



भारत सरकार
GOVERNMENT OF INDIA

केंद्रीय विद्युत प्राधिकरण
Central Electricity Authority

ISO 9001 : 2008

ताप विद्युत नवीनीकरण एवं आधुनिकीकरण प्रभाग
Thermal Renovation & Modernisation Division



R&M Works at Unit-5 (210 MW) of Bandel TPS

Quarterly Review Report Renovation & Modernisation of Thermal Power Stations

January-March, 2015, 4th Quarter of 2014-15

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Foreword

Electric energy is the driving wheel of modern industries. Accordingly, Govt. of India has taken a number of initiatives which, inter-alia; include new multi modal electricity generation capacity addition. To further supplement the above efforts in the area of efficient power generation, Renovation & Modernization (R&M) and Life Extension (LE) of the existing old power stations have been recognized as cost-effective options.

The Thermal Renovation & Modernization (TRM) Division is entrusted with the responsibility of monitoring the progress of R&M/LE activities costing more than ₹ 100 Crore in thermal power generating units in the country. Based on the information received from various utilities, the Quarterly Review Report (QRR) is prepared and circulated to senior officers in MOP and CEA to keep them abreast with the latest status of the physical and financial progress of R&M/LE works at various thermal units. The report is also available on CEA website <http://cea.nic.in>

R&M works in 9 units ((1060.5MW) and LE works in 15 units (1680.76MW) have been completed during 12th Plan upto 31.03.2015. The units where LE works have been carried out are Bathida unit #3 & unit #4, Parichha unit #2 (110 MW), Muzaffarpur TPS Unit #1& 2 (2 x 110 MW), Kawas GT- 1A, 1B, 2A & 2B (4x106 MW), Gandhar GT-2 & GT-3(2x131 MW) and Auraiya GT-1, 2, 3& 4 (4x111.19). In order to carry out R&M/LE works, Barauni TPS Unit # 6&7 (2x110 MW) , Harduaganj TPS Unit # 7 (110MW), Obra TPS Unit # 7,10 & 11 (1x100+2x200 MW), Patratu TPS Unit 9 (110 MW) and Bandel Unit 5 (210 MW) were under shut down for implementation R&M/ LE works.

Under Energy Efficiency Programme funded by KfW Bank/Germany, the DPRs for R&M/LE works for Unit-3 (210 MW) Nasik TPS of Mahagenco, Unit – 1, 2 & 3 (3x210 MW) Kolaghat TPS of WBPDC and Unit – 1, 2 & 3 (3x210MW) Bokaro ‘B’ TPS of DVC have been prepared. Acceptance of DPRs by CEA has been communicated to the concerned utilities.

Under Indo-German Energy Forum (IGEF), Phase-II activity funded by KfW Bank/Germany, contract was signed between CEA and M/s Lahmeyer (India) on 16.03.2012 to provide the consultancy services for ‘Development of Tendering Procedures and Model Contract document for R&M of Fossil Fuel Based Power Plants in India’. M/s Lahmeyer has submitted the Draft Model documents and final Phase II Activity Report. The draft Model Documents and Phase-II Activity Report have been accepted by CEA. The final documents submitted by Lahmeyer. Comments on final documents has been received from TETD Divn. and sent to M/s. Lahmeyer to incorporate in the documents.

The World Bank is providing technical assistance of US \$ 1.1 million to CEA as a part of GEF grant under “Coal Fired Generation Rehabilitation Project –India” for addressing barriers to Energy Efficiency R&M in India. M/s. ABPS Infrastructure Advisory Services Ltd., is working as ISC (Implementation Support Consultant) to assist CEA for implementing the project under title “Technical Assistance to CEA”. Other consultants namely M/s Mercados, M/s WAPCOS and M/s KPMG have been procured under the project to carry out the technical studies. Study reports on “Reduction of Barriers to R&M Interventions in TPS in India” and that of “Developing Markets for Implementation of R&M schemes in TPS in India” submitted by M/s Mercados have been sent to various stakeholders. Final report on Assessment of Institutional Capacity in CEA and Customer Expectations Survey have been submitted by KPMG. Draft Capacity Strengthening Plan of CEA has also been submitted by KPMG. The in-house Management training to CEA officers has been imparted by KPMG in January & February, 2015.

Under 2nd Phase MoU for the CEA-JCoal Co-operation Energy Efficiency R&M related studies have been carried out on Unchaar TPS and Badarpur TPS of NTPC and Unit-4 of Durgapur TPS of DVC. Three workshops have also been organized. Under Clean Coal Technology (CCT) Transfer Programme four study tours have been organized and total 52 Officers in four batches have undertaken the study tours. A draft MoU has been received from JCOAL in January, 2015 and sent to power Utilities for comments.

In the end, I would like to express my sincere thanks to the Utilities and other stake-holders for extending their support and warm co-operation in preparation of the quarterly report through providing the necessary and relevant information regarding the physical and financial progress of their R&M projects. Further, I would be highly grateful for providing the suggestions/feedback for further improvement in the Quarterly Review Report.

Highlights

1. LE/ R&M Achievements during 11th Plan (2007 – 12)

Sl. No.	Particulars	State sector		Central sector		Total (State + Central)	
		No. of units	Capacity (MW)	No. of units	Capacity (MW)	No. of units	Capacity (MW)
A)	LE works						
1.	Completed during 11 th Plan	10	1024	3	267	13	1291
B)	R&M works						
2.	Completed during 11 th Plan	20	4485	39	10370	59	14855
	TOTAL	30	5509	42	10637	72	16146

2. LE / R&M Programme during 12th Plan (2012 - 17)

Particulars	LE/R&M works identified during 12 th Plan No. of units & capacity (MW)		Total (State Sector + Central Sector)
	State Sector	Central Sector	
LE	38 (6820)	33 (5246)	70 (12066)
R&M	20 (4150)	45 (13151)	65 (17301)
Total	58 (10970)	77 (18397)	135 (29367)

3. Achievements of R&M and LE Projects during 12th Plan (upto 31.03.2015)

Year	LE No of unit (MW)		R & M No of unit (MW)		Total (state + central) No of units (MW)		Total LE and R&M No. of unit (MW)
	State	Central	State	Central	State	Central	
2012-2013	1 (110)	1 (106)	5 (850)	1 (110)	6 (960)	2 (216)	8 (1176)
2013-2014	2 (220)	3 (343)	0 (0)	3 (100.5)	2 (220)	6 (443.5)	8 (663.5)
2014-2015	2(220)	6(681.76)	0(0)	0(0)	2(220)	6(681.76)	8(901.76)
Total No of unit (MW)	5 (550)	10 (1130.76)	5 (850)	4 (210.5)	10 (1400)	14 (1341.26)	24 (2741.26)

4. External Co-operation for R&M/LE of TPS

The status of activities under external co-operation for R&M/LE of TPS is furnished below :-

(A) KfW funded Programme

(i) Preparation of DPRs for EE R&M works

The DPR's for the following units have been prepared by M/s STEAG Energy Services GmbH Germany.

- a) Unit-3 (210 MW) of Nasik TPS , MAHGENCO
- b) Unit 1,2 & 3 (3x210 MW) of Kolaghat TPS, WBPDCCL
- c) Unit 1, 2 & 3 (3x210 MW) of Bokaro 'B' TPS, DVC

All the DPRs have been accepted by CEA. The acceptance has been communicated to the concerned utilities and DPRs have been sent to KfW Bank and concerned utilities.

(ii) Phase-II activity: Development of Tender Procedure and Model Contracts for R&M of Fossil Fuel Based Power Plants in India.

M/s Lahmeyer International (India) Ltd. has been appointed as a Consultant for 'Development of Tendering Procedures and Model Contract document for R&M of Fossil Fuel Based Power Plants in India'. The final Model Documents and Phase-II Activity Report have submitted by M/s. Lahmeyer. A presentation was made by M/s. Lahmeyer in CEA Authority Meeting on 26.12.2014. The Draft Model Documents and Phase-II Activity Report have been accepted by CEA. Comments of TETD on final documents has been sent to M/s. Lahmeyer to incorporate in the documents.

(B) 'Technical Assistance to CEA' funded by World Bank under the umbrella project "Coal Fired Generation Rehabilitation Project-India"

The consultants for carrying out the following studies under the above project have been appointed.

- a) **Study on Reduction of Barriers to R&M Interventions in TPS in India:**
Mercados Energy Market India was appointed as a consultant on 02.04.2012. M/s Mercados have submitted the study report on reduction of barriers to R&M intervention in TPS in India on 29th November, 2013. The Study Report has been accepted by CEA in January, 2014 and sent to various stakeholders in the power sector.
- b) **Study on Developing Markets for Implementation of R&M in TPS in India:**
Mercados Energy Market India was appointed as a consultant on 14.05.2012. M/s Mercados have submitted the study report on Developing Markets for Implementation of R&M in TPS in India on 13th November, 2013. The Study Report has been accepted by CEA in January, 2014 and sent to various stakeholders in the power sector.
- c) **Review of Institutional Capacity and Capacity Strengthening Interventions in CEA:**
KPMG have been appointed to carry out the study on 16-07-2012. KPMG have already submitted report on Customer Expectation Survey which has been accepted by CEA. The draft report on Capacity Strengthening Plan of CEA was submitted on 16.05.2014 which is under finalisation. The Technical and Management Training Programmes for CEA officers have been conducted by KPMG from 13.10.2014 to 06.02.2015. A meeting with Chairperson (CEA) and Members has been held in CEA on 27.03.2015 on the Capacity Strengthening Plan.
- d) **Review of Experience from Pilot R&M Interventions in TPS in India:**
WAPCOS Ltd. have 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 reports from WAPCOS on O&M Practices as well as on the review of Implementation Experience have been received in March, 2015 which are under examination at CEA.

(C) Japan-India Co-operation for Pre-Primary Study of Efficiency and Environmental Improvement of Coal Fired Stations.

The 2nd Phase MOU between CEA and JCOAL has been signed on 11.06.2012 for carrying out detail diagnostic study for energy efficiency oriented R&M activities in three nos. of units at various thermal power plant viz Durgapur TPS of DVC, Unchahar & Badarpur TPS on NTPC. A kick-off meeting at the above stations were held in October 2012 and JCOAL team visited these stations during December, 2012 for studies. Final report for energy efficiency oriented R&M activities was submitted on 15th April, 2013. Under the MoU, three workshops have also been organized. Under Clean Coal Technology (CCT) Transfer Programme four study tours have been organized and total 52 Officers in four batches have undertaken the study tours. A draft MoU has been received from JCOAL in January, 2015 and sent to power Utilities for comments.

Quarterly Review Report on Renovation, Modernisation and Life Extension of Thermal Power Plants

1.0 Introduction

At the time of independence, the total installed capacity in the power sector was 1362 MW of which steam power plants contributed 756 MW. The installed generation capacity has since grown manifold. The total installed capacity as on 31.03.2015 was 267637.36 MW of which thermal power plants contributed 188897.79 MW (69.7 %). The contribution of Coal, Gas and Diesel based thermal power plants of total installed capacity is 60.3 %, 8.9 % and 0.5 % respectively.

Renovation & Modernization (R&M) is seen as a cost-effective option for additional generation from the existing thermal power stations and better asset management due to its low cost and short gestation period. Besides generation improvement and improvement in availability, other benefits achieved from R&M / LE include life extension, improved safety, reliability and environmental conditions.

Many of the thermal power plants are not operating to their full potential and large numbers of thermal units including 200/210 MW units are old and outlived their normal economical design life. The perspective R&M programme aims at extending their operating life further and also upgrade their performance through Energy Efficiency R&M (EE R&M).

2.0 Objective of R&M Programme

The main objective of Renovation & Modernisation (R&M) of thermal generating units is to make the operating units well equipped with modified / augmented with latest technology equipment and systems with a view to improve their performance in terms of output, reliability, availability, reduction in maintenance requirements, ease of maintenance and minimizing inefficiencies.

3.0 Objective of Life Extension Programme

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.

4.0 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 and the programme continued during the two Annual Plans 1990-91 & 1991-92. The momentum for undertaking R&M works continued during the 8th & 9th Plan. However, the same could, not be sustained during 10th Plan. The Plan wise details are given below:-

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

*Tentative figure.

** Equivalent MW has been worked out assuming PLF prevailing during that period.

5.0 National Perspective Plan

Based on the discussions held with Ministry of Power, various utilities, PFC and BHEL, CEA have prepared a “National Perspective Plan for Renovation & Modernisation and Life Extension and Uprating (LE&U) of thermal power stations upto the year 2016-17”. This document was released by Honorable Minister of Power on 14.12.2009 on the occasion of Energy Conservation Day. The revised guidelines for R&M of coal based thermal power station were also included in the document.

6.0 R&M/ LE Programme during 12th Plan (2012 - 17)

The R&M/ LE Programme to be implemented during the 12th Plan is given below. The status of implementation of the R&M/LE works at various units is furnished at Annexure.

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

6.1 Achievements of LE and R&M Programme 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 (7 units, 790.57 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	2 nd Quarter, 2014-15
		Kawas	GT-2A	106	August, 2014
		Auraiya	GT-2	111.19	3 rd Quarter, 2014-15
		Auraiya	GT-3	111.19	3 rd Quarter2014-15
		Auraiya	GT-4	111.19	4 th Quarter, 2014-15
R&M	State	NIL	-	-	-
	Central	NIL	-	-	-
Sub Total		No. of units	8	901.76	-
Total		No. of units	24	2741.26	-

6.2 Status of R&M activities under Backward Region Grant Fund (BRGF) Scheme.

R&M-cum-LE works at Barauni and Muzaffarpur thermal power stations under BRGF of Planning Commission.

The Barauni TPS units 6&7 (2x110 MW) were commissioned during May, 1983 and March, 1985 respectively whereas Muzaffarpur TPS unit-1&2 (2x110 MW) were commissioned during March, 1985 and March, 1986 respectively.

Under RSVY now BRGF, Planning Commission in a meeting held on 10.05.2005 identified Barauni TPS, units 6&7 and Muzaffarpur TPS units 1&2 for carrying out Life Extension (LE) works. Subsequently, a five party agreement between the Government of India, Govt. of Bihar, BSEB, BHEL and NTPC was signed on 29.5.2006.

Planning Commission vide their letter dated 16.11.2009 approved the revised cost estimates of Rs. 1053 crores including consultancy charges under the Special Plan for Bihar for LE works of Barauni TPS (Unit 6&7) and Muzaffarpur TPS (Unit 1&2) as per details given below:

Barauni TPS Unit (6&7)	:	Rs. 554.16 crores
Muzaffarpur TPS (6&7)	:	Rs. 471.80 Croes
Consultancy charges to NTPC (for Barauni TPS only)	:	Rs. 27.04 Crores
TOTAL	:	Rs. 1053.00 Crores

Details of Funds released by Planning Commission upto 31st March 2015 :

i)	BHEL	:	Rs. 725.07 crores
ii)	KBUNL	:	Rs. 180.00 crores
iii)	NTPC	:	Rs. 20.11 crores
	Total	:	Rs. 925.18 crores

Commencement of work and Completion Schedule :

Name of TPS	Unit No.	Zero Date	Contractual Completion Date	Anticipated Completion Date	Present physical status as on 30.09.2014
Barauni TPS	7	15.11.2009	15.11.20011	July, 2015	Boiler drainable hydro test done. Turbine boxedup. All platen super heater joints completed. 97 % material supplied. Water box inside painting of condenser completed. Erection of CW vertical pumps completed .ESP erection to be completed. As per BHEL and BSPGCL synchronization is expected by July,2015.
	6	15.11. 2009	15.06.2012	October, 2015	77 % material has been supplied at site. Dismantling work of Boiler, ESP, mills, turbine and generator completed. Turbine, HP, LP & LP rotor sent to Hyderabad for repair. Boiler water wall erection completed, Casting of (32/32) piles at ID fan A completed. Generator Stator to be repaired. Anticipated completion is October, 2015
Muzaffarpur TPS	1	15.04. 2010	15.04.2012	Completed	Unit synchronised on 05.07.2013.
	2	15.04. 2010	15.08.2012	Completed	Unit synchronised on 30.09.2014.

7.0 Future vision for Life Extension / R&M Programme

The coal based thermal plants are the backbone of Indian power sector. Presently, 200/210/250/500 MW thermal units contribute about 55% of total generation in the country. They are performing better in terms of their plant load factor and availability. However, a large number of such 200/210 MW units have or are near completion of their normal operating life and need modernization and life extension. There exists a potential for enhancing their rated capacity by 4-8% and efficiency by 8 to 10% in various 200/210 MW LMZ machines. Few such units have been taken up as pilot projects under Energy Efficient R&M (EE R&M) programme through funding support from World Bank and KfW, Germany. The approach to R&M and Life Extension & Up-rating (LE&U) has shifted primarily from “generation maximization” to “generation optimization ” with efficiency improvement and possible up-rating.

8.0 External Co-operation for R&M of TPS

To demonstrate the Energy Efficiency R&M programme in thermal power stations in India, a few pilot R&M projects have been financed by some external funding agencies such as KfW Development Bank-Germany, World Bank, European Union (EU) etc. The soft loans are provided by these external agencies for energy efficiency R&M programmes. Also, KfW & World Bank have provided some grant for technical assistance for preparation of Feasibility Reports/DPRs at selected thermal units and carrying out some R&M related studies. METI (Ministry of Economy, Trade and Industry), Japan and MOP, Govt. of India have agreed to extend their cooperation in sharing of technical expertise as well as in actual implementation of mutually agreed techno-economical R&M solutions. In addition to this, KfW has also financed the project “Development of Tender Procedure and Model Contract for the R&M of Fossil Fuel Based Thermal Power Plants in India”. The details of the above programme are as follows:-

8.1 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 WBPDC. 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 WBPDC.
- 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 present status of the programme is as under:-

i) Nasik TPS

The final DPR for Unit-3 (210 MW) was prepared by the consultant, and same has been accepted by MAHAGENCO and MERC. The tender documents for procurement of executing agency for BTG package have been prepared. KfW has given their No-Objection for the commercial and technical specification for all the packages on 17.08.2012. The project would be taken up after the R&M works of Unit-4 of Nasik TPS.

ii) Kolaghat TPS

The DPRs for Unit-1,2& 3 (3x210 MW) of Kolaghat TPS,WBPDC were prepared by the consultant and the same have been accepted by WBPDC in September 2011.

iii) Bokaro ‘B’ TPS

The revised DPRs for Unit-1, 2& 3 (3x210 MW) of Bokaro ‘B’ TPS were prepared by the consultant. The acceptance of DVC has been received in Nov, 2013.

All the above DPRs have been accepted by CEA and acceptance has been communicated to concerned utilities and KfW Bank, Germany.

8.2 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.

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 as under.

Phase-I Activity

The objective of Phase-I Activity is an assessment of tendering procedures currently being followed by public utilities in India and a review of documents used for standard R&M projects as well as the documents which have already been developed for projects financed particularly by World Bank. The Phase-I Activity was carried out by the consultant-M/s. Evonik Energy Services India appointed and funded by GIZ. M/s. Evonik Energy Services India submitted the report on Phase-I activity in September 2009.

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.

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 have been submitted by M/s. Lahmeyer. A presentation was made by TRM division of CEA to CEA Authority on 26.12.2014. The Draft Model Documents and Draft Phase-II Activity Report have been accepted by CEA. The final Documents and final Phase-II Activity Report submitted by M/s. Lahmeyer on 29.09.2014 are under examination in CEA.

Sl No.	Description of the Report	Present Status
1	Model Feasibility Report	The final documents have been submitted on 29.09.2014, which are
2	Model Detail Project Report (DPR)	
3	Model RLA/CA Report of R&M projects Model	
4	Model Energy Audit Report of R&M projects	
5	Model Tender Documents for selection of R&M Contractor	
6	Model Tender Documents for selection of R&M	

	Consultant	under examination in CEA.
7	Model Tender Documents for selection of ISC	
8	Phase –II Activity Report	

8.3 “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 WBPDC, Koradi TPS Unit-6(210 MW) of Mahagenco and Panipat TPS Unit-3&4 (2x110 MW) of HPGCL. The World Bank has earmarked US \$ 180 million of IBRD loan and US \$ 37.9 million of GEF grants for the Component-1.

Component-2. Technical Assistance to CEA and Utilities

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

8.3.1 World Bank funded Energy Efficiency Pilot R&M Projects

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

The total estimated cost of R&M project is around US \$ 107.38 Million comprising of loan of around US \$ 59, GEF Grant of around US \$ 12.45 million. In addition to above, Technical Assistance of US \$ 1.3 million under GEF Grant has been provided for consultancy. Further, Bandel TPS will also get additional US\$ 22.21 million comprising of IBRD loan of US\$ 18.01 million and GEF grant of US\$ 4.2 million due to restructuring of funds as a result of cancellation of R&M works in Panipat TPS.

Status of Physical Progress of Pilot R&M Project

Detailed Project Report (DPR) for the R&M project consisting major packages, viz., Main Plant Package (BTG -Boiler, Turbine & Generator), Coal Handling System Package (CHP), Ash Handling Package & Water System Package (AHP & Water), Electrical System Package was prepared by the M/s Evonik Energy Services (Project Design Consultant). Original completion date for R&M works was May, 2014 which was then revised to Sept, 2014. But due to delays the unit is now expected to be synchronized by June, 2015.

- i) **BTG Package:** WBPDC issued Letter of Award (LOA) to M/s Doosan Heavy Industries & Construction Co. Ltd and their associate on January 10, 2012 at a total Package cost of Euro 37,584,887 and Rs 29, 09,782,849 only and the contract was signed on 29th February,

2012. Unit Shut Down has been taken on November 17, 2013 at 0.00 hr and Zero Date of R&M works of BTG package was declared as 2nd Dec, 2013.

- ii) **TG Area:** Final alignment & positioning of all Turbines are completed. Box up of LP and IP Turbines are completed. Generator & Turbine coupling is remaining. Generator rotor insertion is completed on 10/2/2015. Generator final air gap measurement is completed on 11/3/15.
- iii) **Boiler Area:** Erection work of Boiler & its Auxiliaries is complete. Boiler Hydro test carried out successfully at main boiler (water & SH at 200 kg/cm²) and Reheater (43 kg/cm²) in presence of IBR authority on 02.12.2014. Acid cleaning, passivation of Boiler is complete. Preliminary Light up of Boiler was done on 26.12.2014.
- vi) **ESP Area:** For ESP Pass B, erection & inspection is completed. For ESP Pass A, erection work is completed.
- v) **Coal Handling Package (CHP):** Installations of modified Classifiers in Coal Mills are completed.
- vi) **Ash Handling Package (AHP):** Piping work below ESP Hopper is nearing completion at AHP area.
- vii) **Electrical Package:** The Contract was awarded to ALSTOM T&D India Ltd. on October 19, 2012 and the final Contract was signed on December 28, 2012. Supply to UPS and 24 volts Battery Charger from Emergency MCC A & MCC B was completed on 19.11.2014. Trial run of FD Fan A coupled with Inlet & Outlet dampers were done on 16.12.2014. Transformer side of 6.6 KVA transformer was charged on 21.12.2014.
- viii) **Civil Works:** ESP & AHP Control room and CHP Control room civil work is nearing completion, Unit Control Room (UCR) civil work almost completed.

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

The total estimated cost of the project is around US\$ 110.5 Million and the fund allocation for the Koradi TPS is loan of around US \$ 59 million (Loan)), grant of around US \$ 12.45 million. In addition to above Technical Assistance of US \$ 3.3 million under GEF Grant has been provided for 10 consultancy studies.

M/s Evonik Energy Services (Project design consultant) prepared the DPR. The same was approved and accepted by Mahagenco Board on June 26, 2009. In-principle approval of MERC for capital expenditure was received on May 24, 2010. The R&M project consists of four major packages BTG, Electrical, CHP & other BOP.

Status of Physical Progress

Drawing approval, Vendor approvals, Quality Plan approvals, BBU approvals activities are in process. (75% Work completed till date). Actual execution of project is scheduled from 25th Aug2015 to 21st April 2016.

- i) **BTG Package:** Mahagenco issued that the Letter of Award to M/s BHEL Ltd. on May 31, 2013. The contract has been signed on December 18, 2013.
M/s BHEL has opened the site office on January 22, 2014 and has submitted PERT to MSPGCL on January 24, 2014, which is under scrutiny. Further, the expected date of completion of the contract has been extended up-to Aug, 2016.
- ii) **Electrical Package:** Mahagenco issued the Letter of Award to M/s ABB Ltd on March 19, 2012 and the final contract was signed on May 25, 2012. The expected date of completion of the contract has been extended upto Aug, 2016. However the contract is likely to be cancelled as M/s ABB is demanding 65% increase in contract which is not feasible according to MSPGCL. Consequently fresh bidding is likely to be undertaken.
- iii) **BOP Package:** Mahagenco issued the Letter of Award to M/s Tecpro Systems Ltd. on July 16, 2012. The final contract was signed on August 10, 2012. The expected date of completion of the contract has been extended upto Aug, 2016. However due to non execution of the works the contract with Tecpro has been terminated. MSPGCL will refloat the tender for this package and fresh bids will be invited.
- vi) **CHP Package:** Mahagenco submitted that due to closing of units 4 x 120 MW, cancellation of CHP package has been approved by Mahagenco's Board. Accordingly, this package has been dropped out from R&M works.

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

The unit 3 &4 of Panipat TPS was initially identified for R&M under World Bank Programme and a DPR was prepared. A loan of 448.36 Crores was assigned under R&M of Unit 3&4, PTPS, Panipat under the pilot project of Gol. As per the final TAR of consultant R&M cost was 561.27 Crores which was not found financial viable due to high sensitivity of returns to Station Heat Rate and exceeding of estimated cost against available funds. Accordingly, Deptt. Of Economic Affairs, Gol was intimated to foreclose world bank loan for R&M of unit 3& 4 PTPS. Therefore, HPGCL has requested World Bank to consider foreclosure of the Loan agreement.

8.3.2 **Technical Assistance to CEA**

World Bank has financed the project "India: Coal Fired Generation Rehabilitation Project." aimed at demonstrating Energy Efficiency Rehabilitation & Modernization (EE R&M) of coal fired generation units through rehabilitation of 640 MW of capacity across three states- West Bengal, Haryana and Maharashtra. The project is funded through IBRD loan of USD 180 million and GEF grants of USD 45.4 million out of which USD 7.5 million have been earmarked for Technical Assistance/Studies.

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 Implementation of Capacity Strengthening Interventions at CEA	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 report on Capacity Strengthening Plan of CEA was submitted on 16.05.2014 which is under finalisation. The Technical Training Programme for CEA officers was conducted by KPMG from 13.10.2014 to 17.11.2014. The Management Training Programme for CEA officers was conducted from 19.01.2015 to 06.02.2015. The Capacity Strengthening Plan 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 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 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 from WAPCOS on O&M Practices and Implementation Experience was received in March, 2015 which is under examination at CEA.

Brief Financial Status: The total original estimated cost for the Project is USD 1.1 million (Rs. 484 Lac). The cumulative expenditure incurred till date is Rs. 198.14 Lac (including taxes).

8.4 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. Accordingly studies were taken up in Ukai and Wanakbori TPS (GSECL), Ramagundem STPS (NTPC) and Vijaywada TPS (APGENCO) for pre – primary studies. After Pre-Primary Studies, JCOAL finalized 3 units viz., Vijaywada TPS Unit-1 (210MW) of APGENCO, Wanakbori TPS Unit-1 (200 MW) of GSECL and Kahelgaon STPS Unit-2 (210 MW) of NTPC for full-fledged diagnosis. The final report had been submitted in December 2012.

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.

Three workshops have been held on 27.11.2012, 07.02.2014 & 13.11.2014. on “Project on Efficiency and Environmental Improvement of Coal Fired Power Stations – Towards sustainable, stable and low carbon supply of electricity.

Meeting of Electricity Working Group of the Japan India Energy Dialogue was held on 23.8.2013 which was co-ordinated by TRM Division CEA.

Under Clean Coal Technology (CCT) Transfer Programme four study tours have been organized and 52 Officers from MoP, CEA and Power utilities have undertaken the study tours. A draft MoU has been received from JCOAL in January, 2015 and sent to power Utilities for comments.

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Details of Units where LE/R&M works to be taken up during the 12th Plan

STATE SECTOR (LE Works)

S.N.	State	Name of Station	Unit No.	Year of Comm.	Cap. (MW)	Present status
1	U.P.	Obra	10	1977	200	BHEL is executing agency. Contract signed on 02.02.2007. Unit # 10 & 11 taken under S/d since 22.03.2012. The revised scope of supply and services for turbine for name plate rating i.e. 200 MW in place of 216 MW has been finalised at revised total contract price for unit 10 to 13 at 1145.76 Crore. The revised zero date is 25.3.2013. The completion of first unit in 24 months and subsequent units shall be completed with a time interval of 3 month each. Unit wise date of commissioning given by M/s. BHEL is as below: U#10-----August, 2015 U#11-----October, 2015 U#12-----December., 2016 U#13-----November., 2016 Total Revised cost of scheme: 1702.14 Crs. Total expenditure: 1287.26 Cr. Capping Head Expenditure 135 Cr. U#10 : unit under s/d since 22.03.2012. Boiler: 75% work completed. Turbine: 48% work completed. Generator: 20% work completed. ESP: Pass A - 85% work completed. Pass B - 97% work completed. Compressor building House: 60% work completed. AHP: 12% work completed. Switch yard: 40% work completed. WTP: 94% work completed. CHP: 50% work completed. U#11: unit under s/d since 13.07.2011. Boiler: 75% work completed. Turbine: 48% work completed. Generator: 20% work completed. ESP: Pass A - 85% work completed. Pass B - 97% work completed. Compressor building House: 60% work completed. AHP: 12% work completed. Switch yard: 40% work completed. WTP: 94% work completed. CHP: 50% work completed.
2	U.P.	Obra	11	1977	200	
3	U.P.	Obra	12	1981	200	
4	U.P.	Obra	13	1982	200	

5	U.P.	Harduaganj	7	1978	110	Unit was given under shut down on 05-03-2011 - Total cost of scheme is Rs. 392.00 crores. - Zero date of the scheme is 12.06.2009; unit was scheduled to synchronize on 25 months from zero date i.e Nov 2011. Work delayed due to delay in supply of material and slow work by BHEL. -Unit is schedule for lit-up on date 20.04.2015. and synchronization date is 01.05.2015. - - Total expenditure incurred till 31.03.2015 is Rs. 298.23.
6	U.P.	Parichha	1	1984	110	Order Placed on BHEL for LE of unit 2 and BOP of both units 1&2. - Total cost of the project for Unit 1 is Rs. 93.89 cr. Total expenditure incurred for Unit 1 is Rs 8.28 cr. Upto 31.03.2015 - Order placement for supply items of Unit 1 under progress and order likely to be placed within 2 to 3 month expected to complete. LE work in unit-1 has been dropped.
7	U.P.	Parichha	2	1985	110	Unit synchronised on 5.5.2013.
8	Punjab	Bathinda	3	1978	110	The unit was taken under s/d on 14.01.2010, and synchronised on 05.8.2012.
9	Punjab	Bathinda	4	1979	110	BHEL is the executing agency. Unit was taken under s/d on 05.11.2012. Bathinda TPS, unit-4 has been synchronized on oil on 23.06.2014. The unit synchronised on coal in of July,2014.
10	Haryana	Panipat	3	1985	110	The unit 3&4 were identified for World Bank funded project. As per decision taken by HPGCL no life extension works are to be taken up. However, to sustain the unit, Need based Renewal & Replacement (R&R) at an estimated cost of 54.18 crores is under consideration for administrative approval.
11	Haryana	Panipat	4	1985	110	
12	Maharashtra	Nashik	3	1979	210	The unit-3 was to be taken up under KfW funded project. All studies completed and DPR has been accepted . The project would be processed further after the R&M works at unit-4 of Nasik TPS.
13	Maharashtra	Nashik	4	1980	210	To be decided inline with Nashik U#3. Consultant for DPR preparation has been appointed. All studies Completed, Draft Feasibility Study Report received & forwarded to KfW for submitting it to the German government in order to get the approval for the funds earmarked for Unit 3 now for Unit-4.
14	Maharashtra	Koradi	5	1978	200	The LE works at unit-5 would be started after completion of LE works at unit-6 of Koradi TPS. EER&M feasibility study is not carried out.
15	Maharashtra	Koradi	6	1982	210	The unit is being taken up by WB funded project. DPR approved by MSPGCL/MERC. i) BTG Package: Mahagenco issued the Letter of Award to M/s BHEL Ltd. on May 31, 2013. The ii)contract has been signed on

						December 18, 2013. M/s BHEL has opened the site office on January 22, 2014 and has submitted PERT to MSPGCL on January 24, 2014, which is under scrutiny. Further, the expected date of completion of the contract has been extended up-to Aug, 2016. ii) Electrical Package: Mahagenco issued the Letter of Award to M/s ABB Ltd on March 19, 2012 and the final contract was signed on May 25, 2012. The expected date of completion of the contract has been extended upto Aug, 2016. However the contract is likely to be cancelled as M/s ABB is demanding 65% increase in contract which is not feasible according to MSPGCL. Consequently fresh bidding is likely to be undertaken. iii) BOP Package: Mahagenco issued the Letter of Award to M/s Tecpro Systems Ltd. on July 16, 2012. The final contract was signed on August 10, 2012. The expected date of completion of the contract has been extended upto Aug, 2016. However due to non execution of the works the contract with Tecpro has been terminated. MSPGCL will refloat the tender for this package and fresh bids will be invited. iv) CHP Package: Mahagenco submitted that due to closing of units 4 x 120 MW, cancellation of CHP package has been approved by Mahagenco's Board. Accordingly, this package has been dropped out from R&M works.
16	Maharashtra	Bhusawal	2	1979	210	All studies Completed. Draft Feasibility Study Report received from M/s. Energo Engg.Ltd. It is under review at Power Station/ SPGCL Level. EADD & RSA report has been submitted and is approved by MSPGCL & World Bank.
17	Maharashtra	Bhusawal	3	1982	210	RLA/ Feasibility study for EER&M is not carried out.
18	Maharashtra	Chandrapur	1	1983	210	All studies Completed. Draft Feasibility Study Report received from M/s. Energo Engg.Ltd. It is under review at Power Station/ SPGCL Level. EADD & RSA report has been submitted and is approved by MSPGCL & World Bank.
19	Maharashtra	Chandrapur	2	1984	210	
20	Maharashtra	Parli	3	1980	210	All studies Completed. Draft Feasibility Study Report received from M/s. Energo Engg.Ltd. It is under review at Power Station/ SPGCL Level. EADD & RSA report has been submitted and is approved by MSPGCL & World Bank.

21	Chhattisgarh	Korba (West)	1	1983	210	RLA studies done by M/s Evonik. Scope of work of Boiler, Turbine, Electrical Instrumentation, Civil and BOP is being finalised. After that DPR shall be updated and shall be submitted to Board of Directors of CSPGCL and State Regulatory Commission of approval.
22	Chhattisgarh	Korba (West)	2	1984	210	
23	M.P.	Satpura	6	1979	200	Some need based R&M works are being carried out as per DPR submitted by M/s NTPC Consultancy Wing to minimize losses of these unit and also to run these unit on sustainable parameters. For these scheme a loan of Rs. 300 Crs. has been taken from M/s HUDCO and 36 Crs. as equity from GoMP for all the 4 units (6-9)of STPS. Due to ageing and obsolete technology and operational problem being faced in Unit No. 6&7, its performance is deteriorating very fast. Therefore these units may be considered to be retired in the span of 3 to 4 years accordingly a proposal for the same has been submitted to BoD of MPPGCL for retirement of unit nos. 6 to 9 of Satpura TPS Sarni. The BoD of MPPGCL is to be apprised after getting comments of CEA in this regard.
24	M.P.	Satpura	7	1979	210	
25	Tamilnadu	Tuticorin	1	1979	210	<u>Unit-1:</u> <u>Boiler:</u> • Steam Drum Acid cleaning completed. • Replacement of unhealthy pipe supports work completed. • Minor repair works in Pent house area completed. <u>ESP:</u> • Replacement of complete ESP internals for the first two rows & overhauling of remaining 12 fields and replacement of 20 Nos Controllers have been completed. <u>TG:</u> • Minor repair works such as attending cracks in HP, IP & LP casings completed. • All Diaphragms in HP, IP & LP had been renewed and the work has been completed. <u>BoP:</u> • Modification of APH sealing system by Double Sealing work completed. <u>Electrical & Instrumentation:</u> • Existing 3 nos single phase GT have been replaced with new one. <u>Unit-2:</u> <u>Boiler:</u> • Replacement of Reheater Rear pendent Assembly work completed. • Replacement of Z panel tubes work completed. • Boiler structure strengthening work completed. • Checking of Hangers/Supports under
26	Tamilnadu	Tuticorin	2	1980	210	

						Hot/Cold condition completed. <u>TG:</u> • Minor defects noticed in turbine casing, Lines & Steam pipe liner have been attended. • All 11 nos Diaphragms in HP turbine, 8 nos Diaphragms in IP turbine & 2 nos Diaphragms in LP turbine had been renewed. • All the three rotors have been replaced with the reconditioned spare rotors. <u>BoP:</u> • Refurbishment of complete Bottom Ash system work completed. • Modernisation of DCS work completed. • Replacement of existing static AVR by DVR work completed.
27	A.P.	Dr. N.T. TPS (Vijaywada)	1	1979	210	APGENCO have taken up 78 activities under RLA/LE programme for Dr NTTPS units-1&2. Most of the activities have been completed except few items for unit-2 viz. replacement of existing analog control system with distributed Digital Control System(DCS), replacement of existing vent condenser tube bundle with new one, replacement of water wall tubes in the 1 st pass, replacement of boiler insulation, replacement of damaged expansion joints, replacement of ID fan outlet damper with multi flap type gas tight isolator, replacement of existing Generator Transformer which will be taken up during the Capital Overhaul of unit-2.
28	A.P.	Dr. N.T. TPS (Vijaywada)	2	1980	210	APGENCO have postponed the Capital Overhaul (COH) programme of Unit-2 to Aug'2015/ Sept'2015 due to non-availability of the unit for COH due to load demand. APGENCO have completed Annual overhaul (AOH) of unit-1 in Sept'14.
29	Karnataka	Raichur	1	1985	210	KPCL informed that they are taking up need based R&M/LE works for Raichur TPS Units-1&2. As such for Unit-1 BTG RLA study and for Unit-2 comprehensive BTG RLA study have been completed by BHEL. R&M/LE works taken up KPCL: <u>Unit-1:</u> <u>Boiler:</u> • RH Coils works completed. <u>TG:</u> • HPT module replaced by rectified module. • Replacement of IPT rotor and last two stages blades of LPT have been completed. <u>Other works:</u> • Boiler C&I works completed.
30	Karnataka	Raichur	2	1986	210	

						• Station C&I works completed • Order placed for latest version of Electronic controllers retrofitted for ESP to reduce stack emission. • R&M completed for CW pumps. • 2nos PA fans motors replaced. • LT switchgears & Control panels retrofitting done. • Two sets of Vacuum pumps with motors have been commissioned. • Instrumentation & service air compressor, replacement of air circuit breakers & protection panels in 6.6 kV switchgear have been completed. Unit-2: Boiler: • RH Coils work completed. TG: • HPT module replaced by rectified module. • Electronic controllers rectified with latest version in ESP for reducing stack emission. • Generator Transformer replaced with new CGL make. • GT retrofitted with new emulsifier system. Other works: • Boiler C&I works completed. • Station C&I works completed.
31	Bihar	Barauni	6	1983	110	77 % material has been supplied at site. Dismantling work of Boiler, ESP, mills, turbine and generator completed. Turbine, HP, LP & LP rotor sent to Hyderabad for repair. Boiler water wall erection completed, Casting of (32/32) piles at ID fan A completed. Generator Stator to be repaired. Anticipated completion October, 2015
32	Bihar	Barauni	7	1985	110	Boiler drainable hydro test carried out. Turbine boxed-up. All platen super heater joints completed. 97 % material supplied. Water box inside painting of condenser completed. Erection of CW vertical pumps completed .ESP erection to be completed. As per BHEL and BSPGCL synchronization is expected by July, 2015.
33	Bihar	Muzaffarpur	1	1985	110	Unit was under s/d since 6.10.2003. Unit Synchronised on 5th July, 2013.
34	Bihar	Muzaffarpur	2	1986	110	S/d taken on 29.03.2012. Unit Synchronised on 30th September, 2014.
35	W.Bengal	Kolaghat	1	1990	210	DPR has been prepared and accepted.
36	W.Bengal	Kolaghat	2	1985	210	DPR has been prepared and accepted.
37	W.Bengal	Kolaghat	3	1984	210	DPR has been prepared and accepted.
38	W.Bengal	Bandel	5	1982	210	World Bank funded project. Contract for BTG pkg. awarded to M/s DHIC and signed on 29.2.2012. Unit taken on shut down for LE works on 24.11.2013. • Final alignment & positioning of all

						Turbines are completed. Box up of LP and IP Turbines are completed. Generator & Turbine coupling is remaining. Erection work of Boiler & its Auxiliaries is complete. Boiler Hydro test carried out on 02.12.2014. Preliminary Light up of Boiler was done on 26.12.2014. The unit is expected to be synchronized by June, 2015.
Sub Total State Sector (LE)			38		6820	

STATE SECTOR (R&M Programme)

S.N.	State	Name of Station	Unit No.	Year of Comm.	Cap. (MW)	Present status
1	U.P.	Obra	7	1974	100	- Work is being executed by M/S BHEL. - Total cost of scheme is Rs. 178 cr. - Total expenditure incurred till date is 90.91 crs. - Zero date of the scheme is 04.12.2009. Unit was scheduled on 23 months from zero date i.e Nov 2011. Dismanting work is completed. Erection is under process. - Unit 8 was deleted on 12-03-2013 and its material amounting Rs 28.35 cr being utilized at other project. Rs 13 cr material already utilized at other project. - Unit 7 expenditure is 53.45 cr. - Unit 7 is expected to be synchronized by July, 2015. - Revised scheme for Unit 7 is received on 30-12-2014 is being reviewed and same will be put before Technical Committee and BOD for approval shortly. Obra project has informed some additional work pertaining to BMD-I, EMD-I, Turbine, Civil and C&I works is necessary to include in scheme.
2	U.P.	Anpara	1	1986	210	Estimated cost of R&M is Rs. 68.96 Cr. Financed by PFC and UPRVUNL. The scheme completed in March 2013.
3	U.P.	Anpara	2	1986	210	
4	U.P.	Anpara	3	1988	210	
5	U.P.	Anpara'B	4	1993	500	R&M works is being executed by M/s BHEL & M/s MITSUI, Japan. — Total cost of scheme is Rs. 691.97 cr. Total Rs. 298.95 crs drawn so far.
6	U.P.	Anpara'B	5	1994	500	Boiler: Nearly 60% work completed. TG: Nearly 65% work completed. Electrical & Instrumentation: Nearly 45% work completed. BOP: Nearly 60% work completed. - Work is scheduled to be completed by Sept., 2016.
7	Punjab	Ropar	1	1984	210	Utility decided to do need based R&M at estimated expenditure of Rs. 55 Cr.
8	Punjab	Ropar	2	1985	210	
9	Punjab	Ropar	5	1992	210	
10	Punjab	Ropar	6	2001	210	Utility decided to do need based R&M at estimated expenditure of Rs. 65 Cr.
11	Haryana	Panipat	5	1993	210	RLA studies done. Scope of work finalised.
12	Gujarat	Wanakbori	1	1982	210	Utility decided to do need based R&M. Works for upgrading of C&I system has already been awarded. Unit -1 C&I up gradation supply and work is pending. Likely to be completed by March, 2016.
13	Gujarat	Wanakbori	2	1983	210	Utility decided to do need based R&M. Works for upgrading of C&I system has already been awarded. Unit -2 C&I up gradation started on 11.06.2012 & work is carried out during AOH. C&I of unit 1-6 carried out from Oct., 2012 to June, 2013.

14	Gujarat	Ukai	3	1979	200	a) Utility decided to do need based R&M. b) Order for Rehabilitation/ Retrofitting of ESP placed on NASL on 28.07.2014.
15	Gujarat	Ukai	4	1979	200	GSECL is preparing for R&M implementation of LMZ design turbine by high energy efficient turbines. c) Order for Retrofitting of HP, IP & LP placed on NASL on 29.04.2015 and the works will be carried out after completion of unit-3.
16	Rajasthan	Kota	1	1983	110	RRVUNL has identified 17 nos. schemes at an estimated cost of Rs. 356.13 Cr. The present status of these R&M works is as below-
17	Rajasthan	Kota	2	1983	110	- 08 nos. of works fully Completed - 06 nos. of works order placed to the execution agency and work under progress - 01 nos. works of Vacuum Pump E- tender notice is issued & are under tendering process for price bid opening. - 01 no. of work of compressor replacement- Notice inviting E- tendering under process. - 01 no. E- tender for VFD cancelled and re-tendering to be initiated.
18	Jharkhand	Patratu	9	1984	110	Unit was under s/d from 5.8.2006 due to fire incident. – HP , JP boxed –up and LP ready box-up and waiting for gerenerator rotor and bearings of exciter and generator. - 1 not nos BFP & 2 nos CEP is ready. - Boller is ready for hydro test waiting clearance for power supply & TG on Barring gear. - Mechanical & Electrical erection work of ESP is completed, comg U/P. - Panels are erected and ready for charging. - HT & LT panel- Erection completed, commissioning is pending due to unavailability of power supply. - HT mills & CEP & Balance LT motor- Overhauling completed, erection pending due to erection clearance by JSEB. - GT,UAT,ST overhauling- Overhauling and testing completed. Station TRX charging U/P. - HT cable laying- Completed. - LT/ Control cable laying-85% completed. - GRP & UCP Erection and testing completed. - Ash Handling System Supply 99% completed . Civil and E&C is U/P.
19	Jharkhand	Patratu	10	1986	110	Unit was under s/d from 5.8.2006 due to fire incident. Synchronised on 24.05.2012.
20	W. Bengal	DPL	6	1985	110	Synchronised on 07. 05. 2012 after R&M.
Sub Total State Sector (R&M)			20		4150	
Total State sector (LE+R&M)			58		10970	

**CENTRAL SECTOR (LE Programme)
Coal Based**

Sl. No.	Utility	Name of Station	Unit No.	Year of Comm.	Cap. (MW)	Present Status
1	DVC	Bokaro 'B'	1	1986	210	Considered under KfW funded project. DPRs were prepared by M/s Evonik. DPRs have been accepted by DVC.
2	DVC	Bokaro 'B'	2	1990	210	
3	DVC	Bokaro 'B'	3	1993	210	
4	DVC	Durgapur	4	1982	210	Study completed and Reports submitted by JCOAL to DVC.
5	NTPC	Badarpur	4	1978	210	a. Main plant package (Stage II, 2x210MW)- Revised package list approved. FSC completed for TG and DDCMIS packages. b. NIT issued for TG pkg. and Tech.. Bid opened for DDCMIS packages. STP packages under process of tendering
6	NTPC	Badarpur	5	1981	210	
7	NTPC	Singrauli STPS	1	1986	200	a) CW system scheme under execution. b) Following four pkgs. Have been awarded and Details Engineering is in progress i) GT, UAT & ST awarded on 20.02.2014. ii) C&I of Main Plant and BOP- Awarded on 10.06.2014. iii) Switchyard automation awarded on 27.06.2014. iv) RLA of critical piping- Awarded on 16.02.15
8	NTPC	Singrauli STPS	2	1987	200	
9	NTPC	Singrauli STPS	3	1983	200	
10	NTPC	Singrauli STPS	4	1983	200	
11	NTPC	Singrauli STPS	5	1984	200	
12	NTPC	Korba STPS	1	1983	200	Out of revised 47 nos. packages PO/LOI placed for 30 nos. Balance 17 nos. are under various stages of tendering. 04 No. PO/LOI placed in Q4
13	NTPC	Korba STPS	2	1983	200	
14	NTPC	Korba STPS	3	1984	200	
15	NTPC	Ramagundam STPS	1	1984	200	Total Packages
16	NTPC	Ramagundam STPS	2	1984	200	CC
17	NTPC	Ramagundam STPS	3	1984	200	Regional
Sub total C. S (LE Coal based)			17		3460	Site
						25 (38PRs)
						0
						32

Central Sector LE (Gas based)

S.N.	State	Name of Station	Unit No	Year of Comm.	Cap. (MW)	Present status
1		Dadri GT	GT-1	1991	131	Price bid opened on 12.02.2015. Pkg. is under process of award.
2		Dadri GT	GT-2	1991	131	
3		Dadri GT	GT-3	1991	131	
4		Dadri GT	GT-4	1991	131	
5		Auraiya GT	GT-1	1989	111.19	LE works of GT 1& ST 1 (Only C&I in ST) completed in Q1. LE works of GT 2 started in Sep'14 and completed in Q3. LE works of GT3 & ST2 (Only C&I in ST) completed in Q3. LE work of GT4 completed in Q4
6		Auraiya GT	GT-2	1989	111.19	
7		Auraiya GT	GT-3	1989	111.19	
8		Auraiya GT	GT-4	1989	111.19	
9		Kawas GT	GT-1A	1992	106	LE works of GT # 1A, GT#1B, ST#1C (only C & I in ST) and of GT # 2B completed till FY 13-14. LE works of GT # 2 A & ST # 2C (only C&I in ST) completed in Q2 (FY: 14-15)
10		Kawas GT	GT-1B	1992	106	
11		Kawas GT	GT-2A	1992	106	
12		Kawas GT	GT-2B	1992	106	
13		Gandhar GT	GT-1	1994	131	LE work of GT # 3 completed in FY13-14. LE works of GT# 1 completed in Q2. GT # 2 is in progress since 25.02 .2015.
14		Gandhar GT	GT-2	1994	131	
15		Gandhar GT	GT-3	1994	131	
Sub Total (LE Gas based)			15		1785.8	

R&M Programme Central Sector

Sl. No.	Utility	Name of Station	Unit No.	Year of Comm.	Cap. (MW)	Present status
1	NTPC	Singrauli STPS	6	1986	500	. 13 out of 17 (after merger, before merger 23) Schemes are awarded. 06 schemes merged with DDCMIS package which has been awarded on 25.06.12. Balance Schemes under tendering process.
2	NTPC	Singrauli STPS	7	1987	500	
3	NTPC	Korba STPS	4	1987	500	8 out of 9 Schemes are awarded. Balance one scheme is under tendering process.
4	NTPC	Korba STPS	5	1988	500	
5	NTPC	Korba STPS	6	1988	500	
6	NTPC	Ramagundam STPS	4	1988	500	All schemes awarded.
7	NTPC	Ramagundam STPS	5	1989	500	
8	NTPC	Ramagundam STPS	6	1989	500	
9	NTPC	Farakka Stage-I	4	1992	500	All schemes awarded
10	NTPC	Farakka Stage-II	5	1994	500	
11	NTPC	Tanda	2	1989	110	Synchronised on 15.09 2012
12	NTPC	Unchahar	1	1988	210	13 out of 14 Schemes are awarded. Balance 01 Scheme is under tendering process.
13	NTPC	Unchahar	2	1989	210	
14	NTPC	Unchahar	3	1999	210	
15	NTPC	Unchahar	4	1999	210	
16	NTPC	Vindhyachal	1	1987	210	15 out of 20 Schemes are awarded. Balance Schemes are under tendering process.
17	NTPC	Vindhyachal	2	1988	210	
18	NTPC	Vindhyachal	3	1989	210	
19	NTPC	Vindhyachal	4	1989	210	
20	NTPC	Vindhyachal	5	1990	210	
21	NTPC	Vindhyachal	6	1991	210	
22	NTPC	Vindhyachal	7	1999	500	
23	NTPC	Vindhyachal	8	2000	500	
24	NTPC	Simhadri	1	2002	500	All schemes awarded.
25	NTPC	Simhadri	2	2002	500	
26	NTPC	Talchar STPS	1	1995	500	18 out of 19 Schemes are awarded 01 PO placed in Q.4 One Scheme being re-awarded.
27	NTPC	Talchar STPS	2	1996	500	
28	NTPC	Dadri	1	1991	210	18 out of 19 Schemes are awarded. Balance one Scheme is under tendering process.
29	NTPC	Dadri	2	1992	210	
30	NTPC	Dadri	3	1993	210	
31	NTPC	Dadri	4	1994	210	
32	NTPC	Rihand STPS Ph III	1	1988	500	All schemes awarded
33	NTPC	Rihand STPS Ph III	2	1989	500	
34	NTPC	Kahalgaon	1	1992	210	8 Schemes out of 10 are awarded .01 PO placed in Q.4 Balance Schemes under tendering process.
35	NTPC	Kahalgaon	2	1994	210	
36	NTPC	Kahalgaon	3	1995	210	
37	NTPC	Kahalgaon	4	1996	210	
Sub total C.S. (R&M)			37		12890	
Sub total C.S. Coal Based (LE + R&M)			54		16350	

CENTRAL SECTOR R&M (Gas Based)

CENTRAL SECTOR R&M (Gas Based)						The scope of work finalised. The proposals are in advance stage of approval for ₹ 102.25 Cr., completion is expected by March, 2015. GTG-3,4& 5 completed on 31.03.2014 as per schedule. Gas Engines for Gas boosters Station for all GTGs.: All major equipment like 3 Gas Engines and associated auxiliaries have already been delivered at site. Erection works will be started on receipt of Air Cooled Heat Exchanger (Radiaters) at site. As per schedule, the subject R&M works will be completed by August., 2015. The estimated cost is Rs. 62 Cr. (b) Techno Commercial offer from the OEM, M / s Bentley Nevada already received and under process. GT – 2 Physical Progress : For item (a) Order for supply of M/s MHI make MEGAC V , Diasys Netmation System for Up gradation and of old controller MACTUS 620 sequencer and MEAGAC III analog Governor already placed wiyh yhe OEM, M/s MHI, Japan on 26.03.15 Expected date of execution by Oct/Nov, 2015. For item (b): Techno Commercial offer from the OEM already recived and under process. For item (c): One spare GT rotor already procured and recived at site. Order for spares and Technical advisory service already placed with OEM. Expected date execution of works are Oct/Nov,2015. GT – 6: Physical Progress: Planned for the FY 2017-18 (Offer from the OEM, M/s BHEL yet to receive) ST-1: Procurement Process for upgradation of Programmer/ EPROM writer in progress and for others offers yet to obtain from the OEM. ST-2: offers yet to be obtain from the OEM in due course of time.
1	NEEPCO	Kathalguri CCGT	GT-1	1995	33.50	
2		Kathalguri CCGT	GT-2	1995	33.50	
3		Kathalguri CCGT	GT-3	1995	33.50	
4		Kathalguri CCGT	GT-4	1995	33.50	
5		Kathalguri CCGT	GT-5	1996	33.50	
6		Kathalguri CCGT	GT-6	1996	33.50	
7		Kathalguri CCGT	ST-1	1998	30.00	
8	Kathalguri CCGT	ST-2	1998	30.00		
Sub Total Gas (R&M)			8		261	
Sub total Gas in C.S. (LE + R& M)			23		2046.8	
Total R&M + LE			135		29367	

Northern Region

(Unit wise Broad Status of LE works)

Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 31.03.2015)

A	Project Details	Description	Broad Scope of Works
			Supply started
1	Name of Power Station	OBRA	i) Boiler : 100%Replacement damaged ceiling structure, Refractory and thermal insulation- Replacement 180 nos. HP and LP valves, 200 nos. route valves, replacement/repair of fuel oil system valves, replacement of 8 nos. spray control valves and piping for Desuper heater in super heater and reheater, replacement of 4 nos. control valves, 2 nos. drum safety valves, 2 nos. reheater safety valves, all other safety valves superheater will be serviced. 100%Replacement of valves in PRDS system. .Skin Casing, Hangers & supports of Main steam pipe. 100% alignment of water walls. Correction of Buck stays, guide channels, vertical channel, corner attachment from 8M to 48M, replacement of all peep holes & man holes. 100% Replacement of Furnace walls, Down Flow pipes, Riser Tubes, Economizer. O/H of Boiler Drum & Internals, 100% Replacement of Super Heaters, Attemperator, Re-Heater, Sling Rods and supports, Spray Water piping, O/H of PRDS system. Replacement of baskets, seals and sector plates gear boxes of Air and Flue gas system. O/H & repair of damaged parts of FD fans. 100% Replacement of ID fans with 10% enhanced capacity. Cold air ducts, Hot air ducts, Flue gas ducts, Compensators in cold air ducts, Compensators in cold air ducts, Sampling coolers, Dampers and gates, Scanner air fan, Suit blowing system, wall blowers. O/H & Replacement of damaged parts of P.A. Fans., 100% Replacement of Raw coal scrapper feeder (2 Nos.), Wind box & Coal burners of coal burners & Coal dust pipes and bends with ceramic lining of Coal Milling and firing system. Complete O/H of Oil firing system: Replacement of Control & Instrumentation: Boiler Controls, FSSS (BMS), Secondary Air Damper Control Panels (SADC), Soot Blower Control Panels (SBC Panels), Cables between consoles and DCS cabinets, Interconnecting cables between DCS cabinets, Auto Control Loops for Boiler (maxDNA based).
2	Unit No. & capacity	U-10 (200 MW)	
3	Make		
	i) Boiler	BHEL	
	ii) TG.	BHEL	
4	Date of commissioning	01/1979	
B. RLA Study / Consultancy			
Description		Boiler TG.	ii) TG :
Estimated Cost (Rs in Cr)		1 crore for RLA of the unit has been covered along with LE works	HP Turbine:: Fully bladed new rotor,- New blading set complete stages, Complete machined new shaft, Inner casing including guide blades sealing arrangement, safety governor, fasteners, Complete new modernized outer casing IP Turbine: Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Inner casing, sealing arrangement, fasteners, Complete set of diaphragms LP Turbine: Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Complete set of diaphragms. Inner casing, materials for modernisation of LP outer casing, coupling, sealing arrangement, fasteners, Rotor and diaphragms lifting device for units (9 to 13). Jacking oil pump (1 set). Electro hydraulic governing system (1 set). Auxiliary equipment: Ejectors, Condenser tubes 100% replacement Generator(1 set). : Stator winding bars and winding, Supply of end packets and shunts for stator and assembly, Generator C&I, Gas analyzer cabinet, Generator instrumentation cabinet, Conductivity instruments, Moisture measurement system, Group cables for generator C&I area for connection between junction boxes and cabinets, between cabinets, between C&I cabinets and UCB. TG Auxiliaries: Gland steam condenser: Supply of cupronickel tube bundles considered Supply of: Main oil cooler, L.P. heater 1-4 of cupronickel tube bundles, Deaerator, Pipes and supports cooling water line of MOC, Valves upto 65 mm, insulation and cladding, Spares for D/C, A/C oil pumps, S.O.P, Condensate Extraction water pumps, Bearing gear spares, Boiler Feed Pump: BFP cartridge (1 No), Hydraulic coupling R16K (2 Nos), RC valve (3 Nos), Connecting coupling strainer & warm up valve, (3 Nos), Drip pump valves & fittings (2 sets), Warm up valve & safety valves for BFP (1set). O/H of Booster Pump & H.P.Heters: Turbine supervisory instrument including field sensors, cables, electronics. Auto Control Loops for Turbo-Generator & Re-generative Area
Executing Agency		BHEL	
Expected/Actual start of work			
Completion date			
Actual Expenditure (Rs in Cr)			

C	R&M/ LE Works		iii) BOP : Capping Amount of Rs. 60 crores has been of BOP for all the five units of 5x200MW. Station C&I Equipment, SWAS system, Flue gas analysers, Instrumentation cables for auto loop & measurement loops, Max DNA based DCS panels for measurement loops, Back-up control desk (for auto control & measurement loops) for critical operation for safe shut down of unit), Alarm system excepting for generator area., Sequence of event recording SOE (integral part of DCS), Interlocks & protection for fans & BFP (maxDNA based system), Static excitation system: Thruster cubicle, Digital regulation panel, Field breaker cubicle, Field flashing cubicle, Trunking cubicle, Mandatory spares. Major Scopes in additional works: i) DCS MAX DNA in unit 10, 11,. 12 & 13 for TG auto loop. ii) 06 nos. compressors supply, erection, testing & commissioning. iii) Other works.
1	Executing Agency Boiler/ TG.	BHEL	
2	No. of Activities Boiler/ TG.		
3	Zero date	20.6.2006	
4	Expected/Actual date of Start of work	25.03.2013 (A) After revised scope of work	
5	Expected/Actual date of Completion of work		
6	Estimated Cost (Rs in Cr)	Rs 1702.14 crores for units (9 to 13) 5x200 MW units.	
7	Actual Expenditure incurred (Rs in Cr)	Rs 1136.81 Cr (On unit 9-13)	

Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 31.03.2015)

A	Project Details	Description	Broad Scope of Works
			Work under progress
1	Name of Power Station	OBRA	i) Boiler : 100%Replacement damaged ceiling structure, Refractory and thermal insulation- Replacement 180 nos. HP and LP valves, 200 nos. route valves, replacement/repair of fuel oil system valves, replacement of 8 nos. spray control valves and piping for Desuper heater in super heater and reheater, replacement of 4 nos. control valves, 2 nos. drum safety valves, 2 nos. reheater safety valves, all other safety valves superheater will be serviced. 100%Replacement of valves in PRDS system. .Skin Casing, Hangers & supports of Main steam pipe. 100% alignment of water walls. Correction of Buck stays, guide channels, vertical channel, corner attachment from 8M to 48M, replacement of all peep holes & man holes. 100% Replacement of Furnace walls, Down Flow pipes, Riser Tubes, Economizer. O/H of Boiler Drum & Internals, 100% Replacement of Super Heaters, Attemperator, Re-Heater, Sling Rods and supports, Spray Water piping, O/H of PRDS system. Replacement of baskets, seals and sector plates gear boxes of Air and Flue gas system. O/H & repair of damaged parts of FD fans. 100% Replacement of ID fans with 10% enhanced capacity. Cold air ducts, Hot air ducts, Flue gas ducts, Compensators in cold air ducts, Compensators in cold air ducts, Sampling coolers, Dampers and gates, Scanner air fan, Suit blowing system, wall blowers. O/H & Replacement of damaged parts of P.A. Fans., 100% Replacement of Raw coal scrapper feeder (2 Nos.), Wind box & Coal burners of coal burners & Coal dust pipes and bends with ceramic lining of Coal Milling and firing system. Complete O/H of Oil firing system: Replacement of Control & Instrumentation: Boiler Controls, FSSS (BMS), Secondary Air Damper Control Panels (SADC), Soot Blower Control Panels (SBC Panels), Cables between consoles and DCS cabinets, Interconnecting cables between DCS cabinets, Auto Control Loops for Boiler (maxDNA based).
2	Unit No. & capacity	U-11 (200 MW)	
3	Make		
	i) Boiler	BHEL	
	ii) TG.	BHEL	
4	Date of commissioning	01/1979	
B. RLA Study / Consultancy			
Description		Boiler TG.	ii) TG :
Estimated Cost (Rs in Cr)	1 crore for RLA of the unit has been covered along LE		TG HP Turbine:: Fully bladed new rotor,- New blading set complete stages, Complete machined new shaft, Inner casing including guide blades sealing arrangement, safety governor, fasteners, Complete new modernized outer casing IP Turbine: Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Inner casing, sealing arrangement, fasteners, Complete set of diaphragms LP Turbine: Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Complete set of diaphragms. Inner casing, materials for modernisation of LP outer casing, coupling, sealing arrangement, fasteners, Rotor and diaphragms lifting device for units (9 to 13). Jacking oil pump (1 set). Electro hydraulic governing system (1 set). Auxiliary equipment: Ejectors, Condenser tubes 100% replacement Generator(1 set). : Stator winding bars and winding, Supply of end packets and shunts for stator and assembly, Generator C&I, Gas analyzer cabinet, Generator instrumentation cabinet, Conductivity instruments, Moisture measurement system, Group cables for generator C&I area for connection between junction boxes and cabinets, between cabinets, between C&I cabinets and UCB. TG Auxiliaries: Gland steam condenser: Supply of cupronickel tube bundles considered Supply of: Main oil cooler, L.P. heater 1-4 of cupronickel tube bundles, Deaerator, Pipes and supports cooling water line of MOC, Valves upto 65 mm, insulation and cladding, Spares for D/C, A/C oil pumps, S.O.P, Condensate Extraction water pumps, Bearing gear spares, Boiler Feed Pump: BFP cartridge (1 No), Hydraulic coupling R16K (2 Nos), RC valve (3 Nos), Connecting coupling strainer & warm up valve, (3 Nos), Drip pump valves & fittings (2 sets), Warm up valve & safety valves for BFP (1set). O/H of Booster Pump & H.P.Heters: Turbine supervisory instrument including field sensors, cables, electronics. Auto Control Loops for Turbo-Generator & Re-generative Area
Executing Agency	BHEL	BHEL	
Expected/ Actual start of work			
Completion date			
Actual Expenditure (Rs in Cr)			

C	R&M/ LE Works		iii) BOP : Capping Amount of Rs. 60 crores has been of BOP for all the five units of 200MW. Station C&I Equipment, SWAS system, Flue gas analysers, Instrumentation cables for auto loop & measurement loops, Max DNA based DCS panels for measurement loops, Back-up control desk (for auto control & measurement loops) for critical operation for safe shut down of unit), Alarm system excepting for generator area., Sequence of event recording SOE (integral part of DCS), Interlocks & protection for fans & BFP (maxDNA based system), Static excitation system: Thyristor cubicle, Digital regulation panel, Field breaker cubicle, Field flashing cubicle, Trunking cubicle, Mandatory spares.
1	Executing Agency Boiler/ TG.	BHEL	
2	No. of Activities Boiler/ TG.		
3	Zero date	20.6.2006	
4	Date of Start of work	13.07.2011	
5	Expected/Actual date of Completion of work	November, 2013 (E)	
6	Estimated Cost (Rs in Cr)	Rs 1702.14 crores for units (9 to 13) 5x200 MW units.	
7	Actual Expenditure incurred (Rs in Cr)	Rs 1136.81 Cr (On unit 9-13)	

Dismantling of boiler completed.

Complete refurbishment of boiler & ESP and Overhauling of turbine (at existing capacity)

Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 31.03.2015)

A	Project Details	Description	Broad Scope of Works
			Supply started
1	Name of Power Station	OBRA	i) Boiler : 100%Replacement damaged ceiling structure, Refractory and thermal insulation- Replacement 180 nos. HP and LP valves, 200 nos. route valves, replacement/repair of fuel oil system valves, replacement of 8 nos. spray control valves and piping for Desuper heater in super heater and reheater, replacement of 4 nos. control valves, 2 nos. drum safety valves, 2 nos. reheater safety valves, all other safety valves superheater will be serviced. 100%Replacement of valves in PRDS system. .Skin Casing, Hangers & supports of Main steam pipe. 100% alignment of water walls. Correction of Buck stays, guide channels, vertical channel, corner attachment from 8M to 48M, replacement of all peep holes & man holes. 100% Replacement of Furnace walls, Down Flow pipes, Riser Tubes, O/H of Boiler Drum & Internals, Economizer., 100% Replacement of Super Heaters, Attemperator, Re-Heater, Sling Rods and supports, Spray Water piping, O/H of PRDS system. Replacement of baskets, seals and sector plates gear boxes of Air and Flue gas system. O/H & repair of damaged parts of FD fans. 100% Replacement of ID fans with 10% enhanced capacity. Cold air ducts, Hot air ducts, Flue gas ducts, Compensators in cold air ducts, Compensators in cold air ducts, Sampling coolers, Dampers and gates, Scanner air fan. O/H & Replacement of damaged parts of P.A. Fans., Suit blowing system, wall blowers. 100% Replacement of Raw coal scrapper feeder (2 Nos.), Wind box & Coal burners of coal burners & Coal dust pipes and bends with ceramic lining of Coal Milling and firing system. Complete O/H of Oil firing system: Replacement of Control & Instrumentation: Boiler Controls, FSSS (BMS), Secondary Air Damper Control Panels (SADC), Soot Blower Control Panels (SBC Panels), Cables between consoles and DCS cabinets, Interconnecting cables between DCS cabinets, Auto Control Loops for Boiler (max DNA based).
2	Unit No. & capacity	U-12 (200 MW)	
3	Make		
	i) Boiler	BHEL	
	ii) TG.	BHEL	
4	Date of commissioning	01/1979	
B. RLA Study / Consultancy			
	Description	Boiler TG.	ii) TG :
	Estimated Cost (Rs in Cr)	1 crore for RLA of the unit has been covered along with the uprating of units (200 MW to 216 MW)	HP Turbine:: Fully bladed new rotor,- New blading set complete stages, Complete machined new shaft, Inner casing including guide blades sealing arrangement, safety governor, fasteners, Complete new modernized outer casing IP Turbine: Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Inner casing, sealing arrangement, fasteners, Complete set of diaphragms LP Turbine: Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Complete set of diaphragms. Inner casing, materials for modernisation of LP outer casing, coupling, sealing arrangement, fasteners, Rotor and diaphragms lifting device for units (9 to 13). Jacking oil pump (1 set). Electro hydraulic governing system (1 set). Auxiliary equipment: Ejectors, Condenser tubes 100% replacement Generator(1 set). : Set of accumulator (1 set), Rewinding of generators rotors (1 No), Retaining ring (2 Nos), Generator C&I, Gas analyzer cabinet, Generator instrumentation cabinet, Conductivity instruments, Moisture measurement system, Group cables for generator C&I area for connection between junction boxes and cabinets, between cabinets, between C&I cabinets and UCB. TG Auxiliaries: Gland steam condenser: Supply of cupronickel tube bundles considered Supply of: Main oil cooler, L.P. heater 1-4 of cupronickel tube bundles, Deaerator, Pipes and supports cooling water line of MOC, Valves upto 65 mm, insulation and cladding, Spares for D/C, A/C oil pumps, S.O.P, Condensate Extraction water pumps, Bearing gear spares, Boiler Feed Pump: BFP cartridge (1 No), Hydraulic coupling R16K (2 Nos), RC valve (3 Nos), Connecting coupling strainer & warm up valve, (3 Nos), Drip pump valves & fittings (2 sets), Warm up valve & safety valves for BFP (1set). O/H of Booster Pump & H.P.Heters: Turbine supervisory instrument including field sensors, cables, electronics. Auto Control Loops for Turbo-Generator & Re-generative Area
	Executing Agency	BHEL BHEL	
	Expected/ Actual start of work		
	Completion date		
	Actual Expenditure (Rs in Cr)		

C	R&M/ LE Works		iii) BOP : Capping Amount of Rs. 60 crores has been of BOP for all the five units of 5x200MW. Station C&I Equipment, SWAS system, Flue gas analysers, Instrumentation cables for auto loop & measurement loops, Max DNA based DCS panels for measurement loops, Back-up control desk (for auto control & measurement loops) for critical operation for safe shut down of unit), Alarm system excepting for generator area., Sequence of event recording SOE (integral part of DCS), Interlocks & protection for fans & BFP (maxDNA based system), Static excitation system: Thyristor cubicle, Digital regulation panel, Field breaker cubicle, Field flashing cubicle, Trunking cubicle, Mandatory spares.
1	Executing Agency Boiler/ TG.	BHEL	
2	No. of Activities Boiler/ TG.		
3	Zero date	20.6.2006	
4	Expected Date of Start of works	*	
5	Expected date of Completion of works		
6	Estimated Cost (Rs in Cr)	Rs 1702.14 crores for units (9 to 13) 5x200 MW units.	
7	Actual Expenditure incurred (Rs in Cr)	Rs 1136.81 Cr (On unit 9-13)	

***After completion of R&M / LE works of boiler and O/H of turbines of units 10 &11 at rated capacity. Thereafter Unit 12 & 13 will be taken up.**

Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 31.03.2015)

A	Project Details	Description	Broad Scope of Works
			Supply started
1	Name of Power Station	OBRA	i) Boiler : 100%Replacement damaged ceiling structure, Refractory and thermal insulation- Replacement 180 nos. HP and LP valves, 200 nos. route valves, replacement/repair of fuel oil system valves, replacement of 8 nos. spray control valves and piping for Desuper heater in super heater and reheater, replacement of 4 nos. control valves, 2 nos. drum safety valves, 2 nos. reheater safety valves, all other safety valves superheater will be serviced. 100%Replacement of valves in PRDS system. .Skin Casing, Hangers & supports of Main steam pipe. 100% alignment of water walls. Correction of Buck stays, guide channels, vertical channel, corner attachment from 8M to 48M, replacement of all peep holes & man holes. 100% Replacement of Furnace walls, Down Flow pipes, Riser Tubes, O/H of Boiler Drum & Internals, Economizer., 100% Replacement of Super Heaters, Attemperator, Re-Heater, Sling Rods and supports, Spray Water piping, O/H of PRDS system. Replacement of baskets, seals and sector plates gear boxes of Air and Flue gas system. O/H & repair of damaged parts of FD fans. 100% Replacement of ID fans with 10% enhanced capacity. Cold air ducts, Hot air ducts, Flue gas ducts, Compensators in cold air ducts, Compensators in cold air ducts, Sampling coolers, Dampers and gates, Scanner air fan. O/H & Replacement of damaged parts of P.A. Fans., Suit blowing system, wall blowers. 100% Replacement of Raw coal scrapper feeder (2 Nos.), Wind box & Coal burners of coal burners & Coal dust pipes and bends with ceramic lining of Coal Milling and firing system. Complete O/H of Oil firing system: Replacement of Control & Instrumentation: Boiler Controls, FSSS (BMS), Secondary Air Damper Control Panels (SADC), Soot Blower Control Panels (SBC Panels), Cables between consoles and DCS cabinets, Interconnecting cables between DCS cabinets, Auto Control Loops for Boiler (maxDNA based).
2	Unit No. & capacity	U-13 (200 MW) Upgradation to 216 MW	
3	Make		
	i) Boiler	BHEL	
	ii) TG.	BHEL	
4	Date of commissioning	01/1979	
B. RLA Study / Consultancy			
Description	Boiler	TG.	ii) TG :
Estimated Cost (Rs in Cr)	1 crore for RLA of the unit has been covered along with the uprating of units (200 MW to 216 MW)		HP Turbine:: Fully bladed new rotor,- New blading set complete stages, Complete machined new shaft, Inner casing including guide blades sealing arrangement, safety governor, fasteners, Complete new modernized outer casing IP Turbine: Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Inner casing, sealing arrangement, fasteners, Complete set of diaphragms LP Turbine: Fully bladed new rotor, New blading set complete stages, Complete machined new shaft, Complete set of diaphragms. Inner casing, materials for modernisation of LP outer casing, coupling, sealing arrangement, fasteners, Rotor and diaphragms lifting device for units (9 to 13).
Executing Agency	BHEL	BHEL	Jacking oil pump (1 set). Electro hydraulic governing system (1 set). Auxiliary equipment: Ejectors, Condenser tubes 100% replacement Generator(1 set). : Set of accumulator (1 set), Rewinding of generators rotors (1 No), Retaining ring (2 Nos), Generator C&I, Gas analyzer cabinet, Generator instrumentation cabinet, Conductivity instruments, Moisture measurement system, Group cables for generator C&I area for connection between junction boxes and cabinets, between cabinets, between C&I cabinets and UCB.
Expected/ Actual start of work			TG Auxiliaries: Gland steam condenser: Supply of cupronickel tube bundles considered Supply of: Main oil cooler, L.P. heater 1-4 of cupronickel tube bundles, Deaerator, Pipes and supports cooling water line of MOC, Valves upto 65 mm, insulation and cladding, Spares for D/C, A/C oil pumps, S.O.P, Condensate Extraction water pumps, Bearing gear spares,
Completion date			Boiler Feed Pump: BFP cartridge (1 No), Hydraulic coupling R16K (2 Nos), RC valve (3 Nos), Connecting coupling strainer & warm up valve, (3 Nos), Drip pump valves & fittings (2 sets), Warm up valve & safety valves for BFP (1set). O/H of Booster Pump & H.P.Heters:
Actual Expenditure (Rs in Cr)			Turbine supervisory instrument including field sensors, cables, electronics. Auto Control Loops for Turbo-Generator & Re-generative Area

C	R&M/ LE Works		iii) BOP : Capping Amount of Rs. 60 crores has been of BOP for all the five units of 5x200MW. Station C&I Equipment, SWAS system, Flue gas analysers, Instrumentation cables for auto loop & measurement loops, Max DNA based DCS panels for measurement loops, Back-up control desk (for auto control & measurement loops) for critical operation for safe shut down of unit), Alarm system excepting for generator area., Sequence of event recording SOE (integral part of DCS), Interlocks & protection for fans & BFP (maxDNA based system), Static excitation system: Thyristor cubicle, Digital regulation panel, Field breaker cubicle, Field flashing cubicle, Trunking cubicle, Mandatory spares.
1	Executing Agency Boiler/ TG.	BHEL	
2	No. of Activities Boiler/ TG.		
3	Zero date	20.6.2006	
4	Expected date of Start of work	*	
5	Expected date of Completion of work		
6	Estimated Cost (Rs in Cr)	Rs 1702.14 crores for units (9 to 13) 5x200 MW units.	
7	Actual Expenditure incurred (Rs in Cr)	Rs 1136.81 Cr (On unit 9-13)	

***After completion of R&M / LE works of boiler and O/H of turbines of units 10 &11 at rated capacity. Thereafter Unit 12 & 13 will be taken up.**

Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station

(As on 31.03.2015)

A Project Details		Description	Broad Scope of Works
			Order Placed and Supply of steel has started.
1	Name of Power Station	Harduaganj	i) Major scope of work under RLA/R&M: - Dismantling of old equipment. - RLA/CA Study of Boiler & Auxiliaries. Turbine & Auxiliaries, Hydrogen Seal Oil Control Panel & DC EOP Starter Panel. - Repair, Servicing, Replacement, erection, testing & commissioning. - Performance guarantee/handing over of Boiler, Turbine, Generator, Exciter C&I & BOP (CHP, AHP, WTP, CW Pump house. Switchgear & HT/LT motors.
2	Unit No. & capacity	U-7 (105/110 MW) Upgradation to 120MW	
3	Make		
	i) Boiler	BHEL	
	ii) TG.	BHEL	
4	Date of commissioning	03/1978	Functional Guarantees (i) Turbine Heat Rate = 2000 Kcal/Kwh (ii) TG Gross output = 120 MW (iii) Boiler Efficiency = 86%
B. RLA Study / Consultancy (NTPC has been appointed for consultancy works)			
	Description	Boiler	TG.
	Estimated Cost (Rs in Cr)		
	Executing Agency		
	Expected/Actual start of work		
	Completion date		
	Actual Expenditure (Rs in Cr)		
C	R&M/ LE Works		Scope of Work under R&M:
1	Executing Agency Boiler/ TG.	BHEL	i)Boiler : Replacement of all pressure parts, critical piping, fans, mills & other auxiliaries except ii)TG: Replacement of HP, IP &LP Rotors/diaphragms to enhance the capacity from 110 to 120 MW. Replacement of all CEPs, condenser tubes and 02 nos. BFP cartridges. iii)BOP: Various activities in CHP, Fuel oil system CW plant, Water Treatment Plant, Bottom Ash Hopper, Compressors etc. as per scope of work. iv) Electrical & Instrumentation: Retrofitting of HT/LT Breakers, Numerical Relays with Electromagnetic relays, Refurbishment of 04 Nos. HT Motors & 300 LT modules. Supply, installation & commissioning of 11 NOS. new HT motors. ETC of GRP of generator, CT, PT & 125 MVA. GT with new 150 MVA GT. Refurbishment of Generator stator & rotor and Hydrogen Seal Oil system. ETC of new Static Excitation System. Note: A capping amount of Rs 9.0 crores has been kept (will be paid on mutual agreement between BHEL and UPRVUNL on the bases of RLA studies will be carried out BHEL. Supply of materials/equipments has been started.
2	No. of Activities Boiler/ TG.		
3	Zero date		
4	Date of Start of work	March, 2011	
5	Expected Date of Completion	June,2013	
6	Estimated Cost (Rs in Cr)	Rs 392 Cr	
7	Actual Expenditure incurred (Rs in Cr)	Rs. 190.7 Cr.	

Present Status: Unit No. 7 is synchronized on date 03.04.2015 on LDO. Unit is scheduled for Lit- up on date 20.04.2015 for its synchronization for full load. The detail of pending activities are enclosed (Annexure-I) which are scheduled to be completed within 10 days before Lit-up of Unit for Synchronization for Full Load.

Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station

(As on 31.03.2015)

A	Project Details	Description	Broad Scope of Works
			Order Placed
1	Name of Power Station	Parichha	i) Boiler :
2	Unit No. & capacity	1 (110 MW)	
3	Make		
	i) Boiler	BHEL	
	ii) TG.	BHEL	
4	Date of commissioning	03/1984	
B.	RLA Study / Consultancy		(NTPC has been appointed for consultancy works)
	Description	Boiler	TG.
	Estimated Cost (Rs in Cr)		
	Executing Agency		
	Expected/ Actual start of work		
	Completion date		
	Actual Expenditure (Rs in Cr)		
C	R&M/ LE Works		iii) BOP :
1	Executing Agency Boiler/ TG.	BHEL	CHP: Replacement 2 Nos. Plough feeders, 13 Nos Vibrofeeders, 13 Nos rack & pinion gates, bunker sealing arrangement at bunker floor, belt scrapers -17 Nos, idlers, pulleys, 1 No. ring granulator, transfer chutes, surge hopper in crusher house with liners, gear box of conveyor drive, strengthening of structure for all conveyors, safety switches, pull card, belt sway, for all conveyors. AHP: Supply, fabrication and erection of bottom ash hoppers, structure for bottom ash hoppers along with refractory, 4-way solenoid valves, slurry pipe(150 M), L P water piping with fitting, air piping with fitting motorized valves. Replacement of 2 Nos ash slurry disposal pipe lines (1KM). Complete civil, electrical, and C&I work for CHP & AHP. DM Plant: Replacement of alkali storage tank, acid storage tank, acid transfer pump(1 No), alkali transfer pump(1No), anion pimps (4 Nos), degasser pumps (4 Nos), degasser blowers (2 Nos), acid & alkali dozing system, pipes. Compressed Air system: Replacement of 4 Nos instrument air compressors, 4 Nos air dryers with pipings. Fire protection system: New Fire alarm system, Foam pourer system for FO/LDO tanks. Electrical system: Replacement of 7 Nos ABCB breakers with SF-6 breaker, Replacement of 11 Nos Isolators, 6 Nos lightning arrestors ESP augmentation
2	No. of Activities Boiler/ TG.		
3	Zero date		
4	Expected Date of Start of work		
5	Expected Date of Completion of work		
6	Estimated Cost (Rs in Cr)	Rs 343.25 Crs for both unit 1&2	
7	Actual Expenditure incurred (Rs in Cr)		

Status of LE works of Uttar Pradesh (UPRVUNL) Thermal Power Station (As on 31.03.2015)

A	Project Details	Description	Broad Scope of Works
			Order Placed
1	Name of Power Station	Parichha	i) Boiler : Modification in Economiser system along with inlet/outlet headers & elements. Replacement of water wall panels including burner panel and radiant roof tubes. Superheater System: Replacement of Steam cooled wall tube (fully), LTSH coils and terminal tubes (fully), Radial Roof tubes 1 st pass & Roof panels of 2 nd pass (fully). Replacement of De-Superheater System, Re-heater coils & headers. Replacement of All conventional valves of size below 65mm. Replacement of all safety valves, escape pipes, drum safety valves, MS safety valves, CRH & HRH safety valves, Soot blower lines, Soot blower lines safety valve along with SB control station and thermal drain system to suit the new C&I system Replacement of volumetric feeders with Microprocessor based dual belt gravimetric feeders. Replacement of Seal air system for Pulverisers. Replacement of existing coal pipes to suit the XRP 623 mills. Replacement of existing wind boxes with HEA igniters. Piping, valves & fittings of HFO/ LDO system will be redesign and refurbished to suit the NEW C&I system. Replacement of existing Air cooled oil guns. Replacement of existing hot air and cold air ducting, fuel gas ducting. Replacement of existing Refractory and insulation wool. Replacement of soot blowers system along with soot blowers lines, control station, drain station and valves. Replacement of Hangers and supports, Critical piping for PRDS along with piping, valves, Auxiliary steam piping, Blow down piping. Replacement of Air preheater (2 Nos. per boiler) Refurbishment of existing FD fan & , P A fan (2 Nos each per boiler). Replacement of ID fans (3 Nos per boiler) along with hydraulic coupling. Replacement of seal Air fans (2 Nos per boiler) along with motorNew C&I system for boiler and its auxiliaries.
2	Unit No. & capacity	2 (110 MW)	
3	Make		
	i) Boiler	BHEL	
	ii) TG.	BHEL	
4	Date of commissioning	02/1985	
			(NTPC has been appointed for consultancy works)
			ii) TG :

B.	RLA Study / Consultancy		
Description	Boiler	G.	ii) TG : Replacement of H.P. turbine along with inner casing, rotor with improved design bladings, improved design casing, improved gland boxes along with new gland rings. Replacement of M.P. inner casing, rotor with improved design bladings, improved gland boxes along with new gland rings. Modernisation of L.P. casing and replacement of old diaphragm with new diaphragm and rotor. Replacement of old governing system with new electronic governing system.
Estimated Cost (Rs in Cr)			
Executing Agency			
Expected/ Actual start of work			
Completion date			
Actual Expenditure (Rs in Cr)			

C	R&M/ LE Works		iii) BOP : CHP: Replacement 2 Nos. Plough feeders, 13 Nos Vibrofeeders, 13 Nos rack & pinion gates, bunker sealing arrangement at bunker floor, belt scrapers -17 Nos, idlers, pulleys, 1 No. ring granulator, transfer chutes, surge hopper in crusher house with liners, gear box of conveyor drive, strengthening of structure for all conveyors, safety switches, pull card, belt sway, for all conveyors. AHP: Supply, fabrication and erection of bottom ash hoppers, structure for bottom ash hoppers along with refractory, 4-way solenoid valves, slurry pipe(150 M), L P water piping with fitting, air piping with fitting motorized valves. Replacement of 2 Nos ash slurry disposal pipe lines (1KM). Complete civil, electrical, and C&I work for CHP & AHP. DM Plant: Replacement of alkali storage tank, acid storage tank, acid transfer pump(1 No), alkali transfer pump(1No), anion pimps (4 Nos), degasser pumps (4 Nos), degasser blowers (2 Nos), acid & alkali dozing system, pipes. Compressed Air system: Replacement of 4 Nos instrument air compressors, 4 Nos air dryers with pipings. Fire protection system: New Fire alarm system, Foam pourer system for FO/LDO tanks. Electrical system: Replacement of 7 Nos ABCB breakers with SF-6 breaker, Replacement of 11 Nos Isolators, 6 Nos lightening arrestors
1	Executing Agency Boiler/ TG.		
2	No. of Activities Boiler/ TG.		
3	Zero date		
4	Expected date of Start of work.		
5	Expected Date of Completion of work.		
6	Estimated Cost (Rs in Cr)	Rs 343.25 Cr for unit 2 BTG and BOP & ESP of unit 1&2	
7	Actual Expenditure incurred (Rs in Cr)		

Status of LE works of Punjab State Power Corporation Ltd. (PSPCL)

(As on 31.03.2015)

A	Project Details	Description	Broad Scope of Works
			Unit commissioned
1	Name of Power Station	Bathinda	i) Boiler : Complete replacement of existing indirect fired boiler with direct fired boiler. Replacement of air heaters, flue gas ducting, fuel firing system, milling system, upgradation for direct firing & fans etc.
2	Unit No. & capacity	U-3 (110 MW) Upgradation to 120 MW	
3	Make		
	i) Boiler	BHEL	
	ii) TG.	BHEL	
4	Date of commissioning	29.7.1978	
B.	RLA Study / Consultancy		
	Description	Boiler TG.	ii) TG : Retrofitting of HP, IP & LP cylinders. Replacement of turbine gland sealing system, HP heaters, Control valves, RCV valves.
	Estimated Cost (Rs in Cr)	0.28	
	Executing Agency	CPRI, Bangalore	
	Actual start of work	02/01 02/01	
	Completion date	03/01 03/01	
	Actual Expenditure (Rs in Cr)	0.28	
C	R&M/ LE Works		
1	Executing Agency Boiler/ TG.	BHEL	iii) BOP : ESP rectification. Ash Handling System (Replacement of ash slurry pipe lines etc.) Complete replacement of Instrument & Controls. Electrical system : Replacement of existing 220 KV ABCB with SF-6 breakers. Replacement of Pneumatic 220 KV Isolators with motor operated mechanism, Replacement of 6.6 KV switchgear etc. Civil and structural works of boiler and auxiliaries.
2	No. of Activities Boiler/ TG.		
3	Zero date		
4	Actual Date of Start of work	14.01.2010	
5	Expected/Actual Date of Completion of work	05.08.2012(A)	
6	Estimated Cost (Rs in Cr)	483.95 Cr. For U-3 & 4	
7	Actual Expenditure incurred (Rs in Cr)	434.3 Cr. for U-3&4	

Physical Progress :

Order for R&M and uprating works on units – 3 & 4 was placed on BHEL on Vide by PSPCL letter No 02/R&M-121 dated 14.11.2006. **Shut down taken from 14.01.2010.** After dismantlement work of Boiler, erection work of Boiler started from 18.06.2010. Boiler was lighted up on 29.05.2012, Chemical cleaning by EDTA has been completed on 02.06.2012. Turbine put on barring gear on 17.-7.2012, Unit synchronised on oil on 18.7.2012 and on coal on 5.8.2012.

The unit is recommissioned on 05.08.2012. Unit has achieved 120 MW load.

Status of LE works of Punjab State Power Corporation Ltd. (PSPCL)

(As on 31.03.2015)

A	Project Details	Description	Broad Scope of Works
			Order Placed
1	Name of Power Station	Bathinda	i) Boiler : Complete replacement of existing indirect fired boiler with direct fired boiler. Replacement of air heaters, flue gas ducting, fuel firing system, milling system, upgradation for direct firing & fans etc.
2	Unit No. & capacity	U-4 (110 MW) Upgradation to 120 MW	
3	Make		
	i) Boiler	BHEL	
	ii) TG.	BHEL	
4	Date of comming	31.01.1979	
B.	RLA Study / Consultancy		
	Description	Boiler TG.	ii) TG : Retrofitting of HP, IP & LP cylinders. Replacement of turbine gland sealing system, HP heaters, Control valves, RCV valves.
	Estimated Cost (Rs in Cr)	0.28	
	Executing Agency	CPRI, Bangalore	
	Actual start of work	11/01 11/01	
	Completion date	12/01 12/01	
	Actual Expenditure (Rs in Cr)	0.32	
C	R&M/ LE Works		iii) BOP : ESP rectification. Ash Handling System (Replacement of ash slurry pipe lines etc.) Complete replacement of Instrument & Controls. Electrical system : Replacement of existing 220 KV ABCB with SF-6 breakers. Replacement of Pneumatic 220 KV Isolators with motor operated mechanism, Replacement of 6.6 KV switchgear etc. Civil and structural works of boiler and auxiliaries.
1	Executing Agency Boiler/ TG.	BHEL	
2	No. of Activities Boiler/ TG.		
3	Zero date		
4	Actual date of Start of work	5.11.2011	
5	Expected Date of Completion of work.	July,2013	
6	Estimated Cost (Rs in Cr)	483.95 Cr. for U-3 & 4	
7	Actual Expenditure incurred (Rs in Cr)	466.91 Cr. for U-3&4	

Unit synchronized in July, 2014.

Western Region

(Unit wise Broad Status of LE works)

There is no unit in western region where order for LE has been placed.

Southern Region

(Unit wise Broad Status of LE works)

STATUS OF LE WORKS OF Dr. NARLA TATA RAO THERMAL POWER STATION

(As on 31.03.2015)

A		Project details		Description	Broad status of various activities	
1	Name of Power Station	Dr.N.T.TPS				
2	Unit No. & capacity	U-1&2 (2x210MW)			Unit-1: i) Boiler : The scope of works includes : 2) Replacement of hot & cold air dampers and gates for bowl mills. 3) Replacement of water walls, Superheater , Reheater, Soot blower system, 4) Replacement of ID fans with higher capacity ii) TG : The scope of works includes : 1) Repair /Refurbishment of HP,IP&LP turbine 2) Up graded design of boiler feed pump- 200 KHI, Recirculation valves, various valves & pipes of BFP, HP/ LP bypass and PRDS valves. 3) Replacement of various oil coolers. iii) Electrical & Instrument: The scope of works includes : 1) Replacement of 3 nos. CWP motors, 21 nos. ESP transformers, station battery with chargers, 6.6. kV Protection Relay, Generator Transformer, UATs, Bus- bar protection, Generator protection, CTs, 200 kV MOCBs with SF6 brakers etc. 2) Re-winding of HT motors of BFPs, CEPs, PA Fans, FD fans and mills. 3) Installation of DCS including field instruments, microprocessor based soot blowing System, FSSS, SWAS System, 4) Replacement of public address system iv) BOP : The scope of works includes : 1) Replacement of CW pumps and raw water pipeline. 2) Augmentation of DM plant, Ash handling system. Replacement of Air compressor, Renovation of Coal handling plant, Unit-2: i) Boiler : The scope of works includes : 1) Renovation of LTSH coil assembly 2) Replacement of hot & cold air dampers and gates for bowl mills. 3) Replacement of water walls, Superheater , Reheater, Soot blower system, 4) Replacement of ID fans with higher capacity 5) Replacement of CRH coil, SCAPH coil, Damaged water walls, Expansion joints, Damaged ducts from APH outlet to chimney, Damaged hangers, Feed water pipe lines, CRH, HRH, MS lines, boiler insulation, Air pre heater rotor assembly, ID fans dampers valves ii) TG : The scope of works includes : 1) Repair /Refurbishment of HP,IP&LP turbine 2) Up graded design of boiler feed pump- 200 KHI, Recirculation valves, various valves & pipes of BFP, HP/ LP bypass and PRDS valves. 3) Replacement of various oil coolers. 4) Re-insulation of generator rotor with F class. iii) Electrical & Instrument: The scope of works includes : 1) Replacement of 3 nos. CWP motors, 21 nos. ESP transformers, station battery with chargers, 6.6. kV Protection Relay, Generator Transformer, UATs, Bus- bar protection, Generator protection, CTs, 200 kV MOCBs	
3	Make	BHEL/LMW				
4	Date of Commissioning	U# 1-01.11.79 U#2-10.10.80				
B		RLA Studies / Consultancy				
	Description	Boiler	TG			
1	Estimated Cost (Rs.Lacs.)	Included in the cost of R&M works.				
2	Executing Agency	U-1:Blr&TG:Utility Powertech Ltd. New Delhi U-2:Blr&TG:IRC Engg.services India Pvt. Ltd., New Delhi				
3	Exp / Act Start date	-	-			
4	Comple-tion date	U-1: 25.08.04 U-2: 08.09.07	U-1: 25.08.04 U-2: 25.08.07			
5	Actual Exp. (Rs.Lacs.)	U-1: Rs.16.68 U-2:Rs 19.24				
C		R&M / LE works				
1	Estimated cost for both units no-1&2 (Rs. Cr.)	Rs.192.32 Crs				
2	Executing Agency : Boiler/ TG	BHEL				
3	No. of activities : Boiler / TG	78				
4	Date of start / completion (E/A)	Start:25.10.2005				
5	Actual Expenditure incurred (Rs. Cr.)	Rs 162.34 Crs				

			with SF6 breakers etc. 2) Re-winding of HT motors of BFPs, CEPs, PA Fans, FD fans and mills. 3) Installation of DCS including field instruments, microprocessor based soot blowing System, FSSS, SWAS System, 4) Replacement of public address system iv) BOP : The scope of works includes : 1) Replacement of CW pumps and raw water pipeline. 2) Augmentation of DM plant, Ash handling system. Replacement of Air compressor, Renovation of Coal handling plant, 3) Replacement of CI & CS bends/ elbows with ceramic bends/ elbows. 4) Modernisation of goods lifts.
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Physical Progress:

APGENCO have taken up 78 activities under RLA/LE programme for Dr NTTPS units-1&2. Most of the activities have been completed except few items for unit-2 viz. replacement of existing analog control system with distributed Digital Control System(DCS), replacement of existing vent condenser tube bundle with new one, replacement of water wall tubes in the 1st pass, replacement of boiler insulation , replacement of damaged expansion joints ,replacement of ID fan outlet damper with multi flap type gas tight isolator , replacement of existing Generator Transformer which will be taken up during the Capital Overhaul of unit-2 .

APGENCO have postponed the Capital Overhaul (COH) programme of Unit-2 to 2015-16 due to non-availability of the units for COH due to load demand.

APGENCO have completed Annual overhaul (AOH) of unit-1 in Sept' 14.

STATUS OF LE WORKS OF TUTICORIN THERMAL POWER STATION

(As on 31.03.2015)

A	Project details		Description	Broad status of various activities
1	Name of Power Station		Tuticorin TPS	i) Boiler : The scope of works includes : ii) TG : The scope of works includes : iii) Electrical & Instrument: The scope of works includes : iv) BOP : The scope of works includes :
2	Unit No. & capacity		U-1,2 2x210 MW	
3	Make		BHEL/ LMW	
4	Date of Commissioning		U# 1- 09.07.79 U#2- 17.12.80	
B	RLA Studies / Consultancy			
	Description	Boiler	TG	
1	Estimated Cost (Rs.Crs.)	0.08+0.18 =0.26	0+0.26=0.26	
2	Executing Agency	CPRI	BHEL/Alstom	
3	Exp / Act Start date			
4	Completion date	U-1: 12/03 U-2:08/05	U-1: 12/03 U-2:07/08	
5	Actual Exp. (Rs.Crs.)	0.08+0.18 =0.26	0+0.26=0.26	
C	R&M / LE works			
1	Estimated cost for both units no-1&2 (Rs. Cr.)		35.45+25.28 =60.73	
2	Executing Agency : Boiler/ TG		BHEL,CPRI, Alstom, Balaji Engg. Enterprises, Kumar Engg., Sunil Hi-tech, Globus Engrs.	
3	No. of activities : Boiler / TG		U-1:9, U-2:10	
4	Date of start / completion (E/A)			
5	Actual Expenditure incurred (Rs. Cr.)		35.45+21.18=56.63	

Physical Progress:

Unit-1:

Boiler:

- Steam Drum Acid cleaning completed.
- Replacement of unhealthy pipe supports work completed.
- Minor repair works in Pent house area completed.

ESP:

- Replacement of complete ESP internals for the first two rows & overhauling of remaining 12 fields and replacement of 20 Nos Controllers have been completed.

TG:

- Minor repair works such as attending cracks in HP, IP &LP casings completed.
- All Diaphragms in HP,IP & LP had been renewed and the work has been completed.

BoP:

- Modification of APH sealing system by Double Sealing work completed.

Electrical & Instrumentation:

- Existing 3 nos single phase GT have been replaced with new one.

Unit-2:

Boiler:

- Replacement of Reheater Rear pendent Assembly work completed.
- Replacement of Z panel tubes work completed.
- Boiler structure strengthening work completed.
- Checking of Hangers/Supports under Hot/Cold condition completed.

TG:

- Minor defects noticed in turbine casing, Lines & Steam pipe liner have been attended.
- All 11 nos Diaphragms in HP turbine, 8 nos Diaphragms in IP turbine & 2 nos Diaphragms in LP turbine had been renewed.
- All the three rotors have been replaced with the reconditioned spare rotors.

BoP:

- Refurbishment of complete Bottom Ash system work completed.
- Modernisation of DCS work completed.
- Replacement of existing static AVR by DVR work completed.

STATUS OF LE WORKS OF Raichur THERMAL POWER STATION

(As on 31.03.2015)

A	Project details		Description	Broad status of various activities
1	Name of Power Station		Raichur TPS	Need based R&M works planned for Units-1&2.
2	Unit No. & capacity		U-1,2 2x210MW	
3	Make			
4	Date of Commissioning		U-1:29.03.85 U-2:02.03.86	
B	RLA Studies / Consultancy			
	Description	Unit-1	Unit-2	
1	Estimated Cost (Rs.Lacs.)			
2	Executing Agency	RLA of BTG BHEL	Comprehen -sive RLA of BTG BHEL	
3	Date of Start / Completion	U-1:2005-06 U-2:2010-11		
4	Actual Exp. (Rs.Lacs.)	U-1:48.48 U-2:180.00		
C	R&M / LE works			
1	Estimated cost for both units no-1&2(Rs. Cr.)		NA	
2	Executing Agency :Boiler/ TG		BHEL	
3	No. of activities :Boiler / TG			
4	Date of start / completion (E/A)		Start Dt : 20/06/13 Completion Date:25/11/13	
5	Actual Expenditure incurred (Rs. Cr.)		119.22	

Physical Progress:

KPCL informed that they are taking up need based R&M/LE works for Raichur TPS Units-1&2. As such for Unit-1 BTG RLA study and for Unit-2 comprehensive BTG RLA study have been completed by BHEL.

R&M/LE works taken up KPCL:

Unit-1:

Boiler:

- RH Coils works completed.

TG:

- HPT module replaced by rectified module.
- Replacement of IPT rotor and last two stages blades of LPT have been completed.

Other works:

- Boiler C&I works completed.
- Station C&I works completed
- Order placed for latest version of Electronic controllers retrofitted for ESP to reduce stack emission.
- R&M completed for CW pumps.
- 2nos PA fans motors replaced.
- LT switchgears & Control panels retrofitting done.
- Two sets of Vacuum pumps with motors have been commissioned.
- Instrumentation & service air compressor, replacement of air circuit breakers & protection panels in 6.6 kV switchgear have been completed.

Unit-2:

Boiler:

- RH Coils work completed.

TG:

- HPT module replaced by rectified module.
- Electronic controllers rectified with latest version in ESP for reducing stack emission.
- Generator Transformer replaced with new CGL make.
- GT retrofitted with new emulsifier system.

Other works:

- Boiler C&I works completed.
- Station C&I works completed.

Eastern Region

(Unit wise Broad Status of LE works)

STATUS OF LE WORKS OF BIHAR (BSEB) THERMAL POWER STATION

(As on 31.03.2015)

Project details		Description		Broad status of various activities
A				
1	Name of Power Station	Barauni TPS		Unit under s/d since 17.03.2012. As per BHEL unit shall be synchronised by June,2014.
2	Unit No. & capacity	U-6 ,110MW		
3	Make	BHEL/ BHEL		
4	Date of Commissioning	U# 6-01.05.1983		
B	RLA Studies / Consultancy			
	Description	Boiler	TG	
1	Estimated Cost (Rs.Cr.)	Cost included in R&M work		
2	Executing Agency	BHEL	BHEL	
3	Exp / Act Start date	Boiler-4.5.06 Turbine – 18.5.06 Generator Stator-15.5.06		
4	Comple-tion date	Boiler-17.5.06 Turbine –5.6.06 Generator Stator- 17.5.06		
5	Actual Exp. (Rs.Cr.)	R&M work is being executed on turnkey basis and the cost against RLA is included in R&M cost.		
C	R&M / LE works			
1	Estimated cost for both units no.6&7 (Rs. Cr.)	Rs.572.16 Cr. (including the cost of RLA*)		
2	Executing Agency : Boiler/ TG	BHEL/ BHEL		
3	No. of activities : Boiler / TG			
4	Date of start / completion (E/A)	LOA:16/02/2010 Zero Date: 16/11/2009 (BHEL to confirm revised schedule)		
5	Actual Expenditure incurred (Rs. Cr.)	Rs. 405.61 Cr. for both the units 1&2 (incl. restoration of Unit-6)		
i) Boiler : The scope of works includes : 1) Strengthening of Structure(columns, backstays, ceiling girders, floor grills, hand grills, painting) 2) Furnace bottom sealing arrangements 3) Replacement of water walls, Superheater , Reheater, Soot blower system, Economizer, drain& vent piping, Hangers & Supports 4) Pulverized fuel firing system-Coal mills (5 no.), Coal feeders (5 no.), PF piping 5 no. sets), Seal air system (2x100%) 5) Fuel oil firing system 6) Supply/Replacement of Draft & Ducting System (APH,PA fan, FD fan, ID fan, Air and Flue gas ducting 7) Refurbishment of ESP				
ii) TG : The scope of works includes : 1) Refurbishment of HP,IP&LP turbine 2) Replacement/ Refurbishment of Shaft turning gear, Turbine governing system, lubricating oil coolers, Hydrogen coolers, Jacking oil pump, Seal oil coolers, Condenser, HP heaters, LP Heaters, Steam jet air ejector, Deaerator, BFP, CEP, Chimney Steam condenser and chimney exhaust fan, Turbine drain system valves, Hangers& Supports 3) Replacement/ Refurbishment of existing AVR with digital DVR incl. necessary modifications and existing excitation system incl. supply of necessary spares. 4) Complete overhauling of generator stator, Testing & varnishing of rotors and refurbishment of silica gel Hydrogen drier incl. supply of necessary spares. 5) Replacement/Supply/Testing of transformers, isolated phase Bus-duct of generator, Protection panels, 6.6 KV Switchgears, Bus changeover scheme ,LT Switchgears and Bus ducts, LT Motors, HT Motors , Station Lighting, Cabling, Earthing and Lighting Protection, Station Batteries & Chargers, Emergency AC Supply System, 132 KV Switchyard. 6) Installation of Distributed Digital Control Monitoring & Information System(DDCMIS) and other C&I Systems				
iii) BOP : The scope of works includes : 1) Supply and installation of Tube well system, CW System, Aeration System, DM Plant, Softening plant, CW Chlorination System, Air Compressors, Cooling towers, Misc. pump house, AC plant, Ventilation system, Fire fighting system 2) Replacement/ Refurbishment/Repair of Coal Handling Plant, Ash Handling Plant & F.O. Unloading Plant.				

* Planning Commission vide their letter dated 16.11.2009 approved the revised cost estimates of Rs.1053 crores including consultancy charges under the Special Plan for Bihar for both BTPS & MTPS. 77 % material has been supplied at site. Dismantling work of Boiler, ESP, mills, turbine and generator completed. Turbine, HP, LP & LP rotor sent to Hyderabad for

repair. Boiler water wall erection completed, Casting of (32/32) piles at ID fan A completed. Generator Stator to be repaired. Anticipated completion is July, 2015

STATUS OF LE WORKS OF BIHAR (BSEB) THERMAL POWER STATION

(As on 31.03.2015)

A	Project details	Description		Broad status of various activities
1	Name of Power Station	Barauni TPS		Unit under shut down. As proposed by BHEL, anticipated date of synchronization is December, 2013.
2	Unit No. & capacity	U- 7, 110MW		
3	Make : Boiler/ TG	BHEL/ BHEL		
4	Date of Commissioning	U# 7-31.03.1985		
B	RLA Studies / Consultancy			i) Boiler : The scope of works includes : 1) Strengthening of Structure(columns, backstays, ceiling girders, floor grills, hand grills, painting) 2) Furnace bottom sealing arrangements 3) Replacement of water walls, Superheater ,Reheater, Soot blower system, Economizer, drain& vent piping, Hangers & Supports 4) Pulverized fuel firing system-Coal mills (5 no.), Coal feeders (5 no.), PF piping 5 no. sets), Seal air system (2x100%) 5) Fuel oil firing system 6) Supply/Replacement of Draft & Ducting System (APH,PA fan, FD fan, ID fan, Air and Flue gas ducting 7) Refurbishment of ESP ii) TG : The scope of works includes : 1) Refurbishment of HP,IP&LP turbine 2) Replacement/ Refurbishment of Shaft turning gear, Turbine governing system, lubricating oil coolers, Hydrogen coolers, Jacking oil pump, Seal oil coolers, Condenser, HP heaters, LP Heaters, Steam jet air ejector, Deaerator, BFP, CEP, Chimney Steam condenser and chimney exhaust fan, Turbine drain system valves, Hangers& Supports 3) Replacement/ Refurbishment of existing AVR with digital DVR incl. necessary modifications and existing excitation system incl. supply of necessary spares. 4) Complete overhauling of generator stator, Testing & varnishing of rotors and refurbishment of silica gel Hydrogen drier incl. supply of necessary spares. 5) Replacement/Supply/Testing of transformers, isolated phase Bus-duct of generator, Protection panels, 6.6 KV Switchgears, Bus changeover scheme ,LT Switchgears and Bus ducts, LT Motors, HT Motors, Station Lighting, Cabling, Earthling and Lighting Protection, Station Batteries & Chargers, Emergency AC Supply System, 132 KV Switchyard. 6) Installation Of Distributed Digital Control Monitoring& Information System(DDCMIS) and other C&I Systems iii) BOP : The scope of works includes : 1) Supply and installation of Tube well system, CW System, Aeration System, DM Plant, Softening plant, CW Chlorination System, Air Compressors, Cooling towers, Misc. pump house, AC plant, Ventilation system, Fire fighting system 2) Replacement/ Refurbishment/Repair of Coal Handling Plant, Ash Handling Plant & F.O. Unloading Plant. In the first phase of R&M, the restoration of BOP has also been done by BHEL.
	Description	Boiler	TG	
1	Estimated Cost (Rs.Cr.)	Cost included in R&M work		
2	Executing Agency	BHEL	BHEL	
3	Exp/ Act Start date	Boiler-4.5.06 Turbine – 18.5.06 Generator Stator-15.5.06		
4	Completion date	Boiler-17.5.06 Turbine –5.6.06 Generator Stator- 17.5.06		
5	Actual Exp. (Rs.Cr.)	R&M work is being executed on turnkey basis and the cost against RLA is included in R&M cost.		
C	R&M / LE works			
1	Estimated cost for both units no.6&7 (Rs. Cr.)	Rs. 572.16 Cr. (including the cost of RLA*)		
2	Executing Agency : Boiler/ TG	BHEL/ BHEL		
3	No. of activities : Boiler / TG			
4	Date of start / completion (E/A)	LOA:16/02/2010 Zero Date: 16/11/2009 Mach, 2013.		
5	Actual Expenditure incurred (Rs. Cr.)	Rs. 405.61 Cr. for both the units 1&2 (incl. restoration of Unit-6)		

*Planning Commission vide their letter dated 16.11.2009 approved the revised cost estimates of Rs.1053 crores including consultancy charges under the Special Plan for Bihar for both BTPS & MTPS. Boiler drainable hydro test done. Turbine boxedup. All platen super heater joints completed. 97 % material supplied. Water box inside painting of condenser completed. Erection of CW vertical pumps completed .ESP erection to be completed. As per BHEL and BSPGCL synchronization is expected by 30th April,2015.

STATUS OF LE/R&M WORKS OF BIHAR (KBUNL) THERMAL POWER STATION

(As on 31.03.2015)

A	Project details		Description		Broad status of various activities
1	Name of Power Station		Muzaffarpur TPS		Unit s/d on 06.10.2003 and Synchronised on 05.07.2013.
2	Unit No. & capacity		U-1,110MW		
3	Make		BHEL/BHEL		
4	Date of Commissioning		31.03.1985		
B	RLA Studies / Consultancy				i) Boiler: The scope of works includes : 1) Replacement/refurbishment of Furnace water walls, Economizer, Super Heater, Re heater, Steam cooled wall tubes, SH&RH DESH station, Soot blowing system, Drain and vents, Fuel preparation and firing system. 2) Fuel Oil Firing System. 3) Renovation/ Overhauling of APH &Draft system 4) Refurbishment of ESP 5) Replacement of Gates & dampers and Sample cooler along with valves and piping 6) Supply of Hangers and supports, BHEL Vision (electronic water level indicator) 7) Servicing of Boiler drum with internals and strengthening of boiler main structure and painting ii) TG: The scope of works includes : 1) Replacement/repairs/polishing & modification of HP/IP/LP Turbine 2) Replacement of all flexible hoses 3) Balancing of all finished rotor & repairing of casing 4) Refurbishment of Shaft Turning gear(U-1 only),Turbine Governing System, Turbine gland system, Deaerator, Steam jet air ejector 5) Supply/replacement of Lubricating oil coolers, Seal oil coolers, Hydrogen coolers, Jacking oil pumps, condenser tubes, HP Heaters, LP Heaters, BFP,CEP, Condensate booster pump, Turbine drain system valves, Turbine governing valves, Insulation, Turbine lube oil system, TG Bearing & Coupling bolts 6) Installation Of Distributed Digital Control Monitoring & Information System(DDCMIS) 7) Complete overhauling of generator stator & complete testing /varnishing of generator rotor. 8) Regarding Electrical works, Refurbishment / replacement/supply of transformers, Generator bus duct, Protection panels, Bus changeover schemes, 220/132KV Switchyard. iii) BOP : The scope of works includes : R & M of Bore well system ,Fire fighting system, Pre Treatment Plant, DM Plant , Chlorination Plant , Cooling Tower, Compressed Air System, Air Conditioning System, Ash Handling System, Fuel Oil System, Workshop, CW System, Raw Water System, Feed Water Booster Pumps, Chemistry Lab.
	Description	Boiler	TG		
1	Estimated Cost (Rs.Cr.)	a) Included in restoration cost for unit # 2 b) For unit # 1 Not charged			
2	Executing Agency	BHEL	BHEL		
3	Exp / Act Start date	Boiler-4.5.06 Turbine – 18.5.06 Generator Stator-15.5.06			
4	Comple-tion date	May 2008			
5	Actual Exp. (Rs.Cr.)	R&M work is being executed on turnkey basis and the cost against RLA is included in R&M cost.			
C	R&M / LE works				
1	Estimated cost for both units no.1&2 (Rs. Cr.)		471.80		
2	Executing Agency : Boiler/ TG		BHEL/ BHEL		
3	No. of activities : Boiler / TG		48 Packages		
4	Date of start / completion (E/A)		LOA:15/04/2010 15.07.2010 April ,2013 (E)		
5	Actual Expenditure incurred (Rs. Cr.)		356.4 Cr for both the units 1&2. (incl. restoration of Unit-2		

Status: Unit synchronized on 05.07.2013.

STATUS OF LE/R&M WORKS OF BIHAR (KBUNL) THERMAL POWER STATION

(As on 31.03.2015)

A	Project details		Description	Broad status of various activities
1	Name of Power Station		Muzaffarpur TPS	Unit under shut down i) Boiler: The scope of works includes : 1) Replacement/refurbishment of Furnace water walls, Economizer, Super Heater, Re heater, Steam cooled wall tubes, SH&RH DESH station, Soot blowing system, Drain and vents, Fuel preparation and firing system. 2) Fuel Oil Firing System 3) Renovation/ Overhauling of APH &Draft system 4) Refurbishment of ESP 5) Replacement of Gates & dampers and Sample cooler along with valves and piping 6) Supply of Hangers and supports, BHEL Vision (electronic water level indicator) 7) Servicing of Boiler drum with internals and strengthening of boiler main structure and painting ii) TG: The scope of works includes : 1) Replacement/repairs/polishing & modification of HP/IP/LP Turbine 2) Replacement of all flexible hoses 3) Balancing of all finished rotor & repairing of casing 4) Refurbishment of Shaft Turning gear(U-1 only),Turbine Governing System, Turbine gland system, Deaerator, Steam jet air ejector. 5) Supply/replacement of Lubricating oil coolers, Seal oil coolers, Hydrogen coolers, Jacking oil pumps, condenser tubes, HP Heaters, LP Heaters, BFP,CEP, Condensate booster pump, Turbine drain system valves, Turbine governing valves, Insulation, Turbine lube oil system, TG Bearing & Coupling bolts 6) Installation Of Distributed Digital Control Monitoring & Information System(DDCMIS) 7) Complete overhauling of generator stator & complete testing/varnishing of generator rotor 8) Regarding Electrical works, Refurbishment / replacement/supply of transformers, Generator bus duct, Protection panels, Bus changeover schemes, 220/132KV Switchyard. *Partly restored during restoration of unit -2. iii) BOP : The scope of works includes : R & M of Bore well system ,Fire fighting system, Pre Treatment Plant, DM Plant , Chlorination Plant , Cooling Tower, Compressed Air System, Air Conditioning System, Ash Handling System, Fuel Oil System, Workshop, CW System, Raw Water System, Feed Water Booster Pumps, Chemistry Lab. *Partly restored during restoration of unit -2. Both the streams of CHP become operational on 20.04.2010. R&M of one wagon Tippler completed in Sept.'2010.
2	Unit No. & capacity		U-2,110MW	
	Make		BHEL/BHEL	
4	Date of Commissioning		17.03.1986	
B	RLA Studies / Consultancy			
	Description	Boiler	TG	
1	Estimated Cost (Rs.Cr.)	a) Included in restoration cost for unit # 2 b) For unit # 1 Not charged		
2	Executing Agency	BHEL	BHEL	
3	Exp / Act Start date	Boiler-4.5.06 Turbine – 18.5.06 Generator Stator-15.5.06		
4	Completion date	Nov-2006		
5	Actual Exp. (Rs.Cr.)	R&M work is being executed on turnkey basis and the cost against RLA is included in R&M cost.		
C	R&M / LE works			
1	Estimated cost for both units no.1&2 (Rs. Cr.)		471.80	
2	Executing Agency : Boiler/ TG		BHEL/ BHEL	
3	No. of activities : Boiler / TG		48 Packages	
4	Date of start / completion (E/A)		LOA:15/04/2010 Sept.' 2011 (BHEL to confirm revised schedule)	
5	Actual Expenditure incurred (Rs. Cr.)		356.4 Cr for both the units 1&2. (incl. restoration of Unit-2	

Status: Status: Unit synchronized oi July, 2014..

STATUS OF LE WORKS OF WEST BENGAL (WBPDC) THERMAL POWER STATION

(As on 31.03.2015)

A	Project details		Description	Broad status of various activities
1	Name of Power Station		Bandel	Contract for BTG Package awarded to M/s. DHIC and signed on 29.02.2012.
2	Unit No. & capacity		U-5 , 210MW	Main Plant Package (BTG) Boiler: * Replacement of major Valves, Controllers & Hangers and Supports in Boiler & Turbine Area * Replacement of Water wall tubes, Attemperators * Replacement of Economiser coil * Replacement of Platen Superheater coils * Replacement of Final Superheater tubes * Complete replacement of Air pre heater tubes * Up-gradations of Mills and auxiliaries * Modification of ESP to achieve 90 mg/Nm ³ emission level at ESP Outlet Turbine: * Complete replacement of HP, IP & LP turbine * Complete tube replacement of Condenser, LP & HP Heaters * Replacement of BFP Cartridge with high efficient cartridge * Replacement of CEP, CW Pump Generator: * Replacement of Generator by new Generator
3	Make : Boiler/TG		AVB/BHEL	
4	Date of Commissioning		23/03/1983	
B	RLA Studies / Consultancy			
	Description	Boiler	TG	
1	Estimated Cost (Rs.Cr.)			
2	Executing Agency	M/s Evonik		
3	Exp / Act Start date			
4	Completion date	January 2005)		
5	Actual Exp. (Rs.Cr.)			
C	R&M / LE works (Estimated cost: Rs.652 Cr.			
1	Total No. of package	4 (four) – BTG, CHP, Electrical &		

		AHP.	
2	Executing Agency : BTG package	M/s DHIC	
3	Zero date	29.02.2012	
4	Date of start (Original/ Expected /Actual)	Expected Date of start	
5	Date of completion (Original/ Expected /Actual)	Sept 2014 (E).	
6	Actual Expenditure incurred (Rs. Cr.)		

Physical Progress:

World Bank funded project. Contract for BTG pkg. awarded to M/s DHIC and signed on 29.2.2012. Unit taken on shut down for LE works on 24.11.2013.

BTG Package: For Onshore Package, overall cumulative progress for engineering and procurement achieved till August 2014 is 93.95% as against scheduled progress of 100.00%. Order placed for 88 nos. of On-Shore Items. (Total Scope:89 Items)

CHP Package: Progress for Engineering and Procurement is 77.84% achieved.

AHP Package: 97 out of 125 drawings have reviewed.

Electrical Package: Progress for Engineering and Procurement is 88.80% achieved.
174 out of 179 drawings have reviewed.