TAMIL NADU ELECTRICITY REGULATORY COMMISSION
(Constituted under section 82 (1) of the Electricity Act, 2003)
(Central Act 36 of 2003)

PRESENT:

Thiru. S.Akshayakumar - Chairman

Thiru. G.Rajagopal - Member

and

Dr.T.Prabhakara Rao - Member

M.A.P.No.3 of 2015

In the matter of : Approval of Capital cost of Mettur Thermal Power Station Stage III (1x600 MW) of Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) under sections 62 and 86 (1) (a) of the Electricity Act 2003 read with regulation 18 of TNERC (Terms and Conditions) of Tariff Regulations, 2005.

Tamil Nadu Generation and Distribution Corporation Limited
Represented by Chief Engineer/Projects
144, Anna Salai, Chennai – 600 002. : Petitioner

Vs.

Nil : Respondent

Dates of hearing: 20.04.2015; 09.09.2016

Date of Order: 31.01.2017

Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) which is in the business of generation and distribution of electricity in the State of Tamil Nadu has filed the above petition for approval of the Capital cost for Mettur Thermal Power Station Stage –III (1x600 MW) under sections 62 and 86 (1) (a) of the Electricity Act, 2003 read with Regulation 18 of TNERC (Terms and conditions) of Tariff Regulations, 2005. The above petition has been heard on 20.04.2015 and 09.09.2016. The said petition M.A.P.No.3 of 2015 came up for final hearing on

09.09.2016. The Commission upon perusing the above petition and connected records and after hearing the submissions of the petitioner hereby makes the following:

ORDER

1. Prayer of the Petitioner in M.A.P.No.3 of 2015:-

The prayer of the petitioner in M.A.P.No.3 of 2015 is to –

(i) approve the Capital cost for Mettur Thermal Power Station Stage III (1x600 MW) upto date of commercial operation (i.e.12.10.2013); and

(ii) permit to claim the cost of the above thermal station in the Aggregate Revenue Requirement (ARR) of TANGEDCO as per the petition till the time the petition is closed.

2. Facts of the case:-

Through the petition and other additional submissions of the petitioner, the following are stated:

2.1 Mettur Thermal Power Station Stage III is located within the existing Mettur Thermal Power Station. The power generated from this power station will be supplied by TANGEDCO for retail supply of power to its consumers.

2.2. The Detailed Project Report (DPR) for establishment of 1x500 MW, Mettur Thermal Power Project Stage III was prepared. However, as per the guidelines of Central Electricity Authority, Global tender under two part system for a plant capacity between 500 MW to 600 MW was called for. All the bidders offered 600 MW capacity plant and Letter of Intent dt.25.06.2008 was issued to the lowest tenderer viz. M/s.BGR Energy Systems Ltd., Chennai. The plant capacity has been revised from

500 MW to 600 MW and this necessitated the revision of DPR based on the EPC cost. Accordingly, M/s.Development Consultants Private Limited who were the consultants for the above project have revised the DPR and submitted for approval of the Board. The project cost including IDC as on March'2008 worked out to Rs.3550.04 crores.

2.3. The EPC contractor commenced the work on 25th June 2008. The project was to be commissioned during September 2011 but was delayed due to delay in Coal Handling, Ash Handling, Milling System and Bunkers Erection etc. The contract has been extended upto 31st December 2014 in order to hand over the plant to the petitioner after completing the pending balance works in respect of electrical, mechanical and Civil. Since the EPC Cost is firm except Exchange Rate Variation (ERV), the EPC contract price has not varied.

2.4 The Unit was synchronized with oil on 4th May 2012 and achieved a full load capacity of 608 MW on 11th October 2012. The trial operation of the unit was under progress from 23rd November 2012 to 4th December 2012. However, the unit was forced shut down from 4th December 2012 to attend to few technical problems that were encountered during the period of initial operation.

2.5. Trial run was conducted from 14.09.2013 to 12.10.2013. COD was declared on 12.10.2013 and PG test was completed by the EPC Contractor and accepted by the petitioner except Run Back test, Load rejection test of turbine, Turbine load change withstand Capacity Test and coordinated control system.

2.6. Investment approval of Mettur Thermal Power Station Stage III was accorded by TANGEDCO Board through circulation on 17.02.2014 at the revised project cost of Rs.4695.425 crores due to increase in cost of certain elements as detailed below:-

(i) Laying of connecting roads wherever necessary which were ascertained after completion of the erection works of the main plant;

(ii) The quarters facilities to be provided for the staff;

(iii) The amount of Rs.109.04 crores towards Exchange Rate Variation (ERV) as provided for in the LOI;

iv) The final IDC of Rs.1203.39 crores calculated based on the average rate of interest of 12.22% against the initially reckoned interest rate of 11%;

v) The fuel charges of Rs.198.32 crores

2.7. The Unit was under shutdown from 22.06.2014 to 05.08.2014 to attend the Hydrogen leak in generator system and the unit is generating electricity from 06.08.2014.

2.8. No foreign loans were taken for funding of the capital expenditure for project execution. The loan capital was funded by Power Finance Corporation (PFC). The total loan sanctioned and drawn for the project is Rs.3663.70 crores which was sanctioned in three installments viz. Rs.2221.80 crores, Rs.442.20 crores and Rs.999.70 crores. The loan along with interest is to be paid in 60 equal equated quarterly installments. The first repayment is on 15.10.2012 @ Rs.44.40 crores (principal) plus interest for a loan for Rs.2664 crores. Subsequently, a loan of Rs.999.70 crores was sanctioned and the repayment rate towards principal was increased to Rs.62.91 crores. The installments are due on 15th April, 15th July, 15th

October and 15th Jan of every year. The petitioner shall pay interest on the said loan at the rate of interest prevailing on the date of each disbursement as per the Corporation policy which shall be as notified by PFC along with tax, if any, at the rate applicable from time to time. PFC shall have a right to reset the rate of interest, at its discretion, from third/tenth year (as applicable) beginning with the date of first disbursement. The present marginal average lending rate is 12.22%. The difference between actual interest paid and the interest petitioned will be claimed separately through petition as the loan carries variable rate of interest.

2.9. The detailed break up of original estimated project cost and revised project cost along with reasons is given below:-

TABLE
BREAK UP OF PROJECT COST

(Rs. in Crores)

Sl. No.	Head of works	Original cost	Cost on COD	Variation	Reason for variation
1.0	**Infrastructure works - Cost of land & site development**				
1.1	Land	45	42		
1.2	Preliminary Investigation and site development	1.0	1.0		
1.3	**Infrastructure works- Cost of land & site development**	**46**	**43**	(3)	
2	**Major civil works**	**465**	**465**	-	
3	**Plant & equipment (including Taxes & Duties & spares)**			-	
3.1	Steam Generator Island	1524	1524		
3.2	Turbine Generator Island				
3.3	BOP mechanical – CW system, DM water plant, Fuel Handling & Storage system, Ash Handling system, Coal handling system, HP/LP piping	341	341		

3.4	BOP Electrical – Switchyard package, Transformer package, Switchgear package, Cables & accessories, Lighting DG set etc	279	279		
3.5	C& I package	90	90		
3.6	**Total Plant & equipment excluding Taxes and duties**	**2234**	**2234**		
3.7	Taxes & Duties				
3.7.1	Taxes & duties (EPC contract)	309	309		
3.7.2	Taxes & Duties (non EPC contract)	24	24		
3.7.3	**Total Taxes & duties**	**333**	**333**		
3.8	**Total Plant & Equipment including Taxes & Duties**	**2567**	**2567**		
4	**Initial spares**	**96**	**96**		Included in the above EPC cost.
5	**Construction and precommissioning expenses**	**73**	**73**		
6	**Total EPC cost (Sl.No 2+3.8+5)**	**3105**	**3105**		
7	**Overheads**				
7.1	Other works - Railway siding, Road	-	16	16	Works are new other than EPC cost.
7.2	Quarters	-	20	20	
7.3	Exchange rate Variation	-	109	109	
7.4	Fuel cost				
7.4.1	Start up fuel		198	198	Due to delay in completion of project. Revenue earned from sale of infirm power adjusted in Capital cost. Tariff @ Rs.1.34 per unit of infirm power calculated as per formula specified by Commission.
7.4.2	Infirm power		166	166	
7.4.3	Net fuel cost		32	32	
7.5	**Total overheads (Sl.No.7.1+7.2+7.3+7.4.3)**	-	**177**	**177**	
7	Capital cost exldg IDC & FC including Infrastructure cost (Sl.No.1+6 + 7.5)	**3151**	**3325**	**174**	

8	Financing charges and IDC	**413**	**1203**	**790**	Project delay
9	Capital cost incldg IDC &FC	**3564**	**4528**	**964**	
	Cost per MW	5.94	7.55		
	Aggregate revenue Requirement	12.10.2013 to 31.03.2014 – Rs 382 crores; 2014-15 – Rs.870 crores.; 2015-16 – Rs.846 crores.			
	Rate of Energy charge ex bus	12.10.13 to 31.03.14 – Rs 2.66/kWh; 2014-15 – Rs.2.51/ kWh.; 2015-16 – Rs.2.62/ kWh.			

3. The Commission in order to carry out the prudence check of the Capital cost and to address the data gaps, directed the petitioner to submit additional details with respect to actual expenditure incurred upto and after COD, split up taxes and duties, actual taxes and duties paid, details of fuel cost, infirm energy generated, detailed specific reasons for delay in completion of the project which consequently has led to increase in Interest During Construction thereby increasing in the project cost.

4. Contentions of the Petitioner:-

Pursuant to the above, the petitioner submitted the additional details as called for by the Commission. The contents of the petition and the additional details in brief are as follows:-

4.1 The petitioner has enclosed a report of Chartered Accountant certifying that,-

(1) TANGEDCO has computed the cost in the currency of expenditure viz. Indian Rupees under each head approved by the Board of TANGEDCO;

(2) Cost incurred by the Company are as per Agreements entered into with Financial Institutions/Banks and as per contacts entered into with EPC, non EPC contractors and other parties wherever applicable;

(3) The project has commenced Commercial Operation on 12.10.2013 which is the commercial operation date of the project also;

(4) The project cost excludes margin money on working capital provided by the company.

4.2. Against the global tender floated for establishment of thermal power plant with capacity ranging from 500 MW to 600 MW, Letter of Intent was issued to the lowest tenderer viz M/s.BGR Energy Systems Ltd., Chennai. The EPC contractor commenced the work on 25.06.08. The project was to be commissioned during September 2011 but was delayed due to delay in coal Handling, Ash Handling, Milling System and Bunkers erection etc.

4.3. Time overrun and cost overrun of the project are due to the following:

4.3.1 **TIME OVER RUN**:

(i) The LOI was issued for main Boiler, Turbine, Generator packages and Balance of Plant (BOP) under Engineering Procurement and Construction basis to M/s.BGR Energy Systems Pvt. Ltd., (BGRSL) / Chennai on 25.06.2008 and the due date for completion was stipulated as 39 months from 25.06.2008 (i.e) 24.09.2011. The contractor was executing the works in multiple fronts and the overall progress by the EPC contractor was assessed as 60% as on 24.09.2011. However, the unit was synchronized on 04.05.2012 by oil firing and on 14.08.2012 by coal firing and full load reached on 11.10.2012 and COD was declared on 12.10.2013. In order to complete all the pending works and to hand over the plant in complete shape, time extension was given without prejudice to the rights of the petitioner to levy LD and

penalty upto 31.12.2014 vide B.P. No.115 dt. 04.10.2014 and work permit was given upto 28.02.2015. As such there is a delay of 24.5 months.

(ii) The major causes for delay in completion of the project on the scheduled completion date are as detailed below:

(a) Stoppage of works by Southern Railway and issue of change order to BGRESL by the petitioner

Establishing additional Railway siding works for the coal movement for MTPP (Stage III) along with obtaining clearances from Southern Railways was under the scope of EPC contractor. During the execution of the project in order to take parallel measures BGRESL started the wagon tippler excavation in the railway track in spite of objections raised by the petitioner. The Southern Railway which is operating the 4x 210 MW Railway siding for coal movement of these units insisted the petitioner to stop the works and to continue after obtaining the line clearance. The work was stopped by Railways on 09.04.2010. Inspite of efforts put forth by the petitioner to obtain permission from Southern railways to proceed further, line permit was obtained from Southern railways only on 01.11.2010, after series of meetings and discussions with them. Further, there was a dispute between the petitioner and BGRESL in the scope of works in respect of Railway siding and BGRESL was insisting for change order. Since the stand of the petitioner was that the issue of change order would not arise in this case, the petitioner was insisting BGRESL to proceed with the works. Repeated meetings/ discussions became futile and finally by constituting Technical expert Committee and analyzing their reports, Board has directed to issue change order in respect of works

related to railway siding. After acceptance by the petitioner to issue change order, BGRESL was requested to proceed with the works pending finalization of cost. But, BGRESL informed that they would start the works only on receipt of change order whereas the change order warranted repeated negotiations for finalization of the cost of works. Finally change order was issued to M/s.BGRESL on 05.06.2012.

(b) Auxiliary steam requirements for various start up services of the plant

As per specification/pre-bid clarifications, the auxiliary steam tapping was to be taken from the existing MTPS - I. During detailed engineering, BGRESL noted the pressure and temperature of the available auxiliary steam of MTPS Stage I and started submitting the documents accordingly. But after about 28 months of detailed engineering only, M/s.BGRESL were able to firm up the pressure and temperature requirements of the Auxiliary steam that was required for pre-commissioning activities. Based on this, BGRESL proposed the scheme by introducing a fired vessel for achieving the parameter requirements of the steam. After obtaining in-principle approval, BGRESL proceeded with the works.

(c) Coal Burner modification

During November 2012, there was a leak in main steam stop valve and the unit was shut down on 04.12.2012. While investigating the unit to identify the problems in detail, it was observed that the coal burners had a problem and required replacement. A committee was constituted by the petitioner to study the damages that occurred in the burner area of Boiler. The committee has inspected the boiler and observed that the ceramic tiles in the coal nozzle in the bottom two tiers almost got dislodged and recommended that it would be

essential to attend the defects immediately. Based on further discussion with BGRESL to attend the defects, and after scrutiny of the documents, clearance for dispatch of the material was also given to BGRESL vide letter dt.04.02.2013.

(d) Change in the scheme for potable and service water

Under the waste water treatment system proposed for the MTPP stage III, the CT blow down of the existing station (MTPS Stage I) is one of the inputs and the Central Monitoring basin and ETP schemes were to be designed accordingly. When the tapping for CT blow down of MTPS Stage I was to be identified, the tap off proposed by site was not acceptable to BGRESL and hence the matter was under dispute. Meanwhile, it was said that there would be a component called “organo phosphonate” in the CT blow down of MTPS Stage I and if the same is let in the clarifier of MTPP Stage III this would not suit for potable purpose. Hence, the petitioner insisted for alternate potable water scheme. Similarly. The petitioner insisted for an alternate scheme for service water also. This led to a series of discussions and meetings with BGRESL and finally BGRESL executed potable water as a separate scheme. However, BGRESL established through IS that the same can be used as service water and hence no need for separate scheme has arisen.

(e) Mill vibration problem

Initial operation of the unit with coal firing was done on 14.08.2012 with coal of calorific value of 3050 kcal/kg. During the trial measures, heavy vibration was observed in the mills. BGRESL expressed their concern for size of coal supplied to coal bunker for the better life of the mill. The petitioner informed to BGRESL that proper coal bed not formed in between the bowl and rollers

leading to the direct contact of bowl and roller and thereby causing heavy vibration. However, as suggested by BGRESL arrangements were made by the petitioner to feed crushed coal of indigenous coal from NCTPS and simultaneously arrangements were made to spare import coal. A team of TANGEDCO/BGRESL visited ANPARA Power Station/UP on 31.10.2012, where M/s.DEC have commissioned similar capacity power plant who is the OEM for mill at MTPP stage III, in order to study the operation of similar coal pulveriser. During the visit, it was ascertained that the mills were erected with packer plates to avert vibration. After providing packer plates at MTPP mills, the mill vibration issue was resolved.

(iii) The EPC contractor, M/s.BGRESL has proposed to de-scope many works which they have not completed till date as per their EPC contract agreement. The de-scoped works include works in non-plant area such as Roads, drains & culvert (balance), Compound wall, Parking sheds, Green belt development, ETP/STP/Effluent treatment, Distribution piping, CCTV, Street light, Cable dressing, CEIG remarks, Slope protection and retaining wall (balance), providing roof treatment (balance areas), Ash slurry piping, balance pending works in Boiler area, Mill Plant area, Ash handling area & Coal handling area, some MRT and C&I works, Chemical lab equipment, etc The petitioner decided to form a Committee to look into the details of the descoped works, the amount pending in the 1x 600 MW Mettur Thermal Power Project EPC contract, the balance work to be executed by M/s.BGRESL, the amount to be recovered from M/s.BGRESL and the necessity to carry out the descoped works etc. Further the committee will also look into the request made by M/s.BGRESL for extension of time without imposing LD and

Penalty for their contract for various reasons not attributable to BGRESL and this is under process.

4.3.2 **COST OVER RUN**:

Being a firm price EPC contract, cost over run on EPC portion does not arise. Additional works such as Railway siding and Road works and construction of quarters have increased capital cost of the project. The amount of Rs.109 crores towards Exchange Rate Variation (ERV) has been included in the revised cost as on COD. Further, due to delay in implementation, TANGEDCO has suffered additional burden on account of interest during construction and start up fuel cost which was not included in the original estimate.

4.4 Though there is no cost overrun in EPC Contract being a firm price contract, the increase in project cost is due to additional works such as railway siding, road works and construction of quarters, ERV, Interest during construction and Start up fuel cost. The project cost includes IDC of Rs.1203 crores and start up fuel amounting to Rs.32 crores. (Net after deducting the revenue earned from sale of infirm power)

4.5 **Details of Additional works**

4.5.1 **Railway siding and Road works**

(i) Road works (Rs.7.01 crores.):

The connecting roads are to be made ready for the access of both men and material wherever necessary which could be ascertained after completion of

erection works of main plant. Hence orders were placed for laying roads for Rs.7.01 crores.

(ii) Railway works (Rs.9.00 crores):

The scope of EPC contractor, Ms/BGRESL includes the coal handling system with a provision of 2 Nos. wagon tipplers in the existing service lines 1& 2 to operate wagons with loco in the inhaul and outhaul side. During the execution of the works, Southern railways insisted the need for improvements to be carried out in the existing infrastructure facilities at MTPS yard to avoid detention of BOXN rakes as detailed below:-

(a) Restoration of road Nos.9 to 12;

(b) Restoration of loop line at the take off point;

(c)To increase the Clear Standing Line (CSL) of roads 3,4 & 5 to a length not less than 715 mts.

The improvement works as suggested by the Railways did not fall under the scope of the EPC contractor. As per the budgetary offer obtained from M/s. Southern Railways, work order was issued to Southern railways under Deposit Contribution works basis vide Lr.dt.26.03.2012 for an amount of Rs.13.80 crores for carrying out the above works. Subsequently, based on the revised estimate of Southern railways, amendment was issued to them vide lr.dt.10.12.2015 for Rs.19.5 crores The entire amount has also been paid to Southern Railway by TANGEDCO. Loan sanction for the additional amount is awaited from PFC. Out of the original amount of Rs.13.8 crores., Rs.9.00 crores is only included in the petition.

4.5.2 **Employee quarters** – Rs.20.00 crores

Quarters facilities have been provided for the staff of MTPS Stage III for about 510 posts and the expenses towards the same included in the petition is Rs.20.00 crs

4.6 **Exchange Rate Variation** - Rs.109 crores

The amount of Rs.109 crores towards Exchange Rate Variation (ERV) as provided for in the LOI and not included in the original estimate has been accounted in the revised cost as on COD.

4.7 Interest During Construction

The project has been financed by Power Finance Corporation (PFC). The IDC & FC of Rs.413 crores as per original estimates has been calculated at interest rate of 11% with phasing of expenditure for 39 months. The IDC amounts to Rs.1203 crores till COD of the Unit on 12.10.2013 was calculated based on the average rate of interest of 12.22% against the initially worked out interest rate of 11%. The actual IDC is as detailed below:

TABLE
ACTUAL IDC

Sl. No.	IDC amount (Rs. in Crores)	IDC amount (Rs. in Crores)
i)	Interest component before starting of Quarterly repayment of loan until July 2012	
	a) 15.07.2008 to 15.07.2011	463.19
	b) 15.10.2011 to 16.07.2012	325.79
ii)	Interest component after starting of quarterly repayment of loan from Oct'2012 to Oct' 2013 (i.e. COD Date)	414.41
	Total IDC	1203.39

4.8 **Start up fuel and Infirm power**

The infirm energy of 1240.4498 MU (net) at the rate of Rs.1.34 per unit which has been arrived based on TNERC order dated 07.04.2014 in I.A No.1 of 2012 and P.P.A.P No.9 of 2012 introducing Grid Facilitation Factor. The net fuel cost arrived considering the revenue from sale of infirm power is as follows:

TABLE
NET FUEL COST

Expenses towards Start up fuel	Rs.198 crs
Less Revenue from sale of infirm power	Rs.166 crs (1240.4498 MU x Rs.1.34/- per unit)
Net fuel cost	Rs. 32 crores

However, as per actuals, Coal expenses amount to Rs.413 crores. and Oil expenses amount to Rs.98 crores totaling to Rs.511 crores. as oil and coal has been used for 19.4 months and 6.4 months respectively during the time period for trial run and commissioning.

5. Findings of the Commission:-

5.1. Before deciding the issues on hand, we would like to see the various provisions relating to the capital cost. The TNERC's Terms and conditions for determination of Tariff Regulations, 2005 with respect to the General Principles of computing cost and return state as follows:

"Chapter III – General principles of computing cost and return

18. Capital cost

(1) Accurate computation of cost of service including return on investment is essential for determination of cost plus tariff. The Commission shall be guided by the following principles to compute the cost and return.

(2) Investments made prior to the notification of these regulations by the Generating Company and licensees shall be accepted on the basis of audited accounts.

(3) The actual capital expenditure on the date of commercial operation for the original scope of work based on audited accounts of the company/licensee

limited to original cost may be considered subject to prudence check by the Commission

(4) Wherever Power Purchase Agreement or Agreement for transmission /wheeling provided for a ceiling of capital cost, the capital cost to be considered shall not exceed such ceiling.

(5) The capital cost shall include capitalized initial spares subject to the following ceiling norms:

(i) In case of coal based/lignite fired Generating stations – 2.5% of original project cost as on the cut off date;

(ii) ….

(6) Scrutiny of the project cost estimates by the Commission shall be limited to the reasonableness of the capital cost, financing plan, interest during construction stage, use of efficient technology and such other matters, for determination of tariff. …….

19. Additional Capitalisation

(1) The capital expenditure within the original scope of work actually incurred in respect of the following items after the date of commencement of operation and upto the cut off date may be admitted by the Commission, subject to prudence check.

(i) deferred liabilities

(ii) Works deferred for execution

(iii) Procurement of initial spares subject to the ceiling specified in Regulations 18.5

(iv) Liabilities to meet award of arbitration or for compliance of the order or decree of a court

(v) On account of change of law

(vi) Any additional work/services which have become necessary for efficient and successful operation of the Generating Station, but not included in the original project cost

Note: The list is illustrative and not exhaustive.

(2) Any expenditure on minor items/assets like normal tools and tackles, personal computers, furniture, air conditioners etc., bought after the cut off date shall not be considered for additional capitalization for determination of tariff.

(3) The impact of additional capitalization in tariff revision may be considered by the Commission twice in a tariff period, including revision of tariff after the cut off date.

……"

20 Revenue /Charges during trial stage (prior to COD)

(1) The cost incurred during trial upto COD shall be treated as capital cost.

(2) The revenue earned from sale of power (infirm power) shall be treated as reduction in capital cost.

……..

Chapter IV – Thermal Power Generating Stations

38. Capital cost and sale of infirm power

1) …….

2) Any revenue other than the recovery of fuel cost earned by the Generating Company from the sale of infirm power shall be taken as reduction in capital cost as provided in regulation 20."

5.2. The Commission has gone through the petition details and additional submissions made by the petitioner. Firstly, it is seen that the Mettur Thermal Power Project Stage III comprising of 1x600 MW achieved COD on 12.10.2013 after a delay of over 24 months. Further, the petitioner has stated that the capital expenditure detailed in the petition is based on capitalization as on the date of commercial operation of the station. The additional capital expenditure after date of commercial operation and upto cutoff date will be claimed through a separate petition in accordance with regulations 18 and 19 of TNERC's Terms and Conditions of Tariff Regulations, 2005. The capital cost as on COD though certified by Auditor and made available by the petitioner, the closure of contract and quantum of Liquidated Damages and other penalties likely to be levied consequent to the delay in completion of the project are yet to be finalized by the petitioner. Moreover, it is also seen that a Committee has been formed by the petitioner to look into the details of the descoped works of BGRESL and other issues and this is yet to be sorted out by the petitioner. Furthermore, in order to complete all the pending works and to hand over the plant in complete shape, time extension has been given by the petitioner without prejudice to the rights of the petitioner to levy LD and penalty upto 31.12.2014 vide B.P. No.115 dt. 04.10.2014 and work permit has been given upto 28.02.2015.The Commission is therefore of the view that as the actual

expenditure incurred for the entire project is not available at this stage, the Commission at this stage can approve the capital cost only provisionally. Therefore, the Commission decided to carry out the prudence check of the capital cost based on the information provided by the petitioner and provisionally approve the Capital cost of 600 MW unit of MTPS Stage III.

5.3 Now with respect to the project, basic information are as follows:

TABLE

Description	MTPS Stage III
Plant capacity	600 MW
Main EPC contractor	M/s.BGRESL Ltd., Chennai
Work commenced on	25.06.2008
Project period	39 months
Scheduled completion period	September'2011
Actual COD	12.10.2013

The time over run was mainly due to issues related to Railway siding works, Auxiliary steam requirement for various start-up services of the plant, Coal Burner modification, change in scheme of potable and service water and mill vibration problems. However, the EPC Cost being firm (except Exchange Rate Variation), the EPC contract price has not varied. Additional works such as Railway siding and Road works and construction of quarters have increased capital cost of the project. Further, due to delay in implementation, TANGEDCO has suffered additional burden on account of interest during construction and startup fuel cost which was not included in the original estimate. However, the quantum of delay and other related issues are yet to be finalized by the petitioner.

5.4. The analysis of the capital cost has been taken up by the Commission under above perspective. As per regulation 18 (6) of TNERC's Tariff Regulations 2005 extracted supra, the Scrutiny of the project cost estimates by the Commission shall be limited to the reasonableness of the capital cost, financing plan, interest during construction stage, use of efficient technology and such other matters, for determination of tariff. Accordingly, the breakup of capital cost filed by the Petitioner as on COD has been analysed by way of Hard cost, Taxes and duties, Interest during construction and fuel cost associated with infirm power generation as discussed below.

5.5. Hard Cost Analysis

5.5.1 There is no requisite benchmark evolved by TNERC for prudence check of the capital cost. However, Central Electricity Regulatory Commission (CERC) vide Order dated 04.06.2012 has arrived Benchmark Capital Cost (Hard cost) for Thermal Power Stations/Units of size 500/600/660/800 MW with coal as fuel.

The CERC Benchmark Hard Cost in Rs. Crore per MW with December 2011 Indices as Base is as follows:

600 MW Green Field projects:

1x600 MW – Rs.4.87 crores per MW

2x600 MW – Rs. 4.54 crores per MW

Hard cost

- Includes Steam Generator / Boiler Island, Turbine Generator Island, Associated auxiliaries, transformers, switchgears, cables, cable facilities, grounding and lighting packages, control & instrumentation, initial spares for BTG, Balance of Plant including cooling tower, water system, coal handling

plant ash handling plant, fuel oil unloading & storage, mechanical miscellaneous package, switchyard, chimney, emergency DG set.

- Does not include MGR, Railway siding, unloading equipment at jetty and rolling stock locomotive, transmission line till tie point.
- Financing cost, interest during construction, taxes and duties, right of way charges, cost of Rehabilitation & Resettlement etc. would be additional.
- Cost of transportation, insurance, statutory fees paid to IBR, IR etc. is included

5.5.2 As per the above pre-requisites of CERC, Hard Cost of petitioner's Project cost includes Plant and Equipment, initial spare, Civil works, Construction & pre-commissioning expenses, Cost of land and site development and this amounts to Rs.2923 crores including exchange rate variation in Plant and equipment cost excluding railway siding, road works and quarters. Taxes and duties to the tune of Rs. 333 crores has been indicated separately by the petitioner in the petition and the same is considered outside the hard cost analysis.

5.5.3 **INITIAL SPARES**

Initial spares to the tune of Rs.96 crores has been included in the EPC cost. As per TNERC's Tariff Regulations, 2005 extracted above, the capital cost shall include capitalized initial spares subject to ceiling norms of 2.5% of original project cost as on the cut off date in case of coal based/lignite fired generating stations. This works out to 3.05% of the total Capital cost of Rs.3151 crores stipulated above. The petitioner has further informed that the Boiler, Turbine, Generator (BTG) erected by M/s.BGRESL is manufactured by M/s.Dong Fang Electric Corporation,

China and hence the mandatory spares required for the BTG items had to be purchased from the Original Equipment Manufacturer (OEM) and hence the mandatory spares were ordered for both BTG and Balance of Plant (BOP) from M/s.BGRESL and the BOP mandatory spares value works out to Rs.20 crores only and the BTG mandatory spares work out to EURO 12,092,000 (1 EURO = Rs.62.85). The spares for BTG, if any, required has to be purchased from the OEM, China and as spares of BTG are off shore supplies this would take a long time. Hence, the mandatory spares ordered from M/s.BGRESL is essentially required for continuous running of the unit without any break down due to non-availability of spares. Hence, the petitioner has requested that the amount of Rs.96 crores shown in the petition may be allowed considering the generation loss per day which works out Rs.3.5 crores in need of essential off shore spares. The amount of Rs.96 crores towards spares included in the capital cost is allowed considering the mandatory nature of BTG spares and which being off shore items, lead time required to procure in case of emergency would be more thereby causing loss of generation.

5.5.4 Other works – Railway siding, road works, employee quarters

(i) **Railway siding and road works – Rs.16.00 crores.**

The petitioner has incurred an expenditure of Rs.16 crores. towards railway siding and road works which was not originally envisaged in the project cost. It is perceived that road works have been carried out for access of men and material and the railway works have been carried at the insistence of M/s.Southern Railways for improvement in the existing infrastructure facilities at MTPS yard to avoid detention of rakes. This also do not fall under the scope of EPC contractor. In view of its essential nature, the cost of Rs.16.00 crores expended by the petitioner is allowed.

However, the expenditure is taken outside the hard cost but within the capital cost as per CERC norms.

(ii) **Employee quarters- Rs.20.00 crores.**

Expenses towards Employee quarters have also not been envisaged by the petitioner at the time of preparation of original estimates. In view of its essential requirement for a generating station, the expenditure of Rs.20.00 crores towards employee quarters is allowed and considered outside the hard cost of the project.

5.5.5 **Exchange Rate variation.**

The petitioner submits that the letter of Intent (LOI) to the EPC contractor includes provision for admitting the exchange rate variation over and above the contract value. Based on the above, an amount of Rs.109 crs has been admitted by the petitioner as ERV. The petitioner has stated that ERV has not been included in the original cost and this cost has to be deducted in the project cost. As Exchange rate variation is a part of the EPC cost, the same is included within the Hard cost of the project.

5.5.6 **SPECIAL FEATURES OF THE PLANT.**

On the technology part, CERC Norms for arriving at the benchmark cost includes Tower type boiler configuration, Fly ash utilization, River water, Raft foundation, Low seismic & wind zone, Natural draught cooling system etc. As per Petitioner's submission, the Power Plant arrangement includes special features such as Double pass type Boiler configuration, Fly ash & Bottom fly ash utilization, Lower cooling water temperature, the evacuation voltage level at 400 kV etc. and the

cost implication indicated by TANGEDCO in view of the above special features is Rs.142.44 crores and included in the EPC cost.

5.5.7 **HARD COST ALLOCATION**:

Since the EPC contract is firm except Exchange Rate variation (ERV), the EPC contractor price was not varied. Exchange rate variation is also considered by the Commission within the Hard Cost. Therefore, Hard cost of the project is as follows:-

TABLE

HARD COST PROVISION FOR MTPS STAGE III

Sl. No.	Description	Cost on COD Rs. in cr.	Rs. in cr. per MW	Remarks
1	Plant & equipment	2233		
2	Initial spares	96		Included in the above
3	Civil works	465		
4	Construction & precommg. expenses	73		
5	Cost of land and site development	43		
6	Over heads – Revenue expenses, Design & Engineering, Audit & Accounts	109		Exchange rate variation
7	**Total Hard Cost including Land cost**	**2923**	**4.87**	

5.5.8 Comparison of provisional Capital cost with CERC Bench mark capital cost (Hard cost)

As per the above Table, the hard cost of the MTPS Stage III comprising of 1x600 MW unit is Rs.2923 crores i.e @ Rs.4.87 crores/MW including spares, land cost. This is on par with the benchmark capital cost (Hard cost) of Rs.4.87 crs/MW specified by CERC even with the inclusion of cost on account of the above special

technological features, mandatory initial spares beyond the ceiling norms of 2.5% as per TNERC's Tariff Regulations, 2005 and the Exchange rate variation.

5.6 TAXES AND DUTIES.

The petitioner has stated Rs.333 crores as Taxes and duties towards EPC and non EPC contract. However, the actual taxes and duties paid to the contractors is Rs. 269.73 crores i.e. Rs 258.49 croresupto Commercial Operation Declaration (COD) date and Rs.11.24 crores after COD. Further, the petitioner has also stated that the Excise Duty and Central Sales Tax on bought out items of Balance of Plant (Mechanical & Electrical) is also a part of hard cost and the tentative amount is Rs.135.36 crores and though this has not been separately claimed in the invoices by M/s.BGRESL, the EPC contractor, this is a part of the Hard Cost. Thus the Hard Cost stated above is inclusive of Taxes and Duties of bought out items.

TNERC's Terms and conditions for determination of Tariff Regulations, 2005 stipulates the following with respect to taxes and duties:

"14. Multiyear Tariff:
(1)……..
(5) All the uncontrollable costs shall be allowed as pass through in tariff and the uncontrollable costs will include the following:
(a) Cost of fuel;
(b) Costs on account of inflation;
(c) Taxes and duties; and
(d) Variation in power purchase unit cost from base line level including on account of hydro-thermal mix in case of force majeure and adverse natural events like drought.

The Commission accordingly permits the actual payment of Rs. 269.73 crores or say Rs.270 crores made as taxes and duties by the petitioner as pass through.

5.7 INTEREST DURING CONSTRUCTION

The project has been financed by Power Finance Corporation (PFC). The IDC as per TANGEDCO petition is as below:

(i) IDC as per original Estimate - Rs.413 crores

(ii) IDC as per on COD - Rs.1203 crores

The IDC & FC of Rs.413 crores as per original estimates has been calculated at interest rate of 11% with phasing of expenditure for 39 months. The IDC amount of Rs.1203 crores till COD of the Unit has been calculated based on the average rate of interest of 12.22%. The Commission notes that the impact of time over run beyond the contractual schedule is mainly on Interest during construction. As the quantum of delay and consequent closure of contract is also yet to be taken up by the petitioner, IDC as per original estimate amount of Rs.413 crores is only allowed for the present.

5.8 START UP FUEL AND INFIRM POWER

5.8.1 The petitioner has stated that the Fuel cost of Rs. 198 crores has not been envisaged in the original petition. Subsequently, the petitioner has furnished the actual Expenditure statement for Coal and Oil consumption with Coal expenses amount of Rs.413 crores and Oil expenses amount of Rs.98 crores totaling to Rs.511 crores. It is observed that the fuel cost incurred by the petitioner toward fuel cost is mainly due to extended period of initial operation in view of the technical problems that were encountered. As the petitioner is yet to finalise the quantum of delay, the Commission intends to restrict the expenditure on oil and coal as per L1 Schedule of the Project furnished by M/s.BGRESL , the EPC Contractor. Similarly

with respect to the quantum of infirm power generated, the net generation proportionate to the L1 Schedule has been considered.

5.8.2 **START UP FUEL**

As per L1 Schedule of the EPC contractor, M/s.BGRESL, furnished by TANGEDCO, the time period for commissioning and trial run is 98 days (3.26 months). However, as per the TANGEDCO's Actual Expenditure Statement of Oil and coal upto COD (12.10.2013), oil has been used for 19.4 months and coal for 6.4 months.

A statement with proportionate fuel cost allowed is given below:

TABLE

PROPORTIONATE FUEL COST PROPOSED

Sl. No.	Description	Oil	Coal
1	Scheduled period as per L1 schedule of BGRESL	3.26 months	3.26 months
2	As per Expenditure Statement	19.4 months	6.4 months
3	Fuel cost	Rs.198 crores	
4	Revised fuel cost	Rs. 98.00 crores	Rs.413 crores
		Rs.511 crores	
5	Proportionate fuel cost considered for allowing	Rs.16.47 crores	Rs.210.37 crores
6	Total fuel cost being allowed	Rs.226.84 crores	

Hence, an amount of Rs.226.84 crs. is only allowed towards fuel cost.

5.8.3 **QUANTUM OF INFIRM POWER:**

As stated earlier, as per L1 Schedule of the Project furnished by M/s.BGRSL, the time period between synchronization with oil and coal till Commercial Operation Declaration (COD) is 98 days i.e.3.26 months.

However, infirm power generation had been 1240.45 MU for 10.4 months. Hence the net generation proportionate to the L1 Schedule works out to 390.95 MU and the same is allowed.

5.8.4 **RATE OF INFIRM POWER**:

5.8.4.1 The relevant provision for determination of the cost of infirm power as regulation 20 of the Tamil Nadu Electricity Regulatory Commission (Terms and Conditions for the determination of Tariff) Regulations, 2005 reads as follows:

"20. Revenue /Charges during trial stage (prior to COD)

1. *The cost incurred during trial up to COD shall be treated as capital cost.*
2. *The revenue earned from sale of power (infirm power) shall be treated as reduction in capital cost.*
3. *Cost of infirm power shall be the lowest fuel cost applicable to the existing similar type of station."*

As per the above regulation 20(3), the lowest fuel cost of the existing "similar type of Station should be reckoned as the cost of infirm power. As there was difficulty in applying the above said regulation in toto due to non-availability of "similar type of station" in the State and each generating station varies in terms of its capacity and the generators may use different fuels such as Indian coal, Imported coal, gas, liquid fuel etc., the Commission in P.P.A.P No. 9 of 2012 of M/s.Ind Bharath Thermal Power Limited and similar petitions in P.P.A.P No. 6 of 2012 and P.P.A.P No.7 of 2013 of M/s.OPG Power Generation Pvt. Ltd for fixing the rate of infirm power from the respective petitioner's generating plant, arrived at a formula. The following formula can be used to arrive at the generalized per unit cost of infirm power (Ti) and the Commission directed that the same shall be adopted irrespective of generator capacity and fuel used, for the purpose of determination of tariff for the infirm power supplied by the generators during the trial/test run

Rate of infirm power - Ti

Ti = {Gfx[100x(CspxCc)]}/(100-AUX)

Ti = Tariff for infirm power in Paise/kWh

Csp – All India Specific coal consumption of thermal power stations in kg/kWh as per the latest CEA report on " Performance Review of Thermal Power Stations"

AUX – All India average AUX of thermal power stations in percent as per the latest CEA report on Performance Review of Thermal Power Stations".

Cc – Lowest landed cost of Indian coal in any of the power stations in TamilNadu in Paise/Kg as approved by the Commission in its latest tariff order.

Gf – Grid facilitation constant = 0.6

Accordingly the regulation 20(3) was amended including the above formula as per Commission's Notification No. TNERC/TR-5/2-11 dated 13.03.2014 (w.e.f 09.04.2014).

5.8.4.2 Now with respect to TANGEDCO's petition for determining the rate of infirm power, the following are taken into consideration:

Regulation 20(3) has been amended including the Grid facilitation factor as per Commission's Notification No. TNERC/TR-5/2-11 dated 13.03.2014 (w.e.f 09.04.2014). Prior to that the cost of infirm power shall be lowest fuel cost applicable to the existing similar type of station. The COD of the of MTPS Stage III has been achieved on 12.10.2013. Though trial operation took place prior to 09.04.2014, the original regulation could not be applied in toto due to non-availability of similar type of station in the State.

With the amendment in Regulation in force with effect from 09.04.2014 and no similar type station in the State for applying the old regulation, the amended

regulation with grid facilitation factor may be considered to arrive at the cost of infirm power of 1x600 MW unit of MTPS Stage III.

Now with respect to TANGEDCO's calculation of cost of infirm power @ Rs.1.34 per unit with Grid Facilitation Factor, TANGEDCO has considered the period 2011-12 for arriving at the values in the formula. It is submitted that the same may be taken considering that the scheduled COD period of the plant as 2011 -12 and accordingly, the revenue from sale of infirm power is Rs.52.39 crores @ Rs.1.34 per unit.

5.8.4.3 Therefore, the net fuel cost proposed by the Committee is as follows:

TABLE
NET FUEL COST ALLOWED

Particulars	As per TANGEDCO petition	Allowed by Commission
Expenses towards Start up fuel as per petition	Rs.198 crores	Rs.226.84 crores
Expenses towards Start up fuel as per actual expenditure statement of TANGEDCO	Rs.511 crores	
Net generation of infirm power	1240.45 MU	390.95 MU
Less Revenue from sale of infirm power @ Rs.1.34 per unit	Rs.166 crores	Rs.52.39 crores
Net fuel cost	Rs.32 crores	Rs.174.45 crore.

5.9 In the light of the foregoing, as the quantum of delay and the consequent closure of the contract is yet to be taken up by the petitioner, the Commission provisionally approves the capital cost as on COD of MTPS Stage III as per the details given in the Table below:

TABLE

PROVISIONAL CAPITAL COST OF MTPS STAGE III (1x600 MW)

Rs. in cr.

Sl. No.	Description	Cost as on COD as per petition	Cost provisionally approved as on COD	Remarks
1	Total Hard Cost	2923.00	2923.00	
2	Taxes and duties	333.00	270.00	Actual taxes and duties is allowed
3	Total hard Cost including Taxes and duties	3256.00	3193.00	
4	Interest During Construction	1203.00	413.00	Allowed as per original estimate of TANGEDCO.
5	Total capital cost including IDC	4459.00	3606.00	
6	Expenses towards Employee quarters	20.00	20.00	
7	Railway siding and Road works	16.00	16.00	
8	Total fuel cost	198.00	226.84	Considering the fuel expenses of Rs.511 crs as per Actual Expenditure Statement and allowed as per L1 Schedule of the project.
9	Capital cost including IDC	4693.00	3868.84	
10	Less Revenue earned from sale of infirm power (As per Table 6)	166.00	52.39	Allowed as per L1 Schedule of the project
11	Total Capital cost	4527.00	3816.45	
12	Cost in Rs. per MW	7.55	6.36	

5.10 In the result, the Commission provisionally approves the project cost of Mettur Thermal Power Station Stage III as on COD as Rs.3816.45 crores against a capital cost of Rs.4527 crs proposed by the Utility as on COD including the revenue earned from sale of infirm power.

5.11. The petitioner has furnished the actual expenditure as on COD, and the expenditure incurred beyond COD as detailed below. However, it is noted that finalisation of the quantum of Liquidated damages and other penalties and consequent closure of contract is yet to be taken up by the Utility.

TABLE

ACTUAL EXPENDITURE STATEMENT

Description	Expenditure details
Total Approved cost	Rs. 4695.42 crs.
Expenditure upto COD i.e.12.10.13	Rs. 4432.39 crs
Expenditure from 13.10.13 to 31.03.14	Rs. 34.13 crs.
Expenditure for the FY 2014-15	Rs. 39.47 crs.
Expenditure for the FY 2015-16	Rs. 14.74 crs.
Total upto 2015-16	Rs.4520.73 crs.
Balance	Rs. 174.69 crs.

5.12. The Commission directs the Utility to file the petition for approval of final capital cost based on completed actual capital cost duly certified by Auditors based on Audited Accounts of the project on finalization of the quantum of Liquidated damages and other penalties and closure of contract for admitting the expenditure incurred beyond the COD of the project.

6. APPEAL:-

An Appeal against this order shall lie before the Appellate Tribunal for Electricity under section 111 of the Electricity Act, 2003 within a period of 45 days from the date of receipt of a copy of this order by the aggrieved person.

(Sd .....)	(Sd.....)	(Sd.....)
(Dr.T.Prabhakara Rao)	**(G.Rajagopal)**	**(S.Akshayakumar)**
Member	**Member**	**Chairman**

/ True Copy /

Secretary
Tamil Nadu Electricity
Regulatory Commission