

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. 1 of 2015

In the matter of : Approval of Capital cost of North Chennai Thermal Power Station Stage II Unit I (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 I (600 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 was heard on 20.04.2015 and 09.09.2016. The said petition M.A.P.No.1 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.1 of 2015:-

The prayer of the petitioner in M.A.P.No.1 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.20.03.2014); 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 submissions of the petitioner, the following are stated:

2.1. North Chennai Thermal Power Station Stage II (Unit 1 & II) is located inside the North Chennai Thermal Power Station Stage I premises and adjacent to Ennore Port and northern side of Ennore Creek, Puzhuthivakkam Village, Ennore, Ponneri Taluk, Thiruvallur District and it is 35 km from Chennai City. The power generated from this power station will be supplied by TANGEDCO for retail supply of power to its consumers.

2.2. The Board of the erstwhile TNEB accorded approval to undertake preliminary preparatory works for setting up of 1x500 MW Thermal Power Project at existing

NCTPS Complex under State Sector in (Per) B.P.(FB) No.298 dt.12.12.2005. Necessary approval has been accorded by the Board in its 894th meeting held on 30.08.2006 for execution of the project under two Engineering, Procurement and Construction (EPC) packages viz. Main Plant and Balance of Plant. Consultancy contract was awarded to M/s. Development Consultants Private Limited (M/s.DCPL) vide P.O. No. 309 dt.04.09.2006 at a total cost of Rs.2.11 crores.

2.3 While TANGEDCO was in the process of preparation of tender specification for establishment of 1x500 MW thermal power project, MOP/GOI vide letter dated 05.02.2007, advised all the State Governments and Union Territories and Head of all Power Utilities to strictly follow the guidelines prescribed by the CEA to specify the range of unit sizes between 1x500 MW and (500+20%) MW instead of notifying a particular unit size for the purpose of competitive bidding. Accordingly revised tender specification was prepared and tender floated for establishment of Thermal Power Plant with capacity ranging from 500 MW to 500+20% MW under EPC cum Finance basis through International Competitive bidding. Only one bid was received from M/s.BHEL/New Delhi for establishment of 1x600 MW unit.

2.4. The Detailed Project Report (DPR) for establishment of 1x500 MW Coal based North Chennai Thermal Power Station – Stage II with project cost estimate of Rs.264261 lakhs submitted by M/s.DCPL was placed before the 1076th meeting of the Board Level Tender Committee. Subsequently the above proposal was withdrawn as M/s.BHEL/ New Delhi submitted an offer for 1x600 MW Coal based North Chennai Thermal Power Station Stage II. Revised administrative approval for a total cost of Rs.339800 Lakhs (which includes Rs.247500 lakhs towards EPC

cost + Rs.52300 lakhs towards IDC at 11% + Rs.40000 lakhs towards cost of available and shared infrastructure facilities) and approval for award of contract for establishment of 1x600 MW NCTPS Stage II under single EPC cum Finance basis to M/s.BHEL, New Delhi was obtained in the same 1076th meeting of the Board Level tender Committee. This was approved by the Board in the 909th Board Meeting held on 19.01.2008.

2.5. The EPC cum Finance contract was awarded to M/s.BHEL at a total cost of Rs.2475 crores (including Rs.100 crores for mandatory spares common for Unit I & II) vide LOA dated 19.01.2008 for establishment of 1x600 MW, unit I of NCTPS Stage II stipulating the due date for completion of the project by 39 months from zero date i.e.18.02.2008. The project was scheduled for commissioning in May'2011.

2.6. After award of contract, the DPR was frozen taking into account of actual EPC Contract price and the project cost estimated by the Consultant M/s.DCPL was at Rs.3095 crores including Interest During Construction (IDC) and Financing Charges of Rs.345 crs. based on the rates applicable as on 31.10.2007.

2.7. Since the works were not completed in time, provisional time extension till completion of the project was approved by the Board in its meeting held on 17.09.2011 without prejudice to the right of the petitioner levy penalty after completion of the project.

2.8. The Unit was synchronized with oil on 30.06.2013 and achieved a full load capacity of 606.10 MW on 13.09.2013. The trial operation of unit was carried out from 18.02.2014 to 18.03.2014. During this period, the unit was run at full load for 72 hours on average load of 605.14 MW. After successful completion of trial operation, the COD was achieved on 20.03.2014.

2.9. Due to delay in commissioning of coal handling and Ash Handling system in complete shape, there was a delay in completion of trial operation and achieving COD. The project cost increased to Rs.4030 crores on account of increase in IDC from Rs.345 crores to Rs.894.76 crores and additional overhead charges on fuel cost and revenue expenses of Rs.297.37 crores and Rs.87.81 crores respectively which were not included in the original estimate.

2.10 As a trial measure, EPC cum Finance Contract was awarded to M/s.BHEL for the above project. Initially, the project was proposed to be financed by All Bank Finance (Subsidiary of Allahabad Bank) by the L1 Bidder BHEL which carried a fixed rate of interest @ 11% for 5 years. Subsequently due to rise in interest rate, the project was financed through Rural Electrification Corporation (REC) by BHEL at a higher interest rate. BHEL has also agreed to reimburse the incremental interest cost to the petitioner and BHEL has been addressed in this regard to reimburse Rs.91.15 crs. by TANGEDCO vide Ir.dt. 25.11.2014 and reminded vide Ir.dt.30.05.2015. In response, M/s.BHEL in Ir. Dt.10.06.2015 have requested some more time as it involves voluminous data which requires detailed examination. On finalization, TANGEDCO has stated that the project cost will be reduced accordingly.

2.11. 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 AS ON COD**

(Rs. in Crores)

Sl. No.	Head of works	Original cost	Cost on COD	Variation	Reasons for variation
1.0	Infrastructure works - Cost of land & site development				
1.1	Land	44	44		
1.2	Preliminary Investigation and site development	1	1		
1.3	Cost of shared facilities such as Coal handling facilities, water systems, other shared facilities	191	191		
1.4	Cost towards employees quarter	40	40		
1.5	Infrastructure works- Cost of land & site development	276	276	-	
2	Major civil works	375	375	-	
3	Plant & equipment (including Taxes & Duties & spares)			-	
3.1	Steam Generator Island	571	571		
3.2	Turbine Generator Island	208	208		
3.3	BOP Mechanical – Cooling Water system, Station lighting, DM water plant, fuel handling & storage system, Ash Handling system, Coal handling system, HP/LP piping	500	500		
3.4	BOP Electrical – Switchyard package, transformer package, switchgear package, cables & accessories, lighting DG set etc	277	277		
3.5	C& I package	63	63		

3.6	Total Plant & equipment excluding Taxes and duties	1619	1619		
	Taxes & Duties				
3.7	Other Taxes & duties	213	213		
3.8	Freight charges	21	21		
3.9	Total Taxes & duties	234	234		
3.10	Total Plant & Equipment	1853	1853		
4	Initial spares	100	100		
5	Construction and precommissioning expenses	147	147		
	Total EPC cost (Sl.No 2+3.10+4 +5)	2475	2475		
6	Overheads				
6.1	Revenue expenses		88	88	
6.2	Start up fuel		297	297	Due to delay in completion of project and part load operation, the fuel cost has been increased.
6.3	Infirm power		89	89	
6.4	Net fuel cost (Sl.No.6.2 – 6.3)		208	208	
	Total overheads (Sl.No.6.1 + 6.4)	-	296	296	
					Revenue of Rs.89 crs 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	Capital cost exldg IDC & FC	2751	3047	296	
8	Financing charges and IDC	345	862	517	Reason is delay in completion of project
9	Capital cost incldg IDC & FC	3096	3909	813	
	Cost per MW	5.16	6.515		

Aggregate revenue Requirement	20.03.14 to 31.03.14 – Rs.22.71 crs. 2014-15 – Rs.753.67 crs. 2015-16 – Rs.756.66 crs.
Rate of Energy charge ex bus	20.03.14 to 31.03.14 – Rs.2.52 per kWh 2014-15 – Rs.2.40 per kWh 2015-16 – Rs.2.37 per kWh

3. The Commission for carrying 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 has 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 20.03.14 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 tender floated for establishment of thermal power plant with capacity ranging from 500 MW to 500+20% MW under EPC cum Finance basis, only one bid of M/s.BHEL has been received for 600 MW. The contract was awarded to M/s.BHEL for Rs.2475 crores which includes the cost towards mandatory spares of Rs.100 crore.

4.3. The delay in completion of the project is due to the following:

4.3.1 The EPC cum Finance contract for construction of North Chennai Thermal Power Station Stage II Unit I was awarded to Bharat Heavy Electricals Ltd. (BHEL) under ICB route and the works commenced on 18th February 2008. The project was to be commissioned during May 2011 but was delayed due to the accident occurred for the generator stator at Madhya Pradesh on 28.09.11 during transit from BHEL/Haridwar and consequently BHEL has manufactured an alternate stator and dispatched on 22.08.2012. However, monsoon rain and heavy inflow in rivers Ganga/Yamuna enroute hampered the truck movement and it reached the site on 11.02.2013 and erection was started during February'2013.

4.3.2. There is delay in erection and commissioning of Coal Handling System, Cooling water system, electro Chlorination System and Ash Handling System etc.

4.3.3. DELAY IN FINALISATION OF ASH HANDLING SYSTEM:

While floating tender for Unit I through ICB route, it was envisaged for Dry Bottom Ash Handling system. But while floating, only one offer was received i.e.,

from BHEL without quoting for Dry Bottom Ash Handling system. TANGEDCO had to accept BHEL's stand that Dry Bottom Ash Handling System is not proven one for Indian Coal conditions and finalized with semi wet system for Unit I. When the process of tendering for unit II was in progress, TANGEDCO came to know that similar system was in existence in DAV's Durgapur 300 MW Plant and insisted to go in for Dry Bottom System for both the units of NCTPS Stage II from April 2008 itself. M/s.BHEL floated tender for Bottom Ash handling system only during April 2009. Due to delay in finalization of tender specification and floating of tender by 04/2009 and processing of tender by BHEL, the award of semi wet Bottom Ash system was finalized in July 2010 by BHEL even though TANGEDCO have readily accepted to bear the difference in cost by Dry Bottom Ash Handling System over Semi wet system on 10.06.2010.

The design drawing for Ash Handling System were furnished by BHEL in September/October 2011 only. Further the civil works for the Ash evacuation system including Ash Silos were awarded after November 2011. The civil works for 2 out of 3 streams of Ash slurry pipe line and Ash recovery water pump house was taken up only after COD.

4.3.4 COAL HANDLING SYSTEM:

Though the sub-vendor of coal handling completed the engineering in time, commencement of erection of Junction Towers was delayed due to non-readiness of boiler front. Out of two stream of conveyors, M/s.BHEL was able to commission the second stream of conveyors by engaging another sub vendor as the original sub vendor M/s.Tecpro Systems Limited did not complete the same as they are in

financial crisis and not in a position to take up the balance work. Hence delay in commissioning of coal handling plant.

4.3.5 As a trial measure, EPC cum Finance contract was awarded to BHEL for above project. Originally, All Bank had agreed to finance the project, along with consortium of banks. The financial tie up with All Bank did not materialize due to sudden increase in interest rate and some other reasons. BHEL had tried other alternative through SBI also but it did not materialize in view of the commercial conditions of this contract. Finally, financial arrangement was made with REC, the lender for Unit II of NCTPS Stage II. The first payment was made only on 02.06.2010 after 27th month from zero date. Even though as per contract M/s.BHEL is solely responsible for arranging finance, without financial tie up, BHEL have continued to supply and services to an extent of about Rs.800 crores against schedule of cash flow of Rs.1250 crs mentioned in their offer. Due to non-cash flow, there was sluggish in initial execution of the project which delayed the commissioning of the project.

4.3.6. There is 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.

4.3.7. Dearth of skilled labourers due to many infrastructure projects those are in progress all over India and particularly in Chennai.

4.3.8. Being a firm price EPC contract, cost over run on EPC portion does not arise. However, due to delay in implementation, it 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. The petitioner has further submitted that the following towards common facilities of existing NCTPS Stage I (3x210 MW) which were developed for the ultimate capacity of 2150 MW and executed already alongwith development of NCTPS Stage I itself are being shared for 2x600 MW NCTPS Stage II and Rs.190.59 crs. has been included in the capital cost of NCTPS Stage II, Unit I towards these facilities Utility

- (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. is being used for NCTPS Stage II.
- (d) Ash Dyke already developed for NCTPS Stage I.

4.5. Though there is no cost over run in EPC Contract being a firm price contract, the difference in project cost in the original estimate and that as on COD is only on account of IDC of Rs.862 crs (upto COD) and Over heads viz revenue expenses of

Rs. 88 crs. and start up fuel cost of Rs.208 crs. (Net after deducting the revenue from sale of infirm power).

4.6 Interest During Construction

TANGEDCO has submitted that in the original estimated project cost, there was a provision for Interest During Construction (IDC) & Financing charges of Rs.345 crs. This was subsequently revised to Rs.862 crs. as on COD. Due to delay in commissioning of the project, the project cost under the head “IDC & Financing Charges” got increased.

4.7. Revenue Expenses:

The revenue expenses which were not included in the original estimate, have been incurred in the Unit I as detailed below:

TABLE

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.

4.8. Start up fuel and Infirm Power generation

4.8.1 Start up fuel

The Unit was synchronized with oil on 30.06.2013 and achieved a full load capacity of 606.1 MW on 13.09.2013. The trial operation of unit was carried out from 18.02.2014 to 18.03.2014. During this period, the unit was run at full load for 72 hours on average load of 605.14 MW. After successful completion of trial operation, the COD achieved on 20.03.2014. TANGEDCO has also furnished the details of fuel expenditure upto COD wherein oil has been used for 15 months and coal for seven

months. Due to delay in completion of project and part load operation, the fuel cost has been increased. Though the unit was synchronized with oil on 30.06.2013, there was a delay in execution of Coal handling System, Ash Handling System, Electro Chlorination System, A/c & Ventilation system, Fire Protection system and switchyard. Due to this subsequent milestone of coal firing was delayed and the same was achieved on 08.09.2013 and full load touched on 13.09.2013. However, the unit could not be operated with coal firing continuously since only 2 passes of ESP for collection of fly ash has been ready out of 4 ESP passes, 2 Nos. cooling water pump out of 6 Nos. pumps and turbine driven boiler feed pump were not completed. After completion of the required system for coal firing and attending initial teething problems, the trial operation was carried out from 19.02.2014 to 18.03.2014. After completion of trial operation, the COD was declared on 20.03.2014. The above pending systems/equipment could be brought into operation only when the shutdown was given. In order to tide over the situation of power demand prevailing in the State of Tamil Nadu, the unit was run at partial load of 250-400 MW. The Unit could be run on partial load with oil support only till achievement of COD. Due to this part load operation, higher oil consumption is inevitable.

4.8.2 Infirm Power Generation

The infirm power generation had been for eight months. The infirm energy of 658.453 MU (net) has been considered 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 2013 and P.P.A.P No.7 of 2013 introducing the Grid Facilitation Factor.

4.8.3 The expenses towards the Startup fuel and Infirm power is as below:

TABLE

Expenses towards Start up fuel	Rs.297 crs
Less Revenue from sale of infirm power	Rs.89 crs (658.453 MU x Rs.1.34/- per unit)
Net fuel cost	Rs.208 crs.

5. Findings of the Commission:-

5.1 Before deciding the issues on hand, we would like to state 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 states 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. At the outset, the Commission has gone through the petition details and additional submissions made by the petitioner. Firstly, the Commission observes

that the North Chennai Thermal Power Project Stage II comprising of two units of 600 MW each achieved COD on 20.03.14 and 08.05.14. 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 30.07.14. 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 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 penalty proposed 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 I 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, 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 Unit I of the NCTPS Stage II project.

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

TABLE

Description	NCTPS Stage II Unit I
Plant capacity	600 MW
Main EPC contractor	M/s.BHEL/New Delhi

LOA date	18.02.08
Project period	39 months
Scheduled completion period	May'2011
Actual COD	20.03.14

The time over run was mainly due to delay in supply of machineries from different units of BHEL, completion of Coal Handling system and Ash Handling system. The contracts are Firm price contracts. So cost over run on EPC and non EPC contracts does not arise. The impact of time overrun beyond the contractual schedule is only on Interest During Construction and Start up fuel cost.

5.4. Now coming to the analysis of the capital cost, as per Regulation 18 (6) of TNERC's Tariff Regulations 2005 extracted above, 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 evolved 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 prerequisite of CERC, Hard Cost of TANGEDCO Project cost includes Plant and Equipment, initial spare, freight, Civil works, Construction & pre-commissioning expenses, Cost of land and site development, cost of shared facilities such as Coal Handling facilities, water jetty for drawl of cooling water, ash dyke etc. and revenue expenses and this amounts to Rs.2538 crs. excluding Taxes and duties. As taxes and duties are a pass through, the amount of Rs.213 crs. indicated in the petition is taken out of the Hard Cost analysis.

5.5.3. INITIAL SPARES

The petitioner has stated that the initial spares to the tune of Rs.100 crores included in the EPC cost of Unit I is common for Unit I & II of the NCTPS Stage II Project which work out to 3.23% of the Original Project cost of Rs.3096 crores

stipulated above. Being common spare for both units I & II, the Commission propose to consider 50% cost of spares for each unit, which in turn works out to 1.615%. This is within the norms of 2.5% specified in the Tariff regulations. Hence Rs.50 crs is allowed for Unit I and the balance Rs.50 cr. is accounted in the capital cost of Unit II.

5.5.4. SHARED FACILITIES AND REVENUE EXPENSES

From the details furnished by the petitioner in the present petition and subsequent additional information, it is seen that in respect of the shared facilities and revenue expenses indicated in the capital cost, the certain expenditure has been incurred in Unit I as common facility for Unit II of the NCTPS stage II also. Similarly, from the separate petition filed by TANGEDCO for approval of the capital cost of NCTPS Stage II Unit II (M.A.P. No. 2 of 2015), it is ascertained that certain expenditure have been incurred by TANGEDCO in Unit II as common facility for both units I & II. A brief details of such common facilities indicated in both the petitions and Commission's view are discussed below.

5.5.4.1 Shared Facilities included in Unit I

(i) Shared facilities - Rs.191 Crs.

The Utility 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 facility is 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 of Rs.88 crs incurred by the Utility in the Unit I is also common for both units.

5.5.4.2 Shared Facilities included in UNIT II

(i) Revenue expenses amounting to Rs.150 crs. includes expenditure towards establishment, Audit and accounts and contingency expenses. However, as per the additional information of TANGEDCO, 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. This is also common for both the units.

(ii) ENABLING WORKS – Non EPC packages.

(A) ADDITIONAL COAL CONVEYING SYSTEM – Rs.71.5 crs. (For Unit II)

TANGEDCO has submitted 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 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 aroused.

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

5.5.4.4. 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 need to be looked into:-

“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 along with 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.”

5.5.4.5 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.

5.5.4.6 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.

5.5.4.7 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	NCTPS Stage II Unit I –Cost on COD	NCTPS Stage II Unit II – Cost on COD	(Rs. in crs.)	
				Proposed allocation of each unit	Unit I
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	-	95.5	95.5
ii	Quarters	40	-	20	20
	Sub Total (i+ii)	231	-	115.5	115.5
2	Revenue Expenses	88	89.25	88.6	88.6
3	Enabling works- Non EPC packages				
i	New cooling water channel (for both the units)	-	96	48	48
ii	Additional coal handling facilities (for Unit II)	-	71.5		71.5
iii	Other additional contracts in order to have flexibility in coal conveying system, fuel oil system & civil works	-	362	181	181
	Sub Total (i+ii+iii)		529.5	229	300.5
	TOTAL	319	618.75	433.10	504.6

5.5.5 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 submission, 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, the evacuation voltage level at 400 KV etc. and the cost implication indicated by TANGEDCO in view of the above special features is Rs.162.83 crs. and included in the EPC cost.

5.5.6. HARD COST ALLOCATION:

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

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

Sl. No.	Description	Cost on COD Rs. in cr.	Cost per MW Rs. in cr.	Remarks
1	Plant & equipment	1,619.00		
2	Freight	21.00		
3	Initial spares	50.00		50% of expenses considered
4	Civil works	375.00		
5	Construction & precommg. expenses	147.00		
6	Cost of land, site development and common facilities	140.50		Land - Rs. 44 crs. Shared facilities- Rs.95.5 (50%) crs. Preliminary }- Rs.1 cr. Investigation }

7	Over heads – Revenue expenses, Design & Engineering, Audit & Accounts	88.60		
8	Enabling works – Non EPC contracts	229.00		
9	Total Hard Cost including Land cost	2670.10	4.45	
10	CERC Norms		4.54 (2x600 MW)	

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

As per the above Table, the hard cost of the Unit 1 of the 2x600 MW generating station as on COD is Rs.2670.1 crores i.e @ Rs.4.45 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.

5.6 TAXES AND DUTIES:

The petitioner has stated Rs.213 crs. as Taxes and duties as per Letter of Intent to M/s.BHEL. However, the actual taxes and duties paid to EPC contractor is Rs.157.94 crs. i.e Rs. 153.45 crs upto Commercial operation date and Rs.4.49 crs after COD. 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.157.94 crs. made as Taxes and duties by the Utility to the EPC contractor as pass through.

5.7. INTEREST DURING CONSTRUCTION

5.7.1. The project is EPC cum finance contract with financing of 100% EPC cost. The details of Interest during Construction & Financing charges of TANGEDCO as per petition is as below:

- i) IDC as per original Estimate - Rs.345.05 crs.
- ii) IDC as per on COD - Rs.862 crs

The IDC & FC of Rs.345 crs. as per original estimates has been calculated at interest rate of 10.5% with phasing of expenditure for 39 months. IDC at actuals as on COD is Rs.862 crs. In view of the delay in completion of the project, an excess IDC of Rs.517 crs. has been incurred by the Utility.

5.7.2 Going into the details of financial arrangement for the project, it is seen that TANGEDCO has gone in for EPC cum Finance Contract as a trial measure for this project and the contractor, M/s.BHEL proposed to finance the project through All Bank Finance (Subsidiary of Allahabad Bank) which carried a fixed rate of interest @ 11% for 5 years. The financial tie up with All Bank did not materialize due to sudden increase in interest rate and some other reasons. Subsequently the project was financed through REC by BHEL at a higher interest rate. BHEL has agreed to reimburse the incremental interest cost to TANGEDCO and BHEL has been addressed in this regard to reimburse Rs.91.15 crs. by TANGEDCO. On finalization,

TANGEDCO has stated that the project cost will be reduced accordingly. However in view of this delay in financial tie up, the first payment was made only on 02.06.2010 after 27th month from zero date. Even though TANGEDCO has stated that as per contract M/s.BHEL is solely responsible for arranging finance, there was sluggishness in initial execution of the project which delayed the commissioning of the project.

Further, as per the details furnished in the petition the debt financing of the project was through Rural Electrification Corporation for an amount of Rs.3134 cr (Rs.2713 crs. + additional loan of Rs.420.92 crs). Rs 284.55 crs has been so far drawn from the additional loan of Rs.420.92 crs.

5.7.3. TANGEDCO's revised Administrative approval obtained in the 909th Board meeting held on 19.01.2008 for a total cost of Rs.3398.00 crores includes Rs.2475 crores towards 100% EPC cost and Rs.523.00 crs. towards IDC @ 11% and Financing Charges.

5.7.4. Under the above context, the Commission notes that the impact of time over run beyond the contractual schedule is mainly on Interest during construction. Further, the issue of reimbursement of incremental interest cost is yet to be settled by TANGEDCO with BHEL. The petitioner is also yet to finalise the impact of delay which may be mix of controllable and uncontrollable factors. The Commission has accordingly treated the IDC at 11% for the 100% EPC cost for purpose of provisional approval of capital cost as per the revised estimate of TANGEDCO which is also as per contract terms of TANGEDCO with BHEL.

5.7.5 A statement of the same is as follows:-

TABLE
INTEREST DURING CONSTRUCTION CALCULATION

	IDC as per original estimates of TANGEDCO	IDC amount allowed
Total EPC Price	Rs.2475 crs.	Rs. 2487.38 crs. (Including Syndicate fee @ 0.4% and Up front fee @ 0.1%)
Interest	10.5%	11%
Scheduled COD of Unit I	39 months	39 months
Phasing of Expenditure	I year – 15.2% - Rs. 376.20 crs II Year– 23.5%- Rs. 581.625 crs. III year– 51.3% - Rs.1269.675 crs. IV year – 10% - Rs. 247.50 crs. Total - 100% - Rs. 2475 crs.	I year – 15.2% - Rs.378.08 crs. II year – 23.5% - Rs.584.54 crs II year – 51.3%-Rs.1276.03 crs. IV year- 10% - Rs.248.74 crs. Total - 100% - Rs. 2487.38 crs
IDC calculated including FC	Rs.345.05 crs.	Rs.510.06 crs.

5.7.6. An IDC amount of Rs.510.06 crs is allowed against Rs.862 crs expended by TANGEDCO towards IDC.

5.8. START UP FUEL AND INFIRM POWER:

5.8.1 Though TANGEDCO has submitted that the increase in fuel cost is due to delay in completion of the project and part load operation, 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.

5.8.2 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 (20.03.2014), oil has been used for 15 months and coal for seven months respectively.

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

**TABLE
PROPORTIONATE FUEL COST CALCULATION**

Sl. No.	Description	Oil	Coal
1	Trial operation & COD Period as per L1 schedule of BHEL	3 ½ Months	3 Months
2	As per Expenditure Statement of TANGEDCO	15 months	7 months
3	Total fuel cost as per TANGEDCO Expenditure Statement	Rs. 91 crs.	Rs.206 crs.
		Rs.297 crs.	
4	Proportionate fuel cost as per L1 Schedule	Rs.21 crs	Rs.88 crs.
5	Total fuel cost	Rs.109 crs.	

Hence, an amount of Rs.109 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.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, from the generation particulars furnished by TANGEDCO in the petition, infirm power generation of 658.453 MU (Net) had been for eight months. Hence the net generation proportionate to the L1 Schedule is 288.07 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 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.”*

5.8.4.2 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 (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 13.03.14 (w.e.f 09.04.14).

5.8.4.3 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 13.03.14 (w.e.f 09.04.14). 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 I (1x600 MW) of NCTPS Stage II has been achieved on 20.03.14. Though trial operation of Unit I took place prior to 09.04.14, 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 09.04.14 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 I (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.

5.8.4.4 Therefore, the net fuel cost is calculated as follows:

**TABLE
NET FUEL COST ALLOWED**

Particulars	As per TANGEDCO petition	Cost Allowed
Expenses towards Start up fuel	Rs.297 crs	Rs.109 crs.
Net Infirm power generation	658.453 MU	288.07 MU
Less Revenue from sale of infirm power @ Rs.1.34 per unit	Rs.89 crs	Rs.38.60 crs.
Net fuel cost	Rs.208 crs.	Rs.70.4 crs.

5.9 In light of the foregoing, the Commission provisionally approves the Capital cost of North Chennai Thermal Power Station Stage II Unit I (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 I**

Sl. No.	Description	Cost on COD as submitted by TANGEDCO in the Petition Rs. in cr.	Cost provisionally approved as on COD by the Commission Rs. in cr.	Remarks
1	Total Hard Cost	2626	2670.10	Hard cost includes apportioning of shared facilities among both the units of NCTPS Stage II.
2	Taxes and duties	213	157.94	Actual taxes and duties are allowed.

3	Total hard Cost including Taxes and duties	2839	2828.04	
4	IDC	862	510.06	Allowed as per scheduled COD of the project.
5	Employees Quarters 50% for each unit	40 (included in Item 1 above)	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	297	109.00	Allowed as per L1 Schedule of the project
7	Capital cost including IDC	3998	3467.10	
8	Less Revenue earned from sale of infirm power	(-) 89	(-) 38.60	Allowed as per L1 Schedule of the project
9	Total Project cost	3909	3428.50	
10	Cost in Rs. per MW	6.515	5.714	

5.10. In the result, the Commission provisionally approves the project cost of North Chennai Thermal Power Station Stage Unit I as on COD as Rs.3428.50 crs. against a capital cost of Rs.3909 crs proposed by the Utility as on COD in the petition including the revenue earned from sale of infirm power.

5.11. TANGEDCO 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**

Total Project cost (excluding revenue of Rs.89 crs. earned from sale of infirm power) (incl. Notional IDC of Rs. 32.76 crs.)	Rs. 4030.17 crs.
Expenditure upto 31.03.14	Rs. 3832.04 crs.
Expenditure for the FY 2014-15	Rs. 54.88 crs.
Expenditure for the FY 2015-16	Rs. 16.93 crs.
Total upto 2015-16	Rs. 3903.85 crs.
Balance (Notional IDC of Rs.32.76 crs. is proposed not to be utilised)	Rs. 93.56 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)
(Dr.T.Prabhakara Rao)
Member

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

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

/ True Copy /

Secretary
Tamil Nadu Electricity
Regulatory Commission