Chapter II

Performance Audit of Government Company

Chapter II

2. Performance Audit Report on augmentation of Thermal Power Generation Capacity of Maharashtra State Power Generation Company Limited

Executive Summary

Introduction

Maharashtra State Power Generation Company Limited (Company) was incorporated (May 2005) under the Companies Act, 1956 as a wholly owned Government Company and was engaged in the business of generation of electricity. As on 31 March 2017, the Company had an installed capacity of 13,817 Mega Watts (MW). This comprised seven coal based Thermal Power Stations (TPS) of 10,380 MW, a gas based TPS of 672 MW, 180 MW from Solar Power Plants and 26 Hydro Electric Projects of 2,585 MW.

Thermal capacity addition plan

The Company had planned/taken up 13 thermal power projects of 13,900 MW for completion/implementation during 2007-17 as against the capacity addition requirement of 7,891 to 9,664 MW during the same period. The Company completed seven projects having capacity of 5,730 MW (2007-17) while remaining six projects of 8,170 MW on which the Company had incurred ₹ 112.09 crore towards various pre-order activities, were proposed either for cancellation or deferred/pending decision of the Board of Directors (BoD) citing surplus power scenario in the State.

Project implementation

The Company completed five thermal power projects (Koradi, Parli, Chandrapur, Bhusawal and Khaperkheda) involving 4,730 MW during the period 2012-17. All the five projects were constructed by awarding two comprehensive Engineering, Procurement & Construction (EPC) contracts comprising Boiler, Turbine and Generator (BTG) package and Balance of Plant (BoP) package. The Company awarded 10 EPC contracts worth ₹ 20,867 crore for five projects.

Deficiencies in pre-implementation planning

- Construction of an additional unit in Parli despite water shortage and without ensuring permanent water supply for existing units was not justified.

- Detailed Project Report (DPR) of Bhusawal was defective as it did not provide for construction of railway siding which contributed to delayed project execution.

- Coal requirement of three projects (Koradi, Chandrapur and Parli) was to be met from development of a coal block. Even before development of coal block could commence, issues related to coal quality and cost effectiveness have

cropped up raising doubts about its economic viability. As per the prevailing policy, the Ministry of Coal (MoC) had granted Bridge Linkage (BL) for meeting 75 *per cent* coal requirement for period up to March 2019. Thus, existing coal arrangements were inadequate for running the plant to full capacity and there was lack of firm allocation of coal for operation of the three new projects (3,230 MW) beyond March 2019. The Company had not prepared a concrete alternative plan for procurement of coal.

Time overrun

According to terms and conditions of contract, successful completion of trial run of the units was to be considered as completion date of the contract for the project. Delay in completion of trial run of the units ranged between 20 and 49 months from the scheduled completion date. Delayed project execution was attributed to poor performance and financial crisis of EPC contractors. None of the major milestones/activities were completed within the time period stipulated in the contracts.

There was lack of coordination between the BTG and BoP works which affected interrelated works. Further, there was avoidable delay due to factors within management control like delay in awarding BoP contracts; delay in completion of railway siding due to defective DPR and delay in commencement of commercial operation of units in absence of timely obtaining of requisite statutory permissions and Environmental Clearance (EC)/non-compliance with environmental conditions.

Cost analysis

As against the estimated cost of ₹ 25,048 crore for five projects, the actual cost as on date of commercial operations was ₹ 35,012 crore leading to increase in cost by ₹ 9,964 crore.

- Major increase in cost (56 *per cent*) of ₹ 5,620 crore was on account of increase in Interest During Construction (IDC) on loans. Of which, ₹ 1,871.93 crore was disallowed by Maharashtra Electricity Regulatory Commissions (MERC) on the grounds that delay in project execution was not entirely beyond the control of the Company.

- There was loss of equity contribution of ₹ 235.54 crore from the Government of Maharashtra (GoM) in three projects (Koradi, Chandrapur and Parli) consequent to delay in execution of projects.

- The Company incurred excess expenditure of ₹ 19.92 crore on overheads (establishment expenditure) over and above the industry norms in Parli project which was disallowed by the MERC.

Deficiencies during project construction

Audit noticed instances of deficiencies in project execution like pre-mature commissioning of units and issues related to quality of material/workmanship of EPC contractors. This had contributed to low capacity utilisation of new units and consequent irrecoverable loss of revenue on account of disallowance of

fixed cost and loss of generation. Other issues like financing of a non-viable water supply scheme, non-adjustment of interest free advance against water charges, blocking of funds and extra expenditure while providing ash disposal arrangements were also observed.

Payments and recoveries

- Abnormal delay was noticed in recovery of liquidated damages of ₹ 2,296.91 crore from the EPC contractors which led to irrecoverable loss of interest of ₹ 237.30 crore.

- There was non-recovery of labour cess of ₹ 154.84 crore from the EPC contractors in three projects.

Financial management

- Failure to obtain payment security mechanisms from Maharashtra State Electricity Distribution Company Limited facilitated payment defaults and accumulation of huge arrears. This impacted liquidity/cash flow position of the Company thereby affecting project financing and repayment of loans.

- The Company paid penal interest of ₹ 78.86 crore for non-payment of loan instalments within due dates, burden of which was passed on to the consumers against tariff principles.

- The Company could not avail equity contribution to the extent of ₹ 80.10 crore from GoM due to non-inclusion of installation of Flue Gas Desulphurisation (FGD) plant in the project cost.

- There were delays in filing petitions with MERC for approval of tariff/capital costs led to delayed realisation of revenue/returns.

- Return on Equity (RoE) of ₹ 1,041.83 crore on new projects for the years 2016-18 was foregone without fulfilment of mandatory pre-conditions laid down by the BoD.

Monitoring

The monitoring system was ineffective in minimising delays in the project and IT based monitoring system was not implemented.

Operational efficiency of new units

- Performance of new units was below the norms prescribed by MERC for Plant Availability (PA), Plant Load Factor, Auxiliary Energy Consumption (AEC), Station Heat Rate, consumption of oil and Operation & Maintenance (O&M) expenses. Non-achievement/adherence to operational norms fixed by MERC resulted in non-recovery of fixed costs, excess AEC, excess consumption of coal and oil and excess expenses on O&M of plants. Low capacity utilisation of new units due to forced outages led to loss of generation of 20,391 Million Units (MUs) during 2012-17.

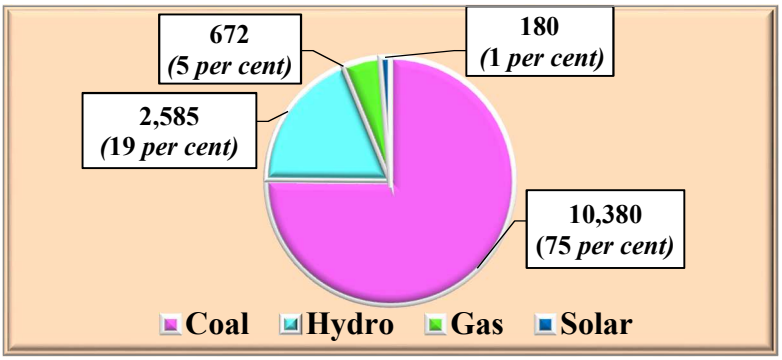
➢ Availability of the generation capacity was as important as to get it dispatched in the Merit Order considering surplus power available in the State. The units having least cost were scheduled/dispatched first and in case power was not required, generating units having higher cost were backed down. Audit observed loss of generation on account of backing down of units of the Company had increased from 143 MUs in 2012-13 to 9,311 MUs in 2016-17 (total loss: 17,313 MUs), leading to loss of revenue (energy charges) to the Company besides burdening the consumers with fixed charges. In respect of new projects, cost of generation was highest at Bhusawal and hence suffered maximum backing down of generation.

Environmental compliances

There was instance of non-compliance with conditions of EC regarding installation of FGD and ozonisation plant at Koradi project. None of the new projects achieved target of 100 *per cent* fly ash utilisation.

Introduction

2.1 Maharashtra State Power Generation Company Limited (Company)[1], a State Public Sector Company, was engaged in the business of generation of electricity. As on 31 March 2017, the Company had an installed capacity of 13,817 Mega Watts (MW). This comprised seven coal based Thermal Power Stations (TPS) of 10,380 MW, a gas based TPS of 672 MW, 180 MW from Solar Power Plants and 26 Hydro Electric Projects of 2,585 MW taken from Government of Maharashtra (GoM) on long term lease as depicted below:



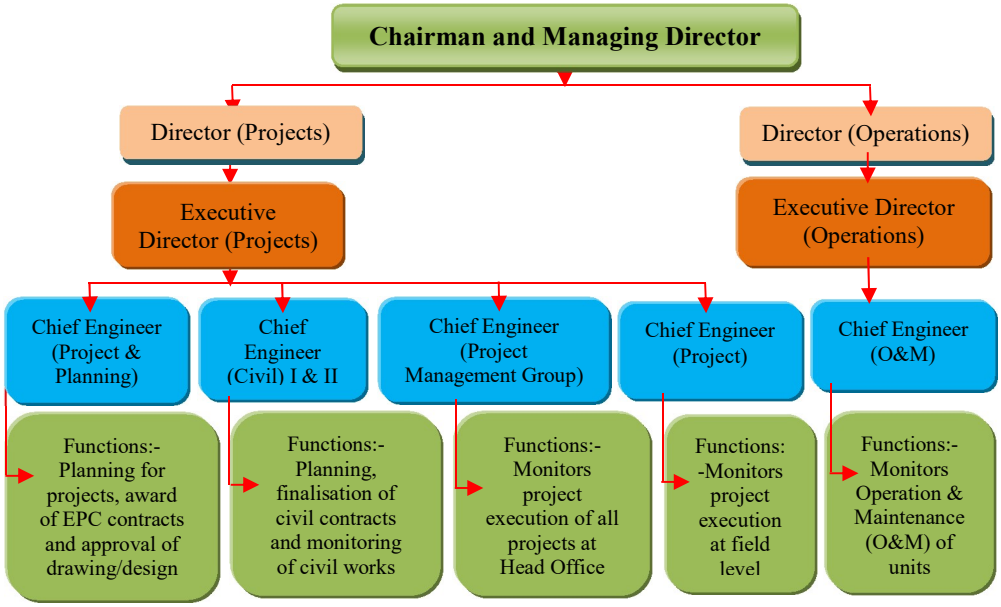
The Company completed seven thermal power projects involving 5,730 MW during 2007-17 as given in ***Annexure 4***. This included two projects of 1,000 MW during 2007-12 and five projects of 4,730 MW during the period 2012-17. The Company had also planned six thermal capacity addition projects of 8,170 MW which were either cancelled or deferred as discussed in **para 2.7**.

Organisational structure

2.2 The Company is under the administrative control of the Energy Department of the GoM. The Management of the Company is vested with the Board of Directors (BoD) consisting of Chairman & Managing Director (CMD) and

[1] Incorporated in May 2005 under the Companies Act, 1956

seven Directors including Principal Secretary (Energy), GoM and two independent Directors. The organisational set up for construction and Operation and Maintenance (O&M) of the projects is as given below:



Financial position and Working results

2.3 The financial position of the Company for the period 2012-13 to 2016-17 is given in ***Annexure 5.*** The working results of the Company for the period 2012-13 to 2016-17 are shown in the table below:

(₹ in crore)

Particular	2012-13	2013-14	2014-15	2015-16	2016-17
Revenue:					
Revenue from operations	16,423.86	16,538.21	18,970.00	19,293.42	18,163.95
Other income	219.18	83.74	266.97	103.64	199.90
Total	**16,643.04**	**16,621.95**	**19,236.97**	**19,397.06**	**18,363.85**
Expenses	**15,715.29**	**16,301.98**	**18,228.01**	**17,618.86**	**19,293.55**
Profit before tax and extraordinary item and tax	927.75	319.97	1,008.96	1,778.20	**(-)929.71**
Extraordinary items	--	--	--	10,520.24	--
Profit before tax	**927.75**	**319.97**	**1,008.96**	**(-)8,742.04**	**(-)929.71**
Net Profit/loss for the year after tax	**487.97**	**111.04**	**435.79**	**(-)8,794.62**	**(-)628.12**

(Source: Annual financial statements of the Company)

The Company had earned profit during 2012-13 to 2014-15 ranging between ₹ 111 crore and ₹ 488 crore and incurred loss during 2015-16 and 2016-17 to the extent of ₹ 8,795 crore and ₹ 628 crore respectively. During 2015-16, assets were revalued as per market rates retrospectively from the date of incorporation (May 2005) of the Company[2] and depreciation was provided on increased value

[2] As per financial re-structuring plan of erstwhile Maharashtra State Electricity Board (MSEB) approved (March 2016) by the GoM

of assets, which contributed to huge loss. During 2016-17, the loss was mainly on account of decrease in revenue from sale of power.

The Company had huge trade receivables *i.e.* outstanding dues from sale of power to Maharashtra State Electricity Distribution Company Limited (MSEDCL), which increased from ₹ 7,133 crore in 2012-13 to ₹ 10,672 crore in 2016-17. This impacted liquidity position of the Company and increased borrowed funds for working capital requirements from ₹ 5,549 crore in 2012-13 to ₹ 8,819 crore in 2016-17.

Scope of audit and objectives

2.4 The Performance Audit (PA) was conducted during May 2017 to September 2017 to analyse adequacy of augmentation of thermal capacity of the Company (2007-17) considering the power requirement *vis-a-vis* supply from all alternate sources in the State. Detailed scrutiny of five projects (4,730 MW[3]) which were completed during 2012-17 was carried out covering aspects related to their pre-implementation planning, project execution, financial management, monitoring, operational performance and compliance to environmental norms along with delay analysis. Besides, operational performance and environmental compliances of two projects of 1,000 MW[4] completed during 2007-12 were also examined.

Audit objectives of the PA were to assess whether:

- planning was adequate considering overall power demand and supply position in the State;
- projects were executed with due economy and efficiency and there existed an adequate and effective monitoring mechanism; and
- performance of the augmented units was as per norms prescribed by Maharashtra Electricity Regulatory Commission (MERC) and environmental rules/regulations were adhered to.

Audit criteria and methodology

2.5 The audit criteria were adopted from the following:

- Thermal capacity addition plans formulated by the Company;
- Electric Power Surveys (EPS) of India published by Central Electricity Authority (CEA), National Electricity Policy (NEP) of Government of India (GoI), guidelines/policies of Ministry of Power (MoP) of GoI, CEA and GoM;
- Feasibility Reports/Detailed Project Reports (DPRs) of the project;
- Government Resolutions, Agenda Notes and Minutes of meetings of BoD, Power Purchase Agreements (PPAs) with Maharashtra State Electricity Distribution Company Limited (MSEDCL);

[3] Koradi: 1,980 MW, Chandrapur: 1,000 MW, Bhusawal: 1,000 MW, Khaperkheda: 500 MW and Parli: 250 MW

[4] Parli: 500 MW and Paras: 500 MW

- Tender documents, Contract Agreements and Central Vigilance Commission (CVC) guidelines;
- Conditions of Environmental clearance, Consent to Establish/Operate the project, Environmental Rules and Regulations of GoI; and
- Tariff regulations/orders issued by MERC.

The audit process involved examination of records at Head Office and Project offices/TPS at five[5] locations entrusted with execution of new projects. Entry Conference was held in May 2017, followed by analysis of data/records with reference to audit criteria, interaction with Management of the Company, issue of draft PA Report to the Management/GoM for their comments. Audit findings were discussed in Exit Conference (September 2017) wherein the representatives of the Company and GoM were present. The views expressed by the Company (September 2017) during Exit Conference and their replies (October 2017) have been considered while finalising Report on the PA. Reply of the GoM was awaited (February 2018).

Acknowledgement

2.6 Audit acknowledges the co-operation and assistance extended by the Company at various stages of conducting the Performance Audit.

Audit findings

Planning for augmentation of thermal capacity

2.7 Power requirement in the State, apart from thermal generation units of the Company, was met from Central Public Sector Undertakings, private power producers, captive power plants and from renewable sources (hydro/solar/ wind). Electricity Act, 2003 also encouraged setting up of thermal power projects by private parties. Accordingly, the MoP, GoI issued (January 2005) Competitive Bidding Guidelines (CBG), allowing private power producers to participate in capacity building through tariff bidding process.

The CEA conducted periodical EPS in the country to forecast State wise electricity demand on short, medium and long term basis. This survey formed the basis for planning for power generation to meet future requirements of the States. Based on 17th EPS report (March 2007) and 18th EPS report (December 2011), the State required capacity additions of 7,891 MW by March 2012 and 9,664 MW by March 2017 respectively.

It was observed that the Company had planned/undertaken 13 thermal power projects of 13,900 MW for completion/implementation during 2007-17 as against the power requirement of 7,891 to 9,664 MW during the same period. This indicated that the Company did not make comprehensive planning considering the capacity additions undertaken by the private parties during this period as evident from the fact that the MSEDCL executed (September 2008 to February 2013) a total of 11 long term PPAs with private power producers for

[5] Bhusawal, Chandrapur, Khaperkheda, Koradi and Parli

procurement of 6,875 MW in the State. The Company completed seven projects having capacity of 5,730 MW (2007-17) while remaining six projects of 8,170 MW[6] on which the Company had incurred ₹ 112.09 crore towards various pre-order activities, were either proposed for cancellation or deferred/pending decision of the BoD citing surplus power scenario in the State.

It is also emphasised that the availability of the generation capacity is as important as to get it dispatched considering surplus power in the State. The units having least cost were scheduled/dispatched first and in case power was not required, generating units having higher cost were backed down under Merit Order Dispatch (MOD) principles. It was observed that consequent to surplus power, there was rising trend of backing down of generating units of the Company as discussed in **para 2.19.7.**

As on 31 March 2017, the total installed generation capacity in the State was 41,410 MW, out of which contribution of private sector and central sector was 19,950 MW (48 *per cent*) and 7,114 MW (17 *per cent*) respectively. The Company had contributed 53 *per cent* of the total installed capacity in the State in April 2007 which was reduced to 35 *per cent* in March 2017 while share of private generating companies had increased from 20 to 48 *per cent* during the same period.

The Company stated (October 2017) that due to enactment of Electricity Act, 2003 and delicensing of generation sector, many private players also planned their projects and demand growth did not happen as per forecast of EPS. Further, requirement of power in the State was assessed by MSEDCL and once the PPA was signed, the Company did not carry out assessment of power requirement but went ahead with the project implementation.

The reply of the Company itself indicated that the capacity addition plan was formulated without assessing the capacity additions from the private companies. Not assessing power requirement after signing of PPAs lacked justification as the MERC had also initiated *suo motu* proceedings for review of PPAs for the six deferred projects and had given an interim order (December 2017) to the Company to carry out a realistic assessment for need of these six projects considering demand supply scenario in the State, competitiveness of generating units, other PPAs of MSEDCL and projected generation from renewable sources. It was also directed to submit a fresh proposal/roadmap for taking decision regarding cancellation of these projects and their consequent removal from the PPAs[7], which was not submitted till date (February 2018).

Pre-implementation planning of five completed projects

2.8 For setting up of a power plant, various pre-order activities like investment approval of BoD/GoM, obtaining various kinds of approvals/statutory clearances, preparation of DPR, selection of site and technology, tying up for

[6] Green field projects: Latur (1,320 MW), Dondaicha (3,300 MW) and Dhopawe (1,980 MW) and replacement projects: Bhusawal (660 MW), Paras (250 MW) and Nashik (660 MW)

[7] Final order of MERC in this regard was awaited (February 2018)

inputs like coal, water, land *etc.* are required to be completed. Timely completion of pre-order activities ensures expeditious completion of projects.

The Company identified four projects[8] for implementation in October 2005 and another project (Parli) in December 2006. As per the capacity addition plan of the Company, these five projects were targeted for completion during XI Five Year Plan (FYP) (2007-12). These five projects were however delayed and completed in XII FYP. It was observed that the Company had not formulated a project management system laying down activity wise schedule for completion of each of the pre-order activities and hence activity wise delays in the five projects could not be identified.

In this connection, audit further observed as follows:

Indecision in selection of plant capacity

2.8.1 Audit observed that the Company obtained investment approval for Parli, Chandrapur and Koradi after a delay of 23, 29 and 36 months respectively from the date of their identification due to uncertainty in settling the planned capacity/ size[9] of these projects. As a result, these projects could be taken up for construction only during July 2008 to September 2009 and completed in last two years of XII FYP (during 2015-17) though planned to be completed in XI FYP.

The Company stated that for bringing latest technology and optimum use of available resources, different studies, approval and clearances from various authorities were involved which led to delay from date of identification to investment approval. The Company accepted the delays at various stages in the process. However, the fact remained that the Company's indecision in finalising the project size/capacity ultimately delayed execution of projects.

Deficiencies in Detailed Project Reports

2.8.2 Formulation of a proper DPR was a critical activity of project planning. Audit observed deficiencies in DPR like non-provision for construction of railway siding and imprudent selection of site as discussed below:

Non-provision for construction of railway siding

2.8.2.1 Audit observed that DPR for Bhusawal project provided for augmentation of railway siding facilities of existing units on grounds of reducing the project cost. This was without assessing its operational feasibility in consultation with the Railway authorities. Though, the DPR did not provide for construction of a new railway siding for coal handling facilities, the Company, after a delay of more than 20 months from date of placing (January 2007) order for Boiler, Turbine and Generator (BTG), awarded (October 2008) a contract for construction of a new railway siding at a cost of

[8] Bhusawal:1,000 MW, Khaperkheda:500 MW, Koradi:1,500 MW and Chandrapur:500 MW

[9] Initial planned capacity of Chandrapur, Koradi and Parli was 500 MW, 1500 MW and 250-300 MW unit which was changed to 1000 MW, 1980 MW and 250 MW respectively

₹ 62.54 crore. The railway siding was completed in April 2013, leading to substantial delay in project completion. This could have been avoided if the same was provided in the DPR and contract for railway siding awarded immediately after placement of order for BTG.

The Company stated that separate railway siding was not provided in the DPR due to cost considerations and the same was subsequently provided for owing to operational constraints on insistence of railways. Audit observed that the MERC had disallowed (April 2015) Interest During Construction (IDC) of ₹ 302.77 crore on account of delay contributed by the Company.

Imprudent selection of site

2.8.2.2 The Company constructed (November 2016) one unit of 250 MW in Parli. The DPR provided that water requirement for the project would be met by increasing the capacity of existing Khadka barrage by raising its height. The Company was aware of the fact that Parli had persistently/perennially faced water shortage/scarcity and hence existing water arrangements were not adequate for running five already existing units[10] at Parli simultaneously. In fact, existing five units were closed on account of water shortage for prolonged periods on various occasions during 2012-13 to 2016-17. Further, water shortage also contributed to delay in completion of the new project. During 2012-17, there was loss of generation of 19,235 MUs due to closure of existing units on account of water shortage. Further, two units of Parli (unit 4 and 5) were closed during the entire year 2016-17 (reserve shutdown) due to water shortage.

The MERC also observed (December 2017) that despite the persistent water shortage situation at Parli TPS, no concrete alternative arrangements have been made by the Company to ensure adequate water for power generation. Besides, Parli TPS was located far from the coal mine areas and hence the generation cost was higher than the stations located closer to the mines, which meant that the unit was inherently prone to backing down under MOD regime.

Thus, selection/construction of an additional unit in Parli at cost of ₹ 2,292 crore despite water shortage and without ensuring permanent water supply for existing units was not justified and the DPR was thus deficient to that extent**.** The Company's subsequent efforts to overcome the persistent water shortage at Parli were also unsuccessful as discussed in **para 2.14.4.1.**

2.8.2.3 The GoI had recommended (December 2007) the State Governments/ power utilities to optimise land requirements for coal based thermal power plants. The Company had assessed (June 2006) land requirement of 35 hectares for 250 MW (expansion unit). The DPR, however, proposed (2008) acquisition of 122.36 hectares land for the project, out of which 55 hectares was to be utilised for the current project and balance land for future expansion. The Company acquired 130.46 hectares of land for ₹ 3.16 crore (₹ 2.42 lakh per

[10] Five units (3 units of 210 MW each and 2 units of 250 MW each)

hectare) which was in excess by 75.46 hectares (130.46 hectares less 55 hectares) land costing ₹ 1.83 crore.

The Company stated that balance land could be utilised for future replacement projects in lieu of existing units which were very old. Further, it would have been very difficult to get adjacent land, if a new project was implemented and cost too would have been very high. The reply was not convincing as capacity additions at Parli were difficult in view of perennial/persistent water shortages besides being contrary to recommendations of GoI to optimise the land requirements. Further, for replacement projects, existing land could be utilised.

Coal arrangements

2.8.3 To ensure that the units are run at optimum level, adequate arrangements for procurement of coal and coal handling system were required. In this connection, audit observed as follows:

Non-availability of firm source of coal at the time of commissioning

2.8.3.1 For meeting coal requirements of the Khaperkheda project, Ministry of Coal (MoC), GoI had granted coal linkage through Letter of Assurance (LoA) issued (July 2010) by Mahanadi Coalfields Limited (MCL). The Company executed (March 2011/June 2012) Memorandum of Understandings (MoU) with MCL followed by execution (January 2013) of Fuel Supply Agreement (FSA), which was after a lapse of nine months from the date of commissioning of the project (April 2012). The MCL commenced coal supplies from April 2013 and hence there was no firm source of coal for running the project during 2012-13. The coal requirement of the project for the interim period was met partially by utilising the coal allocated to other units of the Company. Due to non-availability of firm source of coal, unit could not run on full load during the year 2012-13 which resulted in loss of generation of 659.72 Million Units[11] (MUs).

The Company stated that MCL delayed execution of FSA and did not make supplies under MoUs/FSA despite efforts taken by them at various levels. The fact remained that a new unit could not be operated at optimum level due to non-availability of coal tie-up before its commissioning.

Lack of firm source of coal for period beyond March 2019

2.8.3.2 As per the DPR, coal requirement for three projects at Koradi, Chandrapur and Parli was to be met from Machhakata coal block allocated (February 2006) by the MoC, GoI. The coal allocation was cancelled (August 2014/September 2014) as per the orders of the Supreme Court of India. Subsequently, the MoC allocated (March 2015) another coal block[12] to the Company for end-use of the three projects through e-auction. The tender for selection of a Mine Developer-cum-Operator (MDO) was floated (April 2016) by the Company and finalisation of MDO was in process (February 2018).

[11] As per information furnished by the Company

[12] Gare Palma Sector II coal block in Chhattisgarh

To meet the requirement of coal for the projects in the interim period before start of production from the allotted coal mine, MoC had granted (April 2016) Bridge Linkage (BL). As per the prevailing policy, the BL quantum was allotted for a period of three years from the date of coal allotment which was up to March 2019 and coal supply was 75 *per cent* of the agreed requirement[13] of coal. In view of uncertainties in development of coal block, the Company had requested MoC (July 2017) for extension of BLs up to October 2021, which was not granted till date (February 2018). Further, in the absence of adequate coal arrangements to meet full requirements of the project, the Company suffered loss of generation of 1,814 MUs due to coal shortage in two projects[14] during April 2017-February 2018.

Meanwhile, the Company had submitted (August 2017) before MERC that the coal grades from this coal block were inferior than those specified, which could make the development of coal blocks economically unviable and the Company was considering future course of action in this regard. Accordingly, MERC directed (December 2017) the Company to submit a detailed analysis and action plan with regard to the quality issues and cost effectiveness of development of the coal mine before finalising the appointment of the MDO. The MERC further stated that the Company had not prepared a concrete alternative plan for procurement of coal considering that the units were saddled with high capacity charges and directed to submit a detailed action plan on alternative coal sourcing options, which was not submitted till date (February 2018). Thus, existing coal arrangements were inadequate for running the plant to full capacity and there was lack of firm allocation of coal for operation of the three new projects (3,230 MW) beyond March 2019.

Inadequate Coal Handling System

2.8.3.3 Coal from various collieries transported through railway wagons is unloaded by wagon tipplers at coal stack yard in the Coal Handling Plant (CHP). The Bhusawal project (unit 4 and 5) was provided with two wagon tipplers in the CHP for unloading of coal in the stack yard having capacity of 1.50 lakh Metric Tonnes (MT). The capacity of wagon tipplers was, however, inadequate to unload entire coal meant for the project and hence coal had to be unloaded at stack yard of CHP of old units for reduction of railway demurrage charges. As a result, for meeting coal requirements of the project, coal was transported from old CHP by road. This led to an expenditure of ₹ 6.43 crore on road transportation of coal during the period from February 2013 to March 2017. The BoD had belatedly approved (October 2015) a scheme for providing interconnection between two CHPs at estimated cost of ₹ 24 crore for minimising road transportation costs with direction to the concerned TPS for ensuring implementation of the scheme by March 2017. The work order was, however, not finalised till date (February 2018) and hence the Company continued to incur additional expenditure.

[13] Calculated at 90 *per cent* of normative requirement of projects

[14] Parli: 534 MUs and Koradi: 1,280 MUs

The Company stated that NIT for the work was published in December 2016 and approval of BoD for placement of order on successful bidder was under process.

Project construction

2.9 The Company completed five thermal power projects at Bhusawal, Chandrapur, Khaperkheda, Koradi and Parli involving 4,730 MW[15] during 2012-17. All the five projects were constructed under two comprehensive Engineering, Procurement and Construction (EPC) contracts comprising Boiler, Turbine and Generator (BTG) Package and Balance of Plant (BoP) package. The Company awarded 10 EPC contracts of ₹ 20,867.48 crore for five projects to the lowest bidders as given in table below:

Sl. No.	Name of the project	Name of the contractor (Type of contract)	Date of issue of Letter of Award (LoA)	Awarded cost (₹ in crore)	Zero date of contract	Scheduled completion period (months)	
1	Parli	Bharat Heavy Electricals Limited, New Delhi (BTG)	20/01/2009	798.96	20/10/2009	Unit-8	36
		Sunil Hi Tech Engineers Limited, Nagpur (BoP)	01/01/2010	487.84	01/01/2010		24
2	Koradi	Larsen & Toubro Limited, Hyderabad (BTG)	23/09/2009	7,144.40	23/09/2009	Unit-8	51
						Unit-9	57
						Unit-10	63
		Lanco Infratech Limited, Hyderabad (BoP)	27/07/2010	1,305.72	27/07/2010	Unit-8	44
						Unit-9	44
						Unit-10	44
3	Chandrapur	Bharat Heavy Electricals Limited, New Delhi (BTG)	25/07/2008	2,691.35	09/02/2009	Unit-8	41
						Unit-9	44
		BGR Energy Systems Limited, Chennai (BoP)	12/06/2009	1,631.80	10/07/2009	Unit-8	32
						Unit-9	35
4	Bhusawal	Bharat Heavy Electricals Limited, New Delhi (BTG)	23/01/2007	2,564.82	23/01/2007	Unit-4	43
						Unit-5	47
		TATA Projects Limited, Secunderabad (BoP)	05/11/2007	1,891.95	05/11/2007	Unit-4	32
						Unit-5	36
5	Khaperkheda	Bharat Heavy Electricals Limited, New Delhi (BTG)	23/01/2007	1,352.62	23/01/2007	Unit-5	41
		BGR Energy Systems Limited, Chennai (BoP)	03/07/2007	998.02	03/07/2007		32
		Total		**20,867.48**			

Time overrun and cost analysis

2.10 Time provided for completion of the five projects was within a period of 32 to 63 months from the zero date of the contract *i.e.* date of issue of Letter of Award (LoA) to BTG contractor. According to terms and conditions of the contract, successful completion of trial run of the units was to be considered as

[15] Koradi: 1,980 MW, Chandrapur: 1,000 MW, Bhusawal: 1,000 MW, Khaperkheda: 500 MW and Parli: 250 MW

completion date of the contract for the project. Details of project-wise scheduled date of completion of trial run, actual date of completion of trial run and delay in completion are given below:

Sl. No.	Project	Unit no.	Capacity (MW)	Scheduled date of completion of trial run	Actual date of completion of trial run	Delay (in months)
1	Khaperkheda	5	500	22-06-2010	04-04-2012	20
2	Bhusawal	4	500	22-08-2010	29-10-2012	26
3		5	500	22-12-2010	19-03-2013	26
4	Chandrapur	8	500	08-07-2012	09-11-2015	40
5		9	500	08-10-2012	22-11-2016	49
6	Parli	8	250	19-10-2012	18-11-2016	49
7	Koradi	8	660	22-12-2013	09-11-2015	22
8		9	660	22-06-2014	31-05-2016	23
9		10	660	22-12-2014	14-01-2017	24

(Source: Data furnished by the Company)

It could be seen from the above that none of the nine units (five projects) were completed within the scheduled time limit and delay in completion of trial run ranged from 20 to 49 months. Analysis of delay in project execution is discussed subsequently in **para 2.12, 2.13.1 and 2.13.2.**

2.11 Details of original cost *vis-a-vis* actual final cost (as on the date of commissioning) of five projects were as given below:

(₹ in crore)

Sl. No.	Name of project	As per DPR		Actual final cost on the date of commissioning[16]		Increase in cost	
		Estimated cost	Cost per MW	Cost	Cost per MW	Amount	*Per cent*
1	Koradi	11,880	6.00	14,818	7.48	2,938	24.73
2	Chandrapur	5,500	5.50	7,180	7.18	1,680	30.55
3	Khaperkheda	2,170	4.34	3,570	7.14	1,400	64.52
4	Bhusawal	4,123	4.12	7,152	7.15	3,029	73.47
5	Parli	1,375	5.50	2,292	9.17	917	66.69
	Total	**25,048**		**35,012**		**9,964**	**39.78**

(Source: Data furnished by the Company)

In respect of all these five projects, there was total cost increase of ₹ 9,964 crore (39.78 *per cent*) ranging between 25 *per cent* (Koradi) and 73 *per cent* (Bhusawal). Consequently, actual construction cost per MW of all the units had increased substantially compared to estimated cost in DPR, with

[16] Final cost of Koradi, Parli and Chandrapur may increase on capitalisation of minor balance works being carried out post commissioning of the units

Parli project being most expensive at ₹ 9.17 per MW. The major cost elements which increased/decreased were as follows:

Sl. No.	Increased		Decreased	
	Cost element	**Amount (₹ in crore)**	**Cost element**	**Amount (₹ in crore)**
1	Interest during construction (IDC) on loans	5,620	Overheads/ Contingencies	1,403
2	Basic cost of EPC contract including taxes and duties (BTG and BoP)	3,861	Minor civil works	406
3	Price variation	2,004	Land and development at site	28
4	Civil work	316		
	Total	**11,801**		**1,837**

(Source: Data furnished by the Company)

Financial implications of delayed project execution are discussed subsequently in **para 2.17.1 to 2.17.4.**

Delay analysis

2.12 The Company had appointed (May 2015 to July 2016) third parties[17] to analyse the delays in these five projects. The Company/third party analysis reports attributed delay in project execution due to financial crisis of the BoP contractors and poor performance of BTG/BoP contractors. The reports also highlighted delay in supply of materials and in erection, non-deployment of adequate skilled manpower, failure of some of the equipment and auxiliary during erection and commissioning causing rework, inadequate and inferior quality of coal (Bhusawal) and water shortage (Parli) as given in ***Annexure 6.***

➢ The EPC contracts stipulated scheduled date of completion for various electrical, mechanical and civil works of the projects. The contractors could not complete any of the major milestones/activities within the stipulated time period. These were completed after a delay of six to 2,569 days which delayed the trial run of the units as given below:

Sl. No.	Name of the Project	Unit No.	Delay in completion of major milestones/activities (in days)
1	Khaperkheda	5	62 to 381
2	Bhusawal	4	33 to 464
		5	42 to 539
3	Koradi	8	6 to 659
		9	63 to 878
		10	26 to 799
4	Chandrapur	8	147 to1,050
		9	271 to 1,367
5	Parli	8	10 to 2,569

Delay in completion of major activities delayed the trial run of all the five projects. There was lack of coordination between the BTG and BoP works, due to which interrelated works were affected on account of non-availability of inputs for further works.

[17]MECON Limited, Ranchi (Chandrapur, Khaperkheda and Parli) and Central Power Research Institute (Bhusawal and Koradi)

➢ As per contractual terms, if the contractor neglected to execute the works as defined in the contract with due diligence and expedition, a notice in writing was to be given to contractor to make good the failure/neglect. In case the contractor fails to comply with notice within one week from the date of service thereof, the Company could take the works wholly or in part out of the Contractor's hand and re-contract with any other person or persons to complete the works or any part thereof at his risk and cost. In addition, the contractor remained responsible for payment of Liquidated Damages (LD) for delay and performance guarantee furnished by the terminated contractor also remained valid for the full value and for the full period of the contract. Though the performance of contractors were poor since commencement of the contract and none of the milestone stipulated in the contract were achieved, the Company did not take required action as per the contractual terms.

The Company stated that termination of contract was an extreme step and would not have been time and cost efficient in view of difficulty in assessment of balance work, time involved in re-tendering, legal issues and issues related to performance guarantees of material/equipment. The reply was not convincing as the MERC had stated (December 2017) that the delay in execution of three projects (Koradi, Chandrapur and Parli) was not due to any sudden or unforeseen activities but slow progress/slackness in project execution was noticed from the initial stages itself during which even adequate manpower was not mobilised for taking up the works. Accordingly, the MERC had disallowed IDC of time overrun in these three projects attributing delay was partly within control of the Company to that extent.

Avoidable delays in project execution

2.13 Audit observed that there was avoidable delay in project completion due to factors within management control as discussed below:

Delay in finalisation of BoP contracts

2.13.1 Completion of main plant (BTG package) was dependent on availability of various inputs from BoP contractor. Audit observed that the Company awarded contracts of BoP package for the five projects after a period of five to 12 months from the date of award of orders for BTG package. This contributed to substantial delay in project completion. In fact, Koradi project was delayed by 797 to 948 days due to delay in availability of Natural Draft Cooling Tower (NDCT) to BTG contractor for all the three units, construction of which was under the scope of BoP contractor.

The Company stated that it was not the period by which BoP orders were placed after placement of BTG package, but synchronisation of BoP activities so as to make the inputs ready for scheduled BTG activity. The reply was not convincing as delays in project execution could have been minimised had the BoP contracts been awarded soon after placement of BTG contracts.The CEA/MERC had also stated (April 2015/December 2017) that delay in finalisation of BoP contracts was one of the factors which contributed to delayed project execution of Parli and Chandrapur projects.

Delay in commencement of commercial operations despite successful completion of trial run

2.13.2 As per terms and conditions of contract, successful completion of trial run of the units was to be considered as completion date of the contract for the project. After the trial run was carried out successfully, unit was handed over by the contractor to the Company for declaration of Commercial Operation Date (CoD). Before CoD, the Company was required to obtain Consent to Operate (CTO) from Maharashtra Pollution Control Board (MPCB) by ensuring compliance with conditions of Environment Clearance (EC) granted by the Ministry of Environment & Forest and Climate Change (MoEFCC), GoI.

Audit observed that out of the nine units commissioned during 2012-17, the Company did not ensure CTO prior to successful completion of trial runs in respect of two units, which led to avoidable delay of 381 days in CoD and loss of generation of 4,454 MUs valuing ₹ 865.58 crore as stated below:

Sl. No.	Unit No	Date of successful completion of trial run	COD	Delay (in days)	Loss of generation		Reasons for delay
					Units (in MUs)	Amount (₹ in crore)	
1	Chandrapur 8	09/11/2015	04/06/2016	207	2,111	319.96	EC for the project granted in January 2009 was valid for a period of five years up to January 2014. Considering, delay in completion of the project, the Company was required to obtain extension of EC before its expiry, which was not done. After a delay of 17 months, application for re-validation of the EC was submitted (July 2015). On receipt of EC on 31 March 2016, MPCB granted CTO on 13 May 2016 for the unit. Thus, delay by the Company to renew the EC before its expiry resulted in avoidable delay in CoD.
2	Koradi 9	31/05/2016	22/11/2016	174	2,343	545.62	The Company submitted (January 2016) application for issue of CTO, which was rejected by the MPCB due to non-compliance with conditions (January 2010) of EC regarding installation of Flue Gas Desulphurisation (FGD) and prescribed pollution control systems. The CTO was conditionally granted by MPCB on 3 October 2016 after obtaining undertaking from the Company that they would install FGD to unit 9 within six months period and Bank Guarantee of ₹ 25 lakh for compliance of the same. Thus, CoD was delayed due to non-compliance with conditions of EC.
	Total			**381**	**4,454**	**865.58**	

The Company stated that:

- In Bhusawal project, Company had obtained CTO after the expiry of EC since all the trial runs were completed. Hence, it was decided to directly go for CTO for Chandrapur 8 unit to save further delay.
- The Company had appealed to MoEFCC for waiver of Flue Gas Desulphurisation (FGD) condition for Koradi 9 and the same was intimated to MPCB which led to delay in obtaining CTO.

The reply itself indicated that CTO was delayed on account of various reasons like expiry of EC, non-compliance with terms and conditions of EC and lack of follow up with MPCB which led to IDC of ₹ 289.22 crore during the delay period thereby increasing the project cost to that extent, which was avoidable.

Deficiencies in Project execution

2.14 Audit observed instances of deficiencies in project execution like pre-mature commissioning of units, issues related to quality of material/ workmanship of EPC contractors, water arrangements, Ash disposal arrangements/systems and coal conveying arrangements.

Premature commissioning of projects

2.14.1 As per MERC regulations, full Annual Fixed Charges (AFC) incurred by the Company could be recovered only if actual availability was equal to or higher than the approved target. In case of shortfall in Plant Availability (PA) during any year, recovery of AFC was proportionately reduced and hence the Company had to bear that loss. Audit observed that there was premature commissioning of two units which adversely impacted their PA as discussed below:

- The Company declared commercial operation of Parli project on 19 November 2016. However, major/critical works related to CHP, necessary for sustained operation of the project were not completed. Consequently, the unit was withdrawn on the same day (19 November 2016) up to 17 March 2017 for completion of pending works. Thus, the unit was closed for 118 days (89 *per cent*) out of total 132 days available for operation during 2016-17. This was the major factor which contributed to extremely low PA of 4.44 *per cent* as against norms of 85 *per cent* leading to non-recovery of fixed cost (refer **para 2.19.1)**.
- The Company declared commercial operation of Koradi (unit 10) on 17 January 2017, without completion of major/critical works related to Ash Handling Plant (AHP) and NDCT, which were necessary for sustained operation of the unit. Consequently, unit was withdrawn immediately after its commissioning from 07 February 2017 to 08 April 2017 for completion of pending works. As a result, the unit was closed for 52 days (71 *per cent*) out of total 73 days available for operation during 2016-17. This was the major factor which contributed to lower PA of 47.2*6 per cent* as against norms of 85 *per cent* and loss due non recovery of fixed cost as discussed in **para 2.19.1.**

The Company stated that commercial operation declaration was final target of the Company so as to start its earning and there by commencing repayment of the loan. The fact remained that pre-mature commissioning of units led to non-recovery of fixed costs during that period.

Irrecoverable loss of revenue due to defective/inadequate systems

2.14.2 As per the terms and conditions of the EPC contracts, generating units were to be commissioned after successful completion of trial run during which all the equipment should run to prove their performance and contractor shall demonstrate capabilities of his supplied equipment as per contract specifications. If the trial run was not satisfactory then based on the observations during trial operation, necessary modification/repairs to the plant/equipment were to be carried out by the contractor and on completion of such works, the trial operation was to be repeated again on a date and for a period to be mutually decided. After commissioning of units, the contractor was responsible for replacement/rectification/repair of any defective part in the equipment arising from faulty installation/design, material or workmanship at his cost during defect liability period of one year from the date of successful completion of Performance Guarantee tests. However, the contractor was not liable for any indirect or consequential losses or damages on this account and hence the Company needed to ensure that identified problems are rectified prior to commissioning of the units to safeguard its financial interests.

Audit observed instances of non-rectification of defects noticed since construction stage and erection/acceptance of plants with inadequate systems in three projects which contributed to lower PA/Plant Load Factor (PLF) and consequent irrecoverable loss of revenue on account of disallowance of fixed costs and loss of generation as discussed in **para 2.19.1.** Project wise cases are as discussed below:

Koradi project

- Fly ash generated during the process of coal burning is collected in Electrostatic Precipitator[18] (ESP). The Company had provided for dry fly ash evacuation system in Ash Handling Plant (AHP) of all the five projects for evacuation of fly ash from ESP. The installed system, however, could not perform satisfactorily and hence the Company had to additionally install wet ash evacuation system at cost of ₹ 95.76 lakh at two earlier projects (Bhusawal and Khaperkheda) for overcoming system problems. In fact, there was a major incidence of collapse (November 2013) of ESP hoppers of Bhusawal project (unit 5) due to huge accumulation of fly ash which substantially delayed commercial operation of the unit at full load. Accordingly, the Company had decided (March 2014) to implement standby arrangement of wet fly ash evacuation system for ongoing projects[19] before their commissioning for overcoming AHP problems.

[18] ESP has 108 hoppers (nine rows having 12 hoppers each) for ash collection per unit

[19] Koradi, Chandrapur and Parli

Audit observed that wet fly ash system was not installed before commissioning of first unit at Koradi (unit 8). Further, the unit was commissioned (December 2015) with contingency arrangement of buffer hopper which was inadequate for optimum performance of unit, despite awareness of the fact that any indirect or consequential losses or damages on this account were not recoverable from the contractor. Due to ash evacuation problem from ESP hoppers, unit had to be run on partial load besides there were various instances of closure of unit due to high levels of fly ash and tripping/non-availability of ESP fields leading to huge loss of generation to the extent of 927 MUs[20] of ₹ 233.25 crore during 2015-17. Similar problems of AHP were noticed in unit 9 which led to loss of generation of 361 MUs (valuing ₹ 84.26 crore). AHP problems constituted 26 and 42 *per cent* of total generation loss of unit 8 and 9 respectively, which was the major reason for lower PA/PLF. The Company, after a lapse of 18 months from commissioning of the unit, approved (July 2017) for installation of wet ash evacuation system at cost of ₹ 25.17 crore for all the three units[21] and the work was yet to commence (February 2018).

- Problems of Induced Draft/Forced Draft fans[22] in the main plant of unit 8 and 9 installed by the BTG contractor[23] were noticed by the Company since trial run/construction stage. The problems were not rectified prior to commissioning and were recurring till date (February 2018). During 2015-17, the Company suffered loss of generation of 615 MUs[24] (unit 8:297 MUs and unit 9: 318 MUs) valuing ₹ 148.15 crore[25], which was eight and 37 *per cent* of total generation loss of unit 8 and 9 respectively.

Chandrapur project

Audit observed that there were 10 incidences of Boiler Tube Leakages (BTL) during trial run/construction stage of the project (unit 8 and 9). The Company did not ensure rectification of BTL problem from the BTG contractor[26] prior to commissioning of units. As a result, there were recurring incidences of BTL even after commissioning of plants, which led to forced outages of the both the units on 11 occasions[27] during 2016-17 leading to loss of generation of 586 MUs[28] valuing ₹ 128.80 crore[29]. In fact, BTL accounted for 24 and 42 *per cent* of total generation loss of unit 8 and 9 respectively and thus was the major factor which contributed to lower PA. Though the Company attributed BTL on erection failure of Bharat Heavy Electricals Limited (BHEL),

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[20] As per information furnished by the Company and energy charges approved by MERC

[21] First two rows of ESP hoppers of all the three units

[22] Induced Draft fan sucks out the exhaust gas from inside the furnace and discharges it into the chimney and then the atmosphere. Forced draft fan supplies fresh atmospheric air into the furnace to support the combustion of fuel

[23] Larsen & Toubro Limited, Hyderabad (BTG)

[24] As per information furnished by the Company

[25] Unit 8 : ₹ 73.93 crore and unit 9: ₹ 74.22 crore

[26] Bharat Heavy Electricals Limited, New Delhi

[27] Unit 9: 4 BTLs (233 MUs) and unit 8: 7 BTLs (353 MUs)

[28] As per information provided by the Company

[29] 586 MUs x ₹ 2.198 per unit being MERC approved energy charges for 2016-17

consequent loss of revenue could not be recovered from the contractor in view of the contractual terms.

Bhusawal project

Audit observed that the project had faced problems of BTL since trial run/ construction stage. The Company did not ensure rectification of BTL problem from the BTG contractor[30] prior to commissioning of units. As a result, there were recurring incidences of BTL even after commissioning of plants, which led to forced outages of the both the units during 2012-13 to 2016-17 leading to loss of generation of 1,521 MUs[31] (unit 4: 1,096 MUs and unit 5: 425 MUs). BTL accounted for 14 and nine *per cent* of total generation loss of unit 4 and 5 respectively, which was one of the recurring factors impacting operational performance of the units.

The Company stated that:

- The proposal for providing standby arrangement of wet fly ash evacuation system at Koradi was kept on hold due to non-readiness of AHP by BoP contractor. It was also decided to judge the performance of ash evacuation system during operation of the units before taking decision of installation of wet ash system. As the performance of ash evacuation system was not satisfactory due to poor coal quality, it was decided to install the wet ash system. Further, fan problems occurred due to minor defects which had been attended immediately.

- BTL was a general phenomenon which had minimised after completion of stabilisation period of all the units and various actions had been taken.

- The performance related issues were attributed to stabilisation period of units and supply of lower quality of coal having high ash content

The reply was not tenable as it did not address the issue of non-rectification of recurring defects which had been noticed/identified during trial run which adversely impacted operational performance of the units and consequent irrecoverable loss of revenue. Further, reply was silent on the issue of installation of inadequate AHP at Koradi and non-implementation of preventive /corrective action for overcoming known system problems prior to commissioning of units as already decided.

Modification/rectification of newly installed systems

2.14.3 As per the scope of EPC contracts mentioned under General Conditions of the Contract, contractors were responsible for detailed design and engineering of all equipment and necessary auxiliaries and systems as a whole including complete civil works. These were required to conform to high standards of quality and should be capable of performing in continuous operation in satisfactory manner. Further, contractors within the contract price

[30] Bharat Heavy Electricals Limited, New Delhi

[31] As per information provided by the Company

were required to provide all supplies and services including any equipment or accessories not specified in the contract but which were required for satisfactory completion of the project and safe/successful Operation and Maintenance (O&M) of the same on total turnkey basis.

Audit, however, observed that the Company carried out various modifications/ rectifications in the systems installed by EPC contractors at two projects (Koradi and Chandrapur) for sustained and safe/successful operation at its own cost incurring extra expenditure of ₹ 5.15 crore. Further, various works for modification/rectification of installed systems[32] involving expenditure of ₹ 6.10 crore were also approved by the Company for execution at their cost. Further, the Company had also incurred expenditure ₹ 42.11 crore in Koradi project for completion of works not carried out by the EPC contractors and repairs/restoration of various auxiliaries/equipment prematurely failed during defect liability period. Though, these works were stated to be executed at risk and cost of the contractors[33], no recovery was made till date (February 2018).

The Company had to bear consequential generation losses and damages arising from installation of inadequate and defective equipment as the same were not recoverable from the contractors as per the contractual terms besides exposing plant to safety risks. These issues were not considered adequately by the Company before acceptance of plants after trial run from the contractors.

The Company stated that works were required for smooth running of the system, meeting normative parameters and safety of the plant/human being. Further, works of ₹ 2.26 crore at Koradi were necessitated due to non-availability of washed coal as per plant design. Thus, the reply of the Company indicated that the design and drawings of the project finalised/approved by the Company were not adequate for safe/successful O&M of the plant as accepted in the reply.

Water arrangements

2.14.4 The Company executed MoUs/agreements with the State Government authorities for supply of water for the projects. In this connection, audit observed as follows:

Non-viable water scheme

2.14.4.1 In order to overcome persistent water shortage at Parli, the Company decided to finance a water supply scheme of the GoM. Accordingly, the Company executed (March 2013) a MoU with Godawari Marathwada Irrigation Development Corporation (GMIDC), Aurangabad for constructing Majalgaon Lift Scheme to supply flood water in rainy season from Loni Sawangi barrage. As per terms of MoU, Company was required to pay capital contribution of ₹ 199.86 crore and GMIDC/Water Resources Department (WRD) agreed to supply water from Majalgaon dam to Parli TPS. The Company paid an amount

[32] Coal handling plant, turbine, coal mill reject system, control panels *etc*.

[33] Larsen & Toubro Limited, Hyderabad : ₹ 35.15 crore and Lanco Infratech Limited, Hyderabad : ₹ 6.96 crore

of ₹ 142 crore to GMIDC during the period from June 2013 to January 2015 by availing loan from Power Finance Corporation Limited (PFC).

Audit noticed that GMIDC had already awarded (November 2010) the contract for execution of project at cost of ₹ 163.68 crore, more than two years before execution of MoU. The work[34] was, however, stopped since March 2015 due to land acquisition problems. The GoM constituted (September 2015) a committee[35] for revaluation of the scheme with directions to submit the report by October 2015, which had not been submitted till date (February 2018). The GoM further pointed out (May 2016) that water in the barrage was never full during last four to five years (2011-12 onwards) and hence it was not possible to supply water to Parli project from the scheme.

Thus, financing of a scheme without ascertaining the viability thereof, resulted in blocking of funds of the Company to the extent of ₹ 142 crore and avoidable interest expenditure of ₹ 57.90 crore[36], which added to financial burden to the Company.

The Company stated being a deposit work it was the responsibility of the GMIDC for execution of the scheme including acquisition of land. The reply of the Company was not tenable as though the scheme was under execution by GMIDC, the Company agreed to finance the same and hence necessary due diligence should have been exercised to ascertain viability of the scheme.

Non adjustment of interest free advance against water charges

2.14.4.2 The Company receives raw water for old units[37] of Bhusawal TPS from Hatnur reservoir. For meeting water requirements of new units of Bhusawal project (unit 4 and 5) from the existing Hatnur reservoir, the Company approached GoM and Tapi Irrigation Development Corporation (TIDC), Jalgaon. The Company's request was rejected citing non-availability of water. The GoM suggested that additional water requirement could be met from Ozerkheda dam. Accordingly, the Company executed (August 2008) a MoU with GoM and TIDC for supply of additional water for Bhusawal project from Ozerkheda dam. As per terms and conditions of MoU (August 2008), the Company paid interest free advance of ₹ 60 crore to TIDC during the period from September 2009 to February 2012. This advance was to be adjusted against the charges of water being supplied from Hatnur reservoir. Both old and new units were supplied water from Hatnur reservoir as the proposed Ozerkheda dam was not completed till date (February 2018).

Audit observed that the Company did not adjust the advance against water bills of the old units which were supplied water from Hatnur reservoir and continued

[34] Supply of pipelines and erection of pumping station was completed

[35] Includes Principal Secretary of WRD, Energy, Drinking Water and Sanitation Departments, CMD of the Company and Chief Engineer (Hydrology project), Nashik

[36] The loan was drawn during the period from March 2013 to January 2015 and the prevailing rate of interest was 10.22 *per cent per annum*

[37] Two units of 210 MW

making payments[38] for the same till date (February 2018). Adjustment of advance was started belatedly against water bills of new units (500 MW) after its commissioning in November 2012 and only ₹ 8.86 crore was adjusted till |March 2017. The entire advance could have been adjusted by October 2015. Thus, non-adjustment of advance against water charges as per MoU resulted in loss of interest the extent of ₹ 24.93 crore[39], when the Company was already under financial constraints.

The Company stated that agreement for the water charges of old units was signed with Irrigation Department (GoM), Jalgaon while MoU was signed with TIDC. The reply was not acceptable as the terms of MoU clearly provided for adjustment of advance against water charges of old units. The Company during Exit Conference (October 2017) assured that terms and conditions of MoU would be reviewed.

Ash disposal arrangements

2.14.5 For sustained operation of a thermal generation unit, arrangements are made for disposal of ash in dry form or through water slurry from ash pipe lines to ash bund. Audit observed as follows:

Blocking of funds and extra expenditure

2.14.5.1 As per the provisions of Maharashtra Public Works Manual (March 1984), no work should be started on land which was not acquired and not under possession.

In respect of Khaperkheda project, the Company planned for construction of ash bund on the land acquired at Nandgaon. For laying of ash disposal pipe lines from Khaperkheda project to Nandgaon ash bund, the Company had acquired (December 2001 to June 2002) a strip of land. Subsequently, GoI acquired (2005-07) certain portion of the above land for Western Coalfields Limited (WCL) and the Company ceased to be owner of the said land. The Company and WCL identified an alternate corridor for laying of ash pipelines and accordingly a proposal along with a draft MoU was submitted (May 2010) to the GoI. The GoI granted (June 2010) permission for the same with condition that ownership of land would remain with WCL and the Company would pay lease rent. The MoU was, however, executed after a delay of more than four years (October 2014) and lease agreement for transfer of land has not been executed till date (February 2018). Though, the land required for laying ash pipe lines was not in possession of the Company, it awarded (August 2010) the contract for construction of Nandgaon ash bund, which was completed in March 2016 at cost of ₹ 74.37 crore. The ash bund was lying idle due to non-availability of ash pipe lines required for transporting fly ash from the project (February 2018). Thus, there was blocking of funds to the extent of ₹ 74.37 crore due to construction of ash bund despite non-availability of land

[38] Payment of ₹ 80.21 crore was made till March 2017

[39] Interest worked out on payments made against the water bills of old units at the rate of 10 *per cent per annum* being average rate of working capital/cash credit

for laying ash pipe lines, which strained resources of the Company when it was already under financial constraints.

As the ash bund was not constructed/available, the Company had to make contingency/standby arrangement for ash disposal from existing Waregaon ash bund by incurring extra expenditure of ₹ 38.05 crore, in order to meet exigency of COD (April 2012) of the project.

The Company stated that ash pipe line would be completed before March 2018 and ash bund would be utilised.

2.14.5.2 The Company awarded (January 2014) a contract for laying of RCC pedestals for ash disposal pipe lines of Khaperkheda project, including that on WCL land. The agency erected 170 numbers of pedestals on the WCL land at a cost of ₹ 49.62 lakh. The Company thereafter suspended the work in June 2014 and contract was finally short closed (June 2015) in view of court case filed by WCL against the Company for carrying out construction on their land. Thus, the Company incurred unfruitful expenditure of ₹ 49.62 lakh on work undertaken on WCL land.

The Company stated that construction works were carried out as land was in possession of Company before WCL notification and alternative strip of land was not provided by WCL, which was essential for disposal of fly ash. The reply was not tenable as the Company had commenced construction on WCL land without obtaining their consent.

Coal conveying arrangements

Loss of Interest due to funds lying idle with a third party

2.14.6 The Company had constructed a new railway siding for transporting coal in Bhusawal which was crossing National Highway (NH) and hence it was proposed to construct a Road Over Bridge (ROB) on NH. The Company referred the matter to National Highway Authority of India (NHAI) for construction of ROB on deposit basis. NHAI approved (December 2010) construction of a temporary manned crossing to ensure transportation of coal to the project until completion of ROB. NHAI insisted on advance payment of entire cost and execution of agreement before installing temporary gate on NH for blocking traffic during transportation of wagons. The Company accepted (April 2012) the conditions of NHAI and an agreement was executed (April 2012) for construction of ROB on advance payment deposit of ₹ 124.52 crore (May 2012). The work of construction was, however, not commenced till date (February 2018). The expenditure was funded from loan from Rural Electrification Corporation Limited and the Company had incurred ₹ 71.04 crore towards interest[40] on funds lying idle with NHAI (till October 2017) which had affected profitability of the Company.

[40] Loan was drawn on 31 May 2012 and current rate of interest is 10.22 *per cent per annum*

Payments and recoveries

2.15 Audit observed various shortcomings like abnormal delay in recovery of Liquidated Damages (LD), non-recovery of labour cess in contravention of the statutory provisions, non-recovery of interest free mobilisation advances as per CVC guidelines, irregular refund of interest and excess payment to contractors as discussed below:

Non-recovery of Liquidated Damages for delay

2.15.1 The EPC contracts provided for levy of LD at the rate of half *per cent* of the contract price per week of delay or part thereof subject to maximum of 10 *per cent* of the contract price for delay in the completion of works. The contract further provided that liability of payment for LD would be established once the delay in completion was established on the part of the contractor and the Company should not be required to take any further action like arbitration or approaching the court of law for levying the LD. The LD for delay was recoverable at sole discretion of the Company from contract price or from other securities available.

It was observed that all the five projects were completed (April 2012 to January 2017) with delay, which the Company attributed to poor performance of the contractors. As per information furnished by the Company, LD of ₹ 2,705.81 crore[41] was recoverable from the 10 contractors as per the contractual terms. The Company, however, had recovered LD of only ₹ 408.90 crore leading to shortfall of ₹ 2,296.91 crore. This included five contracts where no recovery was made though an amount of ₹ 870.89 crore was recoverable. The Company had refunded LD collected from contractors from time to time against Bank Guarantees and deferred further recovery citing special financial support to contractors for expediting completion of projects. The Company, however, should have finalised LD immediately after completion of the projects. Thus, there was abnormal delay in recovery of LD which led to irrecoverable loss of interest to the extent of ₹ 237.30 crore[42].

It was further observed that the Company had belatedly appointed (May 2015 to January 2017) third party agencies at the cost of ₹ 3.28 crore for delay analysis. Third party analysis report of three projects (Koradi, Khaperkheda and Bhusawal[43]) were submitted (November 2015 to March 2017) to the Company while that of two projects (Chandrapur and Parli) were awaited (February 2018). The report of Koradi (October 2016) and Khaperkheda (March 2017) also concluded that substantial delays were due to BTG and Balance of Plant (BoP) contractors while in respect of Bhusawal project BoP (November 2015) contractor was responsible for delay. No action was, however, taken for recovery of LD till date (February 2018).

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[41] Koradi: ₹ 1,261.80 crore, Bhusawal: ₹ 518.65 crore, Chandrapur: ₹ 498.07 crore, Khaperkhed: ₹ 273.89 crore and Parli: ₹ 153.40 crore

[42] Calculated at the rate of 10 *per cent per annum* on unrecovered LD amount of ₹ 2,296.91 crore from date of commissioning of units till October 2017

[43] Delay analysis report was sought for only BoP contract for Bhusawal

The Company stated that LD would be recovered from contractors after acceptance of delay analysis report. The reply was, however, silent on abnormal delays in finalisation of LD despite the third party analysis reports attributing project delays to contractors.

Non-recovery of labour cess

2.15.2 The GoM had notified (April 2008) recovery of labour cess from the contractors at the rate of one *per cent* of the construction cost of the building/ project (excluding cost of land) and deposit the same to the Building and Other Construction Workers Welfare Board within a period of 30 days from the date of collection.

After issue of GoM notification, the Company awarded various contracts in respect of projects at Koradi, Chandrapur and Parli. As per the terms and conditions of contracts, contract price included all taxes and duties and the contractors were entirely responsible for payment of all taxes, license fees, registration fees *etc*. and other such levies imposed in owner's country and outside the owner's country within the contract price. Audit observed that the Company had paid an amount of ₹ 15,484 crore (up to May 2017) to EPC contractors of three projects without recovery of labour cess of ₹ 154.84 crore in contravention of the Act.

The Company stated that project construction works were carried out in premises of existing plants for which necessary approvals were obtained under the Factories Act, 1948. Hence, labour cess was not applicable and condition for recovery of the same was not incorporated in the work orders. The reply was not convincing as various High Courts[44] from time to time as well as Supreme Court of India in its order dated 18 October 2016 had held that construction workers were not covered under the Factories Act, 1948 and that contractors were liable to pay labour cess in absence of any operations/manufacturing process. Further, contractual terms provided for payment of all taxes/levies within the contract price.

Recovery of mobilisation advance

2.15.3 As per CVC guidelines (April 2007), recovery of interest free mobilisation advance should be time based instead of being linked to progress of work. This would ensure that even if contractor was not executing the work or executing at a slow pace, recovery of advance could commence and scope of misuse of such advance could be reduced. As per the terms and conditions of EPC contracts, 10 *per cent* mobilisation advance paid to the contractors was interest free up to the scheduled date for completion of entire work under the contract. The Company granted advance of ₹ 1,437 crore for five projects, against which an amount of ₹ 1,138 crore was recovered up to the scheduled completion date based on bills submitted by the contractors. There was unrecovered advance of ₹ 299 crore which was lying unutilised with the contractors at the end of the scheduled contractual period.

[44] High Courts of Allahabad, Odisha, Madhya Pradesh and Karnataka

The Company stated that the recovery of advance was made through bills but was silent on not ensuring time based recovery of advances.

Refund of interest

2.15.4 In case of delays beyond the stipulated completion dates, interest[45] was to be recovered from the contractors on the outstanding unrecovered mobilisation advance. Audit observed that project offices at Chandrapur and Parli had recovered interest from BoP contractors to the extent of ₹ 15.08 crore and ₹ 6.18 crore respectively. However, subsequently entire amount of ₹ 21.26 crore was refunded (March 2015 to June 2016) to the contractors against the contractual terms, citing extension of financial support for early completion of project.

The Company stated that refunded amounts would be recovered from the contractors at the time of final payment to the contractor. The fact remained that the act of the Company was contrary to the terms and conditions of the contract and led to loss of interest to the Company.

Excess payment for imported coal

2.15.5 The Company issued (September 2011 to October 2012) Letter of Award (LoA) to MMTC Limited for supply of non-coking (steam) coal of foreign origin at Bhusawal, Khaperkheda and Chandrapur. According, to the terms and conditions of contract, in case basic concessional Custom Duty (CD) became applicable during the contractual period, the seller was responsible in all manner including completion of formalities in order to obtain concession in CD and such benefit was to be passed on to the purchaser. In case, the same was not availed, the Company had the right to recover from outstanding payments of the seller.

Audit observed that the MMTC supplied imported coal from Indonesia during the period from October 2011 to March 2013 against the said contracts. As per the notification of GoI (June 2011 and March 2012), imported coal from Indonesia was charged preferential Basic Custom Duty (BCD) of zero *per cent*. However, the Company made reimbursement of ₹ 13.40 crore to MMTC towards BCD on the basis of documentary evidence regarding payment of the same as furnished by MMTC. However, as the MMTC did not avail the benefit, the same should have been recovered from the supply bill which was not done by the Company. Thus, there was excess payment of ₹ 13.40 crore to MMTC.

The Company while accepting the audit findings stated that MMTC had been requested to deposit the amount of ₹ 13.40 crore to it and they had failed to do so.

[45] 14.25 *per cent per annum* for BoP and one *per cent* above borrowing rate for BTG contracts

Non-recovery of capital cost

2.15.6 The Company executed (October 2008) an agreement with Nagpur Municipal Corporation (NMC) for construction and operation of a Sewage Treatment Plant (STP) for utilisation of sewage treated water for Koradi project. As per the agreement, NMC was required to pay ₹ 90 crore towards capital cost of the project, as and when demanded by the Company or as per physical progress of work, whichever was later. However, the Company did not safeguard its financial interest by incorporating a suitable provision in the agreement regarding payment of interest in case of delayed payment by NMC.

The Company completed construction of the STP on 19 July 2016 at the cost of ₹ 177.33 crore from its own funds/loan. It was observed that the NMC paid an amount of ₹ 79.09 crore till 31 August 2015 in instalments. However, balance amount of ₹ 10.91 crore has not been paid by the NMC till date (February 2018) despite demands raised by the Company on various occasions (October 2015 to May 2017). As a result, the Company had to bear interest burden of ₹ 1.67 crore[46] thereon, which increased project cost to the same extent.

The Company stated that continuous follow up was being made with NMC for recovery of balance amount. The fact remained that the Company had to bear the interest burden in absence of any penal clause in the agreement.

Financial management

2.16 Audit observed the financial management of the projects was not effective. Various shortcomings/deficiencies were observed like failure to obtain prescribed payment security mechanisms from Maharashtra State Electricity Distribution Company Limited (MSEDCL) which facilitated payment defaults and accumulation of huge arrears, payment of penal interest on loan which was incorrectly recovered from the consumers through tariff, foregoing of equity contribution from GoM due to non-inclusion of cost of mandatory Flue Gas Desulphurisation (FGD) plant in the project cost, non-availing of fiscal benefits available under Mega Power Project policy of GoI, failure to ensure timely realisation of revenue/returns due to delays in issue of bills and filing petitions with MERC for approval of tariff/capital costs and unjustified foregoing of Return on Equity (RoE) which compromised financial position of the Company. The audit observations are discussed as under:

Project financing and servicing of loans

2.16.1 As per the project financing arrangement, the GoM granted equity of 20 *per cent* of the project cost and balance funds were to be arranged by the Company from debt financing and internal resources. Major source of revenue of the Company was sale of power to MSEDCL. The PPA provided for two payment security mechanisms for ensuring timely payments by the MSEDCL *i.e.* Letter of Credit (LC) and Escrow Account (for new projects). In case of

[46] On ₹ 10.91 crore at the rate of 10 *per cent* per annum for 560 days (20 July 2016 to 31 January 2018)

default/failure of MSEDCL to pay monthly bills or part thereof within the due date, Company could encash LC, invoke escrow payment mechanism in case LC was not adequate/operational and sell power to third party.

Audit observed that Company could not obtain payment security mechanisms from MSEDCL as provided in the PPA. This resulted in payment defaults by MSEDCL, as dues from sale of power increased from ₹ 7,133 crore (March 2013) to ₹ 10,671.94 crore (March 2017) which consequently impacted the liquidity/cash flow position of the Company. This had an adverse impact on project financing and repayment of loans as discussed below:

Equity investment

2.16.1.1 As per MERC (MYT) Regulations, 2011, the Company could implement power projects with a maximum equity contribution of 30 *per cent* of the project cost[47], on which the Company was entitled for revenue by way of RoE at the rate of 15.50 *per cent*[48]. Audit observed that the Company could not infuse equity to the extent of 30 *per cent* in all the five projects[49] owing to liquidity crunch and deficit in equity funding was met through loan from financial institutions. Equity financing of the five projects ranged between 15.49 *per cent* (Chandrapur) to 22.89 *per cent* (Khaperkheda) of their capital cost approved by the MERC. Thus, there was lower equity investment to the extent of ₹ 3,003.44 crore which deprived the Company of the opportunity to earn higher profit at the rate of 15.50 *per cent* on the same.

The Company stated that it did not have internal resources to fund the remaining 10 *per cent* equity and hence it was decided to avail debt funding.

Burden of penal interest passed on to consumers against tariff principles

2.16.1.2 As per the terms and conditions of sanction letter of loans availed from Financial Institutions,[50] penal interest[51] was payable in case of default in payment of loan installments (principal and interest) on due dates. Audit observed that during 2012-13 to 2016-17, the Company paid penal interest of ₹ 78.86 crore in respect of four projects[52] as the loan installments were not paid within due dates. As per MERC tariff principles, any penalty paid could not be recovered from consumers through tariff. The Company, however, had neither informed nor MERC sought information regarding penal interest paid on loans during tariff determination and there was no disallowance of penal interest through tariff orders.

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[47] Balance 70 *per cent* of the project by way of debt financing

[48] On projects commissioned on or after 1 April 2011

[49] Bhusawal, Khaperkheda, Koradi, Chandrapur and Parli

[50] Rural Electrification Corporation Limited (REC) and Power Finance Corporation Limited (PFC)

[51] At the rate of two *per cent* over and above interest rates of loan from PFC and as per prevailing loan policy from REC

[52] Khaperkheda: ₹ 37.41 crore, Bhusawal: ₹ 0.86 crore, Parli: ₹ 14.50 crore and Paras: ₹ 26.09 crore

The Company stated that it was constrained to delay debt servicing for certain period owing to adverse liquidity situation on account of huge receivables from MSEDCL.

Foregoing of funds from GoM due to non-inclusion of mandatory work in project cost

2.16.2 The MoEFCC had granted (January 2010) EC for the Koradi project with a condition that FGD system for one of the units should be installed initially and the requirement, if any, for installation in other two units would depend upon prevalent ambient levels of sulphur. Prior to grant of EC, the Company had represented before MoEFCC seeking waiver for installation of FGD system which was rejected (December 2009) on the grounds that justification for waiver was valid only from commercial interest and did not hold any merit on public health[53]. Subsequent request (September 2013) of the Company for waiver was also rejected (November 2013) by MoEFCC. The BoD, however, belatedly decided (November 2016) to install FGD system at one unit at estimated cost of ₹ 400.50 crore (including IDC) by inviting tenders on EPC basis. The Company invited bids (May 2017) and contract was not finalised till date (February 2018).

As installation of FGD system was mandatory, the Company should have provided for the same in the project cost submitted (November 2015) to the GoM. As per the prevailing policy, GoM contributed 20 *per cent* of the project cost by way of equity. In absence of provision of FGD in the project cost, the Company lost the opportunity to avail funds of ₹ 80.10 crore from GoM (20 *per cent* of ₹ 400.50 crore) and hence was borne by the Company from loan/ internal resources, when it was already under financial constraints. Further, operation of units without installation of FGD was in violation of the conditions of EC, which risked public health.

The Company stated that cost of FGD system was not included in the project cost as the decision for installation was not finalised at the time of sending initial/revised project cost proposal to GoM. The fact was that FGD was a mandatory requirement which was not included in project cost leading to non-receipt of 20 *per cent* equity contribution from the GoM.

Non-availing of fiscal benefits under Mega Power Policy

2.16.3 The Ministry of Power (MoP), GoI introduced (November 1995) Mega Power Project (MPP) policy whereby eligible projects of 1,000 MW or more were granted fiscal benefits like exemption from Custom Duty (CD) and exemption from Excise Duty (ED) for contracts awarded on International Competitive Bidding (ICB) basis. Three projects of the Company (Koradi, Chandrapur and Bhusawal) were granted MPP status in December 2009. In this connection, Audit observed as follows:

[53] The condition was insisted upon only for one unit keeping in consideration that Nagpur city was located only six kilometer from the project

Non-inclusion of essential works in EPC contract

2.16.3.1 The EPC contracts of Koradi project which were awarded through ICB route did not include essential works of supply/installation of raw water filtration plant, procurement of mandatory spares of Coal Mill reject handling system and installation of treatment plant for tertiary treated water reservoir. The Company subsequently awarded (January 2015/October 2015/ August 2016) contracts for above works through Local Competitive Bidding (LCB) at cost of ₹ 13.36 crore including ED of ₹ 1.18 crore. As the contracts were not awarded through ICB, the Company could not avail ED exemption of ₹ 1.18 crore.

The Company stated that the above orders were placed independently as and when needed. The bidding was done through LCB as the costs of the individual works involved were of lesser amount as compared to total project cost and was required lesser time to carry out ICB procedure. The reply was not tenable as all the essential works should have included in the EPC contract and invited through ICB considering fiscal benefits available for the project under MPP policy.

Delay in issue of Project Authority Certificate

2.16.3.2 The Company issued (January 2009) amended LoA for BTG package of Chandrapur project to Bharat Heavy Electricals Limited (BHEL) through ICB. Though, MPP status was not available, tender condition specified that in case the benefits for supplies made for MPP were extended by GoI, benefits of ED and CD should be passed to Company by the bidder. In absence of MPP status, the Company advised (September 2009) BHEL for procurement of material by paying ED and confirmed that same should be reimbursed as per terms and conditions of contract.

The GoI granted MPP status to the project on 16 December 2009. As per the provisions of the MPP policy, the Company was required to issue Project Authority Certificate (PAC) to the contractor to avail the benefits of ED exemption, which, *inter alia*, required details of contract agreement executed with the contractor. Audit observed that there was delay of more than three months in issue of PAC as the pre-requisite contract agreement was not executed with the contractor. As per terms of LoA, contract agreement was to be executed/finalised within 90 days from the date of issue of LoA (*i.e*. by April 2009). The Company belatedly issued PAC to the contractor on 30 March 2010 after execution of contract agreement on the same day. In absence of the PAC, the Company made reimbursement of ED to the extent of ₹ 3.89 crore for material supplied by the contractor after grant of MPP status. Thus, the Company incurred avoidable expenditure of ₹ 3.89 crore due to non-availing ED benefits.

The Company stated that BHEL had forwarded the contract agreement to the Company on 22 December 2009 which was executed on 30 March 2010, considering time required for revision in break-up of package price, changes in technical specifications *etc*. The fact remained that there was inordinate delay

in execution of contract agreement which led to delay in issue of PAC and non-availing of ED benefits.

Non-recovery of custom duty

2.16.3.3 The BoP contract (supply) for Bhusawal project was awarded (November 2007) to Tata Power Limited (TPL) for total contract price of ₹ 873.38 crore. The contract agreement provided that in case the MPP status was granted to the project, maximum benefit of CD on supplies was ₹ 19.36 crore which was to be passed on the Company. It was observed that the contractor had refunded (May 2011) CD of ₹ 9.90 crore while an amount of ₹ 4.76 crore was retained from running bills. Thus, there was short remittance of CD benefit of ₹ 4.70 crore (₹ 19.36 crore less ₹ 14.66 crore) by the contractor, which was not recovered from their bills.

The Company stated that counter claim for the same had been made (March 2017) in arbitration proceedings instituted (October 2016) on demand of TPL which were in progress and amount would be recovered as per the decision of the same. The reply was not convincing in view of non-recovery of the same during currency of the contract.

Delay in issue of bills for supply of infirm power

2.16.4 As per the terms and condition of the PPA, actual fuel charges incurred by the Company on power supplied from the new units prior to their commissioning (infirm power) was to be recovered from MSEDCL. Audit, scrutiny revealed that out of total 60 months during which infirm power was generated in five projects,[54] bills for 32 months involving revenue of ₹ 643.43 crore were issued with delay[55] ranging between two to 230 days. Delays were attributed on time taken for rectification of discrepancies/errors in information sent by field offices, which was avoidable. Abnormal delays in issue of bills for infirm power resulted in loss of interest of ₹ 13.72 crore[56].

The Company stated that efforts would be made to minimise the delay in future.

Loss due to delay in filing tariff petitions

2.16.5 The MERC allowed carrying cost[57] to the generating companies in cases where the expenditure was accepted but recovery of costs was delayed/deferred by way of interest on admissible amounts. The carrying cost was allowed based on the financial principle that whenever the recovery of cost is deferred, the financing of the gap in cash flow is arranged by the Company from lenders/ promoters/accruals. Audit observed that the Company could not recover carrying cost of ₹ 143 crore due to delay in filing tariff petitions.

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[54] Chandrapur (8 & 9), Koradi (8,9 & 10), Khaperkheda 5, Bhusawal (4 & 5) and Parli 8

[55] Considering period of 30 days from the end of month for preparation and issue of bills

[56] Worked out at the rate of 10 *per cent per annum*

[57] Carrying cost allowed on the admissible amounts is worked out considering Bank interest rate of the year in which petition is filed

The Company stated that generally approved costs as per the order for Annual Performance Review (APR) petition are considered as the base for final true-up petition. There was no deliberate delay in filing petition as the same was filed immediately after issue of order of APR of 2012-13 in July 2014. The reply was not tenable as the MERC had disallowed carrying cost due to delay in filing petition.

Foregoing of RoE without fulfilment of mandatory pre-conditions

2.16.6 National Tariff Policy provides for RoE on investments with the objective of generating a reasonable surplus of returns for the investor. The rate of RoE stipulated by Central Electricity Regulatory Commission (CERC) was to be adopted by the State Commissions. Financial viability/cost estimates of capacity addition projects of the Company were prepared considering return on investment/equity as per the CERC norms. The MERC regulations (2011/2015) provided for RoE of 15.50 *per cent* on equity for generating companies.

The GoM constituted (January 2015) a Committee[58] to study and suggest long term as well as immediate steps to bring down the tariff to sustainable level. The Committee suggested reduction in RoE which at the same time should ensure that financial viability and the credit rating of the Companies were not weakened. Accordingly, the BoD of the Company decided (January 2016) to provisionally claim RoE at reduced rate of 7.50 *per cent* for two years 2016-17 and 2017-18 and defer claim for balance RoE. In case, there was a loss, the Company would claim and bill the deferred "balance RoE" for an amount that would give a Profit After Tax (PAT) of ₹ 25 crore so as to maintain financial viability and the credit rating. The BoD directed that this policy was to be implemented on fulfilment of conditions by MSEDCL regarding forthwith submission of LC as per provisions of PPA and undertaking that at least current bills will be paid regularly on due dates.

Audit observed that the MSEDCL had neither submitted LC nor paid the current bills regularly. Despite non-fulfilment of mandatory conditions, the tariff petition was submitted (February 2016/July 2017) claiming reduced RoE at the rate of 7.50 *per cent* and conditional deferment of balance eight *per cent* RoE for 2016-17 and 2017-18. Based on submissions of the Company, MERC approved (August 2016/December 2017) RoE for 2016-17 and 2017-18 at the reduced rate of 7.50 *per cent.* However, the request of the Company for conditional deferment was not accepted by MERC. Thus, the Company had foregone revenue of ₹ 1,041.83 crore[59] in respect of new projects without fulfilment of mandatory pre-conditions for implementation of the policy, which weakened its financial position. The Company reported loss of ₹ 628 crore for the year 2016-17 mainly on account of reduction in revenue from sale of power to MSEDCL.

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58 Comprising of Principal Secretary (Energy), GoM and CMDs of MSPGCL, MSEDCL and MSETCL

59 Koradi : ₹ 321.43 crore, Chandrapur : ₹ 127.67 crore, Khaperkheda : ₹ 102.68 crore, Bhusawal : ₹ 194.83 crore, Parli (unit 8) : ₹ 32.98 crore, Parli (unit 6 and 7) : ₹ 136.41 crore and Paras (unit 3 and 4) : ₹ 125.83 crore

The Company stated that tariff petitions were submitted with bona-fide assumption that MSEDCL would reciprocate in positive way and fulfil pre-conditions. The reply was not convincing as submission of petitions on mere assumptions without fulfilment of the conditions laid down by the BoD was not correct. Also, the Committee itself had suggested that while reducing RoE, financial viability and credit rating should not be weakened, which was not ensured by the Company.

Financial impact of delayed project execution

2.17 Delayed project execution led to increase in the project cost mainly on account of IDC, loss of equity contribution from the GoM, disallowance of excess establishment expenditure and foregoing of additional RoE as discussed below:

Disallowance of interest expenses during construction

2.17.1 As stated in **para 2.11,** major increase in cost of ₹ 5,620 crore[60] (56 *per cent*) was on account of increase in IDC on loans which ultimately was borne by the Company and consumers. Out of this, IDC of ₹ 3,743.46 crore was incurred during the period of time overrun (*i.e.* between scheduled completion date and actual completion date). As per the tariff principles adopted by the MERC, where generating company could not establish that delay was entirely beyond their control, 50 *per cent* of IDC for the period of time overrun was disallowed. Accordingly, the MERC disallowed (September 2013/April 2015/ December 2017) IDC of ₹ 1,871.93 crore[61] (50 *per cent* of ₹ 3,743.86 crore) for delayed period in five projects, as Company could not establish that delay was beyond their control.

The Company stated that the MERC had allowed retention of 50 *per cent* LD thereby partly compensating disallowance of IDC. The Company may retain maximum LD of ₹ 1,352.90 crore[62] as against IDC disallowance of ₹ 1,871.93 crore in these five projects, thereby leading to atleast loss of ₹ 519.03 crore.

Loss of contribution from the State Government

2.17.2 As per the prevailing policy, the GoM contributed 20 *per cent* of the project cost by way of equity. The GoM had initially approved (March 2008/ October 2008/November 2008) cost of three projects (Chandrapur, Koradi and Parli) at ₹ 18,755 crore which was subsequently revised (September 2014/ November 2015) to ₹ 23,112.30 crore based on submissions of the Company considering anticipated Commercial Operation Date (COD). As the projects could not be completed within the anticipated COD, there was further cost

[60] Bhusawal: ₹ 1,159 crore, Chandrapur: ₹ 1,459 crore, Khaperkheda: ₹ 520 crore, Koradi: ₹ 1,947 crore and Parli: ₹ 535 crore

[61] Khaperkheda: ₹ 4.60 crore, Bhusawal: ₹ 302.77 crore, Chandrapur: ₹ 652.92 crore, Koradi: ₹ 672.76 crore and Parli: ₹ 238.88 crore

[62] 50 *per cent* of maximum LD of ₹ 2,705.81 crore in five projects, which can be recovered as per terms and conditions of contract

increase of ₹ 1,177.70 crore[63] (from anticipated COD to actual COD) in three projects (total estimated cost ₹ 24,290 crore), which was given in principle approval (May 2017) by the GoM without granting 20 *per cent* equity contribution for the same. As a result, the Company lost funds of ₹ 235.54 crore from the GoM (20 *per cent* of ₹ 1,177.70 crore), which was borne through loans/internal resources, when the Company was already under financial constraints.

The Company stated that GoM did not grant additional equity for increased project cost due to delayed project execution.

Loss due to disallowance of overhead cost

2.17.3 As per prevailing policy, the MERC allowed overhead cost (establishment expenses) incurred during the construction of a project to the extent of five *per cent* of Hard Cost[64], in line with generally accepted industry practice. For overhead cost exceeding five *per cent,* only 50 *per cent* of the cost in excess of five *per cent* was additionally allowed. The Company incurred expenditure of ₹ 96.25 crore on overheads (establishment expenditure) for the Parli project. The MERC observed (December 2017) that the overheads up to COD were 6.55 *per cent* of the Hard Cost (₹ 1,322.20 crore), which was higher than the industry norms by 1.55 *per cent*[65]*,* mainly due to delay in the completion of project. Accordingly, the MERC allowed overhead cost of ₹ 76.33 crore which was 5.77 *per cent*[66] of the approved Hard Cost. Thus, there was excess expenditure of ₹ 19.92 crore on overheads (establishment expenditure), which was disallowed by the MERC.

Loss of additional return on equity through tariff

2.17.4 As per MERC (MYT) regulations, 2011, additional revenue by way of Return on Equity (RoE) of 0.50 *per cent* (above normative 15.50 *per cent)* was allowed if projects are completed within timelines specified in the regulations. The additional RoE was, however, not admissible if projects were not completed within specified timeline for any reasons whatsoever. As all the five projects were delayed, the Company lost the opportunity to earn additional RoE to the extent of ₹ 660.21 crore[67].

The Company accepted that it failed to avail the benefit despite trying its level best mainly on account of poor performance of EPC contractors.

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63 Chandrapur: ₹ 175.59 crore, Koradi: ₹ 791.41 crore and Parli: ₹ 210.70 crore

64 Hard cost was worked out by MERC excluding IDC and expenditure on merry-go-round and Railway siding, unloading equipment at jetty, and rolling stock, locomotive, and Transmission Line till the tie point

65 Overhead cost in respect of other four projects were within industry norms and hence were fully allowed to the Company

66 Five *per cent* plus 0.77 *per cent* (50 *per cent* of excess overhead cost of 1.55 *per cent*)

67 Koradi : ₹ 286.79 crore, Chandrapur : ₹ 106.66 crore, Khaperkheda : ₹ 83.13 crore, Bhusawal: ₹ 147.50 crore and Parli : ₹ 36.13 crore

Monitoring

2.18 The capacity addition projects were monitored at various levels of the Company. In this connection, Audit observed the following:

- The Company had not implemented Information Technology (IT) based monitoring system, which could have enabled the Management to receive all the project related information in real time and highlight critical issues for timely and appropriate action. The Company stated that a Project Management and Control module for new projects was developed in SAP system for monitoring as per project schedule of EPC vendors and capitalisation of cost. The reply was not convincing as the present system was utilised while releasing payments to the contractors and it was not a real time monitoring system.

- The monthly progress reports and Project Review Meetings, addressing the critical issues by concerned department did not mention action taken by the concerned departments.

Operational performance of new units

2.19 Performance of generating units is assessed on the basis of norms fixed by MERC for parameters like Plant Availability (PA), Plant Load Factor (PLF), Auxiliary Consumption (AC), Station Heat Rate (SHR) and Secondary Fuel Oil Consumption (SFOC). Expenditure incurred by the Company in excess of approved norms cannot be recovered through tariff and hence such disallowances are loss to the Company. During 2012-13 to 2016-17, performance of seven projects consisting of 13 units completed (2007-17) by the Company under its capacity addition programme was below the norms approved by MERC[68] as given in table below:

Sl. No.	Name of unit	No. of years[69] during which plant was in operation	No. of years during which performance was below norms					
			PA	PLF	AC	SHR	SFOC	O&M expenses
1	Khaperkheda 5	5	2	5	3	4	1	1
2	Koradi 8	2	2	2	2	2	1	1
3	Koradi 9 &10	1	1	1	1	1	1	0
4	Chandrapur 8 & 9	1	1	1	1	0	1	0
5	Paras 3	5	4	4	5	2	1	2
6	Paras 4	5	4	4	5	2	1	2
7	Parli 6	5	2	4	3	1	1	1
8	Parli 7	5	2	4	3	1	1	1
9	Parli 8	1	1	1	1	1	1	0
10	Bhusawal 4 & 5	3	1	2	3	0	0	1

(Source: Information furnished by the Company)

It could be seen from the table above that operational efficiency of the new units was below the normative performance parameters during most of the years under review which led to low capacity utilisation and non-recovery of fixed costs, excess Auxiliary Energy Consumption (AEC), excess consumption of coal and oil and excess O&M expenses. Analysis of performance parameters

[68] Performance results/losses for 2015-16 and 2016-17 furnished by the Management were provisional based on prevailing MERC norms. Final truing up of the same was pending

[69] Including year of commissioning

for 13 units indicating approved norms, actual norms, extent of deviation along with reasons thereof and resultant losses are discussed below:

Non-recovery of fixed costs due to lower plant availability

2.19.1 Plant Availability is the *ratio* of actual hours operated to maximum possible hours available during a certain period. As per MERC regulations, full Annual Fixed Charges (AFC) incurred by the Company could be recovered only if actual availability was equal to or higher than the approved target. In case of shortfall in PA during any year, recovery of AFC was proportionately reduced and hence the Company had to bear that loss. During 2012-17, PA of 13 units varied between 4.44 to 93.59 *per cent* as against approved norms of 42.80 to 85 *per cent*. PA of two units[70] was below the approved norms during four years while PA of remaining 11 units was below norms during one to two years. Due to lower PA, the Company suffered loss of ₹ 1,404.69 crore[71] towards non-recovery of AFC during the period from 2012-17.

Low capacity utilisation of new units was due to forced outages[72] during 2012-17 which led to loss of generation of 20,391[73] MUs. The forced outages were on account of O&M issues like BTL (3,880 MUs), fan problems (2,003 MUs), CHP problems (2,478 MUs), Electrical problems (842 MUs), Coal Cycle problem (1,368 MUs) *etc.,* which could have been minimised with better O&M of the plants. Non rectification of recurring system problems and premature commissioning of units also contributed to low capacity utilisation as discussed previously in **para 2.14.1, 2.14.2 and 2.14.3.** Other factors like shortage/poor quality of coal, shortage of water, stabilisation period and annual overhauls were also attributed by the Company for lower PA. The Company in its reply stated that various committees such as BTL committee, Coal Mill Improvement committee, Efficiency/Heat Rate Improvement committee, Electrical Protection committee, CHP Improvement committee *etc.* have been formed to improve availability/reliability of units and reduction of forced outages.

Plant Load Factor

2.19.2 Plant Load Factor (PLF) is the *ratio* of the actual generation achieved to the maximum possible generation by installed capacity. As per MERC regulations, thermal Generating Stations were eligible for incentive in case PLF exceeded approved norms. As against MERC norms of 42.18 to 85 *per cent* for 13 units during 2012-13 to 2016-17, actual PLF varied between 2.42 to 88.28 *per cent*.

[70] Paras unit 3 and 4

[71] As per information furnished by the Company

[72] Outages refer to the period for which thermal plant remains closed for attending planned/ forced maintenance

[73] As per information provided by the Company

Audit observed that PLF of Khaperkheda was lower than norms in all five years while that of Parli (unit 6 and 7) and Paras (unit 3 and 4) was below than norms in four years. In respect of remaining eight units, lower PLF was observed during one or two years. During review period, five units achieved PLF exceeding approved norms during 2012-13 and 2015-16 and hence earned incentive of ₹ 8.40 crore. Reasons for lower PLF were attributable to same factors which contributed to lower PA.

Auxiliary Energy Consumption

2.19.3 Energy consumed by power stations themselves for running their equipment and common services is called Auxiliary Consumption (AC). As against the approved norms of 5.25 to 12.15 *per cent* during 2012-13 to 2016-17, actual AC of 13 units varied between 5.87 and 18.03 *per cent*. In fact, AC of Paras (unit 3 and 4) was above the norms during all the five years while that of 10 units was above norms during one to three years. As a result, the Company had to bear loss of ₹ 113.72 crore[74]. The Company attributed higher AC on higher number of trippings during stabilisation period and partial loading of units (Koradi and Chandrapur), water shortage and coal shortage (Parli), poor coal quality/lower PLF/system problems and overhauls (Khaperkheda, Paras and Bhusawal).

In this regard, audit further observed that:

- The guaranteed AC as per the Original Equipment Manufacturer (OEM) of two projects[75] was 9.98 *per cent*, which was beyond prescribed norms of 8.50 *per cent*. The Company requested MERC for revising the norms for these projects as per OEM parameters, which was rejected by MERC on the grounds that norms were specified after considering the equipment design parameters and the operating conditions as per the industry practice, as well as the CERC dispensations.

- As per MERC tariff Regulations, 2015, normative AC for units of 500 MW and above commissioned prior to 1 April, 2016 was six *per cent* while those commissioned after 1 April, 2016 was 5.25 *per cent*. For Chandrapur project (unit 8 and 9) commissioned in June/November 2016, the Company proposed norm of six *per cent* on the grounds that specified normative AC of 5.25 *per cent* was unachievable as the guaranteed AC was higher than the specified norm. The MERC, however, rejected revision of AC on design considerations and approved AC at 5.25 *per cent* stating that inordinate delay in the COD of the units has resulted in the applicable norm being more stringent than for those units which achieved COD in earlier periods.

As such, the Company is inherently saddled with higher AC in respect of these three projects, which will contribute to loss during life of these projects.

[74] As per information furnished by the Company

[75] Parli (Unit 6 and 7) and Paras (unit 3 and 4)

Excess consumption of coal due to higher SHR

2.19.4 Gross SHR is an important parameter to assess efficiency of a TPS which indicates amount of chemical energy required to produce one unit of electrical energy *i.e.* heat energy input in kilo calorie (kcal) required to generate one unit of electrical energy at generator terminals. Lower is the SHR, lower will be coal requirement for generation of one unit of power. The SHR norms fixed by MERC for 13 units ranged between 2,260.06 Kcal/Kwh to 2,563.21 Kcal/kwh during 2012-13 to 2016-17.

Audit observed that SHR was above the norms at Paras (unit 3 and 4) during three years, Parli (unit 6 and 7) during two years and Khaperkheda (unit 5), and Chandrapur (unit 9 and 10) during one year. Further, SHR of supercritical[76] units of Koradi were above norms during all the four years of operation (unit 8: two years, unit 9 and 10: one year each). Due to higher SHR, there was excess consumption of coal (3.70 lakh MT) valuing ₹ 127.77 crore[77].

The higher SHR was attributed to poor coal quality, partial loading of units, low PLF of units on account of O&M issues like BTL, CHP problems, ID fan problems *etc*. The fact remained that the Company could not maintain SHR within the norms prescribed by the MERC.

Excess consumption of oil

2.19.5 Thermal generating stations use fuel oil (Heavy Fuel Oil and Light Diesel Oil) as secondary fuel for start-up and stabilisation of the units. The norms approved/fixed by MERC during 2012-17 ranged between 0.50 to 6.59 ml/unit. Against this, oil consumption varied between 0.33 to 76.83 ml/unit. During 2012-17, excess oil of 22,089 kilo litre was consumed in 11 units worth ₹ 71.19 crore[77]. The Company attributed the same on stabilisation period, fly ash evacuation system problem, poor coal quality/wet coal, BTL *etc*. The fact remained that the Company could not ensure oil consumption within the norms prescribed by the MERC.

Operation and maintenance expenses

2.19.6 The O&M expenses of a generating station includes expenses on manpower, repairs, spares, consumables, insurance and overheads. The MERC has fixed/approved normative O&M expense for the 13 units ranging between ₹ 44.64 crore to ₹ 147.66 crore during 2012-17. Audit observed that O&M expenses of seven units exceeded norms by ₹ 6.81 crore to ₹ 41.27 crore[77] to the extent of ₹ 146.63 crore.

The Company attributed deviation in O&M expenses on factors like revisions of pay, gratuity and leave encashment of manpower, increase in repairs and maintenance expenses *etc.* The Company should have taken necessary steps to ensure that O&M expenses are within norms prescribed by the MERC.

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[76] Supercritical technology implies use of steam pressure above 240 kg/cm^2 with various combinations of temperature and pressure which is beyond the critical point of water/steam

[77] As per information furnished by the Company

Backing down of generating units due to higher cost of generation

2.19.7 The Electricity Act, 2003 provided for procurement of power from competitive sources. Maharashtra State Load Dispatch Centre (MSLDC) was the nodal authority of the State, which was responsible for optimum scheduling and dispatch of electricity within the State from the generators, in accordance with Merit Order Dispatch (MOD) principles. Accordingly, the MSLDC prepared a MOD stack ranking the generating units on the basis of their cost of generation (energy charges) and units having least cost were scheduled/ dispatched first. In case, power was not required, MSLDC directed the generating units having higher cost to back down. Thus, availability of the generation capacity was as important as the ability of such generation capacity to get dispatched considering surplus power scenario in the State.

Energy charges are approved by the MERC considering approved generation, performance parameters, Gross Calorific Value (GCV) of fuels and landed price of fuels. Thus, operational inefficiencies contributed to higher cost of generation. Cost of generation as mentioned in the DPR *vis-a-vis* actual cost in five projects was as given below:

Sl. No.	Name of project	Energy charges as per DPR (₹ per unit)	Actual energy charges as per MERC order[78] (₹ per unit)	Increase (₹ per unit)	Increase in percentage
1	Bhusawal	1.53	2.991	1.461	95
2	Parli	1.14	2.892	1.752	154
3	Khaperkheda	1.36	2.673	1.313	97
4	Koradi	0.98	2.504	1.524	155
5	Chandrapur	1.69	2.198	0.508	30

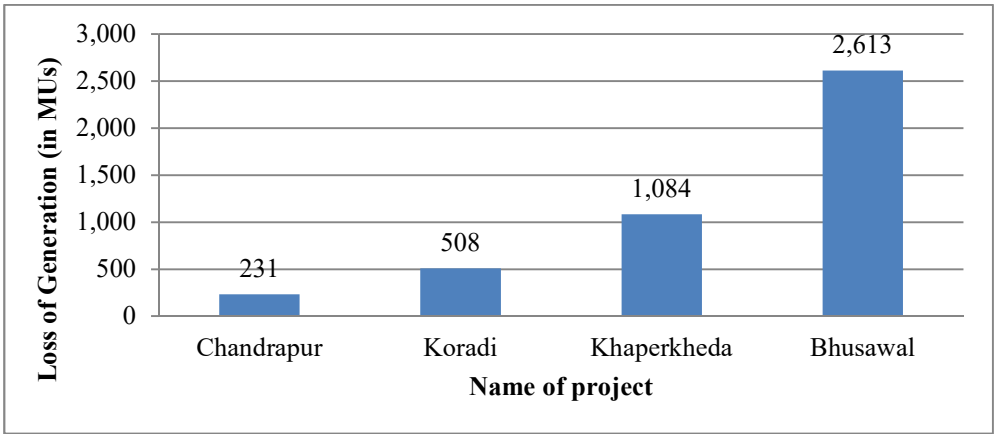
Thus, the actual cost of generation was significantly higher than that projected in DPRs (ranging between 30 to 155 *per cent*) and costliest power was from Bhusawal project.

There was rising trend of backing down of costlier power from generating units of the Company during the review period. Loss of generation on account of backing down of units increased from 143 Million Units (MUs) in 2012-13 to 9,311 MUs in 2016-17 (total loss: 17,313 MUs[79]), ultimately leading to foregoing of revenue (energy charges) by the Company. The Company, however, received fixed charges from MSEDCL even during the period of backing down and burden thereof was borne by consumers of the State. In respect of four new projects which were in operation for a period of one to five

[78] Average of Energy charges approved by MERC for the years during which projects were in operation during 2012-17

[79] Old units : 11,399 MUs and new units : 5,914 MUs

years during 2012-17, there was backing down of 4,436 MUs since their commissioning as shown below:



It could be seen that maximum backing down was at Bhusawal project (2,613 MUs) which had the highest cost of generation among the new projects. The Company was required to take efforts for achievement of normative performance parameters for reducing cost of generation to be competitive *vis-a-vis* other power generators in the State so as to minimise backing down of its generating units.

Environmental compliances

2.20 The Company has statutory obligation to comply with conditions of Environment Clearance (EC) prescribed by MoEFCC, GoI and provisions of various Acts pertaining to environment compliances as it is categorised under major polluting industry, which is monitored by MPCB. Audit scrutiny revealed non-compliance with conditions of EC regarding installation of FGD and ozonisation plant and environmental norms related to fly ash utilisation and Suspended Particulate Matter and Sulphor Dioxide as discussed below:

Non-installation of ozonisation plant

2.20.1 The MPCB while granting (January 2010) Condition to Establish (CTE) for Koradi project, had requested for adoption of ozonisation technology for cooling water treatment. Disregarding the same, the Company awarded (July 2010) BoP contract with provision for installation of Chlorination Plant (CP). Subsequently, the Company submitted (December 2010) another proposal to MPCB for setting up CP, which was rejected (February 2011) with directions to install ozonisation plant as per conditions of the CTE. The planning section of the Company citing MPCB directives initiated (March 2011/August 2012) proposals for installation of ozonisation plant at Koradi at estimated cost of ₹ 16.75 crore[80] (excluding civil works) and deletion of CP from the scope of BoP contract. The CMD however decided (November 2011/January 2013) to go ahead with the installation of CP.

[80] For plant capacity of 49.5 Kg/hr

The Company incurred expenditure to the extent of ₹ 1.38 crore[81] on CP and the work was in progress till date (February 2018). Meanwhile, the MPCB while granting extension to CTO (December 2016) directed Company for adoption of ozonisation system. Accordingly, the Company initiated (February 2017) fresh proposal for installation of ozonisation plant at estimated cost of ₹ 46.90 crore[82] (excluding civil works), which was in process (February 2018). Thus, operation of units without installation of prescribed ozonisation plant for water treatment was in violation of the MPCB directives, which exposed employees/public to health hazards related to chlorination treatment[83]. Further, this would result in unproductive expenditure of ₹ 1.38 crore on CP and avoidable cost escalation on installation of mandatory ozonisation plant.

The Company stated that it was decided to go ahead with chlorination as per the scope of work already specified in the tender documents in accordance with recommendation of a consultant. Further, the present proposal for adoption of ozonisation at Koradi project was started to avoid further complications for getting CTO from MPCB in future.

The reply was not tenable as despite the directives of MPCB for adoption of ozonisation in the initial stages itself, it was not adhered to.

Non-achievement of fly ash utilisation targets

2.20.2 MoEFCC, GoI issued (November 2009) notification specifying that each thermal power generating station should achieve 100 *per cent* utilisation of total ash generated by the end of five years (November 2014).

Audit observed that the Company did not achieve fly ash utilisation targets in respect of all the 13 units. Actual utilisation of fly ash in 12 units was ranging between three *per cent (*Chandrapur) and 78 *per cent* (Parli) during 2012-13 to 2016-17. In respect of three units of Koradi project commissioned during December 2015 to January 2017, there was no utilisation of fly ash. The low utilisation was attributed to poor response from the prospective users. In this connection, it was observed that silo system for utilisation of fly ash has not been completed at Koradi project till date (February 2018) while it was completed (March 2015) at Khaperkheda after a delay of 35 months from the date of commissioning (16 April 2012). Non-utilisation of fly ash not only resulted in loss of revenue but also led to expenditure of ₹ 50.05 crore[84] on transportation/flushing of fly ash to ash pond.

The Company stated a subsidiary company has been formed which was taking various steps for increasing ash utilisation at all TPS and achievement of targets set by MoEFCC.

[81] Excluding cost of building which was not furnished by the Company

[82] Estimated cost of proposed plant having capacity of 90 Kg/hr

[83] Cooling water treatment was being done through manual dosing of chlorine

[84] As per information furnished by the Company

Suspended Particulate Matter and sulphur dioxide

2.20.3 Suspended Particulate Matter (SPM) in flue gas is a pollutant when its concentration in a given volume of atmosphere is high. Electrostatic Precipitator (ESP) is used to reduce SPM concentration in flue gases. Control of SPM level depends on the effective and efficient functioning of ESP of the thermal plant.

As per MoEF norms, permissible level of SPM for 12 units[85] was 50-100 mg/Nm^3. It was observed that the SPM level only at three units of Koradi project was within norms. In respect of three units (Parli 6 and 7 and Chandrapur 9), SPM level exceeded norms in every month during which unit was in operation, ranging between 3.5 to 113 mg/Nm^3. ESPs installed at Parli project were designed to achieve SPM level of 70 which was higher than the norms of 50. In respect of Khaperkheda 5, though designed ESP matched with norms, SPM level exceeded norms in 40 months out of 59 months during which unit was in operation (68 *per cent*) ranging between 01-41 mg/Nm^3. This indicated that the ESPs were not functioning properly. Further, during 2012-13 to 2016-17, Sulphur Dioxide (SO_2) was higher than the norms in seven units for 72 months ranging between 03 to 1,442 mg/Nm^3.

The Company attributed deviations to change in SPM limit after construction of project (Parli), receipt of poor coal quality, stabilisation period *etc*. It was further stated that efforts are being taken to improve ESP performance to lower SPM level within the prescribed limits. As regards, controlling Sulphur emissions, action plan was initiated for installation of FGD system in all non-compliant TPS.

Forfeiture of bank guarantees

2.20.4 The MPCB while granting CTO to various units obtained Bank Guarantees (BG) from the Company for ensuring compliance with prescribed targets/norms of various environmental parameters and installation of pollution control systems. Audit observed that the MPCB forfeited BGs (February to September 2015) to the extent of ₹ 72.50 lakh in respect of five units as the Company did not ensure emissions within prescribed norms and installation of pollution control systems.

The Company stated that necessary actions were being taken to avoid forfeiture of BGs.

Conclusion

The Company had planned/taken up 13 thermal power projects of 13,900 Mega Watts (MW) for completion/implementation during 2007-17 as against the capacity addition requirement of 7,891 to 9,664 MW during the same period. The Company completed seven projects having capacity of 5,730 MW (2007-17) while remaining six projects of 8,170 MW on which the Company had incurred ₹ 112.09 crore towards various pre-order activities, were proposed

[85] Data for Parli unit 8 was not furnished

either for cancellation or deferred/pending decision of the Board of Directors (BoD) citing surplus power scenario in the State.

The Company completed five thermal power projects (Koradi, Parli, Chandrapur, Bhusawal and Khaperkheda) involving 4,730 MW during the period 2012-17. All the five projects were constructed by awarding two comprehensive Engineering, Procurement & Construction (EPC) contracts comprising Boiler, Turbine and Generator (BTG) package and Balance of Plant (BoP) package.

Audit observed various deficiencies in pre-implementation planning of completed projects like imprudent selection of site, non-provision for construction of railway siding in Detailed Project Reports (DPR) and lack of adequate coal arrangements for operation of units at optimum level.

There were significant time overruns in completing construction of all the five projects. According to terms and conditions of contract, successful completion of trial run of the units was to be considered as completion date of the contract for the project. Delay in completion of trial run of the units ranged between 20 and 49 months from the scheduled completion date. Delayed project execution was attributed to poor performance and financial crisis of EPC contractors. None of the major milestones/activities were completed within the time period stipulated in the contracts.

There was lack of coordination between the BTG and BoP works which affected interrelated works. Further, there was avoidable delay due to factors within management control like delay in awarding BoP contracts; delay in completion of railway siding due to defective DPR and delay in commencement of commercial operation of units in absence of timely obtaining of requisite statutory permissions and Environmental Clearance(EC)/non-compliance with environmental conditions.

As against the estimated cost of ₹ 25,048 crore for five projects, the actual cost on their completion was ₹ 35,012 crore leading to increase in cost by ₹ 9,964 crore. Major increase in cost (56 *per cent*) of ₹ 5,620 crore was on account of increase in IDC on loans. Of which, ₹ 1,871.93 crore was disallowed by Maharashtra Electricity Regulatory Commission (MERC) on the ground that delay in project execution was not entirely beyond the control of the Company. Delayed project execution also led to loss of equity contribution from the Government of Maharashtra (GoM), disallowance of excess establishment expenditure and foregoing of additional Return on Equity (RoE).

Audit noticed instances of deficiencies in project execution like premature commissioning of units and issues related to quality of material/workmanship of EPC contractors. This had contributed to low capacity utilisation of new units and consequent irrecoverable loss of revenue on account of disallowance of fixed cost and loss of generation. Other issues like financing of a non-viable water supply scheme, non-adjustment of interest free advance against water charges, blocking of funds and extra expenditure while providing ash disposal arrangements were also observed.

There was abnormal delay in recovery of Liquidated Damages (LD), non-recovery of labour cess in contravention of the statutory provisions and non-recovery of interest free mobilisation advances as per CVC guidelines.

Financial management of the projects was not effective. Various shortcomings/deficiencies were observed like failure to obtain prescribed payment security mechanisms from Maharashtra State Electricity Distribution Company Limited (MSEDCL) which facilitated payment defaults and accumulation of huge arrears, payment of penal interest on loan which was incorrectly recovered from the consumers through tariff, foregoing of equity contribution from GoM due to non-inclusion of cost of mandatory work in project cost delays in filing petitions with MERC for approval of tariff/capital costs led to delayed realisation of revenue/returns and unjustified foregoing of RoE which compromised financial position of the Company.

The monitoring system was ineffective in minimising delays in the project and IT based monitoring system was not implemented.

Operational efficiency of new units was below the norms prescribed by MERC for Plant Availability (PA), Plant Load Factor, Auxiliary Energy Consumption (AEC), Station Heat Rate, consumption of oil and Operation & Maintenance (O&M) expenses. Non-achievement/adherence to operational norms fixed by MERC resulted in non-recovery of fixed costs, excess AEC, excess consumption of coal and oil and excess expenses on O&M of plants. Low capacity utilisation of new units due to forced outages led to loss of generation of 20,391 Million Units (MUs) during 2012-17.

Availability of the generation capacity was as important as to get it dispatched in the Merit Order considering surplus power available in the State. The units having least cost were scheduled/dispatched first and in case power was not required, generating units having higher cost were backed down. Audit observed loss of generation on account of backing down of units of the Company had increased from 143 MUs in 2012-13 to 9,311 MUs in 2016-17 (total loss: 17,313 MUs), leading to loss of revenue (energy charges) to the Company besides burdening the consumers with fixed charges. In respect of new projects, cost of generation was highest at Bhusawal and hence suffered maximum backing down of generation.

There were instances of non-compliance with conditions of EC regarding installation of Flue Gas Desulphurisation (FGD) and ozonisation plant at Koradi project. None of the new projects achieved target of 100 *per cent* fly ash utilisation.

Recommendations

- ***The Company may ensure that thermal capacity addition plans are formulated after comprehensive assessment of power scenario in the State.***

- ***All statutory permissions need to be obtained timely and adherence to terms and conditions of environmental clearance/consent granted for the projects need to be ensured.***

- ***LDs of all completed projects may be finalised and recovered at the earliest. All statutory duties/cess be recovered and remitted to the GoM in accordance with statutory requirement.***

- ***The Company may obtain payment security mechanisms from the MSEDCL as prescribed in the PPA and ensure timely filing of tariff petitions to MERC.***

- ***The Company may ensure rectification of recurring effects/shortcomings identified in commercial operation. O&M practices at new units may be strengthened to ensure achievement of performance norms prescribed by MERC.***