Chapter - II

Performance Audits of Government Companies

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2. Performance Audits relating to Government Companies

2.1 Performance Audit on 'Construction and performance of Bellary Thermal Power Station of Karnataka Power Corporation Limited'.

Executive Summary

The Company

The Karnataka Power Corporation Limited was incorporated (July 1970) as a wholly owned State Government company under the Companies Act, 1956, with the main objective of planning, promoting and organizing development of power including construction, generation and maintenance of power stations in Karnataka State.

As part of mitigating the power deficit, the Company commissioned two units at BTPS having a combined capacity of 1,000 MW; 500 MW each in March 2009 (Unit I) and February 2013 (Unit II).

Audit objectives

The performance audit was conducted to examine and analyze the deficiencies in planning and execution of Unit II and the reasons for failure to achieve targeted generation and operational efficiency in respect of Unit I; verify, examine and analyze the cost of operations with a view to study the reasons for the losses incurred; and assess whether BTPS has been able to achieve environmental and pollution control norms.

Audit findings

Mega Power Project

The Mega Power Project (1,000 MW and above) Policy of GoI envisaged benefits such as exemption of customs duty, tax holiday *etc*., to bring down power tariffs.

Though the Board and the Technical Committee of the Company had favoured implementing Unit II simultaneously with Unit I with a combined capacity of 1,000 MW, considering the expected benefits of substantial savings in project cost by ₹ 1,257 crore, the Company dropped the idea of implementation of both the units simultaneously due to the reason that this would delay the commissioning of Unit I. This has resulted in additional burden on consumers by ₹ 1,257 crore.

Non-availment of concessions under the Infrastructure policy

Notification about implementation of Infrastructure Policy of the GoK was announced in May 2009, which envisaged that power generation projects were exempt from payment of entry tax.

As the Company was late in getting exemption certificate from the GoK, the entry tax of ₹ 27.31 crore including avoidable tax of ₹ 5.88 crore considered in the project cost of Unit I and Unit II stands recovered through tariff, which is an additional burden on the consumers.

Coal supply

In the absence of coal supply arrangement from KECML for Unit II, the Company was forced to procure coal from other sources at higher rates than the rates at which coal was supplied by KECML. This resulted in additional expenditure of ₹ 377.95 crore.

Slippage of project schedule

The works of Unit II were completed with delay of 27 months from the scheduled date of completion due to delay in completion of certain critical works. The Company suffered loss of potential revenue amounting to ₹ 1,391.33 crore during the delayed period of completion.

The State had procured energy from private sources at higher rates to mitigate the shortfall imposing an additional burden of ₹ 1,518.69 crore during delayed period of 2010-13.

The actual expenditure capitalised included interest amounting to ₹ 178.70 crore paid on loan for the delayed completion period, which would ultimately be passed on to the consumers.

Failure to invoke contractual provisions

Award of contract without proper survey resulted in extra financial implications and delay in completion of works. The Company failed to levy penalty of ₹ 5.42 crore on the contractors for the delay in completion of works of Stage I and Stage II of raw water pond.

Underutilization of capacity

The capacity utilization of Unit I had continuously decreased over the years from 84.67 *per cent* in 2009-10 to 80.86 *per cent* in 2013-14 due to the fact that the components of the plant, such as boiler, cooling tower *etc*., were not functioning at the optimum levels. The loss due to underutilization of capacity amounted to ₹ 102.28 crore.

Increased Station Heat Rate

The Station Heat Rate was much above the normative SHR of 2,450 kcal/kWh prescribed by CERC/PPA; the actual SHR ranged between 2,808 kcal/kWh and 3,093 kcal/kWh. The loss on account of increased station heat rate was ₹ 239.14 crore during 2009-13.

Debt-equity mix

The Company raised bills on ESCOMs considering debt-equity mix of 80:20 contemplated in the DPR instead of actual fund mix resulting in net excess recovery of ₹ 45.31 crore, which was an additional burden on the consumers during 2009-14. This would continue to burden the consumers by ₹ 181.24 crore during the remaining period of the PPA.

Non-compliance with the norms of Ministry of Environment and Forest

BTPS achieved fly ash utilization of only 45 *per cent* by March 2014 against 100 *per cent* prescribed by MoEF, as arrangements for evacuation of fly ash were not properly managed.

Our conclusions and recommendations are given at the end of the Performance Audit Report.

Introduction

2.1.1. The Karnataka Power Corporation Limited (Company) was incorporated (July 1970) as a wholly owned State Government company under the Companies Act, 1956, with the main objective of planning, promoting and organizing development of power including construction, generation and maintenance of power stations in Karnataka State.

With rapid industrialization, successful rural electrification and large scale use of electricity for irrigation purpose, the demand for electricity registered a steep increase in the Southern Region, particularly in Karnataka. The Sixteenth Electric Power Survey of India (2001-02) projected an increase in power deficit in the State from 702 MW in 2001-02 to 1,381 MW in 2005-06 and increase in the base energy deficit from 1,711 million kilowatt hour (kWh) in the year 2001-02 to 3,872 million kWh in 2005-06.

In order to meet the deficit of power, the Company proposed (December 2001) to set up a thermal power station at Bellary with a capacity addition of 1,000 MW (2x 500 MW), which was approved (January 2002/June 2002) by the Government of Karnataka. The Company commissioned two units at Bellary (Bellary Thermal Power Station-BTPS) having a combined capacity of 1,000 MW (2 x 500 MW) in March 2009 (Unit I) and February 2013 (Unit II).

The Management of the Company is vested with the Board of Directors (Board). The Chief Minister of the State is the ex-officio Chairman of the Board. As at the end of March 2014, there were 11 members on the Board including the Chairman. The Managing Director is the Chief Executive of the Company. The Executive Director, BTPS, assisted by four Chief Engineers and two Deputy General Managers, is responsible for the day-to-day operations and maintenance.

Audit Objectives

2.1.2. The objectives of the performance audit are to

- examine and analyse the deficiencies in planning and execution of Unit II and the reasons for failure to achieve targeted generation and operational efficiency in respect of Unit I;
- verify, examine and analyse the cost of operations with a view to study the reasons for losses incurred; and
- assess whether BTPS has been able to achieve environmental/pollution control norms.

Scope of Audit

2.1.3. The Performance Audit on the working of the Company was included in the Audit Report (Commercial), Government of Karnataka (GoK), of the Comptroller and Auditor General of India for the year ended 31 March 2010.

The Report covered the planning, award and execution of works relating to Unit I of BTPS and its performance up to March 2010.

Further, a Compliance Audit Paragraph on 'Mining in captive coal blocks' allocated for BTPS was included in the Audit Report on Public Sector Undertakings, GoK, of the Comptroller and Auditor General of India for the year ended 31 March 2013.

The Committee on Public Undertakings is yet to discuss the Performance Audit Report and the Compliance Audit Paragraph (October 2014).

The present Performance Audit deals with planning and execution of works relating to Unit II, operational performance of Unit I, and environmental issues relating to Unit I and Unit II during the period April 2009 to March 2014.

The works relating to each of the Units were bifurcated into (i) Engineering, Procurement and Construction (EPC) contracts, consisting of supply and service portion[18] of the Unit and (ii) Non-EPC contracts, which were ancillary to the working of the Units, which mainly included construction of Raw Water Pond, Ash Pond, Railway siding and laying of water supply pipeline to the Units.

While the EPC contracts for Unit II were through a Memorandum of Understanding (September 2007) with M/s.Bharat Heavy Electricals Limited (BHEL) based on the terms of contract concluded for Unit I, the non-EPC contracts of Unit I and Unit II were awarded to other agencies through tendering process.

Audit reviewed the EPC contracts for Unit II valued at ₹ 1,680 crore and Non-EPC contracts related to Unit I and Unit II using sampling technique. Out of 108 non-EPC contracts having contract value of ₹ 344.83 crore, audit selected[19] 52 works with contract value of ₹ 335.33 crore for review.

Audit Methodology

2.1.4. The methodology adopted for attaining the audit objectives involved explaining audit objectives to the top management, scrutiny of records at Head office and Units, analysis of data with reference to audit criteria and issue of audit observations. Besides, information available on the official websites of the Central Electricity Authority (CEA), Electricity Regulatory Commission (ERC) and Ministry of Power (MoP) were utilized.

[18] Supply included design, engineering, procurement, manufacturing, inspection & testing of all electrical & mechanical equipment / systems and design & engineering of civil works. Service included transportation, erection and testing, commissioning and other works till handing over of the unit.

[19] 21 works having the contract value of above ₹ 50 lakh each aggregating to ₹ 327.79 crore (100 *per cent* selection); 31 works with contract value of less than ₹ 50 lakh each totaling ₹ 7.54 crore (using simple random sampling).

We explained the objectives of the performance audit to the Government and to the Management of the Company during an 'Entry Conference' held in April 2014. The draft Performance Audit Report was issued to the Government in September 2014. The Exit Conference was held in November 2014 wherein the audit findings were discussed with the Government represented by the Additional Chief Secretary to the GoK, Energy Department and the Managing Director of the Company.

Audit Criteria

2.1.5. The following criteria were adopted for the achievement of audit objectives.

- Guidelines/norms/orders of Central Electricity Regulatory Commission (CERC), CEA, Karnataka Electricity Regulatory Commission (KERC) and Southern Regional Power Committee (SRPC), and instructions of the MoP, Government of India (GoI) and GoK;

- Detailed Project Reports (DPR), Feasibility Reports, Design specifications, Project implementation schedule, Power Purchase Agreements (PPA);

- The Karnataka Transparency in Public Procurements (KTPP) Act, 1999, Guidelines of the Central Vigilance Commission (CVC), tender documents, agreements;

- Internal targets of the Company, manuals/ guidelines of the Company, national averages on operational performance of thermal stations as published by CEA and CERC;

- Environmental norms fixed by the Central Pollution Control Board (CPCB) and Karnataka State Pollution Control Board (KPSCB).

Audit Findings

2.1.6. The audit findings are discussed in the succeeding paragraphs. The views of the Government have been considered while finalizing the Performance Audit Report.

Planning

2.1.7. The planning process plays a vital role in implementation of the Project. It involves setting up of milestones for each stage of implementation, project deliverables, identification of resources and their optimum utilisation, anticipation of potential delays and remedies so as to attain the project objectives. We observed the following shortfalls in planning.

Mega Power Project

2.1.7.1. GoI introduced (November 1995) the Mega Power Project (MPP) Policy aimed at improving the overall power supply scenario in the country by setting up power plants having a capacity of 1,000 MW or more. The policy envisaged certain benefit for MPPs such as exemption of customs duty for these projects, tax holiday for any block of ten years within the first fifteen years and exemption of sales tax and other local levies so that these concessions would bring down tariffs to provide much needed relief to State Electricity Utilities, both in the public and private sector. As per the policy, projects of capacity of 1,000 MW and more and catering to more than one State would fall under the category of Mega Power Projects.

- GoK accorded (January 2002/June 2002) approval for setting up of coal based thermal plant units of 500 MW each at Bellary. The total cost of the project (Unit I and Unit II) was estimated at ₹ 4,191.75 crore[20]. As the implementation of both the units simultaneously would entail mega power project status for BTPS, the Board decided (October 2003) to explore the possibility of obtaining MPP status. The Board further noted (April 2004) that other States had expressed their willingness to take power from Unit II of BTPS at the meeting of the Southern Regional Electricity Board (SREB) and subsequently approved (December 2004) to sell a part of the power from BTPS to other States, through Power Trading Corporation (PTC).

- The Technical Committee of the Company discussed (February 2004/ July 2004) the benefits that would accrue to the project and consumers at large through competitive tariff if BTPS got the MPP status and estimated the savings of ₹ 133 crore in the cost of the project and ₹ 1,124 crore by way of reduction in tariff for a period of 25 years. The Committee noted (April 2004) that creation of common infrastructure facilities would economise the cost, reduce implementation time and ease construction and maintenance.

We observed that

- the Department of Energy, GoK, addressed (October 2004) a letter to Central Electricity Authority (CEA) seeking MPP status for BTPS, without insisting on the condition of inter-state sale of power. CEA turned (November 2004) down the request of GoK stating that BTPS did not meet the criteria of MPP as the power from Unit II was allotted to Karnataka Power Transmission Corporation Limited (KPTCL).

- GoK had sought the exemption without making efforts for meeting the eligibility conditions of the MPP policy. Further, when other States were willing to buy power from Unit II, seeking exemption from the condition of inter-state sale of power did not have rationale.

- the Board and the Technical Committee of the Company had favoured implementing Unit II simultaneously with Unit I, considering the expected benefits of substantial savings in project cost and consequent reduction in tariff. The Company, however, dropped the idea of

[20] Unit I - ₹ 2,230.75 crore; Unit II - ₹ 1,961 crore.

implementation of both the units simultaneously stating that this would delay the commissioning of Unit I.

- the Company had neither completed the Unit I on schedule which was delayed by 15 months nor utilised the opportunity of economizing on the project cost and reduction in tariff.

The Government stated (November 2014) that it would be difficult for the State to agree to sell the power outside the State when the State had a power crisis. The Company further stated that its financial health did not support the concept of undertaking the projects on a bigger scale.

The reply is not tenable, as there was under-utilisation of available capacity of BTPS, as indicated in subsequent paragraph 2.1.11.3, and this power if generated could have been sold outside the state. The financial constraint of the Company was never discussed in any forum and the Government could have considered provision of finances in view of future benefits accruing to the consumers.

Hence, the expected savings of ₹ 1,257 crore could not benefit the consumers as the Company did not pursue the issue to its logical end.

Non-availment of concessions under the Infrastructure policy

2.1.7.2. The Infrastructure Policy (Policy) of the GoK envisaged (July 2007) that the power generation projects were exempt from payment of entry tax for capital goods and materials used in construction, for a period of three years from the date of commencement or till the date of completion of the project, whichever was earlier. The exemption was available for machinery, equipment and construction material used for the project.

In continuation to the Policy, the GoK issued (May 2009) a notification implementing the policy decision and requiring the project implementing agency to obtain certificate from the Secretary, Infrastructure Development, to the effect that the project taken up was recognized in terms of the policy.

We observed that

- though the policy implementation was announced in May 2009 itself, the Company approached GoK in October 2010, after a delay of one and half years, seeking exemption from payment of entry tax for Unit I and Unit II of BTPS. The GoK, after seeking (December 2010) certain clarifications from the Company, certified (July 2011) Unit I and Unit II as infrastructure projects under the policy and allowed the Company to seek exemption from entry tax.
- the Company paid (2004-11) entry tax of ₹ 27.31 crore for Unit I and Unit II. This included entry tax of ₹ 5.88 crore paid for Unit II during 2009-11 which could have been avoided, had the application for exemption been sought in May 2009 itself.
- the Company had included the entry tax of ₹ 15.60 crore and ₹ 11.71 crore in the project cost of Unit I and Unit II respectively for the

purpose of claiming through tariff. The tariff for Unit I was approved (November 2010) by KERC considering the entry tax, while the tariff for Unit II was pending approval (November 2014). As the Company had not got the refund of entry tax from the commercial tax department (November 2014), the expenditure on entry tax to the extent of ₹ 27.31 crore including avoidable tax of ₹ 5.88 crore stands recovered through tariff, which is an additional burden on the consumers.

The Government replied (November 2014) that the benefit of reduction of project cost would be passed on to the Electricity Supply Companies once the entry tax is refunded.

The reply is silent on the fact that as the project cost and tariff of Unit I had already been finalised, though GoK had certified the unit to be eligible under the policy, the benefit would not be passed on to the consumers. Further, because of the delay in seeking exemption, the project cost of Unit II included the avoidable expenditure of ₹ 5.88 crore.

Coal supply

2.1.7.3. The GoI allotted (November 2003) coal blocks under the command area of Western Coalfields Limited (WCL) for meeting the coal requirements of Unit I and Unit II of BTPS. Karnataka EMTA Coal Mines Limited (KECML), a joint venture (JV) of the Company was appointed for developing the captive mines and to supply coal to BTPS.

We observed that the mining plan for the allotted coal blocks was finalised and approved (December 2004) only for Unit I, though GoK had already approved setting up of Unit II in June 2002. The Company concluded (May 2007) the Fuel Supply Agreement (FSA) with KECML for supply of coal only to Unit I although the JV provided for increasing the quantity for supply to both the units, and by then the works for Unit II had been finalised. In the absence of coal supply arrangement from KECML for Unit II, the Company was forced to procure (December 2010) the coal from Mahanadi Coalfields Limited and Singareni Coal Company Limited at higher rates than that of KECML.

The extra expenditure up to September 2013 on account of failure to finalise the mining plan for Unit II and consequent procurement of coal at higher rates was commented in the Audit Report of the Comptroller and Auditor General of India on Public Sector Undertakings for the year ended 31 March 2013. The Company had incurred additional expenditure of ₹ 114.17 crore during October 2013 to March 2014 and would incur additional expenditure of ₹ 263.78 crore[21] during 2014-15[22].

[21] ₹ 1,552.15 (difference between average cost of coal ₹ 4,518 per MT charged by SCCL and MCL and ₹ 2,965.85 per MT charged by KECML in 2013-14) multiplied by the coal consumption (7,35,551.52 MTs from October 2013 to March 2014 based on actual consumption; 16,99,440 MTs in 2014-15 estimated based on previous year consumption).

[22] As per the judgement of Hon'ble Supreme Court (August 2014), the captive coal blocks allotted to the Company stands cancelled from April 2015.

The Government replied (November 2014) that the mineable reserves in the captive coal blocks were sufficient only for one unit for its life.

The reply is not tenable as the revised mining plan for Unit II was submitted in August 2011 to meet the requirement of Unit II from the captive mines which could have been done along with the mining plan of Unit I (May 2007) and the Company could have avoided additional expenditure of ₹ 377.95 crore.

Project execution

Slippage of project schedule

2.1.8.1. The cost of construction for Unit II of BTPS was estimated at ₹ 1,961 crore (inclusive of EPC and non-EPC works). The Letter of Intent for EPC contracts were issued to BHEL in August 2006 at a contract price of ₹ 1,680 crore. The works were to be completed in 38 months (November 2010), the zero date being 19 September 2007. The contracts provided for levy of liquidated damages, subject to a maximum of 15 *per cent* of the contract price for delay in the completion of works. The works were completed (February 2013) after incurring an expenditure of ₹ 2035.69 crore[23] with a delay of 27 months from the scheduled date of completion. The Company recovered liquidated damages (LD) of ₹ 240.66 crore from the contractor for the delay.

We observed that

- the delay in completion of the works was due to significant delay in commissioning of Ash Handling Plant, Coal Handling Plant and RCC chimney. The commencement of these critical works had been delayed by 5 to 18 months. Consequently, these works were completed with a delay ranging from 4 to 39 months.

- despite the precedence of delay in commissioning of Unit I by 15 months due to non-completion of these critical works within the timeframe, the Company entrusted the EPC works through MoU to BHEL without going for a competitive bidding process. BHEL continued to show the same tardiness in completion of works of Unit II and the levy of liquidated damages did not act as a deterrent. The reasons for delay in completion of Unit II were not discussed by the Board.

- the Company suffered loss of potential revenue amounting to ₹ 1,391.33 crore (after considering the liquidated damages recovered) due to loss of generation during the delayed period of completion.

- the delay in completion of the Units forced the State to procure energy from private sources at higher rates to mitigate the shortfall during the delayed period. This imposed an additional burden of ₹ 1,518.69 crore during 2010-13 on the State. Further, the actual expenditure

[23] The expenditure arrived at after considering liquidated damages and the sale of infirm power.

capitalised included interest amounting to ₹ 178.70 crore paid on loan for the delayed completion period. As this cost had gone into the cost of the project and the Company was allowed to recover this through tariff as per the PPA, the burden would ultimately be passed on to the consumers.

The Government replied (November 2014) that the benefit of lower cost due to LD recovered has been passed on to the consumers. The reply is not acceptable, as the cost of power purchased by the State Government during the delay and the interest element on borrowings was also included in the project cost which is an additional burden on consumers.

Construction of raw water pond

2.1.9. The annual water requirement of the BTPS (1,000 MW), estimated at 1.03 thousand million cubic (TMC) feet, was proposed to be met from the regenerated water at Maralihalla stream (tributary to Tungabhadra) located 37 kms from BTPS. Since the water was available only for eight to nine months in a year, impounding adequate water into the raw water pond was essential for its use during the off-season of three to four months. The works were completed in two stages. The deficiencies in execution are discussed below:

2.1.9.1. The construction of raw water pond involving embankment up to Reservoir Level (RL) 483.3 metres was awarded (October 2004) to RN Shetty and Company (contractor) for ₹ 25.13 crore, which was 43.81 *per cent* below the amount put to tender. The work was to be completed within 14 months from the date of award, *i.e.*, by December 2005.

Estimation without detailed survey

2.1.9.2. The estimate for the work was prepared with the presumption that the entire pond area had Black Cotton (BC) soil of required thickness based on preliminary survey (2002). During the course of execution, the need for bed treatment to the pond was found necessary (May 2005) as there was no BC soil in the pond area as estimated. The extra financial implication due to change in scope of work was ₹ 9.99 crore. Failure to conduct detailed investigation prior to entrustment of work had not only vitiated the estimate but also the work valuing ₹ 9.99 crore was entrusted to the contractor bypassing the tender process.

The Government replied (November 2014) that the estimate for these works were prepared based on trial pits taken at random locations and during the course of execution the need based bed treatment was found necessary based on site conditions.

The reply is not acceptable as the trial pits were to be taken at specified intervals instead of on random basis so as to have precise estimation of work and also to get the competitive quotes in the bid. Further, the soil strata of Sandur Taluk where BTPS was located consisted of red soil as per the existing geological conditions which the Company should have taken cognizance of.

This was also proved by the subsequent detailed investigation of the site conditions.

Failure to invoke contractual provisions

2.1.9.3. The Company extended the period of contract from the original stipulated period of December 2005 to October 2006 after considering the factors not attributable to the contractor *viz*., change in scope of work, delay in issue of drawings and delay in handing over of borrow area *etc*. The contractor, however, by the stipulated date of October 2006, completed the embankment work up to Reservoir Level (RL) 476 m as against RL 483.3 m which was awarded for construction.

We observed that

- the Company extended the contract up to March 2007 based on the request of the contractor that there was increase in quantities and change in designs and drawings. The Company gave extension up to October 2006 in the first instance. Hence, the second extension without levy of LD was in violation of contract conditions.

- the contractor had not shown any progress of work even in the extension period from November 2006 to March 2007. This indicated that the Company had not ensured the credentials of the contractor while extending the contract without levying the penalty. Considering the extension period of 150 days (November 2006 to March 2007), LD of ₹ 1.88 crore was leviable, but was not levied.

- the contract had been rescinded (April 2007) without invoking risk and cost clause and the balance works (RL 476 m to 483.3 m) valuing ₹ 4.70 crore was included in the second stage works at a cost of ₹ 12 crore at the revised schedule of rates (2007-08). Though the increase of ₹ 7.30 crore in cost was recoverable from the contractor as per contract provisions (Clause 5.03.04), the Company did not recover the same.

The Government replied (November 2014) that LD was not levied and contract was rescinded without risk and cost as the delay was not attributable to contractor.

The reply is not acceptable as the extension up to October 2006 was given considering the reasons not attributable to the contractor. The second extension without levy of LD for the same reasons up to March 2007 and cancellation of contract without the risk and cost, lacked justification and resulted in non-recovery of additional cost.

Undue benefit to contractor

2.1.9.4. The rate for the extra item of work involving BC soil, which was not in the original scope of the work, was to be derived from the schedule of rates. While arriving at the rate for such extra items, the basic cost of the item as per schedule of rates was to be added to other costs *viz.*, cost of BC soil, lead charges and royalty *etc*. Thereafter, tender discount was to be applied on the total cost so arrived. The Company, however, considered (May 2007) only the basic rate of the item, ignoring other costs while applying tender discount. This had unduly benefited the contractor by ₹ 1.73 crore. The payment was in deviation of the procedure followed by the Company in similar cases.

The Government replied (November 2014) that the rate for the work had been approved after observing all formalities. The reply is not correct as the tender discount was applied only on basic cost ignoring other related costs.

Non recovery of cost of BC soil

2.1.9.5. The contractor had utilised 0.41 lakh cum out of 4.14 lakh cum of BC soil from the Ash Pond area of the Company, for which the payment was made without deducting proportionate cost of ₹ 95.75 per cum[24] for the BC soil utilised from the Ash Pond. This had resulted in excess payment of ₹ 0.39 crore.

The Government replied (November 2014) that the Company paid ₹ 135 per cum which was less than the agreement rate of ₹ 150 per cum. The reply is not correct as the rate of ₹ 150 was for homogeneous soil while the payment was made for BC soil. Further ₹ 135 per cum included the cost of BC soil, lead and royalty amounting to ₹ 95.75 cum which should have been deducted while admitting the claim.

Refund of penalty to the contractor in violation of contractual provisions

2.1.10 The Company awarded (March 2010) the work of embankment of raw water pond up to RL 487.50 m to M/s.SEW Infrastructure Limited at a cost of ₹ 58.99 crore under stage II. The work was to be completed within a period of 18 months *i.e.* by September 2011. The contract provided for price variation and any delay in completion of specified milestones[25] beyond the stipulated date attracted penalty.

As per the milestones stipulated in the contract, the contractor was to complete embankment works up to RL 487.50 m by July 2011. The Company, however, revised (February 2012) the milestones for the works to be completed by July 2012. These milestones were revised considering the factors *viz.,* non-availability of soil, modification of designs and ban on excavation. The contractor did not complete the work even by July 2012, citing the same reasons such as non-availability of soil and sought extension (August 2012/June 2013). The Company extended (December 2012/October 2013) the contract period to December 2013. The embankment work up to RL 487.50 m was completed in June 2013, pending ancillary works such as drains and road works.

[24] Include lead charges of ₹ 80.75 per cum, cost of BC soil of ₹ 12 per cum and royalty of ₹ 3 per cum.

[25] October 2010 - RL 476 m; February 2011 – RL 479 m; July 2011 – RL 487 m; September 2011 - other works.

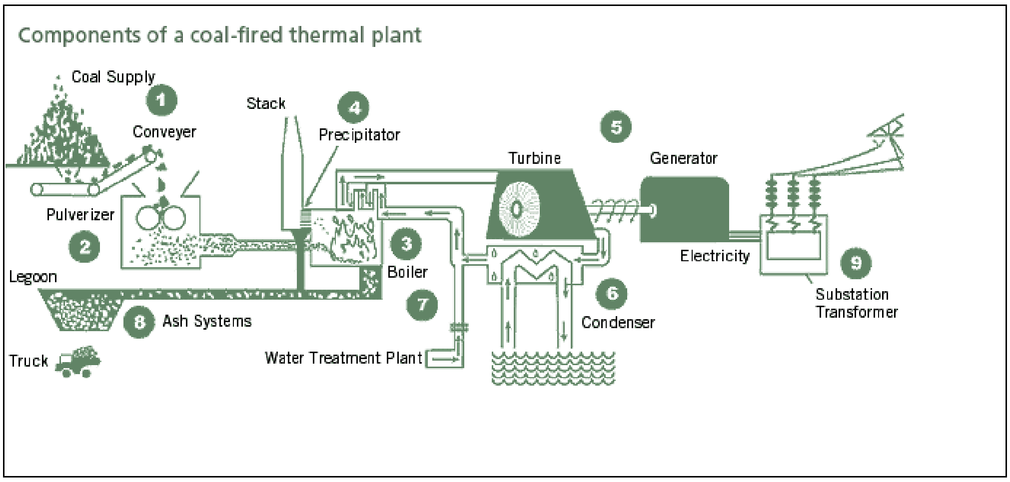
We observed that the Company refunded (December 2012/October 2013) the penalty of ₹ 3.54 crore recovered from October 2012 to August 2013, stating that the reasons for delay were not attributable to the contractor. The refund was in contravention of the terms of the contract due to the fact that the Company revised the targets twice up to July 2012, considering non-availability of soil, modification of designs and ban on excavation which were beyond the control of contractor. Hence, extension of contract period after July 2012 for the same reasons without penalty amounted to extension of undue benefit to the contractor by ₹ 3.54 crore.

The Government replied (November 2014) that the contract period was extended because the reasons for delay were not attributable to the contractor. The reply is not acceptable as the extension from July 2012 to December 2013 was based on the request of the contractor for the same reasons which were considered by the Company while extending the contract up to July 2012.

Operational efficiency

Working of Thermal Plant

2.1.11. The pictorial representation of generation of electricity by a thermal plant is depicted below:



In a thermal plant, water is taken initially into the boiler from a water source. The boiler is heated with the help of coal. The increase in temperature helps in the transformation of water into steam. The steam generated in the boiler is sent through a steam turbine. The turbine has blades which rotate when high velocity steam flows across them. This rotation of turbine blades is used to generate electricity. A generator is connected to the steam turbine. When the turbine rotates, electricity is generated and given as output by the generator, which is then supplied to the consumers through high-voltage power lines.

Low generation due to underutilization of capacity

2.1.11.1 The annual targets for generation were fixed by the Company considering planned and forced outages and expected availability of hydel power. The targets so fixed are forwarded to CEA for approval. The table below depicts the designed capacity of the plant (Unit I), targets fixed, and the actual generation for the five years period 2009-14.

Table No.2.1.1: Actual generation *vis-à-vis* designed capacity

Year	Installed capacity	Target fixed		Actual generation	
	(MU)	(MU)	(*per cent*)	(MU)	(*per cent*)
2009-10	4,380	3,281	75	2,861	65
2010-11	4,380	3,513	80	2,636	60
2011-12	4380	3,554	81	3,087	70
2012-13	4,380	3,487	80	2,991	68
2013-14	4,380	3,506	80	3,049	70
Total		**17,341**		**14,624**	

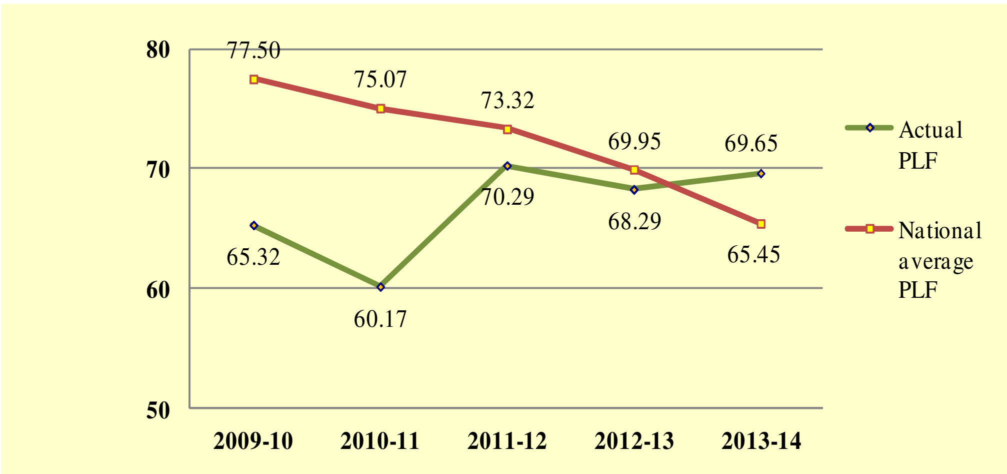
(**Source: Annual budgets, Annual reports and information furnished by the Company**)

We observed that the Company could not attain the targets in any of the years, maximum generation being 70 *per cent* of the installed capacity. Against the targeted generation of 17,341 Million Units (MU) during the five years ended March 2014, the actual generation was only 14,624 MU, resulting in shortfall of 2,717 MU. The lower generation as compared to the installed capacity contributed to lower Plant Load Factor as commented below:

Lower Plant Load Factor

2.1.11.2. Plant Load Factor (PLF) refers to the ratio between actual generation and maximum possible generation at installed capacity. The DPR relating to Unit I had projected Plant Load Factor (PLF) of 77 *per cent*. The comparative position of actual PLF achieved *vis-a-vis* national average PLF[26] is depicted graphically below.

Chart No. 2.1.1: Actual PLF of Unit I *vis-à-vis* national average PLF



We observed that

- the actual PLF recorded during five years 2009-14 was much below the projections made in the DPR. The plant could reach maximum

[26] CEA monthly report of August 2013 and July 2014.

PLF of 70.29 *per cent* in 2011-12 as against projected PLF of 77 *per cent*.

- the PLF of the plant fell short of even the average PLF achieved by the thermal plants at all India level in all the five years except in 2013-14.

The lower PLF with reference to the installed capacity indicated underutilisation of the capacity of the plant. The reasons for underutilisation of the capacity are discussed in the subsequent paragraphs.

Capacity utilization

2.1.11.3. The table below indicates the total available hours, operated hours, and the capacity utilization in respect of Unit I during the five years ended March 2014.

Table No. 2.1.2: Actual generation *vis-à-vis* possible generation

Sl. no.	Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
1	Total available hours	8,760.00	8,760.00	8,784.00	8,760.00	8,760.00
2	Operated hours	6,757.32	6,341.45	7,449.29	7,332.68	7,540.40
3	Possible generation during operated hours (MU)	3,378.66	3,170.73	3,724.64	3,666.34	3,770.20
4	Actual generation (MU)	2,860.83	2,635.53	3,087.13	2,990.59	3,048.73
5	Under utilization (MU)	517.83	535.20	637.51	675.75	721.47
6	Capacity utilization (*per cent*)	84.67	83.12	82.88	81.57	80.86

The capacity utilization continuously decreased over the years from 84.67 *per cent* in 2009-10 to 80.86 *per cent* in 2013-14. This was due to fact that the components of the plant, such as boiler, cooling tower *etc*., were not functioning at the optimum levels as indicated in the succeeding paragraphs. Considering average capacity utilisation at 83 *per cent* during 2009-14, the short fall in generation was 2,562.84 MU. The loss due to underutilisation of capacity amounted to ₹ 102.28 crore.

The Government replied (November 2014) that the Company had entrusted to Central Power Research Institute (CPRI), the task of analysing the technical reasons for the inefficiencies observed and the Company would review the measures suggested by CPRI to increase the efficiency.

Audit scrutiny of records revealed the inefficiencies in the various components of the plant. These are discussed in the following paragraphs.

Increased Station Heat Rate and lower boiler efficiency

2.1.11.4. The specific consumption of coal increased from 0.62 kg/kWh in 2009-10 to 0.70 kg/kWh in 2013-14 against the designed specific coal consumption of 0.4850 per kWh. This was mainly due to poor quality of coal.

Consequent to this, the Station Heat Rate[27] (SHR) was much above the normative SHR of 2,450 kcal/kWh prescribed by CERC/PPA, the actual SHR ranged between 2,808 kcal/kWh and 3,093 kcal/kWh. As a result, the efficiency of the boiler had come down to as low as 62.8 *per cent* and 69.2 *per cent* which was far less than 88.98 *per cent* considered by BHEL.

Since the energy charges were determined considering the fixed SHR of 2,450 kcal per kWh, the increased SHR beyond the specified SHR resulted in under-recovery of energy charges. The underrecovery, on account of increased station heat rate, was ₹ 239.14 crore during 2009-13[28].

Government replied (November 2014) that SHR variation was due to age of the plant, diminishing turbine and boiler efficiency, bad performance of cooling towers and non-operation of the plant at the rated capacity, and that for improving the efficiency, the plant needed an additional investment of ₹ 8.50 crore. Thus, the Government accepted that the performance was below desired levels and that there was need to implement additional measures to improve efficiency.

Sub-optimal performance of cooling tower

2.1.11.5. The primary task of the cooling tower in the plant is to reject heat absorbed in the hot water from heat exchangers into the atmosphere. The BTPS Units are equipped with Natural Draft Cooling Tower having PVC film type fill. The scrutiny of the records revealed that

- raw water analysis sourced from Maralihalla stream indicated (February 2004) turbidity and total dissolved solids (TDS) levels at 100 Nephelometric Turbidity Units (NTU) and 1313 parts per million (PPM) respectively.

- the Company noticed (September 2012) that the PVC fills of the cooling tower relating to Unit I were blocked due to turbidity of water and took note of the fact that this could affect the structural stability of the pre-cast beams and hence required replacement.

- the Company started evaluating the performance of the cooling tower of Unit I only with effect from November 2013 and the average reading up to March 2014 was as under:

Table No. 2.1.3: Performance of cooling tower

Parameters	Designed specification	Actual reading	Indicators of good performance
Range (°C)	10.20	9.80	High range
Approach (°C)	5.00	20.00	Low approach
Effectiveness(*per cent*)	67.10	32.88	High effectiveness
Liquid / Gas (Ratio)	1.873	3.29	Low ratio

(Source: BHEL agreement and information furnished by Company)

[27] Station Heat Rate is the heat energy input in kilocalories (kcal) required to generate one unit of electrical energy at generator terminals.

[28] The under recovery charges were as per the workings of the Company. The charges for 2013-14 were not available as the cost audit had not been finalised.

The actual readings varied adversely against the designed specification. The level of TDS remained as high as 1,500 PPM despite using clarified water. The performance of the cooling tower relating to Unit I was sub-optimal, thus negatively impacting the heat transfer process in the condenser.

Despite being aware of the fact, in May 2007 itself, that PVC film type fills could not be used in water with high turbidity, the Company decided to go in for PVC Film Fill instead of exploring the possibility of using some other types of Fills such as 'Low clog film fills' which were better equipped to handle high turbidity in the water, as per the Bureau of Energy Efficiency.

Excess auxiliary power consumption by cooling water pumps

2.1.11.6. Unit I had four cooling water pumps supplied by BHEL. Of these, three pumps were in operation at any point of time while one was held as stand-by. The combined capacity of the pumps as designed and performance guaranteed (April 2010) by BHEL was 57,300 cubic metres of water per hour with a power input of 4,260 kilowatt. The performance guarantee test of the pumps was conducted only in April 2010. Based on the designed and tested parameters, 7,435 units of energy were required to circulate one lakh cubic metres of water. We observed that the cooling water pumps had consumed auxiliary power in excess of the designed specifications during 2010-14 and the value of power consumed in excess of the designed specification amounted to ₹ 4.43 crore.

Government replied (November 2014) that action would be taken to maintain the salt and algae contents of the water to the minimum and during the annual overhaul of the unit all the choked nozzles and PVC fills would be replaced. The reply indicates that the Company had not taken cognizance of the effect of the raw water analysis done in 2004 which affected the performance of cooling towers resulting in excess consumption of power and recurring expenditure due to replacement of nozzles and fills.

Outages and Plant availability

2.1.11.7. Outages refer to the period for which the plant remained closed for attending to planned/forced maintenance. The plant availability is the average of the declared capacity for all the time blocks during the period, expressed as a percentage of the installed capacity.

We observed that

- forced outages, which represented 22.86 *per cent* of total available hours during 2009-10, had declined to 7.06 *per cent* in 2013-14. The forced outages were within the permitted levels.

- as per the norms of CERC and the PPA approved (November 2010) by KERC, the target for plant availability was 80 *per cent* of the installed capacity. The plant availability was 77 *per cent* and 72 *per cent* in 2009-10 and 2010-11 respectively. This had, however, improved during 2011-14, which ranged between 84 *per cent* and 86 *per cent,* conforming to the norms.

Ineffective maintenance

2.1.11.8. To ensure long term sustainable levels of performance of the plant, it is important to adhere to periodic maintenance schedules. The efficiency and availability of the equipment is dependent on strict adherence to annual maintenance and equipment overhauling schedules.

The table below indicates the details of the dates of annual overhauling of Unit I, forced outages during the year before and after overhauling work, for the four years ended March 2014.

Table No. 2.1.4: Forced outages before and after overhauling

Year	Period of planned shut down for overhaul	Total forced outage hours during the year	Forced outage hours after overhaul	Forced outage hours before overhaul	Percentage of column (4) to column (3)
1	2	3	4	5	6
2010-11	14 September 2010 to 30 October 2010	1,162.24	1,062.43	99.81	91.40
2011-12	2 September 2011 to 3 October 2011	515.95	244.38	271.57	47.40
2012-13	1 September 2012 to 30 September 2012	603.66	603.66	Nil	100.00
2013-14	2 August 2013 to 28 August 2013	484.65	263.35	221.30	54.34

(Source: Outage details furnished by the Company)

The incidence of outage hours after overhauling were abnormally high in 2010-11 and 2012-13 when compared to that of before overhaul. In 2011-12 and 2013-14, the outages had not come down substantially after the overhaul. This indicated ineffective execution of overhaul works. The main problems encountered after overhauling were boiler tube leakages and generator vibrations which could have been avoided with better maintenance.

Government accepted (November 2014) the audit observations.

Financial Management

Debt-equity mix

2.1.12. The DPR of Unit I envisaged debt-equity mix of 80:20. The PPA relating to the sale of energy generated by Unit I was approved by KERC in November 2010, based on which the PPAs were concluded (December 2010) with ESCOMs for a period of 25 years. The project cost, as per PPA, for fixation of tariff comprised a maximum equity component of 30 *per cent* and a minimum debt component of 70 *per cent*. The actual debt-equity mix of Unit I ranged between 84:16 and 89:11 during the five years ended March 2014.

We observed that

- the Company raised bills on ESCOMs considering a debt-equity mix of 80:20, as contemplated in the DPR instead of actual composition of debt and equity which was within the range indicated in the PPA, resulting in underrecovery of interest on debt amounting to ₹ 44.73 crore during 2009-14. Similarly, the return on equity exceeded the return that the Company would have been entitled to by ₹ 90.04 crore during the same period. Consequently, the additional burden imposed on the consumers amounted to ₹ 45.31 crore.

- based on the average interest and return on equity for the five years ended March 2014, the Company would suffer underrecovery of interest (₹ 178.92 crore) and claim return on equity in excess (₹ 360.16 crore calculated with respect to PPA) through the tariff mechanism during the remaining period of the PPA (20 years up to 2034), thus imposing an additional burden of ₹ 181.24 crore on the consumers.

The Government replied (November 2014) that as the project has been envisaged with a debt equity ratio of 80:20, the same ratio has been considered for the purpose of claiming the revenue irrespective of the loan availed for the project and had approached (October 2014) KERC for approval. The reply is not acceptable as the claim was in violation of the Power Purchase Agreement.

Under recovery of Fuel Escalation Charges

2.1.13. In accordance with the PPA for Unit I, the cost of primary fuel was to be arrived at after adding normative transit and handling loss of 0.8 *per cent.* We observed that the Company failed to include transit and handling loss as enunciated in the PPA, while determining the cost of coal for the period April 2009 to March 2012. The Company, however, included the transit and handling losses for the purpose of cost of fuel with effect from 2012-13.

Failure to include the transit and handling loss at 0.8 *per cent* during the period 2009-12, resulted in underrecovery of ₹ 10.90 crore towards primary fuel cost, which had to be absorbed by the Company.

The Government replied (November 2014) that the necessary action has been taken to claim the differential fuel escalation charges from ESCOMs for the period 2009-12.

Inclusion of demurrage charges in the cost of fuel

2.1.14. The supplies of primary fuel (coal) and secondary fuel (Heavy Furnace Oil (HFO) and Light Diesel Oil (LDO)) are received through railway wagons at BTPS. To facilitate unloading of these wagon receipts, the Railways permitted a detention time up to five hours per rake free of cost and levied demurrage charges thereafter.

The Company incurred demurrage charges of ₹ 32.68 crore during the period from 2009-14.

We observed that

- the rake detention time allotted to Raichur Thermal Power Station (RTPS) was seven hours as against five hours allotted to BTPS. The minimum detention time of seven hours was required per rake as per estimation of the Company. Yet, the Company failed to pursue with the Railways for enhancement of detention time for BTPS.

- as per approved PPA of Unit I, recoverable cost of primary fuel and secondary fuel included only the cost of the commodity, taxes, transportation charges, port charges, insurance and other handling charges. Demurrage charges, though, paid due to inefficiency of the Company, were included as part of fuel cost and were passed on to ESCOMs, thus imposing additional burden of ₹ 32.68 crore on the consumers.

While accepting the audit observations, the Government replied (November 2014) that the Company would take up the matter with the Railways to increase detention time and take corrective action on the demurrage charges included in the fuel charges.

Environmental norms

Non-compliance with the norms of Ministry of Environment and Forest

2.1.15 With a view to restricting the excavation of top soil for manufacture of bricks and for other works which involve use of top soil and for promoting utilization of fly ash produced by coal or lignite based thermal power plants in the manufacture of building materials and construction activity, the Ministry of Environment and Forests (MoEF) notified (November 2009) that all thermal power stations in operation before the date of the notification were to achieve 100 *per cent* fly ash utilization on a graduated scale within five years from the date of the notification.

We observed that the BTPS achieved fly ash utilization of only 45 *per cent*, by March 2014, as arrangements for evacuation of fly ash were not properly managed as discussed below.

Evacuation of fly ash

2.1.15.1. The Company awarded (December 2008/June 2011) the contract for collection of dry fly ash from Unit I and Unit II to M/s.Rain Commodities Limited (RCL) and M/s.Ultra Tech Cements Limited (UTCL) respectively.

As per the terms and conditions of the agreements, RCL and UTCL was required to lift the entire quantity of fly ash generated in Unit I and Unit II and allotted to them on monthly basis, which was intimated at the beginning of each quarter at a contract price of ₹ 469 and ₹ 240 per Metric Tonne (MT) respectively to be escalated by 5 *per cent* annually. The contracts provided for levy of penalty at 125 *per cent* of the contract price for quantities of fly ash remaining unlifted.

We observed that

- RCL had lifted only 12.29 lakh MTs out of 18.21 lakh MTs of fly ash generated and allotted during 2009-14. Penalty of ₹ 44.17 crore (up to March 2014), though levied by the Company for non-lifting of the stipulated quantity of fly ash, was yet to be recovered from RCL (August 2014).

- UTCL lifted only 1.76 lakh MTs of the fly ash of 3.04 lakh MTs generated and allotted (September 2013 to March 2014) from Unit II, leaving a balance of 1.28 lakh MTs. The penalty of ₹ 3.04 crore levied on UTCL was yet to be recovered by the Company (August 2014).

- the accumulated and unlifted fly ash of 14.51 lakh MTs of Unit I and Unit II, having a market value of ₹ 64.49 crore, was pumped into the ash pond.

The Government replied (November 2014) that the Company would determine the quantity of unlifted fly ash in order to levy the penalty.

Maintenance of Ash Handling System

2.1.15.2. As per the terms of the Letter of Award (December 2008/June 2011), RCL and UTCL were to maintain the ash handling plant at their cost, including procurement of necessary spares at their cost. The spares that were procured by the Company and lying in inventory were to be taken over by them at cost.

We observed that the Company, instead of shifting the incidence of operation and maintenance expenditure on them as per contractual terms, absorbed ₹ 2.40 crore during 2009-14. We further observed that the Company procured and held the inventory of spares worth ₹ 2.97 crore required for Ash handling Plants of Unit I and Unit II, although the responsibility of holding these inventories rests with the contractors. Thus, funds to this extent which should have been the contractors' burden were borne by the Company.

The Government replied (November 2014) that as the contractors did not procure the spares in the initial stage, the Company had procured spares for smooth running of the plant and would pursue with the contractors to take over the spares. The fact, however, remains that recovery of ₹ 5.37 crore was yet to be made by the Company from the contractor.

Suspended Particulate Matter and Respirable Particulate Matter

2.1.15.3 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. ESPs installed at BTPS were designed to achieve an SPM level of 100 µg/m^3. We observed that the average SPM level exceeded the prescribed levels and ranged between 112.5 µg/m^3 and 125.5 µg/m^3 during 2009-12. The SPM levels were within the designed range thereafter.

2.1.15.4. Respirable Particulate Matter (RPM) is emitted directly into the atmosphere from elemental carbon and organic carbon compounds as a result of physical and chemical transformations during operation of the thermal plant, which could adversely affect human health and impact on climate and precipitation. We observed that the levels of RPM at Unit I had exceeded the permissible level of 40 µg/m^3 notified by CPCB. The average RPM levels at Unit I ranged between 42 and 64 µg/m^3 during 2009-12. The RPM levels, however, were within the norms from 2012-13 onwards.

The Government replied (November 2014) that the SPM and RPM levels, as tested during September 2014, were well within the norms.

Acknowledgement

We acknowledge the co-operation extended by the Energy Department of GoK and the Company in facilitating the conduct of performance audit.

Conclusions

We concluded that

- **the Company had foregone the envisaged benefits under mega power project policy of GoI, thereby foregoing the opportunity of reducing the project cost and bringing down the cost of power generation by ₹ 1,257 crore.**

- **the delay in approaching the Government to avail exemption from entry tax under infrastructure policy and inclusion of the same in the project cost resulted in an additional burden on the consumers by ₹ 27.31 crore.**

- **the Company incurred an additional expenditure of ₹ 114.17 crore towards coal purchases for Unit II in the absence of coal supply arrangement from the captive coal blocks during the period from October 2013 to March 2014 and would continue to incur ₹ 263.78 crore during 2014-15.**

- **despite the precedence of delay in commissioning of Unit I due to incompletion of certain critical works within the timeframe, the Company entrusted the EPC works through MoU through BHEL without going for a competitive bidding process.**

- **the Company could attain maximum generation of only 70 *per cent* of the installed capacity as against the targeted generation of 80**

***per cent* during 2009-14. The shortfall in generation during this period was 2,717 MU.**

- **the capacity utilization of Unit I had continuously decreased from 84.67 *per cent* in 2009-10 to 80.86 *per cent* in 2013-14, indicating suboptimal performance of the plant. The loss due to underutilisation of capacity was ₹ 102.28 crore.**
- **the increased Station Heat Rate which was higher than the stipulated norms, resulted in underrecovery of cost by ₹ 239.14 crore during 2009-13.**
- **the Company did not achieve the norms fixed by MoEF in respect of fly ash utilization.**

Recommendations

We recommend that the Company

- **consider obtaining competitive bids for future thermal power station works.**
- **adhere to strict regime of annual overhaul and preventive maintenance to ensure smooth running of the units for their optimum utilisation.**
- **ensure that the specific coal consumption and Station Heat Rate are well within the norms so as to keep the cost of generation at desired levels.**
- **identify more prospective buyers of fly ash like National Highways Authority of India, Central and State Public Works Departments to ensure hundred *per cent* evacuation as prescribed by MoEF.**