Sector				460	
STATE SECTOR					
63	Ghulal (Addl.)) S/S	220/66	PSTCL	100	APR-14
64	Madri (Udaipur)	220/132	RVPNL	100	APR-14
65	Karamdai (New)	230/110	TANTRANS	100	APR-14

			CO		
66	Faridnagar (New) S/S	220/132/33	UPPTCL	160	APR-14
67	Badnu (Upgradation)	220/132	RVPNL	160	MAY-14
68	Bundi (Addl.) S/S	220/132	RVPNL	100	MAY-14
69	Arasur 400KV S/S (4th ICT)	230/110	TANTRANSCO	100	MAY-14
70	Phursungi S/S	220/33	MSETCL	50	JUN-14
71	Dharamkot S/S	220/66	PSTCL	160	JUN-14
72	Kakrala (Addl.)	220/66	PSTCL	100	JUN-14
73	Rehana Jattan (Addl.)	220/66	PSTCL	100	JUN-14
74	Dehradun S/S	220/132	PTCUL	320	JUN-14
75	Podili S/S (Add Trf)	220/132	APTRANSCO	100	JUL-14
76	Chhuri (Korba)	220/132	CSPTCL	160	JUL-14
77	Kotkapura (New) S/S	220/66	PSTCL	100	JUL-14
78	Malout (Addl.)	220/66	PSTCL	100	JUL-14
79	Sandhaur (New) S/S	220/132	PSTCL	100	JUL-14
80	Coimbatore S/S	230/110	TANTRANSCO	100	JUL-14
81	Vishrampur S/S	220/132	CSPTCL	160	AUG-14
82	Pipariya S/S	220/132	MPPTCL	160	AUG-14
83	Rajgarh (Biora) (Addl) S/S	220/132	MPPTCL	160	AUG-14
84	Ratlam S/S	220/132	MPPTCL	160	AUG-14
85	Eachangadu S/S	230/110	TANTRANSCO	50	AUG-14
86	Pallakapalayam S/S	230/110	TANTRANSCO	200	AUG-14
87	Khair	220/132	UPPTCL	320	AUG-14
88	Nehtour	220/132	UPPTCL	100	AUG-14
89	Sirathu (Kaushambi)	220/132	UPPTCL	160	AUG-14
90	Sadasivpet S/S	220/132	APTRANSCO	100	SEP-14
91	Harsh Vihar GIS	220/66	DTL	320	SEP-14
92	Punnapra S/S	220/132	KSEB	200	SEP-14

93	Veerapuram S/S	230/110	TANTRANSCO	100	SEP-14
94	Firozabad (Extn.)	220/132	UPPTCL	23	SEP-14
95	Rampur S/S	220/132	UPPTCL	100	SEP-14
96	Sirsaganj (Firozabad) S/S	220/132/33	UPPTCL	100	SEP-14
97	Mirzapur S/S	220/132	UPPTCL	100	OCT-14
98	Noida Sec-20 S/S (Extn.)	220/132	UPPTCL	23	OCT-14
99	Noida Sec-62 (Addl.)	220/132	UPPTCL	63	OCT-14
100	Rasra (Balia) S/S	220/132	UPPTCL	320	OCT-14
101	Dairy Farm (Addl. Trf)	220/132	APTRANSCO	100	NOV-14
102	Gooty (Aug.) (160-100)	220/132	APTRANSCO	60	NOV-14
103	Ongole S/S (Aug.) (160-100)	220/132	APTRANSCO	60	NOV-14
104	Doma (Addl. Trf)	220/132	CSPTCL	160	NOV-14
105	Mungeli (160+40)	220/132	CSPTCL	200	NOV-14
106	Saraipali (Addl. Trf)	220/132	CSPTCL	160	NOV-14
107	Karjan (2nd Trf) S/S	220/66	GETCO	100	NOV-14
108	A-4 Faridabad (GIS)	220/66	HVPNL	200	NOV-14
109	Mahalgaon (Addl.)	220/132	MPPTCL	160	NOV-14
110	Algon (Addl.)	220/66	PSTCL	100	NOV-14
111	Chohla Sahib (Addl.) (Trf.)	220/132	PSTCL	100	NOV-14
112	Passiana (Addl..) S/S	220/132	PSTCL	100	NOV-14
113	Bhadla (UC 400 kV)	220/132	RVPNL	160	NOV-14
114	Bhadra S/S	220/132	RVPNL	50	NOV-14
115	Hanumangarh (Aug.) (160-100)	220/132	RVPNL	60	NOV-14
116	Nokha (Aug.) (160-100)	220/132	RVPNL	60	NOV-14
117	Sikar (Aug.) (160-100)	220/132	RVPNL	60	NOV-14
118	Pugalur (Addl.) (3rd Trf.)	230/110	TANTRANSCO	100	NOV-14
119	Gokarna (Aug) Add	220/132	WBSETCL	160	NOV-14
120	Hura (Addl.) (2nd Trf.)	220/132	WBSETCL	160	NOV-14

121	New Bishnupur (Aug) Add	220/132	WBSETCL	160	NOV-14
122	Nawada S/S	220/66	HVPNL	100	DEC-14
123	Manglore SEZ SS	220/110	KPTCL	200	DEC-14
124	Shirsuphal S/S	220/33	MSETCL	50	DEC-14
125	Coimbatore (Addil Trans.)	230/110	TANTRANSCO	100	DEC-14
126	Dhar S/S	220/132	MPPTCL	160	JAN-15
127	Ganj Basoda S/S	220/132	MPPTCL	160	JAN-15
128	Panagar S/S	220/132	MPPTCL	160	JAN-15
129	Anthiyur S/S	230/110	TANTRANSCO	100	JAN-15
130	Ambetha S/S	220/66	GETCO	50	FEB-15
131	Asoj S/S	220/66	GETCO	100	FEB-15
132	Charanka (Addl.)	220/66	GETCO	100	FEB-15
133	Dahej S/S	220/66	GETCO	100	FEB-15
134	Dhokadava (Kansari) S/S	220/66	GETCO	50	FEB-15
135	Hadala S/S	220/66	GETCO	50	FEB-15
136	Halvad (Addl.)	220/66	GETCO	60	FEB-15
137	Halvad S/S	220/66	GETCO	60	FEB-15
138	Jantral S/S	220/66	GETCO	60	FEB-15
139	Kim S/S	220/66	GETCO	50	FEB-15
140	Mitha S/S	220/66	GETCO	50	FEB-15
141	Mota (Bardoli)	220/66	GETCO	50	FEB-15
142	Rajkot Nayara S/S	220/66	GETCO	50	FEB-15
143	Tharad S/S	220/66	GETCO	50	FEB-15
144	Vadavi S/S	220/66	GETCO	100	FEB-15
145	Vapi S/S	220/66	GETCO	60	FEB-15
146	Wagra S/S	220/66	GETCO	50	FEB-15
147	Bhanpura S/S	220/132	MPPTCL	160	FEB-15
148	Pegasus S/S	220/22	MSETCL	25	FEB-15
149	Kotla Jangan (Aug.)	220/132	PSTCL	100	FEB-15
150	Mohali -I (Aug)	220/66	PSTCL	60	FEB-15

151	Bundi (Addl.) S/S	220/132	RVPNL	100	FEB-15
152	Gajner (Addl.) S/S	220/132	RVPNL	160	FEB-15
153	Padampur (Addl.)S/S	220/132	RVPNL	100	FEB-15
154	Karamadai (2nd auto)	230/110	TANTRANSCO	100	FEB-15
155	Karimangalam (3rd auto)	230/110	TANTRANSCO	100	FEB-15
156	Sempatty (3rd auto)	230/110	TANTRANSCO	100	FEB-15
157	Thiruvarur (Enhancement) S/S	230/110	TANTRANSCO	20	FEB-15
158	Shajapur - I S/S	220/132	MPPTCL	160	MAR-15
159	Baithwasia S/S	220/132	RVPNL	100	MAR-15
160	Bamantukda S/S	220/132	RVPNL	100	MAR-15
161	Bidisid S/S	220/132	RVPNL	160	MAR-15
162	Nala PH (Jaipur)	220/132	RVPNL	360	MAR-15
Total of STATE Sector				11624	
Toatl of 220 kV				12084	

Annexure 4A
(Item No. 4.2)

Power Supply Position for 2014-15

State / System / Region	Energy				Peak			
	April, 2014 - March, 2015				April, 2014 - March, 2015			
	Requirement	Availability	Surplus / Deficit (-)		Peak Demand	Peak Met	Surplus / Deficit (-)	
	(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(%)
Chandigarh	1,616	1,616	0	0	367	367	0	0
Delhi	29,231	29,106	-125	-0.4	6,006	5,925	-81	-1.3
Haryana	46,615	46,432	-183	-0.4	9,152	9,152	0	0.0
Himachal Pradesh	8,807	8,728	-79	-0.9	1,422	1,422	0	0.0
Jammu & Kashmir	16,214	13,119	-3,095	-19.1	2,554	2,043	-511	-20.0
Punjab	48,629	48,144	-485	-1.0	11,534	10,023	-1,511	-13.1
Rajasthan	65,717	65,310	-407	-0.6	10,642	10,642	0	0.0
Uttar Pradesh	103,179	87,062	-16,117	-15.6	15,670	13,003	-2,667	-17.0
Uttarakhand	12,445	12,072	-373	-3.0	1,930	1,930	0	0.0
Northern Region	**332,453**	**311,589**	**-20,864**	**-6.3**	**51,977**	**47,642**	**-4,335**	**-8.3**
Chattisgarh	21,499	21,230	-269	-1.3	3,817	3,638	-179	-4.7
Gujarat	96,235	96,211	-24	0.0	13,603	13,499	-104	-0.8
Madhya Pradesh	53,374	53,082	-292	-0.5	9,755	9,717	-38	-0.4
Maharashtra	134,897	133,078	-1,819	-1.3	20,147	19,804	-343	-1.7
Daman & Diu	2,086	2,086	0	0.0	301	301	0	0.0
Dadar Nagar Haveli	5,307	5,304	-3	-0.1	714	714	0	0.0
Goa	3,969	3,932	-37	-0.9	501	489	-12	-2.4
Western Region	**317,367**	**314,923**	**-2,444**	**-0.8**	**44,166**	**43,145**	**-1,021**	**-2.3**
Andhra Pradesh	59,198	56,313	-2,885	-4.9	7,144	6,784	-360	-5.0
Telangana	43,337	40,644	-2,693	-6.2	7,884	6,755	-1,129	-14.3

Karnataka	62,643	59,926	-2,717	-4.3	10,001	9,549	-452	-4.5
Kerala	22,459	22,127	-332	-1.5	3,760	3,594	-166	-4.4
Tamil Nadu	95,758	92,750	-3,008	-3.1	13,707	13,498	-209	-1.5
Pondicherry	2,402	2,376	-26	-1.1	389	348	-41	-10.5
Lakshadweep	48	48	0	0	8	8	0	0
Southern Region	**285,797**	**274,136**	**-11,661**	**-4.1**	**39,094**	**37,047**	**-2,047**	**-5.2**
Bihar	19,294	18,759	-535	-2.8	2,994	2,874	-120	-4.0
DVC	18,222	17,728	-494	-2.7	2,653	2,590	-63	-2.4
Jharkhand	7,599	7,390	-209	-2.8	1,075	1,055	-20	-1.9
Orissa	26,482	26,052	-430	-1.6	3,920	3,892	-28	-0.7
West Bengal	47,086	46,827	-259	-0.6	7,544	7,524	-20	-0.3
Sikkim	399	399	0	0.0	83	83	0	0.0
Andaman-Nicobar	240	180	-60	-25	40	32	-8	-20
Eastern Region	**119,082**	**117,155**	**-1,927**	**-1.6**	**17,040**	**16,932**	**-108**	**-0.6**
Arunachal Pradesh	677	610	-67	-9.9	139	126	-13	-9.4
Assam	8,527	7,926	-601	-7.0	1,450	1,257	-193	-13.3
Manipur	705	678	-27	-3.8	150	146	-4	-2.7
Meghalaya	1,930	1,634	-296	-15.3	370	367	-3	-0.8
Mizoram	455	425	-30	-6.6	90	88	-2	-2.2
Nagaland	688	661	-27	-3.9	140	128	-12	-8.6
Tripura	1,242	1,048	-194	-15.6	310	266	-44	-14.2
North-Eastern Region	**14,224**	**12,982**	**-1,242**	**-8.7**	**2,528**	**2,202**	**-326**	**-12.9**
All India	**1,068,923**	**1,030,785**	**-38,138**	**-3.6**	**148,166**	**141,160**	**-7,006**	**-4.7**

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 schemes			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	Kameng Dam	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 Stage-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 PH-1	WAPCOS	2	18	66	390.00	126.10	7.88
	Kuriarkutty PH-2		2	15		307.00		
83	Perianjakully	WAPCOS	2	30	60	282.90	86.30	6.25
Total (Kerala) - 2 schemes			**6**		**126**			

Annexure- 5B
(Item No. 5.4)

Hydro Capacity Addition During the Year 2014-15

Sl. No.	Particular	Unit Nos.	Capacity (MW)		Commissioning as per program	Actual (A)/ Anticipated	Remarks
			Target	Actual			
A. Central Sector							
1	**Parbati-III** NHPC, HP 4x130= 520 MW	**Unit # 4**	**130**	**130**	**Aug- 14**	**22.05.2014 (A)**	
2	**Rampur** SJVN Limited, HP. 6x68.67 = 412 MW	**Unit # 3** **Unit # 4** **Unit # 6**	**68.67** **68.67** **68.67**	**68.67** **68.67** **68.67**	**Jun 14** **May 14** **Apr 14**	**31.07.2014(A)** **12.06.2014(A)** **04.12.2014(A)**	
Out side the Programme							
3	**Koldam** NTPC, H.P. 4x200 = 800 MW	**Unit # 1** **Unit # 2**		**200** **200**	**Mar-15** **Mar-15**	**31.03.2015 (A)** **30.03.2015 (A)**	
	Sub- total (A):		**336**	**736**			
B. State Sector							
3	**Lower Jurala** TSGENCO, Telangana 6x40= 240 MW	Unit # 1 Unit # 2 Unit # 3 Unit # 4	40 40 40 40	0 0 0 0	Jul.-14 Jul.-14 Oct.-14 Mar.-15	2015-16 2015-16 2015-16 2015-16	Power House flooded on 30.07.2014 during synchronization process for Unit# 1 to Unit# 3.
4	**Nagarjuna Sagar** APGENCO, A.P. 2x25= 50 MW	Unit # 1 Unit # 2	25 25	0 0	Sep-14 Dec-14	2015-16 2015-16	Commissioning delayed due to un availability of water.
	Sub- total (B):		**210**	0			
C. Private Sector							
5	**Jorethang Loop** DANS Pvt. Ltd., Sikkim 2x48= 96 MW	Unit # 1 Unit # 2	48 48	0 0	Feb-15 Mar-15	2015-16	HRT lining and power evacuation arrangement could not be completed.
6	**Teesta-III** Teesta Urja, Sikkim 6x200= 1200 MW	Unit # 6	200	0		2016-17	Financial crunch with the Developer. Completion of Pressure Shaft works and power evacuation arrangement is critical.
	Sub- total (C):		**296**	**0**			
	Total (A+B+C)		**842**	**736**			

Out side RFD achievements:

Unit #1 & # 2 (400 MW) of Kol Dam HEP commissioned during March, 2015.

Annexure- 5C
(Item No. 5.4.1)

Hydro Projects Monitorable Target for 2015-16

Sl. No.	Particular	Unit Nos.	Cap. (MW)	Commissioning as programmed	Remarks
A.	**Central Sector**				
1	**Koldam** NTPC, HP 4x200= 800 MW	Unit # 3 Unit # 4	200 200	4/15 5/15	
2	**Teesta Low Dam IV** NHPC, West Bengal 4x40 = 160 MW	Unit # 1 Unit # 2	40 40	2/16 3/16	
3	**Pare** NEEPCO, Arunachal Pradesh 2x55=110 MW	Unit # 1 Unit # 2	55 55	3/16 3/16	
	Sub- total (A):		**590**		
B.	**State Sector**				
4	**Baglihar - II** JKPDC, J&K 3x150= 450 MW	Unit # 1 Unit # 2	150 150	9/15 9/15	
5	**Kashang – I** HPPCL, H.P. 1x65=65 MW	Unit # 1	65	3/16	
6	**Lower Jurala** TSGENCO, Telangana 6x40= 240 MW	Unit # 1 Unit # 2 Unit # 3 Unit # 4	40 40 40 40	7/15 8/15 9/15 10/15	
7	**Nagarjuna Sagar TR** APGENCO, AP 2x25=50 MW	Unit # 1 Unit # 2	25 25	7/15 7/15	
	Sub- total (B):		**575**		
C.	**Private Sector**				
8	**Sorang** HSPCL, H.P. 2x50 = 100 MW	Unit # 1 Unit # 2	50 50	6/15 6/15	
9	**Srinagar** AHPCL, Uttarakhand 4x82.5=330	Unit # 1 Unit # 2 Unit # 3 Unit # 4	82.5 82.5 82.5 82.5	4/15 4/15 5/15 6/15	
10	**Jorethang Loop** DANS Pvt. Ltd., Sikkim 2x48= 96 MW	Unit # 1 Unit # 2	48 48	9/15 10/15	
	Sub- total (C):		**526**		
	Total (A+B+C)		**1691**		

Annexure – 5D
(Item No. 5.7)

List of Hydro Electric Projects programmed to benefits during 12th Plan (2012-17)

Sl. No.	Name of Project/ Executing Agency	State	Rating Nos x MW = MW	Benefits 12th Plan (MW)
	Central Sector			
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

Sl. No.	Name of Project/ Executing Agency	State	Rating Nos x MW = MW	Benefits 12th Plan (MW)
23.	Lower Jurala TSGENCO	A.P.	6x40=240	240
24.	Pulichintala TSGENCO	A.P.	4x30=120	120
25.	Nagarjuna Sagar TR APGENCO	A.P.	2x25= 50	50
26.	Bhawani Kattalai Barrage-II TANGEDCO	T.N.	2x15= 30	30
27.	Bhawani Kattalai Barrage-III TANGEDCO	T.N.	2x15= 30	30
28.	Pallivasal KSEB Ltd.	Kerala	2x30=60	60
29.	Thottiyar KSEB Ltd.	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/s Tangnu 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**

Annexure – 6A
(Item No. 6.2)

Projects Based on Tariff Based Competitive Bidding (Case-II) by States

S.No.	Name of the Project	Location	Capacity (MW)	Remarks
	Haryana			
1.	Jhajjar	District Jhajjar	2x660	The project is already commissioned
	Punjab			
2.	Talwandi Saboo	District Mansa	3x660	Already awarded , U-1 commissioned, U-2&3 under construction.
3.	Rajpura	Rajpura District Patiala	2x660	Already awarded. Project commissioned.
	Rajasthan			
4.	Banswara TPP	Distt. Banswara	2x660	Coal linkage yet to be tied up. Project is yet to be awarded.
	Madhya Pradesh			
5.	Shahpura	District 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. M/s Jaiprakash Associates was the successful bidder, but could not implement the project activities on the acquired land due to resistance from land owners / farmers. It is now proposed to develop the project through Uttar Pradesh Rajya Vidyut Utpadan Nigam Ltd. (UPRVUNL).
9.	Jawaharpur TPP	Distt. Etah	2x660	Project yet to be awarded. Captive coal block namely Saharpur Jamarpani has been allocated to UPRVUNL for End Use Plants Obra 'C' Extn.- 2x660 MW, or Jawaharpur TPP – 2x660 MW or Harduaganj Extn II- 1x660 MW , Panki Extn. TPP – 1x660 MW.
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	District Surguja	2x660	Already awarded , but the project since deferred. Coal blocks namely Gare Palma sector III & Gidhmuri, Paturia allocated to Chhattisgarh State Power Generation Company Limited which includes Bhaiyathan TPP as one of the End Use Projects.
	Maharashtra			
13.	Maharashtra Industrial Development Corporation	Distt. Bhadrawati	2x660	Coal linkage yet to be tied up. Project yet to be awarded.
14.	Dhopave TPP	Distt. Ratnagiri	3x660	Coal linkage yet to be tied up. Project yet to be awarded.
	Karnataka			
15.	Gulbarga TPP	Distt. Gulbarga	2x660	Coal linkage yet to be tied up. Project yet to be awarded.
16.	Ghatprabha	Distt. Belgaum	2x660	Coal linkage yet to be tied up. Project yet to be awarded.
	Total		**24,300 MW**	

Annexure-6B
(Item No. 6.5.**1**)

RFD programme/Achievement for Thermal capacity addition for the year 2014-15

State	Project Name	Impl Agency	Equip. Supplier	Fuel	Unit No	LOA date	Targeted Cap. (MW)	Commd. Cap. (MW)	Actual Comm. Date	At the beginning of the year
CENTRAL SECTOR										
Bihar	Barh STPP-II	NTPC	BHEL	Coal	U-5	SG:03/2008 TG:10/2008	660	660	04.03.2015	Feb-15
	Muzaffarpur TPS Exp	KBUNL (JV of NTPC & BSEB)	BHEL	Coal	U-3	03/2010	195	195	31.03.2015	Mar-15
TN	Tuticorin TPP	NTPL(JV of NLC & TANGEDCO)	BHEL	Coal	U-1	28.01.09	500	500	10.03.2015	Oct-14
			BHEL	Coal	U-2		500			Feb-15
Tripura	Palatana CCPP	OTPC (JV of ILFS, ONGC & Tripura Govt)	BHEL	Gas	BLK-2	23.06.08	363.3	363.3	16.11.2014	Aug-14
WB	Raghunathpur TPP, Ph-I	DVC	Chinese	Coal	U-1	14.12.2007	600	600	24.08.2014	Aug-14
						Total Central Sector	**2818.3**	**2318.3**		
STATE SECTOR										
AP	Damodaram Sanjeevaiah TPP	APPDCL	Blr-BHEL TG-L&T	Coal	U-1	SG:08/2008 TG:09/2008	800	800	28.08.2014	Jun-14
					U-2		800	800	17.03.2015	Jan-15
Chhattisgarh	Marwa TPP	CSPGCL	BHEL	Coal	U-2	11.04.08	500			Dec-14
Maharashtra	Chandrapur TPS	MSPGCL	BHEL	Coal	U-8	25.07.08	500	500	29.03.2015	Oct-14
	Koradi TPS Expn.	MSPGCL	L&T	Coal	U-8	23.09.09	660	660	30.03.2015	Oct-14
	Koradi TPS Expn.	MSPGCL	L&T	Coal	U-9		660			Jan-15
	Parli TPS Expn.	MSPGCL	BHEL	Coal	U-8	21.01.09	250			Nov-14
MP	Malwa TPP (Shree Singaji)	MPPGCL	BHEL	Coal	U-2	12.12.08	600	600	15.10.2014	Sep-14
Rajasthan	Kalisindh TPP	RRVUNL	Chinese	Coal	U-1	09.07.08	600	600	02.05.2014	Jun-14
	Kalisindh TPP		Chinese	Coal	U-2		600			Jan-15
	Ramgarh CCPP		BHEL	Gas	ST	18.08.09	50	50	01.05.2014	Jul-14
	Chhabra TPP		BHEL	Coal	U-4	20.08.08	250	250	30.06.2014	Jun-14
UP	Anpara-D TPS	UPRVUNL	BHEL	Coal	U- 6	27.10.07	500			Mar-15

						Total State Sector	**6770**	**4260**		
PRIVATE SECTOR										
AP	Painampuram TPP	Thermal Power Tech Corp.Ltd	Chinese	Coal	U-1	09/2010	660	660	07.02.2015	Dec-14
	Vizag TPP	Hinduja National Power Corp.Ltd	BHEL	Coal	U-1	03/2010	520			Oct-14
Chhattisgarh	Swastic Korba TPP	ACB India Ltd.	Blr:ISGEC India TG:Siemens India	Coal	U-1	29.03.10	25	25	31.03.2015	Nov-14
	Salora TPP	Vandana Vidyut Ltd	Chinese	Coal	U-1	11/2008	135	135	10.04.2014	Sep-14
	Bandakhar TPP	Maruti Clean coal	Chinese	Coal	U-1		300			Jan-15
Maharashtra	Amravati TPP Ph-I	India Bulls Power Ltd	BHEL	Coal	U-3	30.11.09	270	270	29.01.2015	Oct-14
Maharashtra	Nasik TPP Ph-I	India Bulls Realtech	BHEL	Coal	U-2	24.11.09	270			Jul-14
Maharashtra	Dhariwal TPP	Dhariwal Infrastucture Ltd	Chinese	Coal	U-2	28.04.10	300	300	28.05.2014	Jun-14
Orissa	Derang TPP	JIPL	BHEL	Coal	U-1	26.07.09	600	600	10.05.2014	Jun-14
Punjab	Rajpura TPP (Nabha)	Nabha Power Ltd	L&T	Coal	U-2	16.07.10	700	700	06.07.2014	Jul-14
Punjab	Talwandi Sabo TPP	M/s Sterlite	Chinese	Coal	U-1	18.07.09	660	660	17.06.2014	May-14
Punjab	Talwandi Sabo TPP	M/s Sterlite	Chinese	Coal	U-2	18.07.09	660			Sep-14
WB	Haldia TPP	M/s Haldia Energy Ltd.	Chinese	Coal	U-1	14.09.11	300	300	14.01.2015	Dec-14
						Total Private Sector	**5400**	**3650**		
						Total target during 2014-15	**14988.3**	**10228.3**		
Additional Capacity Commissioned										
Gujarat	D gen CCPP	Torrent Power	Siemens Germany	gas	Block-II	02.07.2010		400	23.04.2014	
Gujarat	Dhuvaran CCPP	GSECL	Siemens Germany	gas	Uniit 1			376.1	21.05.2014	
MP	Sasan UMPP	SPL	Chinese	Coal	4th Unit (Unit-1)			660	21.05.2014	
MP	Sasan UMPP	SPL	Chinese	Coal	Unit-5			660	24.08.2014	
Chhattisgarh	Akaltara TPP	KSK	Chinese	Coal	Unit-2			600	22.08.2014	
MP	Nigrie TPP	JPVL	L&T	Coal	Unit-1			660	29.08.2014	

Maharashtra	Tirora TPP Ph-II	Adani Power Maharashtra Pvt Ltd	Chinese	Coal	Unit-3	05.11.2009		660	25.09.2014	
TN	Mutiara TPP	Coastal Energen	Chinese	Coal	Unit-1	25.02.2009		600	02.12.2014	
Chhattisgarh	Tamnar TPP (Raigarh)	Jindal Power	BHEL	Coal	Unit-3			600	07.01.2015	
Orissa	Derang TPP	JIPL	BHEL	Coal	U-2			600	24.01.2015	
TN	Neyveli TPS Ph-II Exp	NLC	BHEL	Coal	U-2			250	24.01.2015	
WB	Haldia TPP	M/s Haldia Energy Ltd.	Chinese	Coal	U-2			300	16.02.2015	
MP	Nigrie TPP	JP Ventures Ltd	Non-BHEL	Coal	U-2			660	17.02.2015	
Chhattisgarh	Raikhera TPP	GMR	Chinese	Coal	U-1			685	27.02.2015	
Maharashtra	Amravati TPP Ph-I	India Bulls Power Ltd	BHEL	Coal	U-4	30.11.09		270	04.03.2015	
AP	Simhapuri	Simhapuri Energy Pvt Ltd	Chinese	Coal	U-4			150	07.03.2015	
Maharashtra	Amravati TPP Ph-I	India Bulls Power Ltd	BHEL	Coal	U-5	30.11.09		270	12.03.2015	
MP	Sasan UMPP	SPL	Chinese	Coal	Unit-6			660	19.03.2015	
Tripura	Agartala CCPP	NEEPCO	Thermax	gas	ST-2			25.5	22.03.2015	
Chhattisgarh	DB Power TPP	DB Power Ltd	BHEL	Coal	Unit-2			600	24.03.2015	
Chhattisgarh	Tamnar TPP (Raigarh)	Jindal Power	BHEL	Coal	Unit-4			600	26.03.2015	
Gujarat	Sikka TPP Extn	GSECL	BHEL	Coal	U-3			250	28.03.2015	
Tripura	Monarchak gas power project	NEEPCO	BHEL	Gas	GT			65.4	30.03.2015	
								10602		
								20830.3		

Annexure-6C
(Item No. 6.5.2)

THERMAL CAPACITY ADDITION PROGRAMME FOR THE YEAR 2015-16

State	Project Name	Impl Agency	Equipment Supplier	LOA Date	Unit No	Targeted Cap. (MW)	Commd. Cap. (MW)	Actual Comm. Date	At the beginning of the year
CENTRAL SECTOR									
Assam	Bongaigaon TPP	NTPC	BHEL	05.02.08	U-1	250			Jun-15
Bihar	Muzafferpur	NTPC	BHEL	12.03.10	U-4	195			Feb-16
MP	Vindhyachal TPP-V	NTPC	BHEL	05/2012	U-13	500			Dec-15
Tripura	Agratala CCPP	NEEPCO	Thermax	12.09.12	ST-1	25.5			May-15
Tripura	Monarchak CCPP	NEEPCO	BHEL	23.07.10	ST	35.6			Aug-15
TN	Tuticorin TPP	NLC	BHEL	28.01.09	U-2	500			Jul-15
WB	Raghunathpur TPP, Ph-I	DVC	Chinese	14.12.07	U-2	600			Jan-16
		Total Central Sector				**2106.1**			
STATE SECTOR									
Chhattisgarh	Marwa TPP	CSPGCL	BHEL	11.04.08	U-4	500			Sep-15
Gujarat	Sikka TPS	GSECL	BHEL	10.05.07	U-4	250			Dec-15
Karnataka	Bellary TPS St-III	KPCL	BHEL	28.09.10	U-3	700			Dec-15
Karnataka	Yermarus TPP	KPCL	BHEL	09.04.10	U-1	800			Jan-16
Maharashtra	Chandrapur TPS	MSPGCL	BHEL	25.07.08	U-9	500			Oct-15
Maharashtra	Koradi TPS Expn.	MSPGCL	L&T	23.09.09	U-9	660			Sep-15
Maharashtra	Koradi TPS Expn.	MSPGCL	L&T	23.09.09	U-10	660			Feb-16
Maharashtra	Parli TPS	MSPGCL	BHEL	20.01.09	U-8	250			Jan-16
Rajasthan	Kalisindh TPP	RVUNL	BGRES	09.07.08	U-2	600			May-15
Telangana	Singareni TPP	Singareni Collieries Co Ltd	BHEL	11.11.11	U-1	600			Jan-16
Telangana	Kakatiya TPS Extn.	T GENCO	BHEL	13.10.08	U-1	600			Dec-15
UP	Anpara-D TPS	UPRVUNL	BHEL	24.10.07	U- 6	500			Jun-15
UP	Anpara-D TPS	UPRVUNL	BHEL	24.10.07	U- 7	500			Dec-15
WB	Sagardighi TPS-Extn	West Bengal	BHEL	11.03.11	U-3	500			Sep-15
WB	Sagardighi TPS-Extn	West Bengal	BHEL	11.03.11	U-4	500			Jan-16

		Total State Sector				**8120**			
PRIVATE SECTOR									
AP	Painampuram TPP	Thermal Power Tech Corporation Ltd	Chinese	09/2010	U-2	660			Aug-15
AP	Vizag TPP	Hinduja National Power Corp. Ltd	BHEL	03/2010	U-1	520			Oct-15
Chhattisgarh	Bandakhar TPP	M/s Maruti Clean (Chhattisgarh) Ltd.	Chinese	07.06.11	U-1	300			Jun-15
Chhattisgarh	Uchpinda TPP	RKM Powergen Pvt. Ltd	Chinese	06/2009	U-1	360			Jun-15
Chhattisgarh	BALCO TPP	BALCO Pvt Ltd	Chinese	20.08.07	U-1	300			Jun-15
Chhattisgarh	BALCO TPP	BALCO Pvt Ltd	Chinese	20.08.07	U-2	300			Sep-15
Chhattisgarh	Raikheda TPP	GMR	Non-BHEL		U-2	685			Dec-15
Chhattisgarh	Salora	Vandana Vidyut	Chinese		U-2	135			Sep-15
Maharashtra	Nasik TPP Ph-I	Ratan India (Nasik) Power Ltd	BHEL	24.11.09	U-2	270			Jan-16
MP	Anuppur TPP Ph-I	MB Power(MP)	Chinese	15.11.10	U-1	600			Jun-15
Orissa	Ind Bharat TPP (Orissa)	Ind. Barath	Chinese	16.05.09	U-1	350			Oct-15
Punjab	Talwandi Sabo TPP	Sterlite	Chinese	18.07.09	U-2	660			Jun-15
Punjab	Talwandi Sabo TPP	Sterlite	Chinese	18.07.09	U-3	660			Dec-15
UP	Lalitpur TPP	Lalitpur power Generation Co. Ltd	BHEL	21.03.11	U-1	660			Sep-15
UP	Prayagraj (Bara) TPP	Prayagraj power Gen. Co. Ltd(J.P.Power Ventures)	BHEL	21.10.09	U-1	660			Oct-15
		Total Private Sector				**7120**			
	Grand Total 2015-16					**17346.1**			

Annexure-6D
(Item No. 6.9)

The Year-wise achievements of R&M and LE Projects during 12th Plan

(Upto 31.03.2015)

2012-2013		Name of the TPS	Unit No.	Capacity MW	Date of Achievement
LE (2 units, 216 MW)	**State** (1 unit, 110 MW)	Bathinda	3	110	05.08.2012
	Central (1 unit, 106 MW)	Kawas	GT-1A	106	21.01.2013
R&M (6 units, 960 MW)	**State** (5 units, 850 MW)	DPL	6	110	07.05.2012
		Patratu	10	110	24.05.2012
		Anpara'A	1 to 3	3x210	21.03.2013
	Central (1 unit, 110 MW)	Tanda	2	110	15.09.2012
Sub Total	**No. of units**		**8**	**1176**	**-**
2013-2014					
LE (5 units, 563 MW)	**State** (2 units , 220 MW)	Parichha	2	110	05.05.2013
		Muzafarpur	1	110	05.07.2013
	Central (3units, 343 MW)	Kawas	GT-1B	106	August, 2013
		Gandhar	GT – 3	131	September, 2013
		Kawas	GT-2B	106	31.03.2014
R&M (3 units, 100.5 MW)	**State**	-	-	-	-
	Central (3 units, 100.5 MW)	Kathalguri	GT-3	33.5	31.03.2014
		Kathalguri	GT-4	33.5	31.03.2014
		Kathalguri	GT-5	33.5	31.03.2014
Sub Total	**No. of units**		**8**	**663.5**	**-**
2014-2015					
LE (8 units, 901.76 MW)	State (2 units, 220 MW)	Bathinda	4	110	July, 2014
		Muzafarpur	2	110	30.09.2014
	Central (6 units, 681.76 MW)	Auraiya	GT-1	111.19	22.06. 2014
		Gandhar	GT-1	131	2nd Quarter, 2014-15
		Kawas	GT-2A	106	August, 2014
		Auraiya	GT-2	111.19	3rd Quarter, 2014-15
		Auraiya	GT-3	111.19	3rd Quarter2014-15
		Auraiya	GT-4	111.19	4th Quarter, 2014-15
R&M	State	NIL	**-**	**-**	**-**
	Central	NIL	**-**	**-**	**-**
Sub Total			**8**	**901.76**	**-**
Total under R&M			**9**	**1060.5**	**-**
Total under LE			**15**	**1680.76**	**-**
Grand Total			**24**	**2741.26**	**-**

Annexure-8A
(Item No. 8.1)

HYDRO POWER STATIONS IN OPERATION FOR WHICH CONSULTANCY SERVICES HAVE BEEN RENDERED BY CEA

Sl. No.	Name of the Power Station	Installed capacity (MW)	Year of Commissioning
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-1**	**2x11=22**	**1973-74**
9.	**Western Yamuna Canal**	**2x8=16**	**2004**
10.	**Chenani**	**5x4.6=23**	**1971-75**
11.	**Stakna**	**2x2=4**	**1986-87**
12.	**Kargil**	**3x1.25=3.75**	**1995**
13.	**R.P. Sagar**	**4x43=172**	**1968-69**
14.	**J.Sagar**	**3x33=99**	**1972-73**
15.	**Mahibajaj I**	**2x25=50**	**1989**
16.	**Mahibajaj II**	**2x45=90**	**1986**
17.	**Anoopgarh I**	**3x1.5=4.5**	**1987-88**
18.	**Anoopgarh II**	**3x1.5=4.5**	**1987-88**
19.	**RMC Mangrol**	**3x2=6**	**1992**
20.	**Surat Garh**	**2x2=4**	**1992**
21.	**Ranjit Sagar**	**4x150=600**	**2000**
22.	**Upper Singh-II**	**2x35=70**	**2000-01**
23.	**Nathpa Jhakri**	**6x250=1500**	**2002-03**
24.	**Tehri Stage-I**	**4x250=1000**	**2007-08**
25.	**Koteshwar**	**4x100=400**	**2012**
26.	**Ukai**	**4x75=300**	**1974-76**
27.	**Kadana**	**4x60=240**	**1990-96**
28.	**Ukai LBC**	**2x2.5=5**	**1987-88**
29.	**Gandhi Saar**	**5x23=115**	**1960-64**
30.	**Bargi**	**2x45=90**	**1988**

WESTERN REGION			
31.	**Ban Sagar Tons**	**3x105=315**	**1991-92**
32.	**Hasdeo Bango**	**3x40=120**	**1994**
33.	**Paithon**	**1x12=12**	**1984**
34.	**Rajghat**	**3x15=45**	**1999**
35.	**Koyna I to II**	**4x70+4x80=600**	**1962-67**
36.	**Koyna III**	**4x80=320**	**1975-78**
37.	**Koyna IV**	**4x250=1000**	**1999-00**
38.	**Sardar Sarovar CHPH**	**5x50=250**	**2003**
39.	**Indira Sagar**	**8x125=1000**	**2004-05**
40.	**Sardar Sarovar RBPH**	**6x200=1200**	**2006-07**
SOUTHERN REGION			
41.	**Lower Sileru**	**4x115=460**	**1976-78**
42.	**N.J. Sagar PSS**	**1x110+7x100=810**	**1978-85**
43.	**Kadamparai**	**4x100=400**	**1987-90**
44.	**Srisailam LBPH**	**6x150=900**	**2001-03**
45.	**Pykara Ultimate**	**3x50=150**	**2005-06**
EASTERN REGION			
46.	**Kosi**	**4x5=20**	**1970-78**
47.	**Subernrekha I**	**1x65=65**	**1977**
48.	**Subernrekha II**	**1x65=65**	**1980**
49.	**Sone Western Canal**	**4x1.65=6.6**	**1993**
50.	**Eastern Gandak**	**3x5=15**	**1994-96**
51.	**Sone Eastern**	**2x1.65=3.3**	**1996**
52.	**Rengali**	**5x50=250**	**1985-92**
53.	**Upper Kolab**	**4x80=320**	**1988-93**
54.	**Lower Lagyap**	**2x6=12**	**1979**
55.	**Upper Rongnichu**	**4x2=8**	**1993-94**
56.	**Myangchu**	**2x2=4**	**1993**
57.	**Rammam II**	**4x12.75=51**	**1995-96**
58.	**Teesta Canal Falls I,II,III**	**3x3x7.5=67.5**	**1997-99**
59.	**Upper Indravati**	**4x150=600**	**2000-01**
60.	**Chandil**	**2x4=8**	**-**
NORTH EASTERN REGION			
61.	**Kyrdemkulai**	**2x30=60**	**1979**
62.	**Umiam St.I**	**4x9=36**	**1965**
63.	**Umiam St.II**	**2x9=18**	**1970**

64.	**Umiam Umtru St.IV**	**2x30=60**	**1992**
65.	**Gumti**	**3x5=15**	**1976-84**
66.	**Khandong**	**2x25=50**	**1984**
67.	**Kopili**	**2x50=100**	**1988**
68.	**Kopili Extn.**	**2x50=100**	**1996-97**
69.	**Loktak**	**3x35=105**	**1983&91**
70.	**Ranganadi**	**3x135=405**	**2002-03**
71.	**Doyang**	**3x25=75**	**2000**
72.	**Myntdu Leshka**	**2x42=84**	**2012**
73.	**Myntdu Leshka Extension**	**1x42=42**	**2012-13**
IN NEIGHBOURING COUNTRIES			
NEPAL			
74.	**Gandak**	**3x5=15**	**-**
75.	**Trisuli**	**3x7=21**	**-**
BHUTAN			
76.	**Chukha**	**4x84=336**	**1986-88**
77.	**Gyesta**	**3x0.5=1.5**	**-**
78.	**Khaling**	**3x0.2=0.6**	**-**
79.	**Tala**	**6x170=1020**	**2007-08**
BURMA			
80.	**Sedawgyi**	**2x12.5=25**	**-**

Annexure-9A

(Item No.-9.1.4)

OUTSTANDING DUES OF POWER UTILITIES (PRINCIPAL AND SURCHARGE) PAYABLE TO CENTRAL PUBLIC SECTOR UNDERTAKINGS (CPSUs)

(Based upon the information received from CPSUs upto 30th April, 2015)

Sl. No.	STATE / UTILITY	NTPC		NHPC		PGCIL		NEEPCO		NPCIL		DVC		NLC		SJVNL		BBMB		THDC		NHDC		TOTAL
		PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	
1	2	3		4		5		6		7		8		9		10		11		12		13		14
	Date of Outstanding Dues	31.03.15		31.03.15		31.01.15		31.03.15		31.03.15		28.02.15		31.03.15		31.03.15		28.02.15		31.03.15		31.03.15		
NORTHERN REGION																								
HARYANA																								
1	HPGCL			**25.79**	0					**0.01**	0					0	0			**62.20**	**0.00**			**88.00**
2	HVPNL					0																		0.00
3	HPPC			**34.47**	**0**																			
4	UHBVN																							0.00
5	DHBVN																							0.00
TOTAL (Haryana)		0.00	0.00	**60.26**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**62.20**	**0.00**	**0.00**	**0.00**	**122.47**
HIMACHAL																								
6	HPSEB			**7.64**	**2.77**	**0.00**	0.00			**9.68**	0.00					520.45	0.00	**0.16**	**0.00**	**25.48**	**1.70**			**567.88**
7	HPPC															0.00	0.00							
TOTAL (Himachal)		0.00	0.00	**7.64**	**2.77**	**0.00**	**0.00**	**0.00**	**0.00**	**9.68**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**520.45**	**0.00**	**0.16**	**0.00**	**25.48**	**1.70**	**0.00**	**0.00**	**0.00**
DELHI																								
8	DESU	**0.00**	**0.00**																					**0.00**
9	DTL			**-8.14**	**0.00**					0.01						8.57	0.00			0.00	**0.00**			**0.44**
10	DPCL			**14.19**	3.24					**0.00**	0.00													**17.43**
11	TPDDL			**13.84**	0.00	0.00				**0.00**	0.00					0.00	0.00			**33.24**	0.00			**47.08**
12	BYPL			**141.53**	**37.17**	**63.50**	0.00			**137.37**	0.00					90.51	0.00			**151.79**	**28.98**			**650.85**
13	BRPL			**92.88**	**16.38**	**99.48**	0.00			**125.01**	0.00					116.97	0.00			**148.64**	**17.99**			**617.35**
TOTAL (Delhi)		**0.00**	**0.00**	**254.30**	**56.79**	**162.98**	**0.00**	**0.00**	**0.00**	**262.39**		**0.00**	**0.00**	**0.00**	**0.00**	**216.05**	**0.00**	**0.00**	**0.00**	**333.67**	**46.97**	**0.00**	**0.00**	**1333.15**
J & K																								
14	J&K PDD			**1363.96**	**345.39**	**269.51**	0.00			**316.86**	2.97					298.77	0.00	**6.57**	**0.23**	**171.36**	**9.71**			**2785.33**
15	J&K DCL															0.00								**0.00**
TOTAL (J&K)		0.00	0.00	**1363.96**	**345.39**	**269.51**	**0.00**	**0.00**	**0.00**	**316.86**	**2.97**	**0.00**	**0.00**	**0.00**	**0.00**	**298.77**	**0.00**	**6.57**	**0.23**	**171.36**	**9.71**	**0.00**	**0.00**	**2785.33**
PUNJAB																								
16	PSEB					**0.00**				**34.00**	0.00									**0.00**	**0.00**			**34.00**
17	PSPCL			**52.28**	**1.70**											0.66	0.00			98.11	0.00			**152.75**
TOTAL (Punjab)		0.00	0.00	**52.28**	**1.70**	**0.00**	**0.00**	**0.00**	**0.00**	**34.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.66**	**0.00**	**0.00**	**0.00**	**98.11**	**0.00**	**0.00**	**0.00**	**186.75**

RAJASTHAN																								
18	RRVUNL (BARC)					**145.81**				0.16	0.16							**109.50**	**5.69**					**261.32**
19	RRVPNL			**13.14**	**0.00**																			**13.14**
20	JVVNL			**22.13**	**3.42**					**46.39**	0.00			**74.90**	**11.85**	3.38	0.00			**34.04**	**2.16**			**198.27**
21	AVVNL			**29.37**	**5.68**					**76.07**	0.00			**71.01**	**7.70**	21.21	0.00			**34.42**	**1.85**			**247.31**
22	JDVVNL			**20.41**	**4.81**					**76.12**	0.00			**72.67**	**9.77**	3.15	0.00			**31.23**	**2.33**			**220.49**
TOTAL (Rajasthan)		0.00	0.00	**85.05**	**13.91**	**145.81**	**0.00**	**0.00**	**0.00**	**198.74**	**0.16**	**0.00**	**0.00**	**218.58**	**29.32**	**27.74**	**0.00**	**109.50**	**5.69**	**99.68**	**6.34**	**0.00**	**0.00**	**940.52**
OTHERS																								
23	HWB (KOTA)									**19.35**	0.00													**19.35**
UTTAR PRADESH																								
24	UPPCL			**88.24**	**16.63**	**0.00**				**212.27**	0.00					136.56	0.00			**593.51**	**13.58**			**1060.79**
25	UPRVUNL																							0.00
26	UPJVNL																							0.00
TOTAL (Uttar Pradesh)		0.00	0.00	**88.24**	**16.63**	**0.00**	**0.00**	**0.00**	**0.00**	**212.27**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**136.56**	**0.00**	**0.00**	**0.00**	**593.51**	**13.58**	**0.00**	**0.00**	**1060.79**
UTTARAKHAND																								
27	UPCL			**-0.27**	0.00					**0.09**	0.00									**0.00**	0.00			**-0.18**
CHANDIGARH																								
28	CPDD			**2.01**	0.00					**1.36**								**141.20**	**6.23**	0.00				**150.80**
OTHERS																								
29	M/s N.F.L. Nangal																	**0.01**	0.00					**0.01**
30	B.S.L. Project S/Nagar																	**0.18**	0.00					**0.18**
31	Beas Project talwara																	**0.01**	0.00					**0.01**
32	Irrigation Wing, Nangal																	0.00	0.00					0.00
TOTAL (Others)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.20**	0.00	0.00	0.00	0.00	0.00	**0.20**
TOTAL (Northern Region)		**0.00**	**0.00**	**1913.47**	**437.19**	**578.30**	**0.00**	**0.00**	**0.00**	**1054.75**	**3.13**	**0.00**	**0.00**	**218.58**	**29.32**	**1200.23**	**0.00**	**257.63**	**12.15**	**1384.02**	**78.29**	**0.00**	**0.00**	**7167.06**
WESTERN REGION																								
GUJARAT																								
33	GUVNL									**0.31**	**0.00**													**0.31**
GOA																								
34	GOAED									**4.45**														**4.45**
MADHYA PRADESH																								
35	MPPTCL									**0.63**										0.64	0.00			1.27
36	MPPGCL																							0.00
TOTAL (Madhya Pradesh)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64	0.00	0.00	0.00	1.27
MAHARASHTRA																								
37	MSEDCL									**0.32**	**0.00**													**0.32**

DADRA NAGAR & SILVASA																								
38	Electricity Department					0.00				**0.00**	0.00													**0.00**
DAMAN & DIU																								
39	Electricity Department									**0.14**	**0.00**													**0.14**
CHASTTISGARH																								
40	CSEB									**8.34**	**0.00**													**8.34**
OTHERS										**0.00**	0.00													
41	M/s MP PTC Ltd. Jabalpur			0.00	0.00																	**3.67**	0.00	**3.67**
TOTAL (Western Region)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**14.19**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.97**	**0.00**	**3.67**	**0.00**	**19.83**
SOUTHERN REGION																								
ANDHRA PRADESH																								
42	APTRANSCO									**5.86**	0.70													**6.56**
43	APCPDCL																							
44	APEPDCL													**206.28**	**0.51**									**206.79**
45	APNPDCL																							
46	APSPDCL																							
TOTAL (Andhra Pradesh)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**5.86**	**0.70**	**0.00**	**0.00**	**206.28**	**0.51**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**213.35**
KARNATAKA																								
47	BESCOM					0.00				**0.88**	0.00													**0.88**
48	MESCOM									**-0.49**	0.00													**-0.49**
49	CESCOM									**0.23**	0.00													**0.23**
50	HESCOM									**60.23**	**4.89**													**65.12**
51	GESCOM									**0.52**	0.00													**0.52**
52	TELANGANA									**-0.01**	0.00													**-0.01**
53	ESCOMS													**197.34**	**0.12**									**197.46**
TOTAL (Karnataka)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**61.36**	**4.89**	**0.00**	**0.00**	**197.34**	**0.12**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**263.71**
	BARC									**0.00**	**0.00**													
54	KSEB									**1.26**	**0.00**			**104.73**	**41.06**									**147.05**
TAMILNADU																								
55	TNEB									411.89	**3.49**			**622.83**	**0.00**									**1038.21**
PONDICHERRY																								
56	PED									**9.18**	0.00			**94.20**	**32.86**									**136.24**
TOTAL (Southern Region)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**489.55**	**9.08**	**0.00**	**0.00**	**1225.38**	**74.55**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1798.56**

EASTERN REGION																								
57	**DVC**			**5.95**	**0.00**	**55.50**																		**61.45**
BIHAR																								
58	BSEB			**16.42**	**5.02**	**145.52**	15.63					**3.73**												**186.32**
SIKKIM																								
59	Electricity Department			**0.87**	**0.00**																			**0.87**
WEST BENGAL																								
60	WBSEB			**224.66**	**0.30**	**8.03**	0.00					**-14.67**												**218.32**
JHARKHAND																								
61	JSEB			**25.12**	**6.14**	**0.00**	0.00					**4899.81**	**3801.41**											**8732.48**
ORISSA																								
62	GRIDCO			**0.00**	**1.10**	**0.00**	20.46																	**21.56**
OTHERS																								
63	MEA (Power to Nepal)			**12.05**	0.00																			**12.05**
64	PTC (Regulated Power)			**0.00**	**0.00**																			**0.00**
TOTAL (Others)		**0.00**	**0.00**	**12.05**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**12.05**
TOTAL (Eastern Region)		**0.00**	**0.00**	**285.07**	**12.56**	**209.05**	**36.09**	**0.00**	**0.00**	**0.00**	**0.00**	**4888.87**	**3801.41**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**9233.05**
NORTH EASTERN REGION																								
ARUNACHAL PRADESH																								
65	Department of Power			**-0.01**	**0.00**	**0.00**		**10.94**	0.00															**10.93**
ASSAM																								
66	APGCL			**-0.12**	**0.19**	**0.00**	0.00	**252.97**	**0.00**															**253.04**
MANIPUR																								
67	Electricity Department			**-0.01**	**0.00**	**0.00**	0.00	**20.75**	0.00															**20.74**
MEGHALAYA																								
68	MeSEB			**16.39**	**4.17**	**0.00**	0.00	**283.32**	**0.00**															**303.88**
MIZORAM																								
69	Electricity Department			**0.73**	**0.03**	**6.85**		**16.62**	0.00															**24.23**

NAGALAND																								
70	Department of Power			**0.00**	**0.00**	**0.00**	0.00	**7.98**	0.00															**7.98**
TRIPURA																								
71	TSECL			**-0.09**	**0.00**	**0.00**		**52.38**	0.00															**52.29**
TOTAL (NE Region)		0.00	0.00	**16.89**	**4.39**	**6.85**	**0.00**	**644.96**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**673.09**
GRAND-TOTAL		**0.00**	**0.00**	**2215.43**	**454.14**	**794.20**	**36.09**	**644.96**	**0.00**	**1558.49**	**12.21**	**4888.87**	**3801.41**	**1443.96**	**103.87**	**1200.23**	**0.00**	**257.63**	**12.15**	**1385.99**	**78.29**	**3.67**	**0.00**	**18891.59**

- Upto date information from NLC is yet to be received.

Abbreviations:

1	**APCPDCL**	**Andhra Pradesh Cenral Power Distribution Company Ltd.**	**36**	**MEA**	**Ministry of External Affairs**
2	**APEPDCL**	**Andhra Pradesh Eastern Power Distribution Co. Ltd.**	**37**	**MESCOM**	**Mangalore Electricity Supply Company Ltd.**
3	**APGCL**	**Assam Power Generation Corporation Ltd.**	**38**	**MPPGCL**	**Madya Pradesh Power Generation Co. Ltd.**
4	**APNPDCL**	**Andhra Pradesh Northern Power Distribution Co. Ltd.**	**39**	**MPPTCL**	**Madya Pradesh Power transmission Co. Ltd.**
5	**APSPDCL**	**Andhra Pradesh Southern Power Distribution Co. Ltd.**	**40**	**MSEDCL**	**Maharashtra State Electricity Distribution Co. Ltd.**
6	**APTRANSCO**	**Andhra Pradesh Transmission Corporation Ltd.**	**41**	**TPDDL**	**Tata Power Delhi Distribution Limited**
7	**AVVNL**	**Ajmer Vidyut Vitran Nigam Ltd.**	**42**	**NEEPCO**	**North Eastern Electric Power Corporation Ltd.**
8	**BBMB**	**Bhakra Beas Management Board**	**43**	**NHDC**	**Narmada Hydro Development Corporation**
10	**BESCOM**	**Bangalore Electricity Supply Company Ltd.**	**44**	**NHPC**	**National Hydro Power Corporation**
11	**BRPL**	**BSES Rajdhani Power Ltd.**	**45**	**NLC**	**Nyveli Lignite Corporation**
12	**BYPL**	**BSES Yamuna Power Ltd.**	**46**	**NPCIL**	**Nuclear Power Corporation of India Ltd.**
13	**CESCOM**	**Chamundeshwari Electricity Supply Company Ltd.**	**47**	**NTPC**	**National Thermal Power Corporation**
14	**CPDD**	**Chandigarh Power Development Department.**	**48**	**PED**	**Pondicherry Electricity Department**
15	**DHBVN**	**Dakshin Haryana Bijli Vitran Nigam**	**49**	**PGCIL**	**Power Grid Corporation of India Ltd.**
16	**DPCL**	**Delhi Power Company Ltd.**	**50**	**PSPCL**	**Punjab State Power Corporation Ltd.**
17	**DTL**	**Delhi Transco Ltd.**	**51**	**RRVPNL**	**Rajasthan Rajya Vidyut Prasaran Nigam Ltd.**
18	**DESU**	**Delhi Electric Supply Undertaking**	**52**	**RRVUNL**	**Rajasthan Rajya Vidyut Utpadan Nigam Ltd.**
19	**DVC**	**Damodar Valley Corporation**	**53**	**SJVNL**	**Satluj Jal Vidyut Nigam Ltd.**
20	**ESCOMS**	**Electricity Supply Company (Karnataka)**	**54**	**THDC**	**Tehri Hydro Development Corporation**
21	**GESCOM**	**Gulbarga Electricity Supply Company Ltd.**	**55**	**TSECL**	**Tripura State Electricity Corp. Ltd.**
22	**GOAED**	**Goa Electricity Department**	**56**	**UHBV**	**Uttar Haryana Bijli Vitran Nigam**
23	**GUVNL**	**Gujarat Urja Vikas Nigam Limited**	**57**	**UPCL**	**Uttarakhand Power Corporation Ltd.**
24	**HESCOM**	**Hubli Electricity Supply Company Ltd.**	**58**	**UPJVNL**	**Uttar Pradesh Jal Vidyut Nigam Ltd.**
25	**HPGCL**	**Haryana Power Generation Corporation Ltd.**	**59**	**UPPCL**	**Uttar Pradesh Power Corporation Ltd.**
26	**HVPNL**	**Haryana Vidyut Prasaran Nigam Ltd.**	**60**	**UPRVUNL**	**Uttar Pradesh Rajya Vidyut Utpadan Nigam Ltd.**
27	**UHBVN**	**Uttar haryana Bijli Vitran Niagam**	**61**	**PTC**	**Power Trading Corporation**

Annexure-9B

(Item No.-9.2)

STATEMENT SHOWING ESTIMATED AVERAGE RATES OF ELECTRICITY (upto 01.04.2014) (Provisional)

(Rates in Paise/KWh)

S. No.	Name of Utility	Tariff Effective from	Domestic 1KW (100 KWh/ Month)		Domestic 4KW (400 KWh/ Month)		Domestic 10KW (1000 KWh/ Month)		Commercial 2KW (300 KWh/ Month)		Commercial 10KW (1500 KWh/ Month)		Commercial 30KW (4500 KWh/ Month)		Commercial 50KW (7500 KWh/ Month)		Agriculture 2HP (400 KWh/ Month)		Agriculture 5HP (1000 KWh/ Month)		Agriculture 10HP (2000 KWh/ Month)		Small Industry 10KW (1500 KWh/ Month)		Medium Industry 50KW (7500 KWh/ Month)		Large Industry (11KV) 1000KW 60%L.F. (438000 KWh/ Month)		Heavy Industry (11KV) 10000KW 60%L.F. (4380000 KWh/ Month)		Heavy Industry (33KV) 20000KW 60%L.F. (8760000 KWh/ Month)		Railway Traction 12500KW (25000000 KWh/ Month)	
1	AP	01.04.13	238.50		572.00		730.20		828.17		920.83		941.83		946.03		79.38		74.88		73.38		662.02		649.75		693.53		693.30		648.02		669.52	
2	Assam	01.12.13	398.00		556.90		615.00		698.33		698.33		700.20		700.20		396.19		396.19		527.55		461.67	U	603.43		560.52		560.52		560.52			
																							430.00	R										
3	Bihar	01.04.13	360.40	U	446.53		539.54		628.93	U	610.56		606.32		605.47		174.00	U	174.00	U	174.00	U	647.62		708.40		676.80		-		645.00		745.53	at 25KV
			227.90	R					286.20	R							114.00	R	114.00	R	114.00	R									729.63	at 132KV
4	Chhattishgarh	01.08.13	226.80		348.30		565.92		526.40		641.76		650.72		652.51		142.50		142.50		142.50		379.68		482.94		544.63		544.63		529.59		563.89	at 132KV
5	Gujarat	01.04.13	405.38	U	511.75	U	568.10	U	568.75		568.75		622.92		640.00		190.00		190.00		190.00		568.33		573.47		567.91		620.76		620.44		578.89	at 132KV
			335.94	R	439.41	R	496.11	R																										
6	Haryana	01.04.13	419.20		531.25		613.00		600.00		625.00		715.00		715.00		25.00		25.00		25.00		600.00		625.00		505.79		505.79		497.29		607.35	at 11KV
7	HP	01.04.13	175.10		291.62		360.76		592.20		572.04		657.36		656.02		123.75		115.50		112.75		518.84		645.83		654.71		716.99		651.36			
8	J & K	01.04.13	186.03		290.25		350.28		401.98		631.54		632.09		632.20		82.35		82.35		82.35		404.23		404.23		427.26		427.26		415.78			
9	Jharkhand	01.08.12	300.00	U	301.50		313.00		666.67	U	670.67		671.33		671.47		62.00		62.00		62.00		611.18		611.18		440.13		440.13		427.07		684.41	at 25/132KV
			185.00	R					200.00	R																								
10	Karnataka	01.05.13	380.54	D	561.54	D	618.93	D	800.30	D	814.43	D	816.79	D	817.26	D	0.00		0.00		0.00		570.78	D	674.83	D	648.22	D	656.93	D	655.30	D	636.00	
			344.50	F	510.13	F	560.21	F	740.23	F	754.37	F	756.72	F	757.19	F							538.98	F	642.04	F	637.35	F	643.89	F	642.13	F		
11	Kerala	01.05.13	279.60		625.00		790.00		832.00		1041.00		1081.00		1081.00		167.24		167.24		167.24		557.00		557.00		546.10		546.10		-		573.89	at 110KV
12	MP	01.04.13	466.13	U	654.80	U	722.12	U	748.75	U	754.00	U	754.88	U	755.05	U	335.00		330.25		367.63		538.67	U	741.67	U	702.81		702.81		713.54		647.22	at 132/220KV
			438.88	R	637.89	R	698.16	R	729.75	R	734.87	R	735.72	R	735.89	R							480.22	R	661.73	R								
13	Maharashtra	01.08.12	432.40		709.65		879.75		865.22		963.81		1160.15		1160.15		220.00		220.00		220.00		573.35		877.05		824.63	B	824.63	B	-		781.00	
																											750.51	C	750.51	C	-			
14	Meghalaya	01.04.13	300.00		367.50		396.00		529.33		540.00		541.78		542.13		185.92		185.92		185.92		467.67		467.67		488.56		488.69		473.70		-	
15	Orissa	01.04.13	327.60		445.90		515.32		606.67		695.41		710.20		713.16		112.20		112.20		112.20		561.60		572.40		606.79		606.74		606.74		640.88	at 25/33KV
16	Punjab	01.04.13	572.91		708.51		754.61		878.01		881.93		882.58		882.71		480.25		480.25		480.25		763.88		860.31		767.46		767.46		852.31		935.64	at 132KV
17	Rajasthan	07.06.13	582.50		571.88		587.25		730.00		754.00		772.44		774.80		404.50		404.50		404.50		594.68		643.62		650.51		-		627.09		627.78	
18	Tamil Nadu	21.06.13	160.00		445.63		523.25		708.75		729.75		733.25		733.95		0.00		0.00		0.00		579.60		577.92		657.41		667.91		657.41		688.89	
19	UP	10.06.13	480.00	U	505.00	U	545.00	U	738.33	U	778.33	U	785.00	U	786.33	U	435.00	U	435.00	U	435.00	U	755.00	U	755.00	U	761.04	U	761.04	U	723.32		858.82	Below 132KV
			275.00	R	275.00	R	275.00	R	298.33	R	298.33	R	298.33	R	298.33	R	122.50	R	122.50	R	122.50	R	642.50	R	642.50	R	647.63	R	647.63	R			858.82	132KV & above

20	Uttarakhand	01.05.13	286.00		317.75		352.20		493.33		493.33		570.13		570.13		125.00		125.00		125.00		461.60		486.67		521.05		521.05		521.05		494.12	
21	WB	01.04.13	541.36	U	741.04	U	838.35	U	785.02	U	919.36	U	935.80	U	939.09	U	392.29		392.29		392.29		687.96	U	811.93	U	836.53		836.53		802.03		804.11	at 25KV
			527.51	R	727.88	R	833.09	R	783.33	R	919.01	R	935.68	R	939.02	R							673.61	R	791.16	R							782.11	at 132KV
22	Ar. Pradesh	01.04.13	400.00		400.00		400.00		500.00		500.00		500.00		500.00		310.00		310.00		310.00		420.00		420.00		375.00		375.00		340.00		-	
23	Goa	01.04.13	156.00		211.50		272.60		423.33		454.67		471.56		474.93		140.00		140.00		140.00		320.00		370.00		444.39		444.39		444.39		-	
24	Manipur	01.09.12	302.20		422.20		422.20		442.20		484.87		476.27		476.27		274.58		274.58		274.58		292.20		406.27		407.57		407.57		-		-	
25	Mizoram	01.08.12	235.00		415.00		415.00		478.33		478.33		478.33		478.33		127.46		127.46		127.46		383.33		383.33		351.49		351.49		-		-	
26	Nagaland	01.04.13	383.50		480.25		522.10		620.00		700.00		713.33		716.00		250.00		250.00		250.00		436.67		475.33		519.24		519.92		-		-	
27	Sikkim	01.04.13	167.50		335.63		398.25		469.17		524.17		534.72		536.83		235.00		327.50		436.25		550.00	U	417.65		530.87		530.87		-		-	
																							400.00	R									
28	Tripura	01.04.13	485.50		730.00		730.00		650.00		725.00		725.00		725.00		341.19		341.19		442.38		690.00		720.00		-		-		-		-	
29	A & N Islands	01.04.13	200.00		397.50		465.00		576.67		685.33		711.78		717.07		125.00		125.00		125.00		481.67		496.33		-		-		-		-	
30	Chandigarh	01.04.13	239.00		357.75		412.50		497.67		520.33		525.22		526.20		230.00		230.00		230.00		455.00		507.67		496.98		582.03		482.40		-	
31	Dadra & Nagar Haveli	01.04.13	140.00		187.50		225.00		275.00		295.00		298.33		299.00		65.00		65.00		65.00		300.00		317.87		415.20		422.20		-		-	
32	Daman & Diu	01.04.13	150.00		192.50		230.00		331.67		358.33		362.78		363.67		70.00		70.00		70.00		370.00		402.34		531.74		553.05		-		-	
33	Delhi (BYPL /BRPL /NDPL)	01.08.13	451.50		535.50		657.30		899.50		899.50		976.11		976.11		296.58		296.58		296.58		854.00		886.67		803.30		803.30		784.05		763.44	
34	Delhi (NDMC)	01.08.13	362.25		420.00		527.10		754.25		754.25		957.35		957.35		-		-		-		696.50		696.50		838.20		838.20		818.12		827.34	at 33KV
35	Lakshadweep	01.04.13	122.50		293.13		357.25		516.67		583.33		594.44		596.67		-		-		-		472.22		472.22		625.37		625.37		-		-	
36	Puducherry	01.04.13	120.00		227.50		301.00		465.00		525.00		535.00		537.00		-		-		-		440.67		448.13		497.31		-		500.74		-	
37	Torrent Power Ltd. (Ahmedabad)	01.04.13	416.88		473.66		506.86		543.75		556.25		635.42		635.42		330.00		330.00		330.00		489.50		559.17		514.14		514.14		-		-	
38	Torrent Power Ltd. (Surat)	01.04.13	402.50		477.97		518.94		537.50		537.50		642.59		642.59		70.00		70.00		70.00		473.00		565.48		558.60		558.60		-		-	
39	CESC Ltd. (Kolkata)	01.04.13	494.91		714.65		817.90		737.72		897.51		918.55		922.76		-		-		-		624.79		761.08		739.93		739.93		712.33		648.89	
40	DPSC Ltd. (West Bengal)	01.04.13	417.11		458.82		458.82		489.38		511.62		601.32		601.32		187.95	^	187.95	^	187.95	^	506.65		556.08		668.80		668.80		453.75	^	708.11	
41	Durgapur Projects Ltd. (W Bengal)	01.04.13	394.61		497.73		521.25		507.34		550.34		553.66		554.33		175.29	^	175.29	^	175.29	^	483.65		534.13		598.48		598.48		628.62		626.11	at 25KV
																																	621.11	at 132KV
42	D.V.C. (A) Bihar Area	01.11.12	-		-		-		-		-		-		-		-		-		-		-		-		-		-		433.54		-	at 33KV
	(B) WB Area		-		-		-		-		-		-		-		-		-		-		-		-		-		-		470.35		408.00	at 132KV
43	Mumbai (B.E.S.T)	01.09.13	406.00		664.75		933.74		1060.01		1233.17		1436.53		1436.53		-		-		-		1013.81		1165.48		1003.71		1003.71		-		-	

44	**Mumbai (Reliance Energy)**	**01.09.13**	**512.95**		**805.05**		**1127.05**		**1123.19**		**1045.19**		**1530.13**		**1530.13**		**220.00**		**220.00**		**220.00**		**1035.25**		**1146.95**		**1072.38**		**1072.38**		**-**		**1080.11**	**at 100/33/22/11/6.6kV**
45	**Mumbai (TATA'S)**	**01.07.13**	**305.95**		**491.39**		**727.66**		**935.99**		**857.99**		**1036.39**		**1036.39**		**-**		**-**		**-**		**751.85**		**989.99**		**851.11**		**851.11**		**-**		**814.11**	**33/22/11/6.6KV**
B : Continuous Supply Areas C : Non-Continuous Supply Areas D : Bangalore, Devangere & Other City Municipal Corp. F : Areas under Village Panchayats U : Urban R : Rural O : Other Areas																																			
^ TOD tariff from 23:00 hrs to 06:00 hrs for DPSC Ltd. & Durgapur Projects Ltd. respectively in West Bengal.																																			
Tariffs notified have varrying parameters for various categories of consumers.The above comparision is based on certain assumed loads and electricity consumption levels in a month.																																			

Annexure-10A
(Item 10.2)

All India Sector wise/Organisation wise Generation Target/Actual & %PLF for the year 2014-15

Fuel, Sector/Organisation	Target (MU)	Actual (MU)	PLF (%)
THERMAL			
CENTRAL SECTOR			
APCPL	5912	7022.93	53.45
DVC	33497	25283.81	47.09
NEEPCO.	2334	2369.58	
NLC	19261	19708.5	81.36
NLCTNEB	0	6.79	
NSPCL	3723	3241.1	74
NTECL	6492	5912.65	62.7
NTPC Ltd.	236177	242033.95	79.61
ONGC	1593	2469.44	
RGPPL	1300	0	
TOTAL CENTRAL SECTOR	**310289**	**308048.75**	**73.96**
STATE SECTOR			
HPGCL	15116	13616.77	49.19
IPGPCL	4450	5441.63	35.81
PSPCL	18178	11671.82	50.85
RRVUNL	24768	27347.91	66.67
UPRVUNL	28801	25098.49	58.2
CSPGCL	16372	15592.41	78.07
GMDCL	1315	1358.77	62.04
GSECL	16910	20394.03	54.38
GSEGL	300	214.73	
MAHAGENCO	42478	44274.62	55.32
MPPGCL	19425	17074.22	49.78
APGENCO	21173	21034.57	77.74
KPCL	16307	16786.45	70.45
KSEB	180	207.69	
P&ED, Pudu.	242	102.14	
TNGDCL	29569	29361.1	65.48
TSGENCO	15157	16059.87	80.32
A&N ADM	150	153.76	
DPL	1900	1408.04	19.14
JSEB	850	773.68	11.47

OPGC	2916	2798.93	76.07
TVNL	2300	2380.27	64.7
WBPDC	21760	23853.07	62.74
APGPCL	1243	1526.91	0
TSECL	796	726.46	
TOTAL STATE SECTOR	**302656**	**299258.34**	**59.83**
PVT. SEC. UTL			
CESC	8978	8595.94	76.36
RIL (DAHANU)	4200	3997.22	91.26
TATA PCL	6161	6008.92	39.63
TOR. POW. (UNOSUGEN)	3200	2982.88	85.13
TOTA PVT. SEC. UTL	**22539**	**21584.96**	**65.07**
PVT. SEC. IPP			
ABAN POWR	600	578.81	
ACB	2020	1998.04	76.03
ADHUNIK	3000	2212.58	46.77
AMNEPL	300	0	0
APGCL	1029	663.83	
APL	51815	54660.48	70.41
BEPL	2500	2693.09	68.32
BLAPPL	352	337.16	85.53
BSES(C)	50	154.71	
BSES(P)	389	186.59	
CEPL		1092.69	
CGPL	25000	26577.6	75.85
DBPCL	1548	292.36	0.01
DIPL	1641	475.68	9.94
EEL	3190	3614.9	68.78
EPGL	6000	6609.27	62.87
ESSARPMPL	2700	450.69	8.57
GCEL		21.65	
GIPCL	3750	3304.85	74.58
GMR ENERG	3066	4838.77	52.61
GTE CORP	300	298.44	
GVKP&IL	1180	589.73	
HEL	0	356.23	39.33
HNPC	561	0	
IBPIL	1093	1428.17	54.34
IBPL	2969	2142.32	28.44
IEPL	100	0	0

JBTPP	1800	2444.91	55.82
JPL	10428	11037.9	53.33
JPPVL	0	1758.18	
JSWEL	10942	14979.51	83.01
JhPL(HR)	7000	6537.48	56.54
KONDAPALI	1200	574.71	
LANCO	2223	2239.46	42.61
LAPPL	7600	8340.24	79.34
MADURAI P	400	245.35	
MEL	1357	1552.46	59.07
MPL	7000	6684.08	72.67
NPL	3000	5727.31	55.09
PENNA	250	378.8	
PPNPGCL	1000	1171.37	
RELIANCE	254	12.61	
RPL	6505	17273.83	65.21
RPSCL	8405	8591.61	81.73
RWPL (JSW)	5000	7351.81	77.71
SAMALPATI	270	224.36	
SCPL	250	268.94	61.4
SEL	9441	9753.19	38.47
SEPL	2468	3203.71	81.27
SPGL	914	546.21	
ST-CMSECP	1861	1828.12	83.48
SVPPL	57	0	0
TATA PCL	2310	2537.54	80.46
TOR. POW. (SUGEN)	750	2600.64	
TPTCL	0	5.6	
UPCL	8000	6414.58	61.02
VASAVI	525	576.26	
VIP	400	3644.48	69.34
VVL	295	137.12	12.44
WPCL	5828	4477.56	33.53
PVT. SEC. IPP	**222886**	**248698.57**	**60.2**
PVT. SEC. IMP.			
GIPCL	200	182.63	
ICCL	33	290.34	
NALCO	0	256.44	
PVT. SEC. IMP.	**233**	**729.41**	
TOTAL IPP & IMPORT	**223119**	**249427.98**	**60.2**

TOTAL PVT. SECTOR	**245658**	**271012.94**	**60.58**
NUCLEAR			
KAIGA	5607	6462.17	83.83
KAKRAPARA	3116	3529.4	91.57
KUDANKULAM	5316	2610.52	95.52
MADRAS A.P.S.	2842	2616.63	67.89
NARORA A.P.S.	2834	2890.54	74.99
RAJASTHAN A.P.S.	7645	7722.39	81.63
TARAPUR	7940	10269.89	83.74
TOTAL NUCLEAR	**35300**	**36101.54**	**80.74**
HYDRO			
CENTRAL SECTOR			
BBMB	9275	10599.78	
DVC	218	267.3	
NEEPCO.	2358	1991.95	
NHDC	3455	3670.82	
NHPC	20770	22040.92	
NTPC Ltd.		0.25	
SJVNL	7800	8155.07	
THDC	3952	4233.73	
TOTAL	**47828**	**50959.82**	
TOTAL	**65142**	**67544.7**	
STATE SECTOR HYDRO			
HPSEB	1599	1649.62	
JKSPDC	3058	3844.1	
PSPCL	3938	4039.07	
RRVUNL	535	863.33	
UJVNL	4452	4199.36	
UPJVNL	1112	1247.69	
CSPGCL	250	258.18	
GSECL	700	902.16	
MAHAGENCO	3852	3780.98	
MPPGCL	2575	2628.93	
SSNNL	3601	2909.42	
APGENCO	2167	1862.49	
KPCL	12763	13160.29	
KSEB	6849	6852.65	
TNGDCL	5061	5058.95	

TSGENCO	4421	4400.92	
JSEB	128	33.73	
OHPC	5913	6919.49	
WBSEDCL	958	1755.62	
APGPCL	390	402.43	
MeECL	820	775.29	
TOTAL STATE	**65142**	**67544.7**	
PVT SEC. UTL			
HYDRO			
BHIRA HPS	883	330.91	
BHIRA PSS HPS	0	506.16	
BHIVPURI HPS	270	300.68	
KHOPOLI HPS	267	303.75	
TOTAL PVT SEC. UTL	**1420**	**1441.5**	
PVT SEC. IPP			
HYDRO			
ALLAIN DUHANGAN HPS	700	677.78	
BASPA HPS	1213	1252.58	
BHANDARDHARA HPS ST-	65	65.4	
BUDHIL HPS	291	235.83	
CHUZACHEN HPS	537	430.86	
JORETHANG LOOP	75	0	
KARCHAM WANGTOO HPS	4414	4240.43	
MALANA HPS	340	328.43	
MALANA-II HPS	360	250.41	
TEESTA-III HPS	136	0	
VISHNU PRAYAG HPS	1776	1815.94	
TOTAL PVT SEC. IPP	**9907**	**9297.66**	
TOTAL PVT. SEC.	**11327**	**10739.2**	

Annexure-10B
(Item - 10.4)

ALL INDIA INSTALLED CAPACITY (IN MW) OF POWER STATIONS LOCATED IN THE REGIONS OF MAIN LAND AND ISLANDS

(As on 31.03.2015)
(UTILITIES)

Region	Ownership/ Sector	Modewise breakup							Grand Total
		Thermal				Nuclear	Hydro (Renewable)	RES (MNRE)	
		Coal	Gas	Diesel	Total				
Northern Region	State	15438.00	2879.20	12.99	18330.19	0.00	7052.55	651.06	26033.80
	Private	12405.00	108.00	0.00	12513.00	0.00	2148.00	6505.80	21166.80
	Central	12000.50	2344.06	0.00	14344.56	1620.00	7866.23	0.00	23830.79
	Sub Total	**39843.50**	**5331.26**	**12.99**	**45187.75**	**1620.00**	**17066.78**	**7156.86**	**71031.39**
Western Region	State	21380.00	2993.82	17.28	24391.10	0.00	5480.50	311.19	30182.79
	Private	32689.00	4388.00	0.20	37077.20	0.00	447.00	12483.85	50008.05
	Central	11738.01	3533.59	0.00	15271.60	1840.00	1520.00	0.00	18631.60
	Sub Total	**65807.01**	**10915.41**	**17.48**	**76739.90**	**1840.00**	**7447.50**	**12795.04**	**98822.44**
Southern Region	State	14182.50	555.70	362.52	15100.72	0.00	11398.03	473.45	26972.20
	Private	4770.00	4047.50	576.80	9394.30	0.00	0.00	14643.75	24038.05
	Central	11390.00	359.58	0.00	11749.58	2320.00	0.00	0.00	14069.58
	Sub Total	**30342.50**	**4962.78**	**939.32**	**36244.60**	**2320.00**	**11398.03**	**15117.20**	**65079.83**
Eastern Region	**State**	7040.00	100.00	17.06	7157.06	0.00	3168.92	225.11	10551.09
	Private	8541.38	0.00	0.14	8541.52	0.00	99.00	209.27	8849.79
	Central	13001.49	90.00	0.00	13091.49	0.00	845.20	0.00	13936.69
	Sub Total	28582.87	190.00	17.20	28790.07	0.00	4113.12	434.38	33337.57
North Eastern Region	**State**	60.00	445.70	142.74	648.44	0.00	382.00	253.25	1283.69
	Private	0.00	24.50	0.00	24.50	0.00	0.00	9.13	33.63

	Central	0.00	1192.50	0.00	1192.50	0.00	860.00	0.00	2052.50
	Sub Total	60.00	1662.70	142.74	1865.44	0.00	1242.00	262.38	3369.82
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	5.85	25.85
	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	11.10	81.12
ALL INDIA	**State**	58100.50	6974.42	602.61	65677.53	0.00	27482.00	1919.31	95078.84
	Private	58405.38	8568.00	597.14	67570.52	0.00	2694.00	33857.65	104122.17
	Central	48130.00	7519.73	0.00	55649.73	5780.00	11091.43	0.00	72521.16
	Total	164635.88	23062.15	1199.75	188897.78	5780.00	41267.43	35776.96	271722.17

Abbreviation:- SHP=Small Hydro Project (≤ 25 MW), BP=Biomass Power, U&I=Urban & Industrial Waste Power, RES=Renewable Energy Sources

Note : -

1.RES include SHP, BP, U&I, Solar and Wind Energy. Installed capacity in respect of RES (MNER) as on **: 31.03.2014**

***Break up of RES all India is given below (in MW) :**

Small Hydro Power	**Wind Power**	**Bio-Power**		**Solar Power**	**Total Capacity**
		BM Power/Cogen.	**Waste to Energy**		
4055.36	**23444.00**	**4418.55**	**115.08**	**3743.97**	**35776.96**

2.The installed capacity in respect of Old Talcher TPS and Bairasul HEP stations is reduced to 460 MW and180 MW from 470 MW and 198 MW as earlier respectively.

3. Sasan (6x660 MW = 3960 MW) has been divided among the state Delhi (11.25 %), Haryana (11.25 %), Punjab (15 %), Rajasthan (10 %), Uttar Pradesh (12.5 %), Uttarakhand (2.5 %) and Madhya Pradesh (37.5 %)

4. Installed capacity of Andhra Pradesh has been bifurcated in the ratio of 53.89 and 46.11 among Telangana and New Andhra Pradeh respectively. Except the installed capacity of Thamminapatnam (300 MW), Simhapuri (450 MW) and Tanir Bhavi (220 MW) are shown in the state of New Andhra pradesh.

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN NORTHERN REGION
INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	Ownership/ Sector	Modewise breakup							Grand Total
		Thermal				Nuclear	Hydro (Renewable)	RES (MNRE)	
		Coal	Gas	Diesel	Total				
Delhi	State	135.00	2050.40	0.00	2185.40	0.00	0.00	0.00	2185.40
	Private	445.50	108.00	0.00	553.50	0.00	0.00	21.47	574.97
	Central	4421.37	207.61	0.00	4628.98	122.08	762.64	0.00	5513.70
	Sub-Total	**5001.87**	**2366.01**	**0.00**	**7367.88**	**122.08**	**762.64**	**21.47**	**8274.07**
Haryana	State	3160.00	25.00	3.92	3188.92	0.00	884.51	59.30	4132.73
	Private	2165.50	0.00	0.00	2165.50	0.00	0.00	77.30	2242.80
	Central	1202.03	535.29	0.00	1737.32	109.16	531.63	0.00	2378.11
	Sub-Total	**6527.53**	**560.29**	**3.92**	**7091.74**	**109.16**	**1416.14**	**136.60**	**8753.64**
Himachal Pradesh	State	0.00	0.00	0.13	0.13	0.00	393.60	245.61	639.34
	Private	0.00	0.00	0.00	0.00	0.00	1748.00	478.30	2226.30
	Central	152.02	61.88	0.00	213.90	34.08	1464.94	0.00	1712.92
	Sub-Total	**152.02**	**61.88**	**0.13**	**214.03**	**34.08**	**3606.54**	**723.91**	**4578.56**
Jammu & Kashmir	State	0.00	175.00	8.94	183.94	0.00	780.00	106.53	1070.47
	Private	0.00	0.00	0.00	0.00	0.00	0.00	50.00	50.00
	Central	329.32	129.14	0.00	458.46	77.00	955.45	0.00	1490.91
	Sub-Total	**329.32**	**304.14**	**8.94**	**642.40**	**77.00**	**1735.45**	**156.53**	**2611.38**

Punjab	State	2630.00	25.00	0.00	2655.00	0.00	2230.23	127.80	5013.03
	Private	3154.00	0.00	0.00	3154.00	0.00	0.00	365.62	3519.62
	Central	660.88	263.92	0.00	924.80	208.04	859.85	0.00	1992.69
	Sub-Total	**6444.88**	**288.92**	**0.00**	**6733.80**	**208.04**	**3090.08**	**493.42**	**10525.34**
Rajasthan	State	4590.00	603.80	0.00	5193.80	0.00	987.96	23.85	6205.61
	Private	3196.00	0.00	0.00	3196.00	0.00	0.00	4362.40	7558.40
	Central	1014.72	221.23	0.00	1235.95	573.00	655.73	0.00	2464.68
	Sub-Total	**8800.72**	**825.03**	**0.00**	**9625.75**	**573.00**	**1643.69**	**4386.25**	**16228.69**
Uttar Pradesh	State	4923.00	0.00	0.00	4923.00	0.00	524.10	25.10	5472.20
	Private	3345.00	0.00	0.00	3345.00	0.00	0.00	964.76	4309.76
	Central	2909.95	549.97	0.00	3459.92	335.72	1509.45	0.00	5305.09
	Sub-Total	**11177.95**	**549.97**	**0.00**	**11727.92**	**335.72**	**2033.55**	**989.86**	**15087.05**
Uttrakhnad	State	0.00	0.00	0.00	0.00	0.00	1252.15	62.87	1315.02
	Private	99.00	0.00	0.00	99.00	0.00	400.00	181.45	680.45
	Central	300.50	69.35	0.00	369.85	22.28	421.44	0.00	813.57
	Sub-Total	**399.50**	**69.35**	**0.00**	**468.85**	**22.28**	**2073.59**	**244.32**	**2809.04**
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	4.50	4.50
	Central	32.54	15.32	0.00	47.86	8.84	56.40	0.00	113.10
	Sub-Total	**32.54**	**15.32**	**0.00**	**47.86**	**8.84**	**56.40**	**4.50**	**117.60**
Central - Unallocated		977.19	290.35	0.00	1267.54	129.80	648.70	0.00	2046.04
Total (Northern Region)	State	15438.00	2879.20	12.99	18330.19	0.00	7052.55	651.06	26033.80
	Private	12405.00	108.00	0.00	12513.00	0.00	2148.00	6505.80	21166.80
	Central	12000.50	2344.06	0.00	14344.56	1620.00	7866.23	0.00	23830.79
	Grand Total	**39843.50**	**5331.26**	**12.99**	**45187.75**	**1620.00**	**17066.78**	**7156.86**	**71031.39**

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN WESTERN REGION

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	Ownership/ Sector	Modewise breakup							Grand Total
		Thermal				Nuclear	Hydro (Renewable)	RES (MNRE)	
		Coal	Gas	Diesel	Total				
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	0.00	48.00
	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**	**0.05**	**400.02**
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 *	4720.00	2321.82	17.28	7059.10	0.00	772.00	8.00	7839.10
	Private	8620.00	4160.00	0.20	12780.20	0.00	0.00	4709.55	17489.75
	Central	2648.27	424.27	0.00	3072.54	559.32	0.00	0.00	3631.86
	Sub-Total	**15988.27**	**6906.09**	**17.48**	**22911.84**	**559.32**	**772.00**	**4717.55**	**28960.71**
Madhya Pradesh	State	4320.00	0.00	0.00	4320.00	0.00	1703.66	83.96	6107.62
	Private	3950.00	0.00	0.00	3950.00	0.00	0.00	1480.68	5430.68

	Central	2256.39	257.18	0.00	2513.57	273.24	1520.00	0.00	4306.81
	Sub-Total	**10526.39**	**257.18**	**0.00**	**10783.57**	**273.24**	**3223.66**	**1564.64**	**15845.11**
Chhattisgarh	State	2780.00	0.00	0.00	2780.00	0.00	120.00	11.05	2911.05
	Private	8323.00	0.00	0.00	8323.00	0.00	0.00	313.45	8636.45
	Central	1490.49	0.00	0.00	1490.49	47.52	0.00	0.00	1538.01
	Sub-Total	**12593.49**	**0.00**	**0.00**	**12593.49**	**47.52**	**120.00**	**324.50**	**13085.51**
Maharashtra	State	9560.00	672.00	0.00	10232.00	0.00	2884.84	208.13	13324.97
	Private	11796.00	180.00	0.00	11976.00	0.00	447.00	5980.17	18403.17
	Central	3313.27	2623.93	0.00	5937.20	690.14	0.00	0.00	6627.34
	Sub-Total	**24669.27**	**3475.93**	**0.00**	**28145.20**	**690.14**	**3331.84**	**6188.30**	**38355.48**
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	21380.00	2993.82	17.28	24391.10	0.00	5480.50	311.19	30182.79
	Private	32689.00	4388.00	0.20	37077.20	0.00	447.00	12483.85	50008.05
	Central	11738.01	3533.59	0.00	15271.60	1840.00	1520.00	0.00	18631.60
	Grand Total	**65807.01**	**10915.41**	**17.48**	**76739.90**	**1840.00**	**7447.50**	**12795.04**	**98822.44**

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN SOUTHERN REGION

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	Ownership/ Sector	Modewise breakup							Grand Total
		Thermal				Nuclear	Hydro (Renewable)	RES (MNRE)	
		Coal	Gas	Diesel	Total				
New Andhra Pradesh	State	3085.91	0.00	0.00	3085.91	0.00	1721.99	89.50	4897.40
	Private	1290.00	1672.65	16.97	2979.62	0.00	0.00	1856.50	4836.12
	Central	1414.60	0.00	0.00	1414.60	127.16	0.00	0.00	1541.76
	Sub-Total	**5790.51**	**1672.65**	**16.97**	**7480.13**	**127.16**	**1721.99**	**1946.00**	**11275.29**
Telangana	State	3606.59	0.00	0.00	3606.59	0.00	2012.54	0.00	5619.13
	Private	270.00	1697.75	19.83	1987.58	0.00	0.00	61.25	2048.83
	Central	1653.28	0.00	0.00	1653.28	148.62	0.00	0.00	1801.90
	Sub-Total	**5529.87**	**1697.75**	**19.83**	**7247.45**	**148.62**	**2012.54**	**61.25**	**9469.86**
Karnataka	State	2720.00	0.00	127.92	2847.92	0.00	3599.80	137.33	6585.05
	Private	2060.00	0.00	106.50	2166.50	0.00	0.00	4372.90	6539.40
	Central	1549.51	0.00	0.00	1549.51	475.86	0.00	0.00	2025.37
	Sub-Total	**6329.51**	**0.00**	**234.42**	**6563.93**	**475.86**	**3599.80**	**4510.23**	**15149.82**
Kerala	**State**	0.00	0.00	234.60	234.60	0.00	1881.50	123.92	2240.02
	Private	0.00	174.00	21.84	195.84	0.00	0.00	80.03	275.87
	Central	1002.44	359.58	0.00	1362.02	228.60	0.00	0.00	1590.62
	Sub-Total	1002.44	533.58	256.44	1792.46	228.60	1881.50	203.95	4106.51
Tamil Nadu	**State**	4770.00	523.20	0.00	5293.20	0.00	2182.20	122.70	7598.10
	Private	1150.00	503.10	411.66	2064.76	0.00	0.00	8273.04	10337.80
	Central	3961.60	0.00	0.00	3961.60	986.50	0.00	0.00	4948.10

	Sub-Total	9881.60	1026.30	411.66	11319.56	986.50	2182.20	8395.74	22884.00
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	244.57	0.00	0.00	244.57	52.78	0.00	0.00	297.35
	Sub-Total	244.57	32.50	0.00	277.07	52.78	0.00	0.03	329.88
Central - Unallocated		1463.83	0.00	0.00	1463.83	300.48	0.00	0.00	1764.31
Total (Southern Region)	State	14182.50	555.70	362.52	15100.72	0.00	11398.03	473.45	26972.20
	Private	4770.00	4047.50	576.80	9394.30	0.00	0.00	14643.75	24038.05
	Central	11390.00	359.58	0.00	11749.58	2320.00	0.00	0.00	14069.58
	Grand Total	**30342.50**	**4962.78**	**939.32**	**36244.60**	**2320.00**	**11398.03**	**15117.20**	**65079.83**

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN EASTERN REGION

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	**Ownership/ Sector**	**Modewise breakup**							**Grand Total**
		Thermal				**Nuclear**	**Hydro (Renewable)**	**RES (MNRE)**	
		Coal	**Gas**	**Diesel**	**Total**				
Bihar	State	210.00	0.00	0.00	210.00	0.00	0.00	70.70	280.70
	Private	0.00	0.00	0.00	0.00	0.00	0.00	43.42	43.42

	Central	2306.24	0.00	0.00	2306.24	0.00	129.43	0.00	2435.67
	Sub-Total	**2516.24**	**0.00**	**0.00**	**2516.24**	**0.00**	**129.43**	**114.12**	**2759.79**
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	314.93	0.00	0.00	314.93	0.00	70.93	0.00	385.86
	Sub-Total	**2404.93**	**0.00**	**0.00**	**2404.93**	**0.00**	**200.93**	**20.05**	**2625.91**
West Bengal	State	5220.00	100.00	12.06	5332.06	0.00	977.00	91.95	6401.01
	Private	1941.38	0.00	0.14	1941.52	0.00	0.00	39.76	1981.28
	Central	922.45	0.00	0.00	922.45	0.00	271.30	0.00	1193.75
	Sub-Total	**8083.83**	**100.00**	**12.20**	**8196.03**	**0.00**	**1248.30**	**131.71**	**9576.04**
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	6110.66	90.00	0.00	6200.66	0.00	193.26	0.00	6393.92
	Sub-Total	**7160.66**	**90.00**	**0.00**	**7250.66**	**0.00**	**193.26**	**0.00**	**7443.92**
Odisha	State	420.00	0.00	0.00	420.00	0.00	2061.92	6.30	2488.22
	Private	4650.00	0.00	0.00	4650.00	0.00	0.00	110.09	4760.09
	Central	1683.04	0.00	0.00	1683.04	0.00	105.01	0.00	1788.05
	Sub-Total	**6753.04**	**0.00**	**0.00**	**6753.04**	**0.00**	**2166.93**	**116.39**	**9036.36**
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	99.00	0.00	99.00

	Central	92.10	0.00	0.00	92.10	0.00	75.27	0.00	167.37
	Sub-Total	**92.10**	**0.00**	**5.00**	**97.10**	**0.00**	**174.27**	**52.11**	**323.48**
Central - Unallocated		1572.07	0.00	0.00	1572.07	0.00	0.00	0.00	1572.07
Total (Eastern Region)	State	7040.00	100.00	17.06	7157.06	0.00	3168.92	225.11	10551.09
	Private	8541.38	0.00	0.14	8541.52	0.00	99.00	209.27	8849.79
	Central	13001.49	90.00	0.00	13091.49	0.00	845.20	0.00	13936.69
	Grand Total	**28582.87**	**190.00**	**17.20**	**28790.07**	**0.00**	**4113.12**	**434.38**	**33337.57**

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN NORTH-EASTERN REGION

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	Ownership/ Sector	Modewise breakup							Grand Total
		Thermal				Nuclear	Hydro (Renewable)	RES (MNRE)	
		Coal	Gas	Diesel	Total				
Assam	State	60.00	276.20	20.69	356.89	0.00	100.00	30.01	486.90
	Private	0.00	24.50	0.00	24.50	0.00	0.00	4.10	28.60
	Central	0.00	417.92	0.00	417.92	**0.00**	329.72	0.00	747.64
	Sub-Total	**60.00**	**718.62**	**20.69**	**799.31**	**0.00**	**429.72**	**34.11**	**1263.14**
Arunachal Pradesh	State	0.00	0.00	15.88	15.88	0.00	0.00	104.61	120.49
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
	Central	0.00	43.06	0.00	43.06	0.00	97.57	0.00	140.63
	Sub-Total	**0.00**	**43.06**	**15.88**	**58.94**	**0.00**	**97.57**	**104.64**	**261.15**
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	105.14	0.00	105.14	0.00	74.58	0.00	179.72
	Sub-Total	**0.00**	**105.14**	**2.05**	**107.19**	**0.00**	**356.58**	**31.03**	**494.80**
Tripura	State	0.00	169.50	4.85	174.35	0.00	0.00	16.01	190.36
	Private	0.00	0.00	0.00	0.00	0.00	0.00	5.00	5.00
	Central	0.00	369.32	0.00	369.32	0.00	62.37	0.00	431.69
	Sub-Total	**0.00**	**538.82**	**4.85**	**543.67**	**0.00**	**62.37**	**21.01**	**627.05**
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	67.98	0.00	67.98	0.00	80.98	0.00	148.96
	Sub-Total	**0.00**	**67.98**	**45.41**	**113.39**	**0.00**	**80.98**	**5.45**	**199.82**
Nagaland	State	0.00	0.00	2.00	2.00	0.00	0.00	29.67	31.67
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	46.35	0.00	46.35	0.00	53.32	0.00	99.67
	Sub-Total	**0.00**	**46.35**	**2.00**	**48.35**	**0.00**	**53.32**	**29.67**	**131.34**
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	38.29	0.00	38.29	0.00	34.31	0.00	72.60
	Sub-Total	**0.00**	**38.29**	**51.86**	**90.15**	**0.00**	**34.31**	**36.47**	**160.93**
Central - Unallocated		0.00	104.44	0.00	104.44	0.00	127.15	0.00	231.59
Total (North-Eastern Region)	State	60.00	445.70	142.74	648.44	0.00	382.00	253.25	1283.69
	Private	0.00	24.50	0.00	24.50	0.00	0.00	9.13	33.63
	Central	0.00	1192.50	0.00	1192.50	0.00	860.00	0.00	2052.50
	Grand Total	**60.00**	**1662.70**	**142.74**	**1865.44**	**0.00**	**1242.00**	**262.38**	**3369.82**

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN ISLANDS

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	Ownership/ Sector	Modewise breakup							Grand Total
		Thermal				Nuclear	Hydro (Renewable)	RES (MNRE)	
		Coal	Gas	Diesel	Total				
Andaman & Nicobar	State	0.00	0.00	40.05	40.05	0.00	0.00	5.25	45.30
	Private	0.00	0.00	20.00	20.00	0.00	0.00	5.10	25.10
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total	**0.00**	**0.00**	**60.05**	**60.05**	**0.00**	**0.00**	**10.35**	**70.40**
lakshadweep	State	0.00	0.00	9.97	9.97	0.00	0.00	0.00	9.97
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.75
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total	**0.00**	**0.00**	**9.97**	**9.97**	**0.00**	**0.00**	**0.75**	**10.72**
Total (Islands)	State	0.00	0.00	50.02	50.02	0.00	0.00	5.25	55.27
	Private	0.00	0.00	20.00	20.00	0.00	0.00	5.85	25.85
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Grand Total	**0.00**	**0.00**	**70.02**	**70.02**	**0.00**	**0.00**	**11.10**	**81.12**

Annexure 12A
(Item No. 12.4)

Details of Foreign Tours performed during 2014-15

Sl.No.	Participant(Shri/Smt)	City/Country	Duration/Year
1.	Dr. R. Saha, Director (SP&PA)	Dhaka, Bangladesh	2-3April,2014
2.	Sh. S. M. Aimol, EE (NERPC) Sh. Mohan Jha, EE (NERPC)	China	21-27 April, 2014
3.	Sh. D. K. Srivastava, Director (GM)	Germany	02-07June, 2014
4.	Sh. P. C. Jiloha, Director (GM) Sh. Rakesh Goel, Director (GM)	Bhutan	28 - 30 June, 2014
5.	Dr. R. Saha, Director (SP&PA)	Dhaka, Bangladesh	22-24 June, 2014
6.	Sh. Rakesh Kumar, Director (HERM)	Japan	30 June, 2014 to 7 July, 2014
7.	Sh. K. K. Neema, DD (HERM)	South Korea	22 August, 2014
8.	Sh. Jayaswal, AD	South Korea	31 July,2014 to 8 August, 2014
9.	Sh. J.S. Bawa, Director (HP&I)	Lahore, Pakistan	23-27 August, 2014
10	i. Sh. S. D. Dubey,Chief Engineer ii. Sh. Sanjay Srivastava, Director (HE&TD) iii. Shri. Neeraj Kumar, Director (TCD) iv. Shri. V. S. R. Raju, DD(HE&TD) v. Sh. Deepak Sharma, DD(HE&TD) vi. Sh. R. K. Jayaswal, AD (HE&TD)	Bhutan	26-28 August, 2014
13.	Sh. K. N. Garg, Member (Hydro)	Islamabad, Pakistan	11-12 September, 2014
14.	Sh. Hemant Kumar Pandey, Director (GM)	USA	10-18 November, 2014
15.	i. Sh. Sanjay Srivastava, Director (HE&TD) ii. Sh. Pankaj Kumar Gupta, DD (HE&TD)	Bhutan	22-25 September, 2014
16.	Sh. Kumar Saurabh, DD (IRP)	Paris, France	6-10 October, 2014
17.	i. Sh. Bhai Lal, Director (TRM) ii. Sh. Chandra Shekhar, Director (C&E) iii. Smt. Rishika Sharan, Director (OPM)	Japan	23 September, 2014 to 1 October, 2014
18.	i. Sh. Rakesh Kumar, Director	South Korea	27 October, 2014 to 9

	(HERM) ii. Sh. Raj Kumar Jayaswal, AD (HERM)		November, 2014
19.	i. Sh. Sujit Kumar Mondal, Director (TP&I) ii. Sh. Baboo Singh Verma, DD (TPM) iii. Sh. Anis Ahmed, DD (TRM) iv. Sh. S. Suryanarayama, DD (TRM)	Japan	28 October,2014 to 6 November, 2014
20.	i. Sh. Phool Chandra, Director (TPM) ii. Sh. L. D. Papney, Director (TE&TD) iii. Sh. Shivcharan Chirolia, DD (TRM)	Japan	2 – 10 December, 2014
21.	Smt. Anjuli Chandra, Chief Engineer (PSPM)	Germany	22 – 29 November, 2014
22.	i. Sh. P. C. Jiloha, Director (HPA) ii. Sh. Ajitesh Kumar, DD (HPA)	Bhutan	9 – 11 February, 2015
23.	i. Sh. P. C. Kureel, Director (HPM) ii. Sh. A. K. Thakur, Director (HPM)	Bhutan	13– 17 January, 2015
24.	Sh. Ravinder Gupta, Director (SP&PA)	Nepal	28 January, 2015 to 1 February, 2015
25.	Smt. P. Esther Kamala, Dy. Director (IRP)	Paris, France	22 September, 2014 to 19 December, 2014
26.	Sh. Awdhesh Kumar, Director (SP&PA)	Bangladesh	16 March, 2015
27.	Sh. Goutam Roy, Director (SETD)	Shi Lanka	25-26 Feburary, 2015
28.	Sh. R. Saha, Director (SP&PA)	Nepal	23 -27 November, 2014
29.	Sh. Major Singh, Member	Bangladesh	17-18 December, 2014
30.	Sh. Sanjay Srivastava, Director	China	12-17 January, 2015