

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Petition No. 232/TT/2013

Coram:

**Shri Gireesh B. Pradhan, Chairperson
Shri A.K. Singhal, Member
Shri A.S. Bakshi, Member**

Date of Hearing : 04.06.2015

Date of Order : 13.10.2015

In the matter of:

Determination of tariff in respect of KSEB owned transmission lines/system connecting with other states and intervening transmission lines incidental to inter-State transmission of electricity as per the Central Electricity Regulatory Commission's order dated 14.3.2012 in Petition No.15/Suo-Moto/2012, for inclusion in POC charges in accordance with Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009.

And in the matter of:

Kerala State Electricity Board (KSEB)
Vydyuthi Bhavanam, Pattom,
Thiruvanthapuram-695 004

.....**Petitioner**

Vs

1. Karnataka Power Transmission Corporation Limited (KPTCL)
Cauveri Bhavan,
Bangalore-560 009

2. Tamil Nadu Transmission Corporation Limited,
(A subsidiary of TNEB Limited),
144, Anna Salai, Chennai-600 002

.....**Respondents**

For petitioner : None

For respondents : None



ORDER

The petitioner, Kerala State Electricity Board (KSEB) is a statutory body constituted under Section 5 of the Electricity Supply (Act), 1948 for coordinated development of electricity in the State of Kerala. It has been declared as the State Transmission Utility (STU) and transmission licensee by the Government of Kerala. The instant petition has been filed by KSEB for approval of the annual transmission charges of the transmission assets covered in the petition under the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009 (hereinafter "2009 Tariff Regulations") in compliance of the Commission's order dated 14.3.2012 in Petition No.15/SM/2012.

2. The Commission vide order dated 14.3.2012 in Petition No. 15/SM/2012 gave the following directions:-

"5. It has come to the notice of the Central Commission that the some of the owners/developers of the inter-State transmission lines of 132 kV and above in North Eastern Region and 220 kV and above in Northern, Eastern, Western and Southern regions as mentioned in the Annexure to this order have approached the Implementing Agency for including their transmission assets in computation of Point of Connection transmission charges and losses under the Central Electricity Regulatory Commission (Sharing of inter-State Transmission Charges and Losses) Regulations, 2010 (hereinafter "Sharing Regulations").

6. As a first step towards inclusion of non-ISTS lines in the POC transmission charges, the Commission proposes to include the transmission lines connecting two States, for computation of POC transmission charges and losses. However, for the disbursement of transmission charges, tariff for such assets needs to be approved by the Commission in accordance with the provisions of Sharing Regulations. Accordingly, we direct the owners of these inter-State lines to file appropriate application before the Commission for determination of tariff for facilitating disbursement.

7. We direct the respondents to ensure that the tariff petition for determination of tariff is filed by the developers/owners of the transmission line or by State Transmission Utilities where the transmission lines are owned by them in accordance with the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009, by 20.4.2012."



3. Four transmission lines of KSEB were identified as inter-State transmission lines, under order dated 14.3.2012 in Petition No. 15/SM/2012 and KSEB was directed to file tariff petition for the following four transmission lines for the purpose of inclusion in the POC charges, vide the above mentioned order.

Srl. No.	From	To	Voltage Level (kV)	Connecting States
1	Kaniyampetta	Kadakola	220	Kerala-Karnataka (S. No. 6 of Annexure under SR of order dated 14.3.2012)
2	Moozhiyar	Theni	220	Kerala-Tamil Nadu (S. No. 7 of Annexure under SR of order dated 14.3.2012)
3	Idukki	Udumalpet	220	Kerala-Tamil Nadu (S. No. 9 of Annexure under SR of order dated 14.3.2012)
4	Edamon	Tirunelveli	400	Kerala-Tamil Nadu (S. No. 8 of Annexure under SR of order dated 14.3.2012)

4. The petitioner has submitted that out of the four inter-State lines stated in para-3 above, the Edamon-Tirunelveli 400 kV line (Kerala-Tamil Nadu) was commissioned on 1.7.2010 under ATS of Kudankulam APP and it was owned and operated by Power Grid Corporation of India limited (PGCIL) and the tariff petition for the same has been filed by PGCIL in Petition No. 183/TT/2011 for determination of tariff. Hence, this line does not pertain to inter-State lines of KSEB. The three other inter-State lines are owned by KSEB connect the State of Kerala to the states of Tamil Nadu and Karnataka. Therefore, these three inter-State transmission lines of KSEB have been indentified for approval of transmission tariff and for inclusion in PoC charges.



5. The petitioner has submitted line length in ckt km and date of commercial operation of the instant transmission lines, which are as follows:-

S. No.	Name of Line	Connecting States	Length (ckt. km)	COD
1	230 kV S/C Kaniyampetta-Kadakola	Kerala-Karnataka	19.79	1976
2	230 kV S/C Moozhiyar-Theni	Kerala-Tamil Nadu	44.50	24.2.1968
3	230 kV S/C Idukki-Udumalpet	Kerala-Tamil Nadu	84.40	1988

6. We have perused the material on record. We proceed to determine the annual fixed charges in respect of the assets covered in the petition.

No. of assets to be covered

7. The petition has been filed in response to the Commission's directions for determination of tariff of transmission lines owned or controlled by the STU which carry inter-State power. Section 2(36) of the Act defines the ISTS as hereinafter:-

"2(36) inter-State transmission system includes-

- (i) Any system for the conveyance of electricity by means of main transmission line from the territory of one State to another state;
- (ii) The conveyance of electricity across the territory of any intervening State as well as conveyance within the State which is incidental to such inter-State transmission of electricity;
- (iii) The transmission of electricity within the territory of a State on a system built, owned, operated, maintained or controlled by a Central Transmission Utility"

8. The petitioner has submitted that the three transmission lines identified by the Commission satisfy the conditions of ISTS. The STU lines used for carrying inter-State power can be considered for inclusion in the PoC charges only if it is certified by RPC in terms of para 2.1.3 of the Annexure-I to Central Electricity Regulatory Commission (Sharing of inter-State Transmission Charges and Losses) Regulations, 2010, which is extracted overleaf:-



“The line-wise YTC of the entire network shall be provided by the Transmission Licensees. In case a line is likely to be commissioned during the Application Period, the data in respect of the same, along with the anticipated COD will be provided by the CTU/ Transmission Licensee to the Implementing Agency.

For the determination of the transmission charges based on Hybrid Methodology applicable in the next Application Period, all the above data shall be provided to the Implementing Agency as per the timelines specified by the Implementing Agency.

Overall charges to be allocated among nodes shall be computed by adopting the YTC of transmission assets of the ISTS licensees, deemed ISTS licensees and owners of the non-ISTS lines which have been certified by the respective Regional Power Committee (RPC) for carrying inter-State power. The Yearly Transmission Charge, computed for assets at each voltage level and conductor configuration in accordance with the provisions of these regulations shall be calculated for each ISTS transmission licensee based on indicative cost provided by the Central Transmission Utility for different voltage levels and conductor Page 17 of 21 configuration. The YTC for the RPC certified non-ISTS lines which carry inter-State power shall be approved by the Appropriate Commission.

In case line-wise tariff for the RPC certified non-ISTS lines has not been specified by the Appropriate Commission, the tariff as computed for the relevant voltage level and conductor configuration shall be used. The methodology for computation of tariff of individual asset shall be similar to the methodology adopted for the ISTS transmission licensees and shall be based on ARR of the STU as approved by the respective State Commission.

Certification of non-ISTS lines carrying inter-State power, which were not approved by the RPCs on the date of notification of the Central Electricity Regulatory Commission (Sharing of Transmission Charges and Losses) Regulations, 2009, shall be done on the basis of load flow studies. For this purpose, STU shall put up proposal to the respective RPC Secretariat for approval. RPC Secretariat, in consultation with RLDC, using Web Net Software would examine the proposal. The results of the load flow studies and participation factor indicating flow of Inter State power on these lines shall be used to compute the percentage of usage of these lines as inter State transmission. The software in the considered scenario will give percentage of usage of these lines by home State and other than home State. For testing the usage, tariff of similar ISTS line may be used. The tariff of the line will also be allocated by software to the home State and other than home State. Based on percentage usage of ISTS in base case, RPC will approve whether the particular State line is being used as ISTS or not. Concerned STU will submit asset-wise tariff. If asset wise tariff is not available, STU will file petition before the Commission for approval of tariff of such lines. The tariff in respect of these lines shall be computed based on Approved ARR and it shall be allocated to lines of different voltage levels and configurations on the basis of methodology which is being done for ISTS lines.”

9. The certificate of SRPC is available in terms of the above provision in respect of three transmission lines which were included in the Commission’s order



dated 14.3.2012 in Petition No. 15/SM/2012. Accordingly, three transmission lines are being considered in this petition for grant of annual transmission charges. Further, since the Central Electricity Regulatory Commission (Sharing of inter-State Transmission Charges and Losses) Regulations, 2010 came into force with effect from 1st July, 2011, Yearly Transmission Charges (YTC) for these three transmission lines have been calculated for the year 2011-12 (1.7.2011 to 31.3.2012), 2012-13 and 2013-14.

Capital Cost

10. The petitioner vide affidavit dated 9.4.2013 submitted that the original capital cost data and additional capital cost of these three lines is not available as these lines are more than 25 years old. The Commission vide letter dated 17.6.2014 directed the petitioner to submit the capital cost duly certified by the auditors, funding pattern of the assets, repayment schedule and the interest rates of loans, if any, cumulative depreciation as on 31.3.2012, details of the ARR approved by the State Commission for the 2009-14 period and details of the O&M expenses of the instant assets.

11. The petitioner vide affidavit dated 22.7.2014 submitted that the audited capital cost, funding pattern of the cost, actual repayment schedule, interest rates of the loan and cumulative depreciation details of the instant assets are not available as already submitted by them vide affidavit dated 9.4.2013. The petitioner submitted that KSEB has been continuing as a single entity doing the business of transmission, generation and distribution of power in the State of Kerala upto 31.10.2013. KSEB has been functioning as three business units for transmission, generation and distribution only w.e.f. 1.11.2013 and KSERC has



been approving the ARR of KSEBL by treating it as a single entity as the process of separate balance sheet for the three utilities has not been completed so far. However, KSEBL has segregated the expenditure for financial years 2009-10, 2010-11, 2011-12, 2012-13 and 2013-14 based on certain assumptions, amongst the three business units. The petitioner vide affidavit dated 22.7.2014 submitted the O&M cost incurred by KSEB for the years 2009-10 to 2012-13 and these are as under:-

Year	Total Transmission Gross Block	EHT lines and No. of sub-stations	(₹ in lakh)
			Total O & M cost for transmission
2009-10	325394	EHT lines-9012.50 Ckt. Km/no. of sub-stations-335	15196
2010-11	344144	EHT lines-9046.72 Ckt. Km/no. of sub-stations-348	20000
2011-12	373589	EHT lines-9047.61 Ckt. Km/no. of sub-stations-358	23002
2012-13	386606	EHT lines-9106.63 Ckt. Km/no. of sub-stations-369	25157
2013-14	Annual accounts not yet prepared.		

12. During the hearing on 4.6.2015, the petitioner was directed to submit the ARR and network configurations in the prescribed pro-forma and the details of ARR approved by the SERC for period 2009-14 separately for the respective years containing total amount approved for each respective year. The petitioner submitted the ARR and the O & M norms for the period 2009-14 and F/Y 2014-15 as approved by SERC. The details are as given hereunder:-

Line * Type	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
+500 kV HVDC	-	-	-	-	-	-
+800 kV HVDC	-	-	-	-	-	-
765 kV D/C	-	-	-	-	-	-
765 kV S/C	-	-	-	-	-	-
400 kV D/C	-	-	-	-	-	-
400 kV D/C Quad Moose	-	-	-	-	-	-
400 kV S/C	-	-	-	-	-	-
220 kV D/C	2734.70	2734.70	2734.70	2761.57	2765.88	2802.08



220 kV S/C						
132 kV D/C	-	-	-	-	-	-
132 kV S/C	-	-	-	-	-	-
110 kV	4115.89	4150.11	4150.00	4178.55	4178.55	4216.95
66 kV	2161.91	2161.91	2161.91	2166.51	2312.50	2312.50
ARR approved**	28460.00	29608.00	36567.00	39193.00	42529.00	53668.00

*Line length in Ckt. Km. **ARR of Transmission business as per letter dated 18.9.2015 (in ₹ lakh)

13. The petitioner vide letter dated 18.9.2015 has submitted that as per the provisions of the Electricity Act, 2003, KSEB Ltd. has been continuing as a single corporate entity doing the business of Generation, Transmission and Distribution of power in the State of Kerala. However, as part of the revesting process, KSEB has been functioning as 3 strategic business units for generation, transmission and distribution since 1.11.2013. As part of revesting, it has been decided to draw up separate balance sheet of each strategic business unit. However, the process is yet to be completed. Hence KSEB has been approving the ARR of KSEBL by treating it as a single entity. However, based on the methodology adopted by the State Commission for arriving transmission charges, wheeling charges etc. for the year 2014-15. KSEBL has segregated the transmission ARR for the financial years 2009-10, 2010-11, 2011-12, 2013-14 and 2014-15 as below:-

S. No.	F/Year	Transmission ARR (₹ in crore)
1	2009-10	284.60
2	2010-11	296.08
3	2011-12	365.67
4	2012-13	391.93
5	2013-14	425.29
6	2014-15	536.68

Procedure for calculating YTC for the transmission lines

14. The petitioner submitted that the capital costs of the instant transmission lines are not available. Hence, the indicative cost of lines of various configurations



owned and operated by Power Grid Corporation of India Limited (PGCIL) has been considered for the computation of capital cost as per assumptions as below:-

a) Indicative cost of 400 kV D/C Quad Moose transmission line has been taken as base and indicative cost of lines with configurations other than 400 kV D/C Quad Moose have been made equivalent to the indicative cost of 400 kV D/C Quad Moose (i.e. by dividing indicative cost of the 400 kV D/C Quad Moose line by the indicative cost of line of other configurations).

b) The indicative cost data provided by PGCIL is for voltage level upto 132 kV, but the petitioner also owns lines of 110 kV, 100 kV and 66 kV level. Hence, the line length of 110 kV, 100 kV and 66 kV level has been added to 132 kV level and considered such derived indicative cost of 132 kV level as indicative cost for all transmission lines having voltage level of 132 kV and below.

15. The yearly break-up of indicative cost of various configurations owned and operated by PGCIL is as hereunder:-

For F/Y 2014-15

Line Type	Cost (₹ in lakh)	Cost (₹ in lakh/Ckt.	Co-efficient	
765 kV D/C	450	225.00 (A)	a=D/A	0.53
765 kV S/C	180	180.00 (B)	b=D/B	0.67
400 kV D/C Twin Moose	135	67.50 (C)	c=D/C	1.78
400 kV D/C Quad Moose	240	120.00 (D)	d=D/D	1.00
400 kV S/C Twin Moose	88	88.00 (E)	e=D/E	1.36
220 kV D/C	56	28.00 (F)	f=D/F	4.29
220 kV S/C	35	35.00 (G)	g=D/G	3.43
132 kV D/C	44	22.00 (H)	h=D/H	5.45
132 kV S/C	28	28.00 (I)	i=D/I	4.29

For F/Y 2013-14

Line Type	Cost (₹ in lakh)	Cost (₹ in lakh/Ckt.	Co-efficient	
765 kV D/C	412.00	206.00 (A)	a=D/A	0.56
765 kV S/C	179.80	179.80 (B)	b=D/B	0.65
400 kV D/C Twin Moose	130.40	65.20 (C)	c=D/C	1.78
400 kV D/C Quad Moose	232.60	116.30 (D)	d=D/D	1.00



400 kV S/C Twin Moose	87.00	87.00 (E)	e=D/E	1.34
220 kV D/C	61.40	30.70 (F)	f=D/F	3.79
220 kV S/C	37.80	37.80 (G)	g=D/G	3.08
132 kV D/C	48.40	24.20 (H)	h=D/H	4.81
132 kV S/C	30.00	30.00 (I)	i=D/I	3.88

For F/Y 2012-13

Line Type	Cost (₹ in lakh)	Cost (₹ in lakh/Ckt.)	Co-efficient	
765 kV D/C	357.00	178.50 (A)	a=D/A	0.63
765 kV S/C	179.20	179.20 (B)	b=D/B	0.63
400 kV D/C	122.60	61.30 (C)	c=D/C	1.83
400 kV D/C Quad Moose	224.80	112.40 (D)	d=D/D	1.00
400 kV S/C	84.20	84.20 (E)	e=D/E	1.33
220 kV D/C	67.80	33.90 (F)	f=D/F	3.32
220 kV S/C	41.40	41.40 (G)	G=D/G	2.71
132 kV D/C	53.00	26.50 (H)	h=D/H	4.24
132 kV S/C	32.40	32.40 (I)	i=D/I	3.47

For F/Y 2011-12

Line Type	Cost (₹ in lakh)	Cost (₹ in lakh/ckt.)	Co-efficient	
765 kV D/C	315.25	157.625 (A)	a=D/A	0.64
765 kV S/C	159.25	159.25 (B)	b=D/B	0.63
400 kV D/C	109.50	54.75 (C)	c=D/C	1.84
400 kV D/C Quad Moose	202.00	101.00 (D)	d=D/D	1.00
400 kV S/C	74.25	74.25 (E)	e=D/E	1.36
220 kV D/C	59.50	29.75 (F)	f=D/F	3.39
220 kV S/C	37.00	37.00 (G)	G=D/G	2.73
132 kV D/C	46.75	23.375 (H)	h=D/H	4.32
132 kV S/C	28.50	28.50 (I)	i=D/I	3.54

16. After getting ratio with respect to 400 kV D/C Quad Moose, YTC per ckt. Km of 400 kV D/C Quad Moose transmission line has been calculated as follows:-

$$\text{YTC per ckt km 400 kV D/C} = \frac{\text{ARR for FY.....in ₹}}{\left[\text{Quad Moose (Length of 765 kV DC/a)} + (\text{Length of 765 kV SC/b}) + (\text{Length of 400 kV DC TM/c}) + (\text{Length of 400 kV DC QM/d}) + (\text{Length of 400 kV SC TM/e}) + (\text{Length of 220 kV DC/f}) + (\text{Length of 220 kV SC/g}) + (\text{Length of 132 kV DC/h}) + (\text{Length of 132 kV SC/i}) \right]}$$



*value of a, b, c, d, e, f, g, h & i are as given in para 15 and length in ckt km as given in para 12 of this order.

DC-Double Circuit, SC-Single Circuit, QM-Quad Moose, TM-Twin Moose

17. We have not carried out any due diligence of the tariff of these lines (for consideration of PoC calculations) as the tariff of the lines owned by STU has already been determined by the State Electricity Regulatory Commission. We have considered the ARR of the STU as approved by the State Electricity Regulatory Commission and have adopted the methodology as discussed in para 14 and 16 of this order for the purpose of calculation of PoC charges and apportionment of transmission lines and charges to the transmission system of different configurations of the STU. This methodology has been adopted uniformly for the lines owned by other STUs used for inter-State transmission of power duly certified by respective RPCs for the purpose of inclusion in the PoC mechanism.

18. We have considered the submission of the petitioner. The petitioner has submitted the actual total line length and configuration in Kerala system. However, the petitioner has submitted the line length in ckt. km and ARR for F/Y 2009-10, 2010-11, 2011-12, 2012-13, 2013-14 and 2014-15.

19. As per the information submitted by the petitioner i.e. line length in ckt. km and ARR approved by SERC for 2009-10, 2010-11, 2011-12, 2012-13, 2013-14 and 2014-15 and PoC cost data for the respective years, YTC for the assets for F/Y 2011-12, F/Y 2012-13, F/Y 2013-14 and F/Y 2014-15 has been calculated as follows:-



For 2014-15:

Total ARR approved by the SERC= ₹5,36,68,00,000.00

(in ₹)

S. No.	Asset	For entire system (Kerala)		
		Line Length (ckt. km)	YTC (Per ckt. km)	YTC
1	220 kV D/C	2802.08	676570.22	1895803882.02
2	132 kV D/C	6529.45	531590.89	3470996117.98
Total				5366800000.00

For 2013-14:

Total ARR approved by the SERC= ₹4,25,29,00,000.00

(in ₹)

S. No.	Asset	For entire system (Kerala)		
		Line Length (ckt. km)	YTC (Per ckt. km)	YTC
1	220 kV D/C	2765.88	539529.87	1492274871.17
2	132 kV S/C	6491.05	425297.16	2760625128.83
Total				4252900000.00

For 2012-13:

Total ARR approved by the SERC= ₹3,91,93,00,000.00

(in ₹)

S. No.	Asset	For entire system (Kerala)		
		Line Length (ckt. km)	YTC (Per ckt. km)	YTC
1	220 kV D/C	2761.57	507577.95	1401712032.61
2	132 kV D/C	6345.06	396779.22	2517587967.39
Total				3919300000.00

For 2011-12:

Total ARR approved by the SERC= ₹3,65,67,00,000.00

(in ₹)

S. No.	Asset	For entire system (Kerala)		
		Line Length (ckt. km)	YTC (Per ckt. km)	YTC
1	220 kV D/C	2734.70	475262.87	1299701363.79
2	132 kV D/C	6311.91	373420.82	2356998636.21
Total				3656700000.00

YTC of the three transmission lines

20. YTC per Ckt. Km, total ARR for the transmission system in Kerala is matching with the ARR approved by the Kerala Electricity Regulatory Commission is as given follows:-



Voltage Level	(in ₹)			
	2011-12	2012-13	2013-14	2014-15
220 kV D/C	475262.87	507577.95	539529.87	676570.22
132 kV D/C	373420.82	396779.22	425297.16	531590.89

21. YTC of the three transmission lines calculated on the methodology discussed above is as follows:-

S. No.	Line Name	Length (Ckt. km)	(in ₹)			
			2011-12*	2012-13	2013-14	2014-15
1	Kaniyampetta-Kadakola 230 kV S/C line	19.79	7054089.11	10044967.58	10677296.09	13389325.00
2	Moozhiyar-Theni 230 kV S/C line	44.50	15861898.20	22587218.67	24009079.12	30107374.79
3	Idukki-Udumalpet 230 kV S/C line	84.40	30084139.51	42839578.77	45536320.86	57102526.57
Total			53000126.83	75471765.02	80222696.07	100599226.00

*YTC for 9 months has been taken as per Sharing of Inter-State Transmission Charges and Losses Regulations, 2010 which came into force from 1.7.2011.

22. The annual transmission charges allowed for the assets covered in the instant petition shall be considered in the YTC as per the Sharing of Inter-State Transmission Charges and Losses Regulations, 2010 and shall be adjusted against the ARR of the petitioner approved by the State Commission.

23. This order disposes of Petition No. 232/TT/2013.

sd/-

(A.S. Bakshi)
Member

sd/-

(A.K. Singhal)
Member

sd/-

(Gireesh B. Pradhan)
Chairperson

