

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. 2 of 2015

In the matter of : Approval of Capital cost of North Chennai Thermal Power Station Stage II Unit II (600 MW) of Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) under Section 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: 29.12.2016

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 North Chennai Thermal Power Station Stage –II Unit II (600 MW) under Section 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 M.A.P.2 of 2015 has been heard on 20.04.2015 and 09.09.2016. The said petition came up for final hearing on

09.09.2016. The Commission after 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.2 of 2015

The prayer of the petitioner in M.A.P.No. 2 of 2015 is to

- (i) approve the Capital cost for North Chennai Thermal Power Station Stage II Unit II (600 MW) upto date of commercial operation (i.e.08.05.2014); 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 filings, the petitioner make the following submissions:

2.1. The Board of the erstwhile TNEB accorded approval for placing orders on M/s.BHEL/New Delhi for establishment of 1x600 MW Unit I North Chennai Thermal Power Station – Stage II under EPC cum Finance basis in the land taken over from the already allocated to M/s.Videocon Power Ltd for establishment of 2x525 MW units. As enough space was available for setting up additional 600 MW unit, the proposal for recommendation of Board Level Tender Committee (BLTC) to Board for obtaining in principle approval from Government of Tamil Nadu for setting up of additional 600 MW North Chennai Thermal Power Station Stage II project within the existing NCTPS Complex adjacent to the 600 MW Unit I under execution was submitted in its meeting held on 20.05.2008. The BLTC directed the following, “To examine whether repeat order may be placed for additional unit to save cost and

time". The above proposal was placed before the Board after getting approval of the Expert Committee and BLTC. The Board in its 914th meeting held on 21.06.08 approved the proposal to obtain in principle approval from the Government of TamilNadu for setting up of 600 MW Unit II NCTPS Stage II Project and to award the EPC contract to M/s.BHEL/New Delhi for establishment of the 600 MW Unit II at a cost of Rs.2175 crs. Further Board also approved to approach Rural Electrification Corporation (REC)/New Delhi for financing the project. As approved by the Board, Administrative approval of the Government of Tamil Nadu for the EPC contract for Rs.2175 crs. has been obtained vide G.O.(MS.)No. 84, Energy (B2) Department, dt.14.07.2008.

While approaching REC/New Delhi for financing the project, they requested to submit the loan application along with the Detailed Project Report (DPR). Hence, the work of preparation of DPR for the 600 MW Unit II NCTPS Stage II project was entrusted to M/s. Development Consultants Pvt. Ltd/Chennai (DCPL/Chennai).

The DPR received from the Consultant, M/s.DCPL for establishment of 600 MW Unit II NCTPS Stage II with project cost estimate of Rs.2718.75 crs. including Interest During Construction was placed before the BLTC which in its 1094th meeting held on 18.09.08 recommended to the Board for according revised administrative approval.

2.2. The EPC contract was awarded to M/s.BHEL at a total cost of Rs.2175 crores vide Letter of Intent (LOI) dated 02.03.2009 for establishment of 1x600 MW, unit II of NCTPS Stage II stipulating the due date for completion of the project as 39 months from 16.08.2008. The project was scheduled for commissioning in 15.11.2011.

2.3. As the contract for Unit II was awarded through negotiated route based on the price for Unit I which was awarded through International Competitive Bidding (ICB) route, Unit II attracted customs duty which was not included in the first approval for project cost and the project cost estimate subsequently enhanced to Rs.2211.11 crs. from Rs.2175.00 crs to accommodate the project custom duty of Rs.36.11 crs.

2.4. Due to delay in commissioning of Coal Handling System, Cooling Water System and Ash Handling system in complete shape and issues that cropped during trial operation, there was a delay in completion of trial operation and achieving COD. As the works were not completed by BHEL in time, the provisional time extension in respect of the contracts with M/s.BHEL for Unit I & II of 2x600 MW NCTPS Stage II Project till completion of the project without prejudice to the rights of the petitioner to levy penalty after completion of the project was obtained from Board vide 17th meeting of the TANGEDCO held on 17.09.11.

2.5. The unit was running from 07.02.2014 at partial load around 450 MW – 550 MW and COD was declared on 08.05.2014

2.6. The project cost increased from original cost of Rs.2718.75 crs. to Rs.4031.025 crs on account of

(i) additional cost involved in awarding of contracts other than M/s.BHEL i.e Cooling water channel executed by M/s.RDS and Additional coal handling system executed by M/s.TECPRO,

(ii) Establishment charges

(iii) Cost towards purchasing oil & coal

(iv) cost towards IDC and

(v) other additional works that have aroused subsequent to execution of contract awarded to M/s.BHEL.

2.7. The loan capital was funded by Rural Electrification Corporation (REC) Limited. The loan carries variable rate of interest with reset after three years. The repayment of principal amount together with Interest by TANGEDCO will commence from 46th month onwards (i.e 39 months for COD plus 6 months Moratorium period) in 48 quarterly instalments [equated instalments of Principal (EPC + IDC) amount together with interest on diminishing balance] over a period of 12 years. Since COD has been achieved on 08.05.2014, the moratorium period has been extended upto March 2015 i.e.31.03.2015. Thus, the repayment of loan will be as follows:

- i) First instalment on 31.03.2015
- ii) Second instalment on 30.06.2015
- iii) Third instalment on 30.9.2015
- iv) Fourth instalment on 31.12.2015 and so on.

Petitioner shall pay interest on the said loan at the rate of interest prevailing on the date of each disbursement as per REC Policy, along with tax, if any at the rate applicable from time to time. The REC shall have a right to reset the rate of interest, at its discretion, from third/tenth beginning with the date of first disbursement. The present marginal average lending rate is 12.64%.

Petitioner has stated that the difference between actual interest paid and the interest petitioned will be claimed separately through petition as the loan carries variable rate of interest.

2.8. The detailed break up of original estimated project cost and revised project cost along with reasons for variation are as follows:-

**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	8.40	8.40		
1.2	Preliminary Investigation and site development	0.40	0.40		
1.3	Infrastructure works- Cost of land & site development	8.80	8.80	-	
2	Major civil works	354.01	354.01	-	
3	Plant & equipment (including Taxes & Duties)			-	
3.1	Steam Generator Island	517.96	517.96		
3.2	Turbine Generator Island	248.10	248.10		
3.3	BOP mechanical – CW system, DM water plant, fuel handling & storage system, Ash Handling system, Coal handling system, HP/LP piping	598.51	598.51		
3.4	BOP Electrical – Switchyard package, transformer package, switchgear package, cables & accessories, lighting DG set etc	249.39	249.39		
3.5	C& I package	58.70	58.70		
3.6	Total Plant & equipment including Taxes	1672.66	1672.66		
	Taxes & Duties				
3.7	Other Taxes & duties	-	-		Included in 3.6 above
3.8	Customs duty	-	36.11		Unit II was awarded through negotiated route based on the price for unit I
3.9	Total Taxes & duties	-	36.11	36.11	
3.10	Total Plant & Equipment including Taxes and	1672.66	1708.77		

	duties and Customs duty				which was awarded through ICB route. Unit II attracts customs duty. Hence addition in EPC cost due to addition of customs duty payable for unit II was not considered at the time of placement of order on M/s.BHEL.
4	Initial spares	-	-		
5	Construction and pre-commissioning expenses	148.33	148.33		
6	Total EPC cost (SI.No 2+3.10+5)	2175.00	2211.11	36.11	
7	Cost of non EPC packages				
7.1	Cooling water channel	75.00	95.88		Awarded value was more than the estimated value; awarded through ICB
7.2	Additional coal handling system	50.00	71.50		
7.3	Other additional contracts for flexibility in operation	-	362.00		The additional work has aroused in order to have flexibility in Coal Conveying system, Fuel Oil system.
7.4	Total of non EPC Packages	125.00	529.38	404.38	
8	Overheads				
8.1	Revenue expenses – establishment charges, audit & accounts etc	90.99	150.00	59.01	
8.2	Other revenue expenses				
I	Start up fuel		727.69	727.69	Due to delay in completion of project and part load operation, the fuel cost has been
ii	Infirm power		211.88	211.88	
iii	Net fuel cost		515.81	515.81	

8.3	Overheads – Total	90.99	665.81	574.82	increased. 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.
9	Capital cost exldg IDC & FC (1.3+6+7.4+8.3)	2399.79	3415.10	1015.31	
10	Financing charges and IDC	318.95	754.65	435.70	Reason is delay in completion of project
11	Capital cost incldg IDC &FC	2718.74	4169.75	1451.01	
	Cost per MW	4.53	6.95		
	Aggregate revenue Requirement	5/2014 to 3/2015 – Rs.752 crs.; 2015-16 – Rs. 813 crs.			
	Rate of Energy charge ex bus	5/2014 to 3/2015 – Rs.2.18/kWh; 2015-16 – Rs. 2.14/kWh.			

3. The Commission in order to carry out the prudence check of the Capital cost and to address the data gaps, asked 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 08.05.14 which date will be the commercial operation date of the project also.

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

4.2. The EPC for construction of North Chennai Thermal Power Station Stage II Unit II was awarded to Bharat Heavy Electricals Ltd. (BHEL) on nomination basis based on the EPC contract awarded to M/s.BHEL for NCTPS Stage II, Unit I through ICB open tender and the works commenced on 16th August 2008. The project has to be commissioned during November 2011 but was delayed mainly due to delay in Coal handling System, Cooling water system, Ash Handling system etc. The COD was declared on 08.05.2014.

4.3. Time over run and Cost overrun of the project are due to the following:

4.3.1 TIME OVER RUN:

(i) There was delay in supply of various machineries from different units of BHEL because of their commitment to so many projects in the national and international level.

(ii) Further there are only few reputed vendors available for Coal Handling and Ash Handling Systems in India and hence every project whether the main equipment is

supplied from indigenous source or from imported source, erection and commissioning of CHP and AHP for all projects are dependent from the available vendors only.

(iii) As all the projects are taken at a time in all over India, the mobilisation of skilled labour has also been delayed.

(iv) There were also delay in finalization of civil contractors in this project which caused delay in erection of equipment in various fronts.

(v) Delay in completion of coal handling system:

In the Coal Handling System, Erection & Commissioning of second stream of conveyors, the miscellaneous systems such as Dust Suppression, Dust Extraction, Actuator for flap gates, commissioning of Fire Alarm & Detection panels, commissioning of Belt Weigher were delayed.

(vi) Delay in completion of Ash Handling System

- (a) Delay in commissioning one pass of ESP & Fly ash silos
- (b) The Bottom Ash belt conveyor feeding to Bottom Ash Silo
- (c) Completion of Ash Slurry system
- (d) Construction of recovery water house.

(vii) Delay in erection of Electro Chlorination System:

The vendors one after the other on whom contracts were awarded previously by M/s.BHEL have not executed the job. M/s.BHEL awarded the contract for third time in January 2014 end and one stream of electrolyser was commissioned. The Electro chlorination system in complete shape was completed in December 2014.

(viii) Fire accident occurred in boiler area on 17.11.2013 and it took two months to resume generation i.e. from 05.01.2014.

(ix) After fire accident rectification works, generation resumed from 05.01.2014. Further the unit was run at full load from 25.01.2014 to 27.01.2014 and the unit got

tripped due to the failure of the copper flexible cable connecting the Generator circuit breaker and the Aluminium bus bar.

(x) After replacement of the copper flexible cables the unit was running from 07.02.2014 at partial load around 450-550 MW due to the heavy vibration noticed in the 2 nos. of Cooling Water Pump and problem in Turbine Driven Boiler Feed Pump.

(xi) The unit was under trial run with load of 500 MW to 600 MW and COD was declared on 08.05.2014.

4.3.2. **COST OVER RUN:**

(i) Due to delay in achieving COD, the IDC component has been increased.

(ii) Further due to part load operation for more than a year before achieving COD in order to meet out the power crisis prevailing in the State of Tamil Nadu, the oil & coal consumption has been more and hence increase in cost.

(iii) Further, the additional works that arose due to execution of the works in order to have flexibility of operation for Coal Handling System, Fuel Handling System, shifting of Silos of Stage I to have dust free atmosphere and other civil works to the tune of Rs.362 crs. have increased the project cost.

4.4 The increase in project cost has also resulted due to additional enabling works (Non EPC packages i.e New cooling water channel, additional coal handling facilities, flexibility in coal conveying system, fuel oil system), Interest During Construction, overhead cost and Start up fuel cost. The Interest during Construction & Financing charges stated in the petition as per original estimates and as on COD are Rs.318.95 crs. and Rs.754.65 crs. respectively. Overhead expenditure had increased from Rs.90.99 crs. to Rs.150.00 crs. and start up fuel amounts to Rs.515.81 crs. (Net after deducting the revenue from sale of infirm power).

4.5 Interest During Construction

The project has been financed by Rural electrification Corporation (REC). The IDC & FC of Rs.318.95 crs. as per original estimates has been calculated at interest rate of 11% with phasing of expenditure for 39 months. The first disbursement date is 19.1.2008. The IDC amounts to Rs.754 crs. till COD of Unit II on 08.05.2014. Further IDC as per actuals upto the scheduled date i.e. 11/2011 is Rs.257 crs.

4.6. Revenue Expenses:

Revenue expenses amounting to Rs.150 crs. includes establishment, Audit and accounts and contingency. However, the expenditure made towards establishment charges upto COD has been only Rs.89.25 crs as against estimated amount of Rs.150 crs. and the balance amount would not be utilized.

4.7. Start up fuel and Infirm Power generation

4.7.1 Start up fuel

Due to delay in completion of project and part load operation, the fuel cost has been increased.

4.7.2 Infirm generation

The infirm energy of 1581.19 MU (net) at the rate of Rs.1.34 per unit which has been arrived based on TNERC order dated 07.04.14 in I.A No.1 of 2012 and P.P.A.P No.9 of 2012 and I.A.No. 1 of 2013 and P.P.A.P. No. 7 of 2013 has been considered.

4.7.3. The statement of startup fuel and infirm power is as below:

TABLE

Expenses towards Start up fuel	Rs.727.69 crs
Less Revenue from sale of infirm power	Rs.211.88 crs (1581.19 MU x Rs.1.34/- per unit)
Net fuel cost	Rs.515.81 crs.

5. Findings of the Commission

5.1. Before going into the details of the issues on hand, we would like to see the various provisions relating to capital cost approval. 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 North Chennai Thermal Power Project Stage II comprising of two units of 600 MW each achieved

COD on 20.03.2014 and 08.05.2014. The petitioner has filed two separate petitions (viz. M.A.P. 1 of 2015 for Unit I and M.A.P. 2 of 2015 for Unit II) for approval of the capital cost of Unit I and Unit II as on COD as per the directions of the Commission in M.A.P No. 1 of 2013, Order dated 30.07.2014. The petitioner has submitted that the capital expenditure stated 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 Regulation 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 TANGEDCO. The Commission is therefore of the view that as the actual expenditure incurred for the entire project (Unit I & II) is not available at this stage and the capital cost of Unit II depends upon the capital cost of the entire project as certain common facilities are being shared between the Units I & II, the Commission at this stage can approve the capital cost only provisionally. Therefore, it is proposed 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 Unit II of the NCTPS Stage II project.

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

TABLE

Description	NCTPS Stage II Unit II
Plant capacity	600 MW
Main EPC contractor	M/s.BHEL/New Delhi
Work commenced on	16.08.08
Project period	39 months

Scheduled completion period	November'2011
Actual COD	08.05.14

5.4. Time over run was mainly due to the following:

- (a) Delay in completion of Ash Handling system, coal handling system and electro chlorination System
- (b) Fire accident in boiler area
- (c) Dearth of skilled labour and delay in supply of various machineries from different units of BHEL etc

5.5. The Board of TANGEDCO has subsequently approved provisional time extension in respect of the contracts with BHEL for Unit 1 and Unit 2 of 2x600 MW NCTPS Stage II project till completion of the project without prejudice to the rights of petitioner to levy penalty after completion of the project.

5.6. EPC and non EPC packages (except new cooling water channel) are firm price contracts. The contract on new cooling water channel is with price adjustment clause for cement & steel item only. Hence there is no enhancement in cost of the contract price of the Plant & Equipment to BHEL beyond the scheduled date of completion of the project according to the terms of the agreement and so, there is no cost over run on EPC portion. However, the IDC component has increased due to delay in achieving COD. Further due to part load operation for more than a year before achieving COD in order to meet out the power crisis prevailing in the State of Tamil Nadu, the oil & coal consumption have been more and hence increase in cost.

5.7. Now coming to the analysis of the capital cost, as per Clause 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 and are discussed below.

5.8. Hard Cost Analysis

5.8.1. 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 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

5.8.2. As per the above prerequisites of CERC, Hard Cost of the Project as per petition includes Plant and Equipment, Civil works, Construction & pre-commissioning expenses, Cost of land and site development, enabling works and revenue expenses. This amounts to Rs.2899.19 crs. including Taxes and duties and enabling works which is common for both units of NCTPS Stage II.

5.8.3. Taxes & Duties

As per petition of TANGEDCO, the total plant and equipment cost and the non EPC packages are inclusive of taxes. The following are the details with respect to Taxes and duties.

**TABLE
DETAILS OF TAXES AND DUTIES**

Taxes and duties	Taxes included in the EPC & NON EPC Packages	Taxes as per actuals
EPC package	Rs.166.88 crs.	Rs.138.02 crs
Non EPC package	Rs. 4.26 crs	Rs. 4.26 crs.
Total taxes and duties	Rs.171.14 crs	Rs.142.28 crs.
Customs Duty	Rs. 36.105 crs.	Rs. 36.105 crs

The 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.”

As taxes and duties are pass through, the taxes included in the EPC and non EPC packages need to be taken out for arriving at the Hard cost

The taxes amount of Rs.171.14 crs and Customs Duty of Rs.36.10 crs. included in the petition is deducted for arriving at the Hard cost; however, actual payment of Rs.142.28 crs as above as taxes along with Customs Duty of Rs.36.10 crs made by the Utility to the contractors is allowed as a pass through.

5.8.4 Initial spares

TANGEDCO in M.A.P. No 1 of 2015 for approval of the capital cost of NCTPS Stage II Unit I has stated that the initial spares to the tune of Rs.100 crores included in the EPC cost of Unit I is common for both the units. Considering 50% spares for each unit, Rs.50 crs. was allowed for Unit I. The balance 50% i.e.Rs.50 crs. has to be allocated to Unit II. The cost of spares for Unit II works out to 1.84% of the Original project cost of Rs.2718.74 crores which is within the norms of 2.5% specified in the Tariff Regulations and hence Rs.50 crores towards initial spares is included in the capital cost of Unit II.

5.8.5. Common facilities and Revenue expenses

Certain expenditure with respect to enabling works has been incurred in Unit II as common facility for Unit I of the NCTPS Stage II. Similarly, from the separate petition filed by the Petitioner for approval of the capital cost of NCTPS Stage II Unit I (M.A.P. No. 1 of 2015), it is ascertained that certain expenditure have been incurred by TANGEDCO in Unit I as common facility for both units I & II.

5.8.5.1. Common Facilities included in UNIT II

(i) **ENABLING WORKS** - Non EPC packages.

(a) ADDITIONAL COAL CONVEYING SYSTEM_– Rs.71.5 crs. (For Unit II)

The petitioner submits that as the existing coal handling system could not cater the need of both the 600 MW units of NCTPS Stage II, it was proposed to establish additional coal conveying system at the time of considering the proposal to establish Unit II which will convey coal from the ECHS of Stage I conveyors to the Junction Tower 1B (JT-1B) of 600 MW Unit I and from there facilities available in Unit I will be utilized for conveying coal to Unit II. Provision in DPR is Rs.50 crs; however cost finalized through ICB tender is Rs.71.5 crs.

(b) New Cooling water channel- Rs.96 crs. (Common for both units)

As the existing cooling water channel could not meet the requirement for both units of NCTPS Stage II, new Cooling Water Channel with necessary pump house and travelling water screen was proposed at the time of considering the proposal to establish Unit II. Provision in DPR is Rs.75 crs; however cost finalized through ICB tender is Rs.96 crs.

(c) OTHER WORKS – Rs.362 crs. (Common for both units)

In order to have flexibility in coal conveying system, fuel oil system, additional works have arisen.

(ii) **Revenue expenses**

Revenue expenses amounting to Rs.150 crs. includes establishment, Audit and accounts and contingency. However, the expenditure made towards establishment charges upto COD is only Rs.89.25 crs as against estimated amount of Rs.150 crs. and the balance amount will not be utilized.

5.8.5.2. Common Facilities included in UNIT I

(i) Shared facilities of Rs.191 Crs.

The shared facilities included in the capital cost of NCTPS Stage II Unit I amounts to Rs.191 crs. The following facilities of existing NCTPS Stage I (3x210 MW) which were developed for the ultimate capacity of 2150 MW and which were executed already alongwith development of NCTPS Stage I itself are being shared for 2x600 MW NCTPS Stage II and Rs.191 crs. has been included in the capital cost of NCTPS Stage II, Unit I towards these facilities –

- (a) 2x4000 TPH External Coal Handling conveyors of length of 2.3 Km, 2x2000 TPH Internal Coal Handling Conveyors of length of 4.5 Km, 2 Nos. Shore unloader, 1 No. Primary coal crusher, 1 No. Secondary coal crusher, 2 Nos. Stacker and 2 Nos. Reclaimers which were already established facilities for NCTPS Stage I are being utilized for feeding the coal to NCTPS Stage II.
- (b) Water jetty developed near Ennore Port for NCTPS Stage I is being shared for drawl of cooling water for NCTPS Stage II.
- (c) Other facilities like existing approach road and compound wall etc. are being used for NCTPS Stage II.
- (d) Ash Dyke already developed for NCTPS Stage I.

The petitioner has developed certain facilities such as Coal Handling System, Coal unloading system, Water Jetty for drawl of Cooling Water, Ash Dyke etc. for the existing NCTPS Stage I (3x210 MW) and the new NCTPS Stage II (Units I & II) and has now transferred a portion of Rs.191 crs. of the cost of the shared facilities to NCTPS Stage II Unit I which facilities are likely to be shared by the subsequent unit also.

(ii) **Employee Quarters** – Rs.40 crs

This is common for both the units.

(iii) **REVENUE EXPENSES** – Rs. 88 crs.

The revenue expenses incurred by the Utility in the Unit I as detailed below are also common for both units:

Works and supply	Rs. 79.76 crs.
Vehicle	Rs. 1.44 crs.
Temporary advance	Rs. 0.29 crs.
Water	Rs. 6.32 crs.
TOTAL	Rs.87.81 crs.or say Rs.88 crs.

5.8.5.3 The Utility has incurred certain expenditures in each of the two units of NCTPS Stage II i.e Rs.319 crs. and 618.75 crs respectively towards common facilities for both units.

5.8.5.4 With respect to sharing of the common facilities, the following directions of the Hon'ble APTEL in the Judgment dated 27.04.2011 in Appeal No.72 of 2010 filed by Maharashtra State Power Generation Co. Ltd. against Maharashtra ERC and others would be relevant:-

“11.2 Provision of common facilities is done mainly for optimum utilization of resources including land, benefit of which is ultimately passed on the consumers. There could be two approaches for capitalization of cost of common facilities. In the first approach, the common facilities essential for operation of the first unit could be loaded to this unit. This will ensure timely servicing of capital cost incurred and eventually reduce the capital cost of the subsequent unit including IDC on deferred capital cost of common facilities till the commissioning of the subsequent unit. The second approach is to apportion the total cost to each unit. In this case the generating company will be entitled to IDC on the deferred capital cost of common facilities till the commissioning of the subsequent unit. There is, however, no specific Regulation on apportioning of cost of common facilities. In our opinion, where the

gap between two generating units is more, it would be prudent to allow cost of common facilities essential for commissioning of the first unit along with the capital cost of the first unit.

11.3 In the present case common facilities have been created for Units 6 and 7 at Parli which have been executed one after another. Order for Unit 6 was first followed by order for Unit 7 after sometime. The commissioning of some of the common facilities was essential for operation of unit no.6 and the same facilities will be used by Unit no. 7 subsequently. In our opinion, it would be prudent to allow capitalization of such common facilities which were essential for operation of Unit No.6 in the capital cost of unit No.6. This will result in reduction of capital cost on Unit No. 7 on account of common facilities and IDC on the same and also ensure servicing of capital cost incurred by the appellant for common facilities which have been commissioned alongwith Unit No.6. Accordingly, the State Commission is directed to allow Capitalization of only such common facilities commissioning of which were essential for commissioning of Unit No.6 in capital cost of Unit No. 6.”

5.8.5.5. With due consideration to the above direction of the Hon'ble APTEL, it is observed that the North Chennai Thermal Power Project Stage II comprising of two units of 600 MW each and the COD of which were achieved on 20.03.2014 and on 08.05.2014 respectively, the works of both units were taken up at almost the same time and COD of the units achieved within two months period and hence the Commission is of the view that apportioning of the expenditure towards common facilities equally among the two units of NCTPS Stage II would be apt.

5.8.5.6. Regarding the Employee quarters which is also being common for both the units, we intend to consider 50% of the expenses for each unit. However, we propose to include the same within the Capital cost but outside the Hard cost.

5.8.5.7 Accordingly, the details of the expenditure incurred towards common facilities in both the units along with the proposed allocation for each unit I & II of NCTPS Stage II are as follows:

**TABLE
ALLOCATION OF COST ON COMMON FACILITIES**

Sl. No	Description	(Rs. in crs.)			
		NCTPS Stage I – Cost on COD	NCTPS Stage II – Cost on COD	Proposed allocation of each unit	
				Unit I	Unit II
1	Cost of land and development – Shared facilities				
i	Common facilities such as coal handling system, coal unloading system, water jetty for drawl of cooling water, ash dyke etc. for the existing NCTPS Stage I (3x210 MW) and the new NCTPS Stage II (Units I & II)	191.00	-	95.50	95.50
ii	Quarters	40.00	-	20.00	20.00
	Sub Total (i+ii)	231.00	-	115.50	115.50
2	Revenue Expenses	88.00	89.25	88.60	88.60
3	Enabling works- Non EPC packages				
i	New cooling water channel (for both the units)	-	96.00	48.00	48.00
ii	Additional coal handling facilities (for Unit II)	-	71.50		71.50
iii	Other additional contracts in order to have flexibility in coal conveying system, fuel oil system & civil works	-	362.00	181.00	181.00
	Sub Total (i+ii+iii)	-	529.50	229.00	300.50
	TOTAL (1+2+3)	319.00	618.75	433.10	504.60

5.8.6. 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 the petitioner's statement, the Power Plant arrangement includes Double pass type

Boiler configuration, Fly ash & bottom fly ash utilization, onshore coastal raw water system, pile foundation, high seismic and wind zone, once through method of condensate cooling, lower cooling water temperature, the evacuation voltage level at 400 KV etc. and the cost implication in view of the above special features amounts to Rs.242.84 crs. and included in the EPC cost.

5.8.7. HARD COST ALLOCATION:

Being a firm price contract, the petitioner has stated there is no cost over run on EPC and non EPC portion. Therefore, Hard cost of the project is as follows.

**TABLE
HARD COST PROVISION FOR NCTPS STAGE II UNIT II**

Sl. No.	Description	Cost on COD Rs. in cr.	Rs. in cr. per MW
1	Plant & equipment (including taxes and duties)	1,672.66	
2	Initial spares	50.00	
3	Civil works including taxes	354.01	
4	Construction & precommg. expenses including taxes	148.33	
5	Cost of land and site development	8.80	
6	Over heads – Revenue expenses, Design & Engineering, Audit & Accounts	88.60	
7	Enabling works		
i	Non EPC contracts	300.50	
ii	Common facilities from Unit I	95.50	
8	Total Hard Cost including land cost and taxes	2718.40	
9	Less 100% taxes and duties paid in actuals in item (1), (4), (5) and (8)	(-)171.10	
10	Total Hard cost excluding Taxes	2547.30	4.245
11	CERC Norms		4.54 (2x600 MW)

5.8.8. Comparison of provisional Capital cost with CERC Bench mark capital cost

As per the above Table, the hard cost of the Unit II of the 2x600 MW generating station as on COD is Rs.2547.30 crores i.e @ Rs.4.245 crores/MW including spares, shared facilities, land cost. This is lower than the benchmark capital cost (Hard cost) of Rs.4.54 crs/MW specified by CERC even with the inclusion of cost on account of the above special technological features.

5.9 INTEREST DURING CONSTRUCTION

The project has been financed by Rural electrification Corporation (REC). The IDC details are as follows:

- (i) IDC as per original Estimate - Rs.318.95 crs.
- (ii) IDC as per on COD - Rs.754.65 crs

Going into the details of the petition and the additional details of TANGEDCO, it is seen that the IDC & FC of Rs.318.95 crs. as per original estimates has been calculated at interest rate of 11% with phasing of expenditure for 39 months.

The Commission notes that the impact of time over run beyond the contractual schedule is mainly on Interest during construction. The petitioner is also yet to finalise the impact of delay which may be mix of controllable and uncontrollable factors. Accordingly, IDC of Rs.318.95 with phasing of expenditure for 39 months as per scheduled completion period is provisionally allowed.

5.10. START UP FUEL AND INFIRM POWER:

5.10.1. Though the petitioner has stated that due to part load operation for more than a year before achieving COD in order to meet out the power crisis prevailing in the State of Tamil Nadu, the oil & coal consumption is more and hence increase in

cost, the Commission intend to restrict the expenditure on oil and coal as per L1 Schedule of the Project furnished by M/s.BHEL, the EPC Contractor, as TANGEDCO is yet to finalise the quantum of delay. Similarly with respect to the quantum of infirm power generated, the net generation proportionate to the L1 Schedule has been considered.

5.10.2. FUEL COST

As per L1 Schedule of the Project furnished by M/s.BHEL, the time period between synchronization with oil and coal till Commercial Operation Declaration (COD) is three and a half months and three months respectively; however, as per the TANGEDCO's Expenditure Statement of Oil and coal upto COD (08.05.14), oil has been used for 20 months and coal for 15 months respectively.

A statement with proportionate fuel cost for allowing is tabulated below:

**TABLE
PROPORTIONATE FUEL COST CALCULATION**

Sl. No.	Description	Oil	Coal
1	Scheduled period as per L1 schedule of BHEL	3 ½ Months	3 Months
2	Period as per Expenditure Statement	20 months	15 months
3	Total fuel cost as per Expenditure Statement	Rs. 214.44 crs.	Rs.513.25 crs.
4	Total fuel cost as per expenditure Statement	Rs. 727.69 crs.	
5	Proportionate fuel cost considered for allowing	Rs. 37.53 crs	Rs.102.65 crs.
6	Total fuel cost being allowed	Rs.140.18 crs.	

Hence, an amount of Rs.140.18 crs. is only allowed towards fuel cost.

5.10.3. QUANTUM OF INFIRM POWER

As stated earlier, as per L1 Schedule of the Project furnished by M/s.BHEL, the time period between synchronization with oil and coal till Commercial Operation Declaration (COD) is three and a half months and three months respectively.

However, infirm power generation had been 1709.39 MU (gross) for 15 months and 8 days. Hence the net generation proportionate to the L1 Schedule works out to 362.43 MU and the same is allowed.

5.10.4. RATE OF INFIRM POWER

5.10.4.1 The relevant provision for determination of the cost of infirm power in Regulation 20 of the Tamil Nadu Electricity Regulatory Commission (Terms and Conditions for the determination of Tariff) Regulation, 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.”*

5.10.4.2 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 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 (T_i) 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 - T_i

$$T_i = \{Gf \times [100 \times (Csp \times Cc)]\} / (100 - AUX)$$

T_i = 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).

5.10.4.3. Now 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 Unit II (600 MW) of NCTPS Stage II has been achieved on 08.05.14. Though trial operation for a certain period 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 is considered to arrive at the cost of infirm power of Unit II (600 MW) of NCTPS Stage II.

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. The same is taken into consideration as the scheduled COD period of the plant is 2011 -12 and accordingly the revenue from sale of infirm power of 288.07 MU @ Rs.1.34 per unit is Rs.38.60 crs.

5.10.4.4 Therefore, the net fuel cost allowed is as follows:

TABLE
NET FUEL COST ALLOWED

Particulars	As per TANGEDCO petition	Admitted by Commission
Expenses towards Start up fuel	Rs.727.69 crs	Rs 140.18 crs.
Infirm power generated (Net)	1581.19 MU	362.43 MU
Less Revenue from sale of infirm power @ Rs.1.34 per unit	Rs.211.88 crs	Rs. 48.57 crs.
Net fuel cost	Rs.515.81 crs.	Rs 91.61 crs.

5.11 In light of the foregoing, the Commission provisionally approves the Capital cost of North Chennai Thermal Power Station Stage II Unit II (600 MW) as on COD as per the details given in the Table below:

TABLE
PROVISIONAL CAPITAL COST AS ON COD OF NCTPS STAGE II- UNIT II

Sl. No.	Description	Cost as per petition Rs. in cr.	Cost provisionally approved as on COD Rs. in cr.	Remarks
1	Total Hard Cost	2863.07	2547.30	Hard cost includes apportioning of shared facilities among both the units of NCTPS Stage II.
2	Taxes and duties	Included in the above	142.28	Actual taxes and duties are allowed.
3	Customs duties	36.10	36.10	
4	Interest During Construction	754.65	318.95	Allowed as per scheduled COD of the project.
5	Others- Expenses towards Employee quarters 50% for each unit I & II	-	20.00	Apportioning of Rs.40.00 crs towards employee quarters equally among both the units of NCTPS Stage II being a common facility.
6	Fuel cost	727.69	140.18	Allowed as per L1 Schedule of the project
7	Capital cost including IDC	4381.51	3204.81	
8	Less Revenue earned from sale of infirm power	(-)211.88	(-)48.57	Allowed as per L1 Schedule of the project
9	Total Project cost	4169.63	3156.24	
10	Cost in Rs. per MW	6.95	5.26	

5.12. In the result, the Commission provisionally approves the project cost of North Chennai Thermal Power Station Stage II Unit II as on COD as Rs.3156.24 crs.

against a capital cost of Rs.4169.63 crs proposed by the petitioner as on COD including the revenue earned from sale of infirm power.

5.13. The petitioner has furnished the actual expenditure statement as on COD and also 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**

Details	Actual Expenditure incurred
Total approved cost	Rs. 4031.02 crs.
Expenditure upto COD i.e. 08.05.14 Including IDC	Rs. 4055.61 crs
Expenditure after COD	Rs. 143.15 crs.
Balance	Rs. 122.01 crs.
Total expenditure	Rs. 4320.77 crs.

5.14. The Commission directs the petitioner 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)
(Dr.T.Prabhakara Rao)
Member

(Sd.....)
(G.Rajagopal)
Member

(Sd.....)
(S.Akshayakumar)
Chairman

/ True Copy /

Secretary
Tamil Nadu Electricity
Regulatory Commission