

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Petition No. 298/2010**

**Coram:**

Shri V.S. Verma, Member

Shri M. Deena Dayalan, Member

**Date of Hearing: 16.07.2013**

**Date of Order: 18.02.2014**

**In the matter of:**

Approval under Regulation 86 of Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999 and Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009 for determination of Transmission Tariff for Transmission System associated with Ramagundam STPP including ICT at Khammam and Reactor at Gazuwaka under CTP Augmentation in Southern Region for the period from 01.04.2009 to 31.03.2014

**And**

**In the matter of:**

Power Grid Corporation of India Limited, Gurgaon

...**Petitioner**

**Vs**

1. Kerala State Electricity Board, Thiruvananthapuram
2. Tamil Nadu Electricity Board, Chennai
3. Electricity Department, Govt. of Pondicherry, Pondicherry
4. Electricity Department, Govt. of Goa, Panaji
5. Transmission Corporation of Andhra Pradesh Ltd.  
Hyderabad
6. Northern Power Distribution Company of Andhra Pradesh  
Ltd., Warangal
7. Eastern Power Distribution Company of Andhra Pradesh  
Ltd., Visakhapatnam
8. Southern Power Distribution Company of Andhra Pradesh  
Ltd., Tirupati

9. Central Power Distribution Company of Andhra Pradesh Ltd., Hyderabad
10. Karnataka Power Transmission Corporation, Ltd. Bangalore
11. Bangalore Electricity Supply Company Ltd., Bangalore
12. Gulbarga Electricity Supply Company Ltd., Gulbarga
13. Hubli Electricity Supply Company Ltd., Hubli
14. MESCOM Corporate Office, Mangalore
15. Chamundeswari Electricity Supply Company Ltd., Mysore

**Respondent**

For Petitioner : Shri S.S Raju, PGCIL  
Shri M M Mondal, PGCIL  
Shri J. Mazumdar, PGCIL  
Shri Shashi Bhushan, PGCIL  
Shri Upendra Pande, PGCIL  
Shri P. Ranga Rao, PGCIL

For Respondent : None

### **ORDER**

The petition has been filed for approval of transmission tariff for Transmission System associated with Ramagundam STPP including ICT at Khammam and Reactor at Gazuwaka under CTP Augmentation (hereinafter referred to as “the transmission asset”) in Southern Region for the period from 01.04.2009 to 31.03.2014, based on the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009, (hereinafter referred to as “the 2009 Tariff Regulations”).

2. Transmission tariff for the transmission asset for the tariff period 2004-2009 up to 31.03.2009 was initially approved by the Commission vide its order dated 2.5.2006 in Petition No. 130/2004, based on capital cost of ` 38170.20 lakh. The same was revised vide order dated 17.03.2008 in compliance of the directions of the Hon’ble Appellate Tribunal for Electricity in Appeal No. 135/2005 and other related appeals. Consequent to additional capital expenditure incurred during 2008-09, tariff was further revised, initially

vide order dated 7.8.2009, and later vide order dated 10.12.2009 in Petition No. 76/2009, based on capital cost of ` 38375.41 lakh. Subsequently, the Commission dismissed Petition No. 235/2009 filed for revision of tariff, vide order dated 20.8.2010, being devoid of merit.

3. The current petition has been filed for the determination of tariff for Transmission System associated with Ramagundam STPP including ICT at Khammam and Reactor at Gazuwaka under CTP Augmentation for 2009-14 tariff period, based on capital cost as admitted by the Commission as on 31.3.2009 i.e. ` 38375.41 lakh and proposed additional capitalization/de-capitalization during 2009-14.

4. Details of the transmission charges claimed by the petitioner are as under:-

De-cap ( ` in lakh)

	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation	619.37	619.37	619.37	619.37	619.37
Interest on loan	0.00	0.00	0.00	0.00	0.00
Return on equity	3077.14	3070.14	3055.76	3044.31	3036.56
Interest on working capital	186.67	192.75	199.12	205.89	213.12
O & M expenses	2191.52	2316.03	2449.31	2589.62	2737.21
<b>Total</b>	<b>6074.70</b>	<b>6198.29</b>	<b>6323.56</b>	<b>6459.19</b>	<b>6606.26</b>

Add cap ( ` in lakh)

	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation	0.00	41.59	254.59	554.95	771.75
Interest on loan	0.00	28.95	159.29	305.97	365.21
Return on equity	0.00	26.66	150.29	308.29	409.36
Interest on working capital	0.00	2.03	11.77	24.37	32.23
O & M expenses	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>0.00</b>	<b>99.23</b>	<b>575.94</b>	<b>1193.58</b>	<b>1578.55</b>

5. Details submitted by the petitioner in support of its claim for interest on working capital are given hereunder:

De-cap ( ` in lakh)

	2009-10	2010-11	2011-12	2012-13	2013-14
Maintenance Spares	328.73	347.40	367.40	388.44	410.58
O & M expenses	182.63	193.00	204.11	215.80	228.10
Receivables	1012.45	1033.04	1053.93	1076.53	1101.04
<b>Total</b>	<b>1523.81</b>	<b>1573.44</b>	<b>1625.44</b>	<b>1680.77</b>	<b>1739.72</b>
Interest	186.67	192.75	199.12	205.89	213.12
Rate of Interest	12.25%	12.25%	12.25%	12.25%	12.25%

Add cap ( ` in lakh)

	2009-10	2010-11	2011-12	2012-13	2013-14
Maintenance Spares	0.00	0.00	0.00	0.00	0.00
O & M expenses	0.00	0.00	0.00	0.00	0.00
Receivables	0.00	16.54	96.07	198.93	263.09
<b>Total</b>	<b>0.00</b>	<b>16.54</b>	<b>96.07</b>	<b>198.93</b>	<b>263.09</b>
Interest	0.00	2.03	11.77	24.37	32.23
Rate of Interest	0.00	12.25%	12.25%	12.25%	12.25%

6. No comments or suggestions have been received from the general public in response to the notices published by the petitioner under Section 64 of the Electricity Act. Reply to the petition has been filed by Tamil Nadu Generation and Distribution Corporation (TANGEDCO), successor to Tamil Nadu Electricity Board viz. Respondent No. 2, vide its affidavit dated 22.1.2011, objecting to the additional capital expenditure claimed by the petitioner. The petitioner has filed its rejoinder to the reply filed by TANGEDCO, vide its affidavit dated 15.9.2011.

7. We have heard the representatives of the petitioner present at the hearing and have perused the material available on record. We proceed to dispose of the petition. While doing so, the submissions of the respondent

shall be duly taken care of.

### **Capital Cost**

8. Regulation 7 (1) of the 2009 Tariff Regulations provides as under:-

“The expenditure incurred or projected to be incurred, including interest during construction and financing charges, any gain or loss on account of foreign exchange risk variation during construction on the loan – (i) being equal to 70% of the funds deployed, in the event of the actual equity in excess of 30% of the funds deployed, by treating the excess equity as normative loan, or (ii) being equal to the actual amount of loan in the event of the actual equity less than 30% of the fund deployed, - up to the date of commercial operation of the project, as admitted by the Commission, after prudence check.”

9. Based on the above provision, the admitted capital cost as on 31.3.2009 and estimated additional capitalization and de-capitalization projected to be incurred for the project during 2009-14 period are summarized hereunder:-

(` in lakh)

<b>Particulars</b>	<b>Admitted Cost as on 1.4.2009 as per CERC order dated 7.8.2009 in Petition No.76/2009</b>	<b>De-cap during 2009-14</b>	<b>Add-Cap during 2009-14</b>	<b>Estimated completion cost</b>
Land	295.69		-	295.69
Building	653.36		-	653.36
Sub-Station	7559.99	-842.46	6211.67	12929.20
Transmission Line	29742.44		2375.93	32118.36
PLCC	123.93		-	123.93
<b>Total</b>	<b>38375.41</b>	<b>-842.46</b>	<b>8587.60</b>	<b>46120.54</b>

### **Additional capital expenditure**

10. With regard to additional capital expenditure, clause 9(2) of the 2009 regulations provides as under:

“(2) The capital expenditure incurred on the following counts after the cut-off date may, in its discretion, be admitted by the Commission, subject to prudence check:

(i) XXX

- (ii) XXX
- (iii) XXX
- (iv) XXX

(v) In case of transmission system any additional expenditure on items such as relays, control and instrumentation, computer system, power line carries communication, DC batteries, replacement of switchyards equipment due to increase of fault level, emergency restoration system, insulators cleaning infrastructure, replacement of damaged equipment not covered by insurance and any other expenditure which has become necessary for successful and efficient operation of transmission system.”

11. The petitioner has proposed additional capitalization of ` 8587.60 lakh and de-capitalisation of ` 842.46 lakh for the period 2010-11 to 2013-14. The category wise break-up of additional capital expenditure during 2009-14 period is as per details given under:-

( ` in lakh)

Description of item	Admitted cost as on 01.04.2009 as per order dated 7.8.2009 in Petition No. 76/2009	De-cap during 2009-14	Add-cap during 2009-14	Estimated completion cost
Land	295.69			295.69
Building	653.36			653.36
Sub-station	7559.99	-842.46	6211.67	12929.20
Transmission Line	29742.44		2375.93	32118.36
PLCC	123.93			123.93
<b>Total</b>	<b>38375.41</b>	<b>-842.46</b>	<b>8587.60</b>	<b>46120.54</b>

12. The petitioner has submitted the following justification for additional capital expenditure:-

(a) Procurement of 400/220 kV 315 MVA, ICT – I at Hyderabad: ICT – I commissioned in September, 1984 at 400 kV Hyderabad Sub-station

completed 25 years of service in August, 2009. Tan  $\delta$  (Tan Delta) values of the winding increased to almost limiting values. SFRA analysis also indicates the deterioration of the transformer's capability to withstand further short circuits in future. Transformer oil was also leaking heavily from the main tank joints, radiator joints and other valve joints. Some of the valve joints had to be sealed to arrest /reduce transformer oil leakage. In spite of replacement of all the gaskets during major overhaul of the transformer in 1992, oil leakage was occurring since the year 2002. About 1 kL of transformer oil /month was being used for topping up. In addition to increased O & M cost due to oil requirement for topping up, the leakage of transformer oil leads to bad effects on environment as well. The infrared thermograph detects hot spots inside the transformer to the tune of 87°C along with several other hotspots. In the 12<sup>th</sup> SRPC meeting held on 18.12.2009, the replacement of transformer was agreed to. Accordingly, vide notification dated 30.06.2010, ICT –I at Hyderabad was taken out of service w.e.f. 06:13 Hrs of 10.06.2010 and a new ICT was put under commercial operation on 1.7.2010.

(b) Procurement of one no. 400/220 kV, 315 MVA, transformer and one no. 167 MVA, 400/220 kV ICT for Bangalore: Two nos. 400/220 kV 315 MVA ICTs (one no. at Nagarjunasagar and one no. at Cuddapah) were put under commercial operation on 19.8.1985 and 19.2.1986 respectively. They have completed twenty five years service of their useful life during 2009-14 period. One banks of 3X167 MVA, 400/220 kV ICT at Bangalore put under commercial operation on 2.7.1986 is also completing 25 years of service during 2009-14 period. Probability of their failure is high. Besides, lead time

for procurement and commissioning in their cases is more than two years. This requires procurement of one no. 400/220 kV, 315 MVA ICT as spare against two transformers of same rating and one no. 1-Ph 167 MVA Auto Transformer.

(c) Procurement of three nos. spare Reactors: The line reactors installed for Ramagundam – Nagarjunasagar transmission line (two nos.), Nagarjunasagar – Cuddapah – I and Ramagundam – Hyderabad – I line and Cuddapah –Bangalore line are completing 25 years of service life during 2009-14 period. The probability of their failure is high. Besides, lead time for their procurement and commissioning is more than one and half years. This requires procurement of three Reactors as spare against the above referred four Reactors.

(d) Replacement of Sub-station equipments: Various equipments at Hyderabad sub-station commissioned in September, 1984 have completed 25 years of service in September, 2009. During various routine/special tests, these equipments were found to be giving operational problems and pose threat to the reliability and security to the grid. In view of absence of proper support from suppliers, due to obsolescence of design, the maintenance of these equipments was not possible.



13. The petitioner has claimed additional capital expenditure for tower strengthening of various lines in Southern Region under Ramagundam Transmission System, as per details given hereunder:-

Element Name	DOCO	Unit	Quantity of tower parts proposed for replacement	Unit Estimated Cost (` in lakh)	Total cost (` in lakh)
Ramagundam-Hyderabad I	1.10.1984	MT	228	1.00	228
Hyderabad-N'Sagar	1.9.1985	MT	189	1.00	189
Nagajunasagar-Cuddapah- I	1.2.1986	MT	336	1.00	336
Ramagundam-Nagajunasagar D/C	21.6.1988	MT	486	1.00	486
Nagajunasagar- Cuddapah-II	15.3.1989	MT	354	1.00	354
Nagajunasagar-Raichur-Munirabad	1.8.1989	MT	522	1.00	522
Cuddapah-Bangalore	2.7.1986	MT	223	0.41	131.47
Bangalore-Salem	23.9.1988	MT	219	0.59	129.46
<b>Total</b>			<b>2115</b>	<b>1.00</b>	<b>2375.93</b>

14. The petitioner has submitted the design specification and its experience with them, as under:-

SI No.	Applicable design practices/period of applicability	Petitioner's experience
1	IS:802-1977-Old Code (100% wind in BWC*)/ upto 1992	54 incidents of failure of 400kV towers have been reported till 15-09-2010
2	IS:802 Draft Code (100% wind in BWC*)/ 1987 to 1992	No failure of 400kV towers reported till 15-09-2010.
3	IS:802-1995 New Code (0% wind in BWC*)/ 1992 to 1998	20 incidents of failure of 400kV towers have been reported till 15-09-2010
4	IS:802-1995 New Code (0% wind in BWC* with Narrow Front Wind)/ 1998 to 2001	5 incidents of failure of 400kV towers have been reported till 15-09-2010
5	IS: 802-1995-(Under revision-draft stage)-New Code (75% wind in BWC with Narrow Front Wind)/ from 2001 onwards	No failure of 400kV towers reported till 15-09-2010

\*BWC- Broken Wire Condition

15. The petitioner has given the following justification for tower strengthening, based on elaborate studies, as under:-

- (a) There has been change in wind zone as per design criteria in IS: 802 from light wind zone (1977) to wind zone-3 (1995);
- (b) There were 54 instances of failure (163 towers) of 400 kV suspension towers on different transmission lines with design criteria as per IS 802:1977.
- (c) 400 kV transmission lines transfer bulk amount of power for long distance and some of them are inter-regional/evacuation lines. Outage of 400 kV transmission line due to collapse of towers would be of longer duration and could also affect the grid stability.
- (d) Tower strengthening of transmission lines for which additional capitalization is sought, are to improve the stability/reliability of the vulnerable lines resulting to enhance the stability of the grid.

16. The petitioner has , vide affidavit dated 4.2.2011, submitted as under:-

- (a) Tests reports of ICTs, Transformers and Reactors installed at various sub-stations indicate that the ICTs, transformers and reactors are critical, having completed 25 years of service. They may create problem for the stability and security of the grid. These reports also establish that in case of failure, it would require one to one and a half year for replacement, which may cause long outage of the system. It is therefore necessary to provide spares for ICTs, Transformers and Line reactors.

(b) The substation equipment which have completed/are completing 25 years of service have been subjected to regular wear and tear, apart from being subjected to increased stresses during abnormal conditions. These have completed their useful life. The in-service failure of equipment results in consequential damages also, restoration of which would take more time due to the uncertainty in the time of failure. Non-availability of spares, procurement of which takes a long lead time, would result in delays in system restoration, leading to extended periods of outage of elements and consequential system constraints.

(c) Line Reactors are being provided with Neutral Grounding Reactor (NGR), whenever required, based on studies to limit the secondary arc current. Sometimes switchable Line Reactors are being used as bus reactors. During switching off of such reactors, failures of Circuit breakers have been reported. It has also been corroborated from the studies that higher voltage across the Circuit Breaker contacts is being observed during switching off. Switchable Line Reactor having NGR are used as Bus Reactor. Hence, to avoid stress on the Circuit Breakers while switching off of Line Reactor being used as bus reactor, necessary arrangement for bypassing of NGR and controlled switching of Circuit Breaker are to be provided. As no cost estimate is readily available, a lump sum estimate has been provided.

(d) The 400 kV Cuddapah-Bangalore line commissioned under RSTPP Stage – 1 was LILoed in August, 2002 at HVDC sub-station at Kolar and this line has been re-designated as (i) Cuddapah – Kolar line and (ii) Kolar – Bangalore line. Due to this re-designation of the feeders post LILo, the erstwhile Cuddapah line Reactor at Bangalore has been re-designated as Kolar Line Reactor.

17. TANGEDCO has, vide affidavits dated 22.1.2011 and 6.4.2011, submitted that the petitioner has claimed O&M expenses for 25 bays including one bay at Salem Sub-station for terminating the 400 kV S/C line from Bangalore to Salem. This bay is getting duplicated in Petition No. 90/2009 where the petitioner has claimed tariff for NLC Stage II Transmission System. TANGEDCO has requested the commission to approve tariff after excluding bay at Salem sub-station end for O&M charges. Winding Tan delta value should not be strictly taken for decision on transformer health, especially if it is an Auto Transformer. Tan delta value will be different when the test is done at different oil/winding temperature. Furan value less than 100 PPB are considered safe and do not indicate any ageing, warranting replacement of the transformer.

18. The petitioner has, vide affidavits dated 1.3.2011 and 15.9.2011, submitted that the claim of the petitioner for tariff of 25 bays including one bay at Salem sub-station for terminating the 400kV S/C Line from Bangalore to Salem under Ramagundam Transmission System is in order. The petitioner

has submitted CPRI report giving detailed justification regarding Tan delta value and Furan value.

19. The petitioner has, vide its affidavit dated 23.1.2012, submitted the following reasons for claiming the expenditure as additional capital expenditure under Regulation 9(2) rather than as Renovation and Modernization under Regulation 10 of the 2009 Tariff Regulations:

- (a) Renovation and Modernization is for replacement of transmission elements for the purpose of extension of life beyond the useful life of the transmission system as a whole.
- (b) The transmission system has both transmission line elements and substation elements which include ICTs and Reactors, to facilitate transmission of power. Under Ramagundam Transmission System, many transmission lines were commissioned along with a large number of sub-station equipments to provide the desired services i.e. transmission of power.
- (c) Replacement of a few items of any transmission system cannot ensure extension of the life of whole transmission system beyond its useful life. While most of the elements may have completed 25 years of service life, only few are new elements because of replacement.
- (d) The expenditure for replacement of some of the problematic elements has become necessary for successful and efficient operation of this transmission system which is covered under additional capitalization under Regulation 9(2)(v).

20. We have perused the CPRI report submitted by the petitioner. The CPRI report shows that the condition of transformer was critical, giving operational problems and posing a threat to the reliability and security of the grid. In the 12th meeting of SRPC held on 18.12.2009 it was agreed to replace the transformer on accounts of its critical condition. It was also agreed that the element could be de-capitalized and new transformer would be capitalized after commissioning. We are satisfied that there is sufficient reason for replacement of the elements as well as tower strengthening as claimed by the petitioner. Hence the same is allowed.

### **Debt- equity ratio**

21. Regulation 12 of the 2009 Tariff Regulations provides as under:-

**“12. Debt-Equity Ratio.** (1) For a project declared under commercial operation on or after 1.4.2009, if the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan:

Provided that where equity actually deployed is less than 30% of the capital cost, the actual equity shall be considered for determination of tariff:

Provided further that the equity invested in foreign currency shall be designated in Indian rupees on the date of each investment.

**Explanation.-** The premium, if any, raised by the generating company or the transmission licensee, as the case may be, while issuing share capital and investment of internal resources created out of its free reserve, for the funding of the project, shall be reckoned as paid up capital for the purpose of computing return on equity, provided such premium amount and internal resources are actually utilised for meeting the capital expenditure of the generating station or the transmission system.

(2) In case of the generating station and the transmission system declared under commercial operation prior to 1.4.2009, debt-equity

ratio allowed by the Commission for determination of tariff for the period ending 31.3.2009 shall be considered.

(3) Any expenditure incurred or projected to be incurred on or after 1.4.2009 as may be admitted by the Commission as additional capital expenditure for determination of tariff, and renovation and modernisation expenditure for life extension shall be serviced in the manner specified in clause (1) of this regulation.”

22. Details of debt-equity ratio in respect of the transmission asset as on 1.4.2009 are as follows:-

(` in lakh)

Capital Cost as on 1.4.2009		
Particulars	Amount	%
Debt	20772.64	54.13
Equity	17602.77	45.87
<b>Total</b>	<b>38375.41</b>	<b>100.00</b>

23. Details of debt – equity ratio as on 31.3.2014 are as under:-

(` in lakh)

Capital Cost as on 31.3.2014		
	Amount	%
Debt	26194.24	56.80
Equity	19926.32	43.20
<b>Total</b>	<b>46120.55</b>	<b>100.00</b>

24. Debt-equity ratio for projected net additional capital expenditure is as per details given overleaf:-

(` in lakh)

2010-11		
	Amount	%
Debt	523.68	70.00
Equity	224.44	30.00
Total	<b>748.12</b>	<b>100.00</b>
2011-12		
	Amount	%
Debt	2406.74	70.00
Equity	1031.46	30.00
Total	<b>3438.20</b>	<b>100.00</b>
2012-13		
	Amount	%
Debt	1492.75	70.00
Equity	639.75	30.00
Total	<b>2132.50</b>	<b>100.00</b>
2013-14		
	Amount	%
Debt	998.42	70.00
Equity	427.90	30.00
Total	<b>1426.32</b>	<b>100.00</b>

### Return on equity

25. Regulation 15 of the 2009 Tariff Regulations provides as under:-

“15. (1) Return on equity shall be computed in rupee terms, on the equity base determined in accordance with regulation 12.

(2) Return on equity shall be computed on pre-tax basis at the base rate of 15.5% for thermal generating stations, transmission system and run of the river generating station, and 16.5% for the storage type generating stations including pumped storage hydro generating stations and run of river generating station with pondage and shall be grossed up as per clause (3) of this regulation.

Provided that in case of projects commissioned on or after 1st April, 2009, an additional return of 0.5% shall be allowed if such projects are completed within the timeline specified in **Appendix-II**.

Provided further that the additional return of 0.5% shall not be admissible if the project is not completed within the timeline specified above for reasons whatsoever.



(3) The rate of return on equity shall be computed by grossing up the base rate with the Minimum Alternate/Corporate Income Tax Rate for the year 2008-09, as per the Income Tax Act, 1961, as applicable to the concerned generating company or the transmission licensee, as the case may be.

(4) Rate of return on equity shall be rounded off to three decimal points and be computed as per the formula given below:

$$\text{Rate of pre-tax return on equity} = \text{Base rate} / (1-t)$$

Where “t” is the applicable tax rate in accordance with clause (3) of this regulation.

(5) The generating company or the transmission licensee, as the case may be, shall recover the shortfall or refund the excess Annual Fixed Charge on account of Return on Equity due to change in applicable Minimum Alternate/Corporate Income Tax Rate as per the Income Tax Act, 1961 (as amended from time to time) of the respective financial year directly without making any application before the Commission:

Provided further that Annual Fixed Charge with respect to the tax rate applicable to the generating company or the transmission licensee, as the case may be, in line with the provisions of the relevant Finance Acts of the respective year during the tariff period shall be trued up in accordance with Regulation 6 of these regulations.

26. Return on equity allowed for the years 2009-10, 2010-11, 2011-12, 2012-13 and 2013-14 is given hereunder:-

(` in lakh)

	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>
Opening equity	17602.77	17602.77	17827.21	18858.67	19498.42
Addition due to additional capital expenditure	0.00	224.44	1031.46	639.75	427.90
Closing equity	17602.77	17827.21	18858.67	19498.42	19926.32
Average equity	17602.77	17714.99	18342.94	19178.54	19712.37
Return on equity (Base Rate )	15.50%	15.50%	15.50%	15.50%	15.50%
Tax rate for the year 2008-09 (MAT)	11.330%	11.330%	11.330%	11.330%	11.330%
Rate of return on equity (Pre Tax )	17.481%	17.481%	17.481%	17.481%	17.481%
Return on equity (Pre Tax)	<b>3077.14</b>	<b>3096.76</b>	<b>3206.53</b>	<b>3352.60</b>	<b>3445.92</b>

### **Interest on loan**

27. Regulation 16 of the 2009 regulations provides as under:-

“16. (1) The loans arrived at in the manner indicated in regulation 12 shall be considered as gross normative loan for calculation of interest on loan.

(2) The normative loan outstanding as on 1.4.2009 shall be worked out by deducting the cumulative repayment as admitted by the Commission up to 31.3.2009 from the gross normative loan.

(3) The repayment for the year of the tariff period 2009-14 shall be deemed to be equal to the depreciation allowed for that year:

(4) Notwithstanding any moratorium period availed by the generating company or the transmission licensee, as the case may be the repayment of loan shall be considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed,.

(5) The rate of interest shall be the weighted average rate of interest calculated on the basis of the actual loan portfolio at the beginning of each year applicable to the project:

Provided that if there is no actual loan for a particular year but normative loan is still outstanding, the last available weighted average rate of interest shall be considered:

Provided further that if the generating station or the transmission system, as the case may be, does not have actual loan, then the weighted average rate of interest of the generating company or the transmission licensee as a whole shall be considered.

(6) The interest on loan shall be calculated on the normative average loan of the year by applying the weighted average rate of interest.

(7) The generating company or the transmission licensee, as the case may be, shall make every effort to re-finance the loan as long as it results in net savings on interest and in that event the costs associated with such re-financing shall be borne by the beneficiaries and the net savings shall be shared between the beneficiaries and the generating company or the transmission licensee, as the case may be, in the ratio of 2:1.

(8) The changes to the terms and conditions of the loans shall be reflected from the date of such re-financing.

(9) In case of dispute, any of the parties may make an application in accordance with the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999, as amended from time to time, including statutory re-enactment thereof for settlement of the dispute:

Provided that the beneficiary or the transmission customers shall not withhold any payment on account of the interest claimed by the generating company or the transmission licensee during the pendency of any dispute arising out of re-financing of loan.”

28. In keeping with the provisions of Regulation 16, the petitioner's entitlement to interest on loan has been calculated on the following basis:-

(a) Gross amount of loan, repayment of instalments and rate of interest on loan have been considered as per the petition.

(b) The repayment for the tariff period 2009-14 has been considered to be equal to the depreciation allowed for that period.

(c) Weighted average rate of interest on actual average loan worked out as per (a) above is applied on the notional average loan during the year to arrive at the interest on loan.

29. The petitioner has considered separate loan portfolio for de-capitalisation and additional capitalisation in order to work out the weighted average rate of interest. As per prevailing practice (followed also in Petition No. 334/2010 and in Petition No. 331/2010), a combined loan portfolio has been considered in this order for calculating the weighted average rate of interest.

30. Cumulative repayment of loan up to 31.3.2009 amounting to ₹ 20772.64 lakh vide orders dated 17.3.2008 in Petition No. 130/2004 and dated 7.8.2009 in Petition No. 76/2009 has been considered for computing tariff.

31. Detailed calculations in support of the weighted average rate of interest have been given in the Annexure to this order.

32. Based on the above, interests on loan has been calculated as under:-

(` in lakh)

	2009-10	2010-11	2011-12	2012-13	2013-14
Gross normative loan	20772.64	20772.64	21296.32	23703.06	25195.81
Cumulative Repayment upto previous year	20772.64	20772.64	21296.32	22153.46	23310.79
Net loan-opening	0.00	0.00	0.00	1549.60	1885.02
Addition due to additional capital expenditure	0.00	523.68	2406.74	1492.75	998.42
Repayment during the year	0.00	523.68	857.14	1157.32	998.42
Net loan-closing	0.00	0.00	1549.60	1885.02	1885.02
Average loan	0.00	0.00	774.80	1717.31	1885.02
Weighted Average Rate of Interest on Loan	8.3400%	8.5339%	8.6212%	8.6350%	8.6390%
Interest	<b>0.00</b>	<b>0.00</b>	<b>66.80</b>	<b>148.29</b>	<b>162.85</b>

### Depreciation

33. Regulation 17 of the 2009 Tariff Regulations provides as under:-

“17. (1) The value base for the purpose of depreciation shall be the capital cost of the asset admitted by the Commission.

(2) The salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the capital cost of the asset.

xxxx

xxxx

(3) Land other than the land held under lease and the land for reservoir in case of hydro generating station shall not be a depreciable asset and its cost shall be excluded from the capital cost while computing depreciable value of the asset.

(4) Depreciation shall be calculated annually based on Straight Line Method and at rates specified in Appendix-III to these regulations for the assets of the generating station and transmission system:

Provided that, the remaining depreciable value as on 31st March of the year closing after a period of 12 years from date of commercial operation shall be spread over the balance useful life of the assets.

(5) In case of the existing projects, the balance depreciable value as on 1.4.2009 shall be worked out by deducting the cumulative depreciation as admitted by the Commission up to 31.3.2009 from the gross depreciable value of the assets.

(6) Depreciation shall be chargeable from the first year of commercial operation. In case of commercial operation of the asset for part of the year, depreciation shall be charged on pro rata basis.”

34. In our calculation, depreciation has been calculated in accordance with clause (4) of regulation 17 extracted above.

35. The de-capitalised assets are the part of sub-station which in turn is a part of the transmission system. The capital cost of the de-capitalised equipment as indicated in the petition are ` 268.48 lakh, ` 278.57 lakh, ` 157.98 lakh and ` 137.43 lakh for the years 2010-2011, 2011-12, 2012-13 and 2013-14 respectively and the same has been allowed.

36. In the present case, it is clear that although a part-asset of the sub-station is being taken out of service, the sub-station itself has not been taken out. It is observed that while the petitioner has shown that the full depreciable value corresponding to the part-assets has been recovered, the sub-station has not depreciated fully. Thus, there appears to be a mismatch in the depreciation recovery. Similar issue was addressed in the Commission's order dated 13.8.2012 in Petition No. 334/2010. The same treatment is being applied in the context of depreciation in this petition.

37. Proportionate cumulative depreciation corresponding to de-capitalised assets has been worked out by multiplying the capital cost of de-capitalised assets by the ratio of Cumulative depreciation up to 31-03-2009 and Gross block for the combined asset up to 31-03-2009. The proportionate accumulated depreciation works out to ` 187.77 lakh, ` 194.83 lakh, ` 110.49 lakh and ` 96.12 lakh for equipment de-capitalised during 2010-11, 2011-12,

2012-13 and 2013-14 respectively. As the part assets have been taken out of service, these amounts of depreciation have been reduced from the accumulated depreciation during the corresponding years. The de-cap and add-cap taking place during the tariff period shall change the value of gross block, therefore, in order to have a common reference point for depreciation, the ratio has been calculated considering the gross block as on 31.3.2009.

38. In keeping with previous orders of the Commission for the subject asset, balance useful life of the asset is 12 years as on 1.4.2009 and accordingly, depreciation has been spread over the balance useful life.

39. Cumulative depreciation up to 31.3.2009 amounting to ` 26839.25 lakh vide order dated 7.8.2009 in Petition No. 76/2009 has been considered for computing tariff.

40. Details of the depreciation worked out are as under:-

(` in lakh)

	2009-10	2010-11	2011-12	2012-13	2013-14
Opening Gross Block	38375.41	38375.41	39123.53	42561.73	44694.23
Addition during 2009-14 due to projected additional capital expenditure	0.00	748.12	3438.20	2132.50	1426.32
Gross Block	38375.41	39123.53	42561.73	44694.23	46120.55
Average Gross Block	38375.41	38749.47	40842.63	43627.98	45407.39
Rate of Depreciation	5.2097%	5.2104%	5.2139%	5.2181%	5.2206%
Depreciable Value	34271.75	34608.40	36492.25	38999.06	40600.53
Balance useful life	12	11	10	9	8
Remaining Depreciable Value	7432.50	7149.78	8571.41	10415.92	10970.55
Depreciation	<b>619.37</b>	<b>649.98</b>	<b>857.14</b>	<b>1157.32</b>	<b>1371.32</b>

### **Operation & maintenance expenses**

41. Clause (g) of Regulation 19 of the 2009 Tariff Regulations prescribes the norms for operation and maintenance expenses based on the type of sub-

station and line. Norms prescribed in respect of the elements covered in the instant petition are given hereunder:-

(` in lakh)

<b>Transmission Line/ Bays:</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>
400 kV, D/C, twin conductor transmission line (` lakh / km)	0.627	0.663	0.701	0.741	0.783
400 kV, S/C, twin conductor transmission line (` lakh / km)	0.358	0.378	0.400	0.423	0.447
400 kV bay (` lakh/bay.)	52.40	55.40	58.57	61.92	65.46

42. Based on the above norms, the allowable O&M expenses for the assets covered in the petition are as given hereunder:-

(` in lakh)

<b>Elements</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>
267.2 km., 400 kV Double Circuit , twin conductor transmission line	167.53	177.15	187.31	198.00	209.22
1994.379 km., 400 kV Single Circuit , twin conductor transmission line	713.99	753.88	797.75	843.62	891.49
25 Nos. 400 kV bays	1310.00	1385.00	1464.25	1548.00	1636.50
<b>Total O&amp;M expenses</b>	<b>2191.52</b>	<b>2316.03</b>	<b>2449.31</b>	<b>2589.62</b>	<b>2737.21</b>

43. The petitioner has submitted that O & M expenditure for 2009-14 tariff block had been arrived at on the basis of normalized actual O & M expenses during the period 2003-04 to 2007-08. The wage hike of 50% on account of pay revision of the employees of public sector undertaking has also been considered while calculating the O & M charges for the tariff period 2009-14. The petitioner has further submitted that it would approach the Commission for suitable revision in the norms for O & M expenditure in case the impact of wage hike with effect from 1.1.2007 is more than 50%.

44. While specifying the norms for the Operation and Maintenance Expenses, the Commission has, in the 2009 Tariff Regulations, already factored 50% on account of pay revision of the employees of the PSUs after extensive consultation with the stakeholders. At this stage, there does not seem to be any justification for deviating from the norms. However, in case the petitioner approaches the Commission by making an appropriate application, the same shall be dealt with in accordance with law.

#### **Interest on working capital**

45. The petitioner is entitled to interest on working capital as per the 2009 Tariff Regulations. The components of the working capital and the petitioner's entitlement to interest thereon are discussed hereunder:-

##### **(i) Receivables**

As per Regulation 18(1) (c) (i) of the 2009 Tariff Regulations, receivables will be equivalent to two months' fixed cost. The petitioner has claimed the receivables on the basis of 2 months' annual transmission charges claimed in the petition. In the tariff being allowed, receivables have been worked out on the basis of 2 months' transmission charges.

##### **(ii) Maintenance spares**

Regulation 18(1)(c)(ii) of the 2009 Tariff Regulations provides for maintenance spares @ 15% per annum of the O & M expenses as part



of the working capital from 1.4.2009. The value of maintenance spares has accordingly been worked out.

**(iii) O & M expenses**

Regulation 18(1) (c) (iii) of the 2009 Tariff Regulations provides for operation and maintenance expenses for one month to be included in the working capital. The value of maintenance spares has accordingly been worked out.

**(iv) Rate of interest on working capital**

In accordance with Regulation 18 (3) of the 2009 Tariff Regulations, as amended, rate of interest on working capital shall be on normative basis and shall be equal to State Bank of India PLR as on 1.4.2009 (i.e., 12.25%). The interest on working capital for the assets covered in the petition has been worked out accordingly.

46. Necessary computations in support of interest on working capital are appended hereunder:-

(` in lakh)

	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>
Maintenance Spares	328.73	347.40	367.40	388.44	410.58
O & M expenses	182.63	193.00	204.11	215.80	228.10
Receivables	1012.45	1042.78	1131.40	1245.74	1326.34
<b>Total</b>	<b>1523.80</b>	<b>1583.19</b>	<b>1702.90</b>	<b>1849.99</b>	<b>1965.02</b>
Rate of Interest	12.25%	12.25%	12.25%	12.25%	12.25%
Interest	<b>186.67</b>	<b>193.94</b>	<b>208.61</b>	<b>226.62</b>	<b>240.71</b>

### **Transmission charges**

47. The transmission charges being allowed for the transmission assets are summarized below:-

(` in lakh)

	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>
Depreciation	619.37	649.98	857.14	1157.32	1371.32
Interest on loan	0.00	0.00	66.80	148.29	162.85
Return on equity	3077.14	3096.76	3206.53	3352.60	3445.92
Interest on working capital	186.67	193.94	208.61	226.62	240.71
O & M expenses	2191.52	2316.03	2449.31	2589.62	2737.21
<b>Total</b>	<b>6074.70</b>	<b>6256.71</b>	<b>6788.38</b>	<b>7474.46</b>	<b>7958.01</b>

48. The transmission charges allowed are subject to truing up in accordance with the 2009 Tariff Regulations.

### **Filing fee and the publication expenses**

49. The petitioner has sought reimbursement of fee paid by it for filing the petition and publication expenses. In accordance with the Commission's order dated 11.1.2010 in Petition No. 109/2009, the petitioner shall be entitled to recover the filing fee directly from the beneficiaries on *pro-rata* basis. The petitioner shall also be entitled for reimbursement of the publication expenses in connection with the present petition, directly from the beneficiaries on *pro-rata* basis.

### **Licence fee**

50. The petitioner has submitted that in O&M norms for tariff block 2009-14 the cost associated with license fees had not been captured and the license fee may be allowed to be recovered separately from the respondents.

51. The petitioner shall be entitled for reimbursement of licence fee in accordance with Regulation 42 A (1) (b) of the 2009 Tariff Regulations

**Service tax**

52. The petitioner has made a prayer to be allowed to bill and recover the service tax on transmission charges separately from the respondents, if it is subjected to such service tax in future. We consider petitioner's prayer premature and accordingly this prayer is rejected.

**Sharing of Transmission Charges**

53. The billing, collection and disbursement of the transmission charges approved shall be governed by the provisions of Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2010, as amended from time to time.

54. This order disposes of Petition No. 298/TT/2010.

Sd/-

**(M. Deena Dayalan)**  
**Member**

Sd/-

**(V. S. Verma)**  
**Member**

**Annexure**

**CALCULATION OF WEIGHTED AVERAGE RATE OF INTEREST ON LOAN**

(` in lakh)

	<b>Details of Loan</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>
<b>1</b>	<b>Bond XXXIII</b>					
	Gross loan opening	0.00	<b>0.00</b>	<b>711.62</b>	<b>3313.36</b>	<b>4916.70</b>
	Cumulative Repayment upto DOCO/previous year	0.00	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
	Net Loan-Opening	0.00	0.00	711.62	3313.36	4916.70
	Additions during the year	0.00	711.62	2601.74	1603.34	1094.63
	Repayment during the year	0.00	0.00	0.00	0.00	0.00
	Net Loan-Closing	0.00	711.62	3313.36	4916.70	6011.33
	Average Loan	0.00	355.81	2012.49	4115.03	5464.02
	Rate of Interest	8.64%	8.64%	8.64%	8.64%	8.64%
	Interest	0.00	30.74	173.88	355.54	472.09
	Rep Schedule	12 Annual Instalments from 8.7.2014				
<b>2</b>	<b>IBRD-I</b>					
		691.68	691.68	691.68	691.68	691.68
	Cumulative Repayment upto DOCO/previous year	9.34	63.44	121.64	184.23	251.56
	Net Loan-Opening	277.80	223.70	165.51	102.92	35.58
	Additions during the year	0.00	0.00	0.00	0.00	0.00
	Repayment during the year	54.10	58.19	62.59	67.34	35.58
	Net Loan-Closing	223.70	165.51	102.92	35.58	0.00
	Average Loan	250.75	194.60	134.21	69.25	17.79
	Rate of Interest	8.34%	8.34%	8.34%	8.34%	8.34%
	Interest	20.91	16.23	11.19	5.78	1.48
	Rep Schedule	15 Annual Instalments from 1.6.1998				
	<b>Total Loan</b>					
	Gross loan opening	691.68	691.68	1403.30	4005.04	5608.38
	Cumulative Repayment upto DOCO/previous year	9.34	63.44	121.64	184.23	251.56
	Net Loan-Opening	277.80	223.70	877.13	3416.28	4952.28
	Additions during the year	0.00	711.62	2601.74	1603.34	1094.63
	Repayment during the year	54.10	58.19	62.59	67.34	35.58
	Net Loan-Closing	223.70	877.13	3416.28	4952.28	6011.33
	Average Loan	250.75	550.41	2146.70	4184.28	5481.81
	<b>Weighted Average Rate of Interest</b>	<b>8.3400%</b>	<b>8.5339%</b>	<b>8.6212%</b>	<b>8.6350%</b>	<b>8.6390%</b>
	<b>Interest</b>	20.91	46.97	185.07	361.31	473.57