

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 2014

In the matter of : Approval of Capital cost of Periyar Vaigai II Small Hydro Electric Project (2x1.25 MW) of Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) under sections 62 and 86 (1)(a) of the Electricity Act, 2003 read with regulation 18 of TNERC (Terms and Conditions of) Tariff Regulations, 2005

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

Vs.

Nil : Respondent

Dates of hearing : 26.12.2014, 27.04.2015, 09.09.2016

Date of Order : 31.01.2017

Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) which is in the business of generation and distribution of electricity in the State of Tamil Nadu has filed a petition for approval of the Capital cost of Periyar Vaigai II Hydro Electric Project (2x1.25 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 26.12.2014, 27.04.2015 and 09.09.2016. The said M.A.P. No. 2 of 2014 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:-

ORDER

1. Prayer of the petitioner in M.A.P.No.2 of 2014:-

The prayer of the petitioner in M.A.P.No.2 of 2014 is to –

- (i) approve the Capital cost for Periyar Vaigai II Small Hydro Project (2x1.25 MW) upto the date of commercial operation; and
- (ii) permit to claim the cost of the above hydro 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 Periyar Vaigai I (2x2 MW), Periyar Vaigai II (2x1.25 MW), Periyar vaigai – III (2x2 MW) and Periyar Vaigai – IV (2x1.25 MW) Small Hydro Electric Power Projects were established across the River Periyar in between the Periyar Power House and the Vaigai reservoir. The Periyar Vaigai II Power station is located at about 5.75 km downstream of the existing Periyar Power House at Cumbum Village, Theni District. This power station utilizes the tail water of Periyar Power House and the bed fall of 8.50 m available thereof, for power generation.

2.2. The project work was taken up as per (Per) BP No.211 (TB) dt.09.09.2005 for a project cost of Rs.1425 lakhs.

2.3. The project component involves construction of the following works:

- (a) Weir – A Weir of height 13.50 m for heading up of water;
- (b) Power House Sub structure works;
- (c) Power House Super structure to house two units of 1.25 MW each;
- (d) Other allied works such as Approach road, Penstock encasing etc.;
- (e) Electro Mechanical works which included Turbine, Generator and Switchyard.

2.4. Administrative Approval

Administrative approval by Board of TANGEDCO has been accorded for a total cost of Rs.14.25 crores during September 2005. Subsequently, after the award of all Civil, Electrical and Mechanical packages, the cost has been escalated upto Rs.48.30 crores as per price level varying from 2006 to 2009 which is inclusive of IDC component of Rs.6.32 crores. IDC was not originally included in the Administratively approved cost.

2.5. The Electrical & Mechanical works have been executed by M/s.Kirloskar Brothers Ltd., Pune. The other works viz Weir and allied works, Power House Sub-structure, Power House Super structure, Tail race works and other works as per site conditions have been executed by various contractors.

2.6. Change in foundation levels of weir and power house area, increase in construction material quantity and cost, increase in cost of power house plant and machinery, delay in execution of the project are the primary reasons leading to the escalation in project cost. Interest During Construction (IDC) has also not been envisaged in the Original estimate cost.

2.7. The date of commercial operation of this Hydro power station –

Unit I – 01.11.2012 and Unit II – 04.11.2012.

2.8. The petitioner has availed Loan from Power Finance Corporation (PFC) for four projects Periyar Vaigai I, II, III & IV under Loan No. 36102011 as detailed below:

**TABLE
PFC Loan particulars**

(Rs. in Crores)

Sl. No	Name of the Project	Project Cost	Revised project cost	Loan sanctioned	Additional loan sanctioned	Loan sanctioned project wise at 80% of revised project cost
1	Periyar Vaigai I (2x2 MW)	18.83	62.10	120.11	73.86	49.68
2	Periyar Vaigai II (2x1.25 MW)	14.25	48.30			38.64
3	Periyar Vaigai III (2x2 MW)	18.63	75.00			60.00
4	Periyar Vaigai IV (2x1.25MW)	15.00	57.07			45.65
	Total	66.71	242.47			193.97

2.9 Interest During Construction (IDC) amounting to Rs.6.32 crores has been worked by the petitioner as follows:

**TABLE
IDC Calculation**

Sl.No.	Description	Rs. in Lakhs
1	Capital Cost of the Project	4198
2	Phasing of Expenditure	
	1 st Year 2006-07	15.00
	2 nd Year 2007-08	439.79
	3 rd Year 2008-09	468.48
	4 th Year 2009-10	852.51
	5 th Year 2010-11	2422.07
	Total	4197.85

3	Interest During Construction @ 12%	
	1 st Year 2006-07	0.90
	2 nd Year 2007-08	28.19
	3 rd Year 2008-09	82.68
	4 th Year 2009-10	161.94
	5 th Year 2010-11	358.42
	Total	632.13

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

TABLE
BREAK UP OF PROJECT COST
(Rs. in lakhs)

Sl. No	Head of works	Original cost	Cost on COD	Variation	Reasons for variation
1	Infrastructure works- Land, Building, maintenance etc.	60	182	122	Original approved cost was based on Price level 2004-05 and the work was awarded during 11/2006. The price variation is due to price escalation of materials and labour.
2	Major civil works – Dam, power plant civil works	432	1787	1355	
3	Plant & equipment	600	1796	1196	
4	Taxes & Duties	Included in the respective Civil and E&M works			
5	Construction and precommissioning expenses	Included in the respective Civil and E&M works			
6	Overheads – establishment, Audit & accounts, cost of Tr. & Dist.	333	433	100	
7	Project cost excluding Fin.charges & IDC	1425	4198	2773	
8	Financing charges and IDC	-	632	632	.
	Capital cost	1425	4830	3405	
	Cost per MW	570	1932		

3. The Commission in order to carry out the prudence check of the Capital cost and to address the data gaps, directed the petitioner to submit additional details with respect to actual expenditure incurred upto and after COD, split up of taxes and duties, actual taxes and duties paid, detailed statement of completion of various works of the project viz Weir, radial gates, PH sub-structure, PH super structure, Electrical & Mechanical works, specific reasons for delay in completion of the project.

4. Contentions of the Petitioner:-

Pursuant to the above, the petitioner submitted the 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 contracts entered into with Non EPC contractors and other parties wherever applicable.

(3) The project has commenced Commercial Operation for Unit I on 01.11.2012 & Unit II on 04.11.2012 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 The project cost as per the administrative approval of the Board of TANGEDCO is Rs.14.25 crores. Subsequently, after the award of all civil,

electrical and mechanical packages, the cost has been escalated to Rs.48.30 crores which is inclusive of IDC component of Rs.6.32 crores.

4.3 The factors contributing to the increase in capital cost of the power station are as follows:

4.3.1 The rates adopted in Detailed Project Report were based on 2004-05 price level. The rates adopted in sanctioned estimate were as per PWD schedule of rates for the year 2008-09 for Theni District and local market rates. Thus due to cost escalation over the period of four years, there was a hike in the cost of the project.

4.3.2 Change in Power House area.

Due to increase in the area of Power House by about 62% as per the requirement of machinery supplier, there is an increase in every item pertaining to Power House like excavation, RCC works, roof truss, painting etc. The area of Power House is -

As per DPR : 15.5 m x 19 m

As per actual : 26.20 m x 29.5 m

4.3.3 Change in height of Weir.

Due to increase in height of Weir by 1.5 times, there is a corresponding increase in base width of Weir in order to satisfy the stability criteria. Thus the total quantity related to Weir increased manifold. The height of the weir is-

As per DPR : 9 m

As per actual : 13.5 m

4.3.4 Increase in cost of structural steel, reinforcement rods and cement.

The cost of structural steel has increased 1.6 times, the cost of reinforcement rods has increased 2 times, and the cost of cement has increased 1.5 times from that adopted in the DPR.

4.3.5 Change in foundation levels of Power House.

At the time of preparation of DPR, exploration works by drilling bore holes will not be taken up and foundation level is decided based on assumed Rock level. There has been a lowering of foundation level by 3 m. As per DPR, the bottom level of foundation of Power House was taken as RL.421.50 m. At the time of execution, the level of foundation concrete was fixed at RL.418.50 m due to non-availability of rock. The soil test report and the machinery suppliers drawing finally led to increase in Capital cost due to change in civil works executed.

4.3.6 Rise in labour charges and fuel charges.

There was a steep rise in the All India Price Indices towards cost of materials, labour charges and fuel charges which in turn resulted in the increase of the project cost. Due to the above said reason the works related to Power House such as Sub-structure, Super structure and allied works escalated from Rs.140 lakhs to Rs.983 lakhs with a hike of Rs 843 lakhs.

4.3.7 Construction of Weir.

In the DPR, the Weir was proposed with RR Masonry. As per Standing Committee's recommendation the Weir was constructed with PCC 1:2:4 using Plums. Provision of Radial gate, intake gate with some other allied works and also

increase in the cost of materials, the value of work for Weir got increased from Rs.292 lakhs to Rs.804 lakhs.

4.3.8 Change in foundation levels of Weir.

There has been a lowering of foundation level by 4.5 m which lead to increase in all the Weir items as indicated below:-

As per DPR : 426.00 m

As per actual : 421.50 m

4.3.9 Increase in cost of Power Plant Machinery.

A provision of Rs.600 lakhs towards the cost of power plant machinery and electrical system had been made in DPR based on the Budgetary offer but the actual awarded value of work was Rs.1796 lakhs which lead to hike of Rs.1196 lakhs.

4.3.10 Inclusion of IDC component.

Interest during construction was not provided in DPR of the above project. An IDC of Rs.6.32 crores @ 12 % has been included for a period of five years in the revised capital cost.

4.3.11 Additional items that were not included in the DPR includes,-

(1) **Access road** – No provision made in DPR, but road work carried out for

Rs.25 lakhs

(2) **RCC roof for Power House** – In the DPR ACC roof was proposed for Power House and as per approval of Standing Committee, RCC roof was provided. Hence an amount of Rs.15 lakhs has been increased.

(3) **Tail race works** – In the DPR, no provision was made for Tailrace channel work. During execution the tail race channel works were carried out and completed for a value of Rs.35 lakhs over and above sanctioned cost to ensure free flow of water so as to maintain the efficiency of generation.

(4) **Weir with PCC 1:2:4** – The Weir was of RR masonry as per DPR. But as per the Standing Committee's approval, PCC 1:2:4 using 30% Plums has been adopted for the construction of Weir which was estimated to a value of Rs.495 lakhs.

(5) **Using RCC M 25 for PH Sub-structure** – As per DPR, Power House Sub structure work was proposed with RCC M20. As per Standing Committee approval this was replaced with RCC M25 concrete. Hence an amount of Rs.4.5 Lakhs increased.

(6) **Items executed which were not present in DPR** – Provision of Mastic pad, PVC water stopper, doors, ventilators, partitions, staircase, pointing hand wash basin, anti termite treatment, false ceiling, girders for crane, Chequered plate covers, additional deck bridge for placing power packing system for radial gates, hoisting arrangements etc. were executed with an additional expenditure of Rs.35 lakhs.

(7) **Draft Tube piers** – The quantities pertaining to 2nd stage concreting, Draft Tube piers were not conceived in the DPR which lead to increase in cost for an amount of Rs.481 Lakhs.

(8) River training works in upstream and downstream side, site grading and leveling the existing water diversion arrangements, Earthen bund formation were carried out for an amount of Rs.120 Lakhs.

(9) Providing Cistern and Baffle wall arrangements across Periyar River to regulate the water at Peyathevan anicut were carried out for an amount of Rs 18 lakhs.

(10) Providing 300 mm dia PVC line for feeding water to the existing Peyathevan irrigation canal was executed for an amount of Rs 5 lakhs.

(11) Filling low lying area for forming approach road from canal bund to weir site was executed for an amount of Rs 10 lakhs.

(12) Forming bund for moving men and machineries from right flank and left flank was executed for an amount of Rs 10 lakhs.

(13) Temporary lighting arrangements provision was executed for an amount of Rs 3.3 lakhs.

(14) Design, Supply, Fabrication and Erection of steel liner for left side and right side penstock bell mouth in the Weir were executed for an amount of Rs 14 lakhs.

(15) Construction of temporary building for the accommodation of site office and power room was executed for an amount of Rs 2 lakhs.

(16) Providing protection arrangements for intake area in the upstream and downstream side of irrigation canal regulation work to avoid land slide was executed for an amount of Rs 24 lakhs.

(17) Supplemental item covering Hoisting arrangements for Radial gate and Intake gates were executed for an amount of Rs 49 lakhs.

4.3.12. The above said additional works not included in the DPR but carried out by the petitioner in view of site conditions amounts to Rs.1374.80 Lakhs.

4.4 Major specific reasons furnished by the petitioner for increase in Time over run and cost overrun of the project are as follows:

(i) TIME OVER RUN:

Natural calamities like floods in Periyar River have caused additional works and increase in quantities and thereon time over run. The chief reasons for time over run occurred due to the delay in supply of Draft Tube liner by the machine supplier, M/s.Kirloskar Brothers Ltd., (KBL) and delay in tender finalization for civil packages. The other reason for time over run is increase in quantities of Power House items which occurred due to increase in size of Power House based on requirements of machine supplier. Similarly due to additional quantities of work involved in the Head race and Tail race works and embankment protection works, not envisaged in DPR but based on actual, additional time was necessitated. However the delay attributed by M/s KBL has been recovered by way of levying Liquidated damages.

(ii) COST OVER RUN

The Original approved cost for Plant and Equipment was based on the budgetary offer obtained during 09/2003 and was awarded during 12/2007. Other works were awarded during 11/2006. The price variation is due to price escalation of materials and labour.

Major components that influenced the increase of the project cost due to difference in the preparation of DPR and award of work is as follows:

TABLE

Rs. in Crores.

Sl. No.	Packages	Value as per DPR (2004-05)	Revised cost now proposed
1	Power House	1.40	9.83
A	Sub structure		
B	Super Structure		
C	Balance works	Nil	

2	Weir and allied works	2.92	8.04
3	E&M works	6.00	17.96
4	IDC	Nil	6.32

Also, initially no Interest During Construction Component was provided for in the sanctioned estimate and in DPR for the above project. Now an IDC of Rs.6.32 crores has been included for a period of 5 years in the revised abstract estimate/revised administrative approval.

5. Findings of the Commission

5.1 Before going into the details of the issue, we would like to see the provisions in Tariff Policy 2016 and TNERC Regulations relating to the capital cost approval.

5.1.1. The relevant extracts in National Tariff Policy 2016 is reproduced below:

“5.11 (a) Return on Investment

.....
While allowing the total capital cost of the project, the Appropriate Commission would ensure that these are reasonable and to achieve this objective, requisite benchmarks on capital costs should be evolved by the Regulatory Commission.”

5.1.2 TNERC’s Terms and conditions for determination of tariff Regulations, 2005 with respect to the Capital Cost 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) *.....*
 - (ii) *.....*
 - (iii) *In case of Hydro generating stations – 1.5% of the original project cost as on cut off date;*
- (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.*
- (3)

Chapter V – Hydro Power Generating Stations - 51. Capital cost and sale of infirm power

- 1) *The capital cost of Hydro Power Generating Station, including the complete hydro power generating facility covering all components such as dam intake, water conducting system, power generating station and generating units of the scheme as apportioned to power generation, shall be determined in accordance with Chapter III of these Regulations..*
- 2) *Any revenue earned by the Generating company from sale of infirm power, shall be taken as reduction in capital cost of the Generating station and shall not be treated as revenue. The rate for infirm power shall be same as the energy rate of the Generating Stations.”*

5.1.3 TNERC's Power Procurement from New and renewable Sources of Energy Regulations, 2008 with respect to determination of tariff is reproduced below:

“4. Determination of tariff

- (1)
- (2) *While deciding the tariff for power purchase by distribution licensee from new and renewable sources based generators, the Commission shall, as far as possible, be guided by the principles and methodologies specified by:*
- a) Central Electricity Regulatory Commission*
 - b) National Electricity Policy*
 - c) Tariff Policy issued by the Government of India*
 - d) Rural electrification Policy*
 - e) Forum of Regulators*
 - f) Central and State Governments*
- (3) *The Commission shall by a general or specific order, determine the tariff for the purchase of power from each kind of new and renewable sources based generators by the distribution licensee. In case of small hydro projects with a capacity of more than 5 MW but not exceeding 25 MW capacities, Commission decide the tariff on case to case basis.*

Provided where the tariff has been determined by following transparent process of bidding in accordance with the guidelines issued by the Central Government, as provided under section 63 of the Act, the Commission shall adopt such tariff.

5.2 The milestone activities in respect of Periyar Vaigai II project are detailed below:

- Detailed project report prepared during September 2004.
- Administrative approval of the Board accorded during September 2005
- The gestation period of the Project is two years as per the DPR
- COD of Unit I achieved on 01.11.2012 and Unit II on 04.11.2012

5.3 The details of completion of the civil, mechanical, E&M works are given in the Table below:

TABLE

Name of work	Scheduled Period of completion	Date of start of work	Schedule date of completion	Actual date of completion
Weir and allied works	24 Months	05.02.2007	4.02.2009	28.02.2011
PH Base slab, PH Walls and Columns	6 Months	30.08.2008	28.02.2009	15.06.2009
PH Super structure	6 Months	22.01.2010	21.7.2010	30.06.2011
2 nd stage concreting, DT gate arrangements with allied works	6 Months	19.05.2010	18.11.2010	11.01.2012
Tail race	6 Months	09.04.2009	8.10.2009	10.09.2009
E&M supply	12 Months	24.12.2007	23.12.2008	31.12.2015
E&M Erection	4 Months	23.08.2010	22.12.2010	31.12.2015

5.4 In view of the delay in execution of the project, the award cost of all major packages viz Power house sub-structure and super structure works, weir and allied works and E&M works have increased manifold from the DPR cost. Thus the time over run has led to the increase in capital cost as on COD to Rs.48.30 crores from Rs.14.25 crores.

5.5 Now coming to the analysis of the capital cost, there is no requisite benchmark arrived by the Commission for prudence check of the capital cost. However, Central Electricity Regulatory Commission has notified CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources)

Regulations, 2009 with effect from 16.09.2009 for renewable sources including small hydro wherein “Small hydro” is defined as follows,

“ ‘Small Hydro’ means Hydro Power projects with a station capacity upto and including 25 MW.”

The relevant Regulation of CERC’s Terms and Conditions for Tariff determination from Renewable Energy Sources Regulations, 2009 with respect to capital cost is reproduced below:

“12. Capital Cost

The norms for the Capital cost as specified in the subsequent technology specific chapters shall be inclusive of all capital work including plant and machinery, civil work, erection and commissioning, financing and interest during construction, and evacuation infrastructure upto inter-connection point.

28. Capital Cost:

(1) The normative capital cost for small hydro projects during first year of Control Period (FY 2009-10) shall be as follows:

<i>Region</i>	<i>Project size</i>	<i>Capital Cost (Rs.Lakh/MW)</i>
<i>Himachal Pradesh, Uttarakhand and North Eastern states</i>	<i>Below 5 MW</i>	<i>700</i>
	<i>5 MW to 25 MW</i>	<i>630</i>
<i>Other States</i>	<i>Below 5 MW</i>	<i>550</i>
	<i>5 MW to 25 MW</i>	<i>500</i>

(2) The capital cost for subsequent years shall be determined on the basis of indexation formula as outlined under Regulation 29.”

5.6 Based on the above RE Regulation, the CERC proceeded with the determination of generic tariff of the RE Projects for the first year of the control period (i.e. FY 2009-10) through its order dated 03.12.09 and based on the Indexation formula specified in the said regulation for the subsequent years.

5.7 In this context, it is significant to recall the Hon’ble Appellate Tribunal for Electricity ‘s Judgment dated 18.09.2009 in Appeal No. 50 and 65 of 2008 filed by a developer of Small Hydro Power, on the order of the Himachal Pradesh

Electricity Regulatory Commission on “Small Hydro Power Projects, Tariff and other issues” dated 12.08.2007 wherein it had been observed that:

“The consensus that emerged during arguments is that capital cost of Rs.6.5 crs./MW should be accepted as the normative capital cost which can be adopted by the promoter of hydel energy and the Board, but the promoter or the Board shall be entitled to apply for a site specific fixation of capital cost in case either of them find the normative capital cost to be unsuitable for the project.”

The Hon’ble APTEL in the said order has also ordered that,

“The Capital cost of Rs.6.5 crs/MW shall be treated as normative capital cost in all such cases as are found suitable by all parties. The promoters of hydel power in the State of Himachal Pradesh as well as the Himachal Pradesh State Electricity Board shall be entitled to apply to the Commission for fixing project specific capital cost for any project in case the normative capital cost is not suitable to either of them. Similarly, if”

5.8. The petitioner was asked for project specific issues if any for consideration. From the details furnished by the petitioner, we have found the following:

5.8.1. The Board of erstwhile TNEB while according administrative approval in the meeting held on 03.09.2005 for taking up the execution of the Periyar Vaigai II Small Hydro Electric Project with an installed capacity of 2.5 MW (2x1.25 MW) at a total cost of Rs.14.25 crores has directed TANGEDCO to ensure the following aspects:

- (i) To avail the Capital subsidy of Rs.2.125 crores from Ministry of Non-Conventional Energy Sources which is provided as incentive for Small Hydro Power development.
- (ii) To pursue the Clean Development Mechanism credits.
- (iii) To restrict the quantities of construction materials as per the Detailed Project Report.

- (iv) To ensure effective Project time and cost management so as to reduce overhead charges as this project is a small hydro project
- (v) To ensure Global tendering for Qualitative Turbo generators.

5.8.2 Subsequently, during execution of the project an appraisal note on the status and pending issues of Periyar Vaigai I to IV projects has been submitted by the petitioner to their Board on 07.02.2011 whereupon the Board directed that a Technical/ Expert Committee may be formed to scrutinize each and every element of the revised cost estimates with reference to the original cost estimates and certify the reasonableness of the quantity and rate variations of the revised estimates and suitable proposal placed before the Board.

5.8.3 Consequently, the Board of TANGEDCO in its Board Meeting held on 04.05.2011 while according the revised administrative approval for project for Rs.48.30 crores at 2010-11 Price Level, directed that in future the DPRs shall be prepared more realistically to reflect the cost of the project. Board further directed that funds should be allotted scheme wise within the approved budget provision to avoid the excess over administratively approved cost.

5.8.4 The Committee constituted by TANGEDCO to go into the details of the cost of the project also observed that the project has not been executed by TANGEDCO with due diligence.

5.9. In view of the above position, the Commission is also of the view that the DPR has not at all been prepared with due diligence. The site specific issues such as construction of weir, height of weir, optimum size of power House have not

been duly taken into account while preparing DPR. Additional works for an amount of Rs.13.748 crores not envisaged in the DPR have also been carried out. It is also to be noted that though the DPR has been prepared at Price level of 2004-05 and the gestation period of the project is two years as per DPR, TANGEDCO has however executed works since 2007 upto 2015. There has been abnormal delay on the part of E&M contractor in execution of the contract. There has been abnormal delay on the part of equipment supplier in supply of Draft Tube Liner for which the TANGEDCO has recovered Liquidated Damages and delay in tender finalization for civil packages. Also, the delay in execution of the project by TANGEDCO has led to escalation in cost of project.

5.10. CERC's Terms and Conditions for tariff determination of Renewable Energy Sources Regulations, 2009, provides that the Commission shall take into consideration any incentive or subsidy offered by the Central or State Government including Accelerated depreciation benefit if any availed by the generating company for Renewable Energy power plant while determining the tariff under these regulation. Though the Board of erstwhile TNEB has directed the Utility to ensure to avail the Capital subsidy of Rs.2.125 crores from Ministry of Non-conventional Energy Sources which is provided as incentive for Small Hydro Power development, no Capital subsidy has been received from MNRE by the petitioner.

5.11 All these factors have contributed to the increase in the unit cost of generation which was at Rs.1.46 per kWhr as per DPR to Rs.7.67 per kWhr as per revised cost on COD.

5.12 No site specific project issues has been put forth by the Utility for determining the site specific project cost. The Commission, therefore for admitting the capital cost, proposes to consider the Normative Capital cost determined by CERC for the FY 2009-10 relevant for TANGEDCO project considering that the project ought to have been completed in 2009-10 since the work commenced during 2007.

5.13 CERC Norms for project size below 5 MW for the year 2009-10 is given in the Table below:

TABLE

Description	Rs in Lakhs per MW
CERC's Normative capital cost the first year of the Control period (FY 2009-10)	550 (with IDC) 495 (without IDC)

5.14 PROJECT COST OF THE PETITIONER:-

The capital cost and cost per MW of Periyar Vaigai II (2x1.25 MW) as per original cost estimate and as on COD as per TANGEDCO petition is compared with the CERC norms for 2009-10 in the Table given below:

TABLE

Rs. in Crores.

Description	Capital cost		Per MW cost		
	As per Original estimate	As on COD	As per Original estimate	As on COD	CERC Norms 2009-10
Total cost excluding IDC	14.25	41.98	5.70	16.79	4.95
IDC	-	6.32	-	2.53	0.55
Total	14.25	48.30	5.70	19.32	5.50

5.15 It is seen that the petitioner's project cost per MW @ Rs.19.32 crores./MW as on COD for which approval has been sought for is very much on the higher side. The cost per MW as per DPR i.e. Rs.5.70 crores without IDC arrived at the

price level of 2004-05 is also high compared to the normative capital cost of CERC @ Rs.4.95 crores per MW without IDC for the control period 2009-2010. Commission therefore proposes to restrict the capital cost of the Project to the level of CERC Norms for the control period 2009-2010 i.e. Rs.4.95 crores per MW without IDC. The capital cost of Periyar Vaigai II project of capacity 2x1.25 MW thus works out to Rs.12.40 crores. without IDC.

5.16. Regarding IDC, an amount of Rs.6.32 crores has been indicated towards IDC. However, as per CERC norms, an amount of Rs.0.55 crores per MW is allowable as IDC for small hydro projects of below 5 MW capacity. Accordingly Rs.1.375 crores or say Rs.1.4 crores (Rs.0.55 crores per MW x 2.5 MW) is only allowable for TANGEDCO Periyar Vaigai II project of capacity 2x1.25 MW.

5.17 The actual expenditure statement of the project as on COD and beyond COD is however as detailed below:

TABLE

(Rs. in Crores)

COD – Unit I - 01.11.2012 & Unit II – 04.11.2012	Expenditure against work	Expenditure in Revenue expenses Account	Expenditure against IDC	Total
Expenditure Upto COD	35.12	1.56	2.60	39.28
After COD	2.10	2.91	15.09	20.10
Total	37.22	4.47	17.69	59.38

The Commission in the preceding paras has already restricted the expenditure incurred by the petitioner upto COD against project work and IDC in

view of the cost overrun of the project. Therefore, the Commission disallows the expenditure incurred by the petitioner beyond COD also.

5.18 Now prior to approving the project cost of the hydro project, the Commission wishes to state that earlier in its MYT Petition for 2013-14 to 2015-16 along with tariff revision for 2013-14 filed before the Commission on 19.02.2013 for Determination of Tariff for Generation and Distribution, the petitioner has indicated a capital cost of Rs.48.29 crores as on COD for the said new hydro project. As the Commission then felt that the proposed capital cost was extremely high compared to industry norms and inspite of repeated directions, as TANGEDCO has not filed any petition for approval of the capital cost of the new hydro station, the Commission in its related Tariff Order dated 20.06.2013 allowed the capital cost only to the extent considering the capital cost of Rs.5.50 crores/MW for small hydro plants in accordance with CERC RE tariff Regulations.

5.19 In the light of the foregoing, the Commission admits the Capital cost of the Periyar Vaigai II Small Hydro Project of capacity 2x1.25 MW as on COD as per the details given below:

TABLE
CAPITAL COST APPROVAL OF PERIYAR VAIGAI II HYDRO PROJECT
(2X1.25 MW) AS ON COD

Description	Cost on COD as per Petition		Cost approved as on COD	
	Total cost	Cost per MW	Total cost	Cost per MW
Capital cost of the project without IDC	41.98	16.79	12.40	4.95
IDC proposed	6.32	2.53	1.40	0.55
Total Capital cost including IDC	48.30	19.32	13.80	5.50

5.20 In the result, the Commission allows a capital cost of Rs.13.80 crores against Rs.48.30 crores including IDC sought by the petitioner for the Periyar Vaigai II Small Hydro project of capacity 2x1.25 MW.

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