CENTRAL ELECTRICITY REGULATORY COMMISSION

NEW DELHI

Petition No. 543/TT/2014

Coram:

Shri Gireesh B. Pradhan, Chairperson
Shri A.K. Singhal, Member
Shri A.S. Bakshi, Member
Dr. M.K. Iyer, Member

Date of Order : 20.09.2016

In the matter of:

Truing up of transmission tariff for 2009-14 tariff period and determination of transmission tariff for 2014-19 tariff period for 400 kV S/C Singrauli-Vindhyachal Transmission Link alongwith (2x250 MW) HVDC Back to Back at Vindhyachal between NR and WR (COD: 6.6.1989) under Regulation 86 of Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999, Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009, and Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2014.

And in the matter of:

Power Grid Corporation of India Ltd
'Saudamini', Plot No-2,
Sector-29, Gurgaon-122 001 (Haryana) **……Petitioner**

Vs

1. Rajasthan Rajya Vidyut Prasaran Nigam Limited,
   Vidyut Bhawan, Vidyut Marg,
   Jaipur- 302 005

2. Ajmer Vidyut Vitran Nigam Limited,
   400 kV GSS Building (Ground Floor), Ajmer Road,
   Heerapura, Jaipur

3. Jaipur Vidyut Vitran Nigam Limited,
   400 kV GSS Building (Ground Floor), Ajmer Road,
   Heerapura, Jaipur

4. Jodhpur Vidyut Vitran Nigam Limited,
   400 kV GSS Building (Ground Floor), Ajmer Road,
   Heerapura, Jaipur

5. Himachal Pradesh State Electricity Board,
   Vidyut Bhawan, Kumar House Complex Building II,
   Shimla-171 004

6. Punjab State Electricity Board,
   The Mall, Patiala-147 001

7. Haryana Power Purchase Centre,
   Shakti Bhawan, Sector-6,
   Panchkula (Haryana)-134 109

8. Power Development Department,
   Govt. of Jammu and Kashmir,
   Mini Secretariat, Jammu

9. Uttar Pradesh Power Corporation Limited,
   (Formerly Uttar Pradesh State Electricity Board)
   Shakti Bhawan, 14, Ashok Marg,
   Lucknow-226 001

10. Delhi Transco Limited,
    Shakti Sadan, Kotla Road,
    New Delhi-110 002

11. BSES Yamuna Power Limited,
    BSES Bhawan, Nehru Place,
    New Delhi

12. BSES Rajdhani Power Limited,
    BSES Bhawan, Nehru Place,
    New Delhi

13. North Delhi Power Limited,
    Power Trading & Load Dispatch Group,
    Cennet Building,
    Adjacent to 66/11kV Pitampura-3 Grid Building,
    Near PP Jewellers,
    Pitampura, New Delhi-110 034

14. Chandigarh Administration,
    Sector-9, Chandigarh

15. Uttarakhand Power Corporation Limited,
    Urja Bhawan, Kanwali Road,
    Dehradun

16. North Central Railway,
    Allahabad

17. New Delhi Municipal Council,
Palika Kendra, Sansad Marg,
New Delhi-110 002

18. Madhya Pradesh Power Management Company Limited,
Shakti Bhawan, Rampur,
Jabalpur-482 008

19. Maharashtra State Electricity Distribution Company Limited,
Prakashgad, 4th floor,
Andheri (East), Mumbai-400 052

20. Gujarat Urja Vikas Nigam Limited,
Sardar Patel Vidyut Bhawan,
Race Course Road,
Vadodara-390 007

21. Electricity Department,
Government of Goa,
Vidyut Bhawan, Panaji,
Near Mandvi Hotel, Goa-403 001

22. Electricity Department,
Administration of Daman and Diu,
Daman-396 210

23. Electricity Department,
Administration of Dadra Nagar Haveli,
U.T., Silvassa-396 230

24. Chhattisgarh State Electricity Board,
P.O. Sunder Nagar, Dangania, Raipur
Chhattisgarh-492 013

25. Madhya Pradesh Audyogik Kendra
Vikas Nigam (Indore) Limited,
3/54, Press Complex, Agra-Bombay Road
Indore-452 008 **.....Respondents**

For Petitioner: Shri S.K. Venkatesan, PGCIL
Shri J. Mazumder, PGCIL
Shri Shashi Bhushan, PGCIL
Shri R.P.S. Rana, PGCIL
Shri V.P. Rastogi, PGCIL
Shri A.K. Arora, PGCIL
Shri Rakesh Prasad, PGCIL
Shri S.S. Raju, PGCIL

For Respondents: None

ORDER

The present petition has been filed by Power Grid Corporation of India Limited ('the petitioner'), for truing up of capital expenditure and tariff for 400 kV S/C Singrauli-Vindhyachal Transmission Link alongwith (2x250 MW) HVDC Back to Back at Vindhyachal between NR and WR (hereinafter referred as "transmission assets") under Regulation 6 of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009 (hereinafter referred to as "the 2009 Tariff Regulations") based on actual expenditure for the period 1.4.2009 to 31.3.2014 and for determination of tariff under Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2014 (hereinafter referred to as "the 2014 Tariff Regulations") for the period from 1.4.2014 to 31.3.2019.

2. The respondents are distribution licensees, who are procuring transmission service from the petitioner, mainly beneficiaries of Northern Region and Western Region.

3. This order has been issued after considering the petitioner's affidavit dated 20.1.2016, 25.1.2016, 16.3.2016 and 8.7.2016.

4. 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, 2003 ("the Act"). The petitioner has served the petition to the respondents. BSES Rajdhani Power Limited (BRPL), Respondent No 12 and M.P. Power Management Company Limited, (MPPMCL), Respondent No 18 have filed

replies vide affidavit dated 20.1.2016 and 5.7.2016 respectively. The respondents have mainly raised the issue of additional capitalisation of smoothing reactor as it was earlier rejected vide order dated 23.1.2012 in Petition No. 286 of 2010 and other issues of claim for depreciation, filing fee and the expenses incurred on publication of notices, higher O&M Expenses on account of wage revision for 2014-19 tariff period. The petitioner has filed rejoinders dated 16.3.2016 and 20.7.2016 to the replies of BRPL and MPPMCL respectively. The submissions made by the respondents and their clarifications have been dealt in relevant paragraphs of this order.

5. During hearing on 28.1.2016, the petitioner was directed to file certain information, in order to work out the final tariff. The reply submitted by the petitioner, vide affidavit dated 16.3.2016, are as follows:-

a) In response to the query "Whether the smoothing reactor is being used as spare or put into use after commissioning of it. If commissioned then submit the COD certificate", the petitioner, has submitted that smoothening reactor has been procured as spare to take care of any contingency in case of failure of the existing one, which is completing 25 years of useful service life. Vindhyachal HVDC back to back system was implemented prior to establishment of the petitioner and no spare was procured by the implementing agency at that time. The reactor does not come as ready to use condition. The reactor is transported from the factory without oil due to convenience of transport and oil is supplied separately. All the necessary testing is done for its healthiness and oil is filled in the reactor tank after filtration, if the DGA is not upto the desired level. After thorough checking/

testing the spare reactor is made completely ready to take into service at any time i.e. kept as standby unit. In case of any failure of reactor in service, the faulty unit is dragged out from the plinth and spare unit is placed in the plinth at the earliest possible time. Hence, complete readiness of spare reactor as a standby unit is termed as its commissioning and after commissioning, the reactor is ready for intended use, hence declared under commercial operation. Accordingly, the COD Date is 1.12.2013, COD letter already submitted vide affidavit dated 8.1.2016. As per the 2009 Tariff Regulations, no certificate is required from RLDC for declaring COD of any element. The reactor can be charged only by taking shutdown of one pole, drag out the old reactor and put the new reactor into service in place of existing one. Since there is no such provision of spare bays for the reactor charging, therefore, charging of the same is not possible under normal circumstance. Further, in order to exchange the reactor with a spare reactor, shutdown of existing reactor will be required for about 3 to 4 days interrupting power flow in one pole for this duration. As such, this spare reactor will be put into service by replacing the existing one provided the required outage period is considered as deemed available. In addition to this there will be additional expenditure also to be incurred for completion of the replacement work.

b) In response to the query "What is useful life of the spare smoothening reactor and for how many more years this system will run?" the petitioner has submitted that the Vindhyachal HVDC back to back system completed 25 years of useful service life in 2014. Further, some of the defective/ problematic equipments are being replaced through additional

capitalization in tariff wherein it has been proposed "extension life" of the system by another 10 years. As majority of the equipment in this project are older than 25 years, it is very difficult to predict the extension of the service life. It is expected to run the system at least by another 10 years, however, the system will be put to use as long as possible to derive the maximum economic benefit till system is not viable techno-economically. However, the useful life of the project is estimated to be extended by another 10 years only after the replacement of the various equipments during the year 2015-19. Thus, the depreciation of the smoothening reactor has been considered upto 2014-15 only, as extension of useful life of the project depends on the replacement of other equipment. However, in case other equipments are allowed to be replaced during 2015-19 period, the project life will extend by another 10 years.

c) The petitioner, in response to direction to submit “Details of de-capitalization of assets made during 2009-14 and 2014-19 period, if any. Also, the Gross Block and cumulative depreciation of all the assets which have been de-capitalized”, has submitted that the smoothening reactor is proposed under additional capital expenditure during 2009-14 as a spare. Therefore, de-capitalization during 2009-14 is nil against this reactor.

6. A report dated 11.4.2013 of ABB inspection of the petitioners’ assets was also submitted by the petitioner vide affidavit dated 16.3.2016. Therefore, after a perusal of ABB report, during hearing on 2.6.2016, it was enquired from the petitioner that why there is no mention about the requirement of spare

smoothening transformer. The petitioner, in response, vide affidavit dated 8.7.2016 has submitted as under:-

> "Procurement of spare smoothing reactor was taken up in CERC during tariff block 2009-14 vide petition no. 286/2010 in the year 2010 as no spare was available. Prior to filling petition in CERC, matter was taken up with OEM, M/s ABB whether Vindhyachal HVDC Pole can be put into service without smoothing reactor in case of failure of the same. ABB vide their reply on 18-08-2008 conveyed that it is not safe to operate HVDC pole without smoothing reactor and they cannot recommend adding stress to the valves by running without smoothing reactor. They also explained the detrimental effect on the grid stating that harmonics current generation will increase above specified level with risk for problems in the interconnected generators."
>
> "Vindhyachal HVDC back to back system was implemented in the year 1989 prior to establishment of POWERGRID, as an inter-regional link between Northern Region and Western Region. Two smoothing reactors installed in the system and are in service since then. No spare smoothing reactor was procured by the implementing agency at that time and no spare smoothing reactor has been procured since installation of the system in 1989. The installed smoothing reactor is in service for 25 years and seen number of faults which has effect on the health of the equipment. Increase in Furan content in oil of the reactor indicates gradual degradation of insulation paper of the winding and may lead to sudden failure. The Furan content in one of the reactor for the oil sample taken on 16.10.2008 was 0.056 and the Furan content increased to 0.458 for the oil sample taken on 21.12.2015. There is substantial increase in furan content in this reactor. Since there was no spare smoothing reactor, POWERGRID approached Hon'ble Commission during 2009-14 tariff block for procurement of one Smoothing Reactor through additional capitalisation in tariff to take care of any contingency in future."
>
> "CERC vide tariff Order dated 23.1.2012 notified the following
>
> Quote
>
> …….
>
> However, our decision does not prevent the petitioner from procuring a spare smoothing reactor. The petitioner is granted liberty to approach the Commission for additional capital expenditure for the smoothing reactor as soon as it is commissioned.
>
> Unquote"
>
> "In order to maximise reliability and availability of the system with smooth operation, POWERGRID procured one spare smoothing reactor and approached Hon'ble Commission vide truing up petition as per direction of above mentioned Tariff Order."
>
> "Spare smoothing reactor is essential because of following reasons:
>
> (i) The OEM i.e. ABB Sweden vide mail dated 18-08-2008 clarified that replacement of reactor in case of failure is must. They clarified that it may not be suitable for operation of HVDC system without smoothing reactor and they also anticipated development of stress on Main Circuit as the actual short circuit capacity in the Vindhyachal area is already higher than originally anticipated for Vindhyachal HVDC. ABB in their reply stated that they cannot recommend

adding stress to the valves by running without smoothing reactor. Also harmonic current generation will increase above the specified level with risk for problems in the interconnected generators. Hence, OEM restricts running the system in case of non-availability of smoothing reactor.

(ii) Further, the lead time of procurement of this smoothing reactor is around two to three years which means in case of failure of the reactor, HVDC back to back system may not be available for supply of power for almost 2 to 3 years. HVDC block will remain idle without providing service for want of spares. Hence it is prudent to procure one spare. Availability of smoothing reactor will make it possible to bring back the pole in case of failure of smoothing reactor in service within a period of 3 to 4 days thus making both poles available for power flow, thus benefiting the grid as well as beneficiaries.

(iii) HVDC Vindhyachal Back to back system is first of its kind in India and was installed by the implementing agency prior to establishment of POWERGRID. No spare smoothing reactor was taken at that time. Afterwards, spare smoothing reactor has been procured along with the project for all other HVDC system wherein smoothing reactor installed."

7. Both BRPL and MPPMCL have mainly raised the issue of additional capitalisation of smoothing reactor as it was earlier rejected vide order dated 23.1.2012 in Petition No. 286 of 2010. We have considered the submission of the respondents and the petitioner. We had earlier, vide order dated 23.1.2012, in Petition No. 286/2010 observed that the 2009 Tariff Regulations do not provide for capitalization of any asset, which is not put into use during the tariff period, therefore, claim of the petitioner for additional capitalization of spare smoothing reactor was not allowed. However, the petitioner was granted liberty to approach this Commission for additional capitalization for smoothing reactor as and when it is commissioned. The petitioner has submitted that Vindhyachal HVDC back to back system was implemented prior to establishment of the petitioner's organisation and no spare smoothing reactor was procured by the implementing agency at that time. Spare smoothing reactor has been procured afterwards, along with the projects for all other HVDC system wherever smoothing reactor is installed. The petitioner has also submitted that the OEM, i.e. ABB Sweden vide e-

mail dated 18.8.2008 clarified that it may not be suitable for operation of HVDC system without smoothing reactor. Further, the spare smoothing reactor is in ready to use condition and kept as a standby unit after all the necessary testing and oil filtration since there is no provision of spare bays for the reactor charging under normal circumstances. The petitioner has submitted that the complete readiness of spare reactor as a standby unit is termed as its commissioning and it will put spare reactor into service by replacing the existing one, provided the required outage period of 3 to 4 days is considered as deemed available. We do not agree with the contention of the petitioner that complete readiness of spare reactor as a standby unit is termed as its commissioning and deemed availability is considered for outage period if spare reactor will be put into service by replacing the existing one. In our view, the spare asset is said to be commissioned and being utilized when it is put into use after charging. The testing/checking and oil-filtration are only pre-commissioning activities that carried out for spare asset when the asset is only being kept ready as standby. Further, the Tariff Regulations consider the planned and forced outages period while fixing the availability norms. The sufficient margins are kept in the availability norms for replacement of existing asset with spare one such as smoothing reactor in the instant case.

8. The petitioner has further submitted that there is increase in Furan content in the oil of existing smoothing reactor form 0.056 on 16.10.2008 to 0.458 on 21.12.2015. This substantial increase in Furan content in oil indicates gradual degradation on insulation paper of the winding and may lead to sudden failure. We are inclined to agree with the submission of the petitioner that high Furan content in oil may lead to sudden failure of the smoothing reactor. Further, considering the

clarification from the OEM i.e. ABB, Sweden vide e-mail dated 18.8.2008, that the operation of HVDC system without smoothing reactor will add stress to the valves and increase the risk for problem in the interconnected generator and the fact that HVDC Vindhyachal back to back system was installed prior to establishment of the petitioner's organisation and no spare smoothing reactor was taken at that time contrary to be practice of procuring spare smoothing reactor in all other HVDC project. Therefore, considering the fact that the availability of power to the beneficiaries concerned would be severely affected, in case of failure of the existing reactor and would lead to non-availability of HVDC system for at least two to three years, in the absence of a spare smoothing reactor as well as at a cost lower than the cost of a new HVDC system, we are inclined to allow the capitalisation of spare smoothing reactor as a special case in exercise of our "Powers to Relax" under Regulation 54 of the 2014 Tariff Regulations. However, this is not to be considered as precedence in future petitions.

9. The petitioner has also submitted that the useful life of the project would be extended by another 10 years only after the replacement of various connected equipments during 2015-19. As we have allowed capitalisation of the smoothing reactor, the useful life of the spare smoothing reactor is considered as 10 years after completion of useful life of 25 years of existing smoothing reactor w.e.f. June, 2014.

10. The hearing in the matter was held on 2.6.2016. Having heard the representatives of the petitioner and perused the material on record, we proceed to dispose of the petition.

11. The brief facts of the case are as under:-

a. The tariff for the period from 1.4.2009 to 31.3.2014 was allowed vide order dated 23.1.2012 in Petition No. 286/2010 in accordance with Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009.

b. Further, the petitioner had prayed for procurement of spare smoothing reactor as additional capitalisation (additional capital expenditure) in 2012-13, which was disallowed due to non-utilisation/non-commissioning. However, the petitioner was granted liberty to approach for additional capital expenditure for the smoothing reactor as soon as it is commissioned. Therefore, based on the admitted capital cost of ₹17712.57 lakh as on 31.3.2009 as well as on 31.3.2014, the final transmission tariff allowed vide order dated 23.1.2012 in Petition No. 286/2010 for the tariff period 2009-14 is as under:-

(₹ in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation	273.41	273.41	273.41	273.41	273.41
Interest on Loan	-	-	-	-	-
Return on Equity	1453.17	1453.17	1453.17	1453.17	1453.17
Interest on Working Capital	58.21	59.46	60.81	62.22	63.72
O & M Expenses	444.20	469.26	496.34	524.41	554.49
Total	**2228.99**	**2255.30**	**2283.74**	**2313.21**	**2344.80**

c. The MAT rate applicable as on 2008-09 was considered to arrive at rate of return on equity for the tariff period 2009-14, which is required to be adjusted as per the actual MAT rate applicable for the respective year at the time of truing up of tariff for 2009-14 tariff period.

d. The instant petition was filed on 6.2.2015 and the petitioner has claimed additional capital expenditure for the cost of smoothing reactor under Regulation 9(2)(v) of the 2009 Tariff Regulations during 2013-14. The petitioner has also claimed projected additional capital expenditure on account of balance expenditure towards the cost of smoothing reactor during 2014-15 alongwith projected additional capital expenditure and Decapitalisation during 2014-19 tariff period.

e. As per the petitioner, this smoothing reactor is in ready to use condition and would be replaced with the damaged/ faulty reactor as and when required.

Truing-up of Annual Fixed Charges for Tariff Period 2009-14

12. The truing up of tariff for 2009-14 tariff period has been determined as discussed hereinafter.

Capital Cost and Additional Capital Expenditure

13. Last proviso to Clause (2) of Regulation 7 of the 2009 Tariff Regulations provides that:-

> "Provided also that in case of the existing projects, the capital cost admitted by the Commission prior to 1.4.2009 duly trued up by excluding un-discharged liability, if any, as on 1.4.2009 and the additional capital expenditure projected to be incurred for the respective year of the tariff period 2009-14, as may be admitted by the Commission, shall form the basis for determination of tariff".

14. The Commission vide order dated 23.1.2012 in Petition No. 286/2010 had admitted capital cost of ₹17712.57 lakh as on 31.3.2009 and the same capital cost has been considered as on 1.4.2009 for the purpose of tariff calculation. In addition to this, the petitioner has submitted Auditors' Certificate dated 25.6.2016

vide affidavit dated 8.7.2016 for additional capital expenditure and de-capitalisation to be incurred/incurred during 2009-14 and 2014-19 periods, which is as under:-

(₹ in lakh)

Admitted capital cost as on 31.3.2009	Additional capital expenditure incurred/projected to be incurred during						Estimated completion cost as on 31.3.2019
	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	
17712.57	2004.25	260.52	625.13	10323.76	14941.14	2821.64	48689.01

15. It has been observed that the petitioner has claimed the additional capital expenditure of ₹2004.25 lakh during 2013-14 on account of capitalisation of smoothing reactor, which as per the directions dated 26.7.2016, is to be capitalised after the completion of the useful life of the existing smoothing reactor. The COD of the instant asset i.e. existing smoothing reactor was 6.6.1989 and therefore has completed its 25 years of life on 5.6.2014, which falls in 2014-15. In addition, as the new smoothing reactor is claimed to be commissioned and capitalised, the old smoothing reactor needs to be de-capitalised.

16. In view of above, the additional capital cost of ₹2004.25 lakh, claimed by the petitioner in 2013-14, towards new smoothing reactor, is allowed in 2014-15 and the original gross block of the old smoothing reactor is to be deducted from the total gross block of the instant asset.

17. Thus, the capital cost admitted as on 31.3.2009 vide order dated 23.1.2012 in Petition No. 286/2010 has been considered as the opening capital cost as on 1.4.2009 for determination of tariff in accordance with Regulation 7 of the 2009 Tariff Regulations. The admitted capital cost of ₹17712.57 lakh as on 31.3.2009 in case of instant asset has been considered as on 1.4.2009 to work out the true-up

tariff for the tariff period 2009-14. However, as no additional capital expenditure has been allowed, the capital cost allowed as on 31.3.2014 remains ₹17712.57 lakh.

Debt: Equity Ratio

18. Clause (2) of Regulation 12 of the 2009 Tariff Regulations provides that:-

> "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:
>
> (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."

19. The debt: equity ratio of 53.07:46.93, as on 31.3.2009/1.4.2009 has been considered and as no additional capital expenditure is allowed, the same ratio has been considered as on 31.3.2014 for the existing asset.

20. The details of the debt: equity considered for the purpose of tariff for 2009-14 tariff period is as under:-

(₹ in lakh)

Particulars	**Cost as on 1.4.2009**		**Cost as on 31.3.2014**	
	Amount	**%**	**Amount**	**%**
Debt	9399.70	53.07	9399.70	53.07
Equity	8312.87	46.93	8312.87	46.93
Total	**17712.57**	**100.00**	**17712.57**	**100.00**

Interest on Loan ("IOL")

21. The petitioner has not claimed any interest on loan as the entire actual and notional loan have been repaid. Therefore, no interest on loan has been allowed in this order.

Return on Equity ("RoE")

22. Clause (3), (4) and (5) of the Regulation 15 of the 2009 Tariff Regulations provide that:-

> "(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:
>
> Rate of pre-tax return on equity = 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."

23. The petitioner has submitted that MAT rate of 11.330% applicable for 2008-09 was considered in the order dated 23.1.2012 in Petition No. 286/2010. However, for truing up purpose, the computation of RoE for the tariff period 2009-14 has been done on the basis of actual MAT rate applicable during 2009-14. The

petitioner has submitted the variation in the MAT rate during 2009-14 as per the Finance Act of the relevant year for the purpose of grossing up of RoE, as below:-

Particulars	MAT Rate	Grossed up RoE (Base rate/(1-t))
2009-10	16.995 %	18.674%
2010-11	19.931 %	19.358%
2011-12	20.008 %	19.377%
2012-13	20.008 %	19.377%
2013-14	20.9605%	19.610%

24. Accordingly, the RoE as trued up is shown in the table as under:-

(₹ in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 23.1.2012	1453.17	1453.17	1453.17	1453.17	1453.17
Claimed by the petitioner	1552.35	1609.21	1610.78	1610.78	1689.11
Allowed after trued up	1552.35	1609.21	1610.78	1610.78	1630.15

25. The return on equity allowed in the instant order is higher than the return on equity allowed vide order dated 23.1.2012 due to increase in the applicable MAT rate for the purpose of grossing up of base rate of return on equity.

Depreciation

26. Clause (42) of Regulation 3 of the 2009 Tariff Regulations defines useful life as follows:-

> **"useful life'** in relation to a unit of a generating station and transmission system from the COD shall mean the following, namely:-
> .....
> (c) AC and DC sub-station 25 years
> (d) Hydro generating station 35 years
> (e) Transmission line 35 years**"**

27. Further, Clause (4) of Regulation 17 of the 2009 Tariff Regulations provide as follows:-

"17. **Depreciation** (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.
Provided that in case of hydro generating stations, the salvage value shall be as provided in the agreement signed by the developers with the State Government for creation of the site;

Provided further that the capital cost of the assets of the hydro generating station for the purpose of computation of depreciable value shall correspond to the percentage of sale of electricity under long-term power purchase agreement at regulated tariff.

(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."

28. As per Regulations 3(42) and 17 (4) of the 2009 Tariff Regulations, useful life for transmission line and sub-station is 35 years and 25 years, respectively. The instant asset was put under commercial operation on 6.6.1989 and has completed its useful life of 25 years in 2014-15. The Commission, in its order dated 23.1.2012 in Petition No. 286/2010, had observed the following:-

"27. The yearly depreciation has been worked out by spreading over the balance depreciable value over the remaining useful life of the asset. The balance useful life of the asset as per order dated 15.12.2005 in Petition No. 113/2004, for the tariff period 2004-09, was 10 years as on 1.4.2004.The life of the asset shall extinguish by the end of this tariff period. Accordingly, no more depreciation is required to be allowed after 31.3.2014."

29. Therefore, in line with order dated 23.1.2012 in Petition No. 286/2010 for the purpose of tariff calculations, 90% of the gross block of the instant asset is allowed to be fully depreciated upto 31.3.2014, although the instant asset has completed its useful life of 25 years in 2014-15. The details are as under:-

(₹ in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 23.1.2012	273.41	273.41	273.41	273.41	273.41
Claimed by the petitioner	273.41	273.42	273.41	273.42	2077.23
Allowed after trued up	273.41	273.41	273.41	273.41	273.41

30. Thus, the depreciation allowed in the instant order is same as the depreciation allowed vide order dated 23.1.2012 in Petition No. 286/2010 for the tariff period 2009-14.

Operation & Maintenance Expenses ("O&M Expenses")

31. The O&M Expenses claimed by the petitioner for tariff period 2009-14 are same as that approved in the tariff order dated 23.1.2012 in Petition No. 286/2010. Accordingly, the O&M Expenses allowed and trued up are same as under:-

(₹ in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 23.1.2012	444.20	469.26	496.34	524.41	554.49
Claimed by the petitioner	444.20	469.26	496.34	524.41	554.49
Allowed after trued up	444.20	469.26	496.34	524.41	554.49

Interest on working capital ("IWC")

32. Sub-clause (c) of clause (1) of Regulation 18 of the 2009 Tariff Regulations provides the components of the working capital for the transmission system and clause (3) of Regulation 18 of the 2009 Tariff Regulations provides for the rate of interest of working capital.

33. The petitioner has submitted that the rate of interest on working capital has been considered as 12.25% as per Clause (3) of Regulation 18 of the 2009 Tariff Regulations and the components of working capital are also considered in accordance with Sub-clause (c) of clause (1) of Regulation 18 of the 2009 Regulations.

34. The Commission in its order dated 23.1.2012 in Petition No. 286/2010 approved rate of interest on working capital of 12.25% applicable for 2008-09. In accordance with clause (3) of Regulation 18 of the 2009 Tariff Regulations, rate of interest on working capital shall be on normative basis and in case of transmission assets declared under commercial operation prior to 1.4.2009, shall be equal to short-term Prime Lending Rate as applicable as on 1.4.2009. State Bank of India short-term Prime Lending Rate on 1.4.2009 was 12.25%. Therefore, interest rate of 12.25% has been considered to work out the interest on working capital in the instant case.

35. The IWC trued up is as under:-

(₹ in lakh)

Particulars	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**
Maintenance Spares	66.63	70.39	74.45	78.66	83.17
O & M Expenses	37.02	39.11	41.36	43.70	46.21
Receivables	388.37	402.43	407.44	412.35	420.91
Total	**492.02**	**511.93**	**523.25**	**534.71**	**550.29**
Rate of Interest	12.25%	12.25%	12.25%	12.25%	12.25%
Interest	**60.27**	**62.71**	**64.10**	**65.50**	**67.41**

36. The summary of IWC earlier allowed and trued up are as shown in the table below:-

(₹ in lakh)

Particulars	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**
Approved vide order dated 23.1.2012	58.21	59.46	60.81	62.22	63.72

Claimed by the petitioner	60.27	62.71	64.10	65.50	106.23
Allowed after true up	60.27	62.71	64.10	65.50	67.41

37. The IWC has increased on account of increase in receivables due to variation in RoE on account of applicable MAT rate during the 2009-14 tariff period.

Annual Fixed Charges for 2009-14 Tariff Period

38. The detailed computation of the various components of the trued up annual fixed charges for the transmission assets for the tariff period 2009-14 is summarised below:-

(₹ in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Gross Block					
Opening Gross Block	17712.57	17712.57	17712.57	17712.57	17712.57
Additional Capitalisation	0.00	0.00	0.00	0.00	0.00
Closing Gross Block	17712.57	17712.57	17712.57	17712.57	17712.57
Average Gross Block	17712.57	17712.57	17712.57	17712.57	17712.57
Depreciation					
Rate of Depreciation	1.5436%	1.5436%	1.5436%	1.5436%	1.5436%
Depreciable Value	15941.31	15941.31	15941.31	15941.31	15941.31
Elapsed Life (Beginning of the year)	21	22	23	24	25
Weighted Balance Useful life of the assets	5	4	3	2	1
Remaining Depreciable Value	1367.05	1093.64	820.23	546.82	273.41
Depreciation	**273.41**	**273.41**	**273.41**	**273.41**	**273.41**
Interest on Loan					
Gross Normative Loan	9399.70	9399.70	9399.70	9399.70	9399.70
Cumulative Repayment upto Previous Year	9399.70	9399.70	9399.70	9399.70	9399.70
Net Loan-Opening	0.00	0.00	0.00	0.00	0.00
Addition due to Additional Capitalisation	0.00	0.00	0.00	0.00	0.00
Repayment during the year	0.00	0.00	0.00	0.00	0.00
Net Loan-Closing	0.00	0.00	0.00	0.00	0.00
Average Loan	0.00	0.00	0.00	0.00	0.00
Weighted Average Rate of Interest on Loan	0.00%	0.00%	0.00%	0.00%	0.00%
Interest	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Return on Equity					
Opening Equity	8312.87	8312.87	8312.87	8312.87	8312.87
Addition due to Additional	0.00	0.00	0.00	0.00	0.00

Capitalisation					
Closing Equity	8312.87	8312.87	8312.87	8312.87	8312.87
Average Equity	8312.87	8312.87	8312.87	8312.87	8312.87
Return on Equity (Base Rate)	15.50%	15.50%	15.50%	15.50%	15.50%
Tax rate for the year (MAT)	16.995%	19.931%	20.008%	20.008%	20.9605%
Rate of Return on Equity (Pre Tax)	18.674%	19.358%	19.377%	19.377%	19.610%
Return on Equity (Pre Tax)	**1552.35**	**1609.21**	**1610.78**	**1610.78**	**1630.15**
Interest on Working Capital					
Maintenance Spares	66.63	70.39	74.45	78.66	83.17
O & M expenses	37.02	39.11	41.36	43.70	46.21
Receivables	388.37	402.43	407.44	412.35	420.91
Total	**492.02**	**511.93**	**523.25**	**534.71**	**550.29**
Rate of Interest	12.25%	12.25%	12.25%	12.25%	12.25%
Interest	**60.27**	**62.71**	**64.10**	**65.50**	**67.41**
Annual Transmission Charges					
Depreciation	273.41	273.41	273.41	273.41	273.41
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Return on Equity	1552.35	1609.21	1610.78	1610.78	1630.15
Interest on Working Capital	60.27	62.71	64.10	65.50	67.41
O & M Expenses	444.20	469.26	496.34	524.41	554.49
Total	**2330.23**	**2414.59**	**2444.63**	**2474.11**	**2525.47**

Determination of Annual Transmission Charges for 2014-19

39. The petitioner has claimed the transmission charges as under:-

(₹ in lakh)

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Depreciation	234.47	38.70	775.07	2420.37	3596.76
Interest on Loan	-	17.84	324.24	972.32	1259.33
Return on Equity	1755.73	1781.78	2103.84	2847.01	3369.50
Interest on Working Capital	77.82	77.03	111.32	184.37	233.45
O&M Expenses	579.35	628.40	680.44	737.49	798.54
Total	**2647.37**	**2543.75**	**3994.91**	**7161.56**	**9257.58**

40. The details submitted by the petitioner in support of its claim for interest on working capital are given hereunder:-

(₹ in lakh)

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Maintenance Spares	86.90	94.26	102.07	110.62	119.78
O & M Expenses	48.28	52.37	56.70	61.46	66.55
Receivables	441.23	423.96	665.82	1193.59	1542.93
Total	**576.41**	**570.59**	**824.59**	**1365.67**	**1729.26**
Rate of Interest	13.50%	13.50%	13.50%	13.50%	13.50%
Interest	**77.82**	**77.03**	**111.32**	**184.37**	**233.45**

Capital Cost and Additional Capital expenditure

41. Clause (1) and (3) of Regulation 9 of the 2014 Tariff Regulations provides as follows:-

> "(1) The Capital cost as determined by the Commission after prudence check in accordance with this regulation shall form the basis of determination of tariff for existing and new projects."
>
> (2) The Capital Cost of a new project shall include the following:
>
> (a) the expenditure incurred or projected to be incurred up to the date of commercial operation of the project;
>
> (b) Interest during construction and financing charges, on the loans (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 funds deployed;
>
> (c) Increase in cost in contract packages as approved by the Commission;
>
> (d) Interest during construction and incidental expenditure during construction as computed in accordance with Regulation 11 of these regulations;
>
> (e) capitalised Initial spares subject to the ceiling rates specified in Regulation 13 of these regulations;
>
> (f) expenditure on account of additional capitalization and de-capitalisation determined in accordance with Regulation 14 of these regulations; 39
>
> (g) adjustment of revenue due to sale of infirm power in excess of fuel cost prior to the COD as specified under Regulation 18 of these regulations; and
>
> (h) adjustment of any revenue earned by the transmission licensee by using the assets before COD.
>
> " (3) The Capital cost of an existing project shall include the following:
>
> (a)the capital cost admitted by the Commission prior to 1.4.2014 duly trued up by excluding liability, if any, as on 1.4.2014;
>
> (b) additional capitalization and de-capitalization for the respective year of tariff as determined in accordance with Regulation 14; and
>
> (c) expenditure on account of renovation and modernisation as admitted by this Commission in accordance with Regulation 15."

42. The capital cost of ₹17712.57 lakh had been considered as on 1.4.2009 for working out the true-up tariff for 2009-14 tariff period. Further, as no additional

capital expenditure is allowed during 2009-14, the same capital cost i.e. ₹17712.57 lakh of the existing asset considered as on 31.3.2014 is considered for working out the tariff of 2014-19 period.

43. The estimated expenditure during 2014-15 is on account of balance expenditure towards the cost of spare smoothing reactor and 90% of this cost has been claimed as depreciation in one year i.e. 2014-15 and included in transmission tariff for 2014-15. Later on, the petitioner vide affidavit dated 20.1.2016 has submitted a proposal for replacement of problematic/defective equipments during 2014-19 period along with justification, details of additional capitalization/de-capitalization for different years.

44. The petitioner has submitted that the Vindhyachal HVDC back to back system was implemented in 1989, prior to establishment of PGCIL and has completed its useful life. With the aging, some of the component/equipment in the system deteriorated and may affect the stability and reliability of the Grid in case of sudden failure of the same and pole may go out of service. Sudden failure may cause consequential damages and the downtime will be higher as most of the components are imported, affecting the reliability and stability of the Grid. The transmission was system was assessed by OEM (ABB) for its residual life of various component/equipment during the year 2012-13 and suggested for replacement of some of the equipment/components for smooth operation of the system in future. The petitioner has further submitted that during 2015-16 (up to December, 2015) Vindhyachal Pole-I and Pole-II was out of service for 2456 hrs and 363 hrs respectively due to failure of various equipment/components. Combined availability of Pole-I & Pole-II for the period August, 2015 to

November, 2015 was less than normative target availability of 95%. Availability of Vindhyachal back to Back HVDC along with the reason of outage during last two years from November, 2013 to November, 2015 has been submitted. The petitioner has submitted that based on the OEM report and the failure of various equipment/components thereafter, it was required to replace some of the equipment/components at Vindhyachal HVDC Sub-station.

45. The petitioner has projected following additional capitalization and decapitalisation during 1.4.2014 to 31.3.2019:-

(₹ in lakh)

Particular	Cost
Capital cost as on 31.3.2014	19716.82
Additional Capitalisation during 2014-15	260.52**
Decapitalisation during 2014-15	0.00
Additional Capitalisation during 2015-16	850.00
Decapitalisation during 2015-16	-133.64
Additional Capitalisation during 2016-17	12142.02
Decapitalisation during 2016-17	-1909.05
Additional Capitalisation during 2017-18	17660.76
Decapitalisation during 2017-18	-2719.62
Additional Capitalisation during 2018-19	3348.04
Decapitalisation during 2018-19	-526.40
Total	48689.45

46. The petitioner, vide affidavit dated 16.3.2016, has submitted a copy of the report of OEM (ABB). We have perused the report submitted by the OEM. The OEM has recommended replacement of certain components and equipments and the details are as follows:-

1. BTB HVDC Valve Hall Equipment:

a) Thyristors & TCU Units

Since the failure rate of the Thyristors at Vindhyanchal HVDC BTB station has increased manifold in recent years, and the old

design Thyristors and TCUs are obsolete and are no longer in manufacturing line, it is imperative to replace all the old design Thyristors along with associated accessories with new design Thyristors along with accessories for the valve Hall 1 and 2 of Vindhyachal HVDC BTB for desired reliability and availability factors of this HVDC System.

b) Snubber Circuit Capacitors

Considering the ageing effects of capacitors and proposed replacement of all other neighboring equipment of Thyristors module, it is required to replace the Snubber capacitors in the Valve Hall 1 and 2 of Vindhyachal HVDC BTB station so as to enable the desired reliability and availability of the HVDC BTB system.

c) Light Guides:-

Since the chances of failure of Light Guides at Vindhyanchal HVDC stations is high due to faulty covers/cladding therefore, it is required to replace the Light Guides in the Valves Hall 1 and 2 of Vindhyachal HVDC stations so as to enable the desired reliability factors of the HVDC BTB system.

d) Valve Cooling System

The present Valve cooling system has served its operational life and reached the end of its life. The old cooling system is no more in use at any HVDC Stations and all the new HVDC Stations use new states of Art Dry type cooling system. In New Dry type cooling system, fine water is used in closed loop without need for the new water cooling system. In view of above, it is required to replace the old and obsolete design valves cooling system with new dry type design of Valve Cooling System. The

advantages of new Dry type cooling system are that it is less hazardous to environment, no requirement of raw water, less maintenance requirement as it involves only one water circuit which is the fine water circuit.

e) Valve Surge Arrestor

Since the failure of the Surge Arrester has continued to take place, it is required to replace the Surge Arrester in the Valve Hall 1 and 2 of Vindhyachal HVDC BTB station.

f) Electronic Unit DCCT in Valve Hall.

Frequent failure of the electronic circuitry based DCCT and the electronic circuit design is obsolete and hence replacement of the same is required for smooth operation of HVDC BTB.

g) HVDC Valve Hall Ventilation

In view of frequent operation problems faced due to ageing of ventilation system equipment with the decrease in efficiency, revamping of valve hall ventilation system with the new system with modern design is required for smooth operation of Vindhyachal HVDC BTB and to avert disruption of BTB of this account.

2. HVDC Control & Protection including SCADA system

Due to technology changes over the period, the original supplier is unable to provide prompt service support of these old design cards. Hence, complete control, protection and SCADA system, which are predominantly based on electronics, need to be replaced with requisite hardware/software units based on new technology application to the HVDC system.

3. **Converter Transformers and Smoothing Reactor Bushing**

It is prudent to procure one additional spare converter transformer at HVDC BTB since the repair/replacement of these converter transformer at site involve lead times ranging more than 2 years from the date of failure.

The Converter transformer and smoothing Reactor have served their useful life to avert outages of the BTB station due to failure of bushings and the same need to be replaced with the available design of bushings with polymers housing. This shall prevent fire incidence which may happen in case of failure of above mentioned indoor bushings.

4. **Switchyard Equipment (Circuit Breakers, Isolators and Grounding Switches)**

In view of operation difficulties being faced due to ageing of circuit breakers, isolators and grounding switches, the same need to be replaced to enable the desired reliability and availability of the HVDC BTB system.

47. The OEM in its concluding remarks has submitted that the equipment at Vindhyachal HVDC back to back system has already completed 25 years of service in June, 2014. The OEM has stated that Valve Hall equipments incl. Thyristors & Valve Cooling and Control, Protection & Communication Systems are required to be replaced and the AC Switchyard Equipments, Ventilation system and AC Filters are to be replaced partly. The Convertor Transformers are envisaged to continue to remain in service with additional spare unit to take care of Converter Transformer failures eventualities in future. The polymer housing bushings & oil shall be replaced as per site requirements.

The OEM has stated that similar practice is followed worldwide for HVDC systems to enhance its life and to improve reliability of the system. The OEM has further estimated cost of replacement and refurbishment of equipments in the existing HVDC BTB Blocks is about ₹34000 lakh and the expenditure on this account will be capitalized under additional capital expenditure. OEM has stated that expected Life enhancement of existing BTB blocks at Vindhyachal shall be more than 10 years for replacement items. The anticipated cost of new BTB of 2x250 MW shall be about ₹70000 lakh.

48. The petitioner has claimed following additional capital expenditure and decapitalisation for the period 2014-19 as detailed below:-

(₹ in lakh)

Equipment to be Replaced / Refurbished	**Additional capital expenditure during the year**					**De-cap during the year**				
	2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**
BTB HVDC Valve Hall Equipment		850.00	12142.02	3700.48	-		133.64	1909.05	581.81	-
Replacement of thyristors per Octuple valves (192) thyristors each) for 03 valves per HVDC Block		850.00	3650.00							
Replacement of thyristors control units per Octuple valves (192 thyristors each) for 03 valves per HVDC Block			3258.02							
Replacement of Snubber Capacitor per Octuple valves (192 thyristors each) for 03 valves per HVDC Block			2658.00							
Optical fibres, one set per valve hall per HVDC Back			828.00							
Valve cooling system- Replacement of valve cooling system with modern type of				2000.00						

two circuit system with adiabatic cooler										
Replacement of cooling pipes per Octuple valves (192 thyristors each) for 03 valves per HVDC Block			1068.00							
Replacement of Valve Arrestor in HVDC Valve Hall Block-I & Block II				960.48						
Electronic unit for DCCT				740.00						
Valve Hall Ventilation- Replacement of ventilation system alongwith introduction of Differential Pressure Sensor for effective monitoring & control			680.00							
HVDC control & protection including SCADA system				6800.00					1069.14	
Convertor Transformer and smoothing Reactor Bushing				6796.99					1068.67	
Supply of converter transformer complete				3500.00						
Supply of secondary bushing for converter transformer: type: GEKTI 450/75 AC 3150				1430.00						
Supply of 400 kV bushing TYPE:GOE 180013602500-06-ABL				700.00						
Complete overhauling of OLTC of all converter transformer				891.99						
Smoothing Reactor										
Supply of Secondary bushing for smoothing reactor type GEKTI 450/75-DC 3700				275.00						
Switchyard					3348.04					526.40

Equipment										
Refurbishment of 400 kV main CB - Pull rod replacement -Operating mechanism replacement -Supply of spare breaker-1set					770.00					
Refurbishment of 400 kV Filter CB -Pull rod replacement -Operating mechanism replacement -Supply of spare breaker-2 set					1400.00					
Replacement of 400 kV pantograph Isolator Type RP 700, S&S making including earth switches					912.60					
Replacement of 400 kV HCB Isolator Type RC 500, S&S making including earth switches					265.44					
Total		850.00	12142.02	17297.47	3348.04		133.64	1909.05	2719.62	526.40
Contingency				363.29						
Grand Total		850.00	12142.02	17660.76	3348.04	-	133.64	1909.05	2719.62	526.40

49. In response to a query regarding approval of competent authority for replacement of equipment, the petitioner vide affidavit dated 8.7.2016 has submitted that in principle technical approval from Director (Operations) for replacement of problematic equipment under Vindhyachal HVDC system. The petitioner has submitted that on approval by the Commission, execution of allowed O&M additional capital expenditure activities will be carried out keeping provisions in the budget which is approved by Board of Directors year on year basis. The petitioner has also submitted that earlier the Commission approved additional capital expenditure for Rihand-Dadri HVDC system (Petition No. 133/TT/2015 vide order dated 28.1.2016) based on the in-principle technical

approval of Director (Operations) and directed the petitioner to submit Board approval. The relevant extract of order is hereunder:-

> "47. Based on analysis of the documents furnished by the petitioner and the facts discussed above, we are convinced about the need for replacement of elements. However, it is seen that as a result of the proposed additional capital expenditure, the capital cost of the transmission system as on 31.3.2019 will be ₹177132.37 lakh (Asset I: ₹115395.62 lakh and Asset-II: ₹61736.75 lakh). This exceeds the revised cost estimate of ₹146058.00 lakh approved vide Ministry of Power letter dated 19.4.1995 by ₹31074.37 lakh. However, considering the requirement of the up gradation and its impact on operational efficiency, the additional capital expenditure is allowed under Regulation 14(3)(ix) read along with Regulation 14(3)(vii) of the 2014 Tariff Regulations. However, the petitioner is directed to submit the approval of its Board for replacement of these equipments at the time of true-up."

The petitioner has also requested the Commission to approve this additional capitalisation proposal based on in-principle technical approval of Director (Operations). Further, in line with the directions in order dated 28.1.2016 in case of Rihand-Dadri HVDC, approval of Board will be submitted at the time of truing up.

50. In response to another query regarding "Why these expenses should not be claimed in Renovation and Modernization of the system?". The petitioner has submitted that:-

a) As per Regulations, 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) Ensuring extension of life for certain period of whole transmission system beyond its useful life is very difficult just by replacing few equipments of any transmission system with new equipments i.e. majority of the equipments continue to be in service are older than 27 years. It may be

appreciated that the replaced elements form only a part of the whole system while other old elements continue to be in service.

c) ABB, vide assessment report dated 11.4.2013, suggested replacement of equipments for efficient and smooth operation of system. Further, ABB vide letter dated 27.10.2015, also communicated obsolescence of some components. The petitioner approached the Commission for replacement of problematic equipments through additional capitalisation for 8 number of projects in 2009-14 and around 15 nos. of project during the tariff block 2014-19.

d) In all cases additional capitalisation was taken up after completion of 25 years of service life. The Commission approved these proposals under additional capitalisation. During 2014-19 period, the Commission approved replacement of problematic equipments through additional capitalisation for 14 projects out of total 15 proposal submitted. The additional capitalisation for Vindhyachal HVDC back to back system may also be approved in line with 14 cases already approved in 2014-19 and 8 cases approved in 2009-14.

e) During last one year poles were out of service for longer duration due to frequent failure of various components. The combined availability of Pole I & II as certified by Member Secretary, NRPC is less than the normative target availability of 95% in number of months and in some months it was less than 50%. This clearly indicates that there is urgent need to go for replacement of problematic equipments. Availability for Vindhyachal HVDC system during last one year as certified by Member Secretary NRPC has been submitted. .

51. In response to another query regarding justification of cost, the petitioner has submitted that original cost of Vindhyachal HVDC back to back system was ₹17713 lakh which is the price level prior to 1989 i.e. 27 years old price. Cost of new single 500 MW HVDC pole as per the recent procurement is around ₹95300 lakh. (as per latest installation done for Bangladesh project carried out PGCIL, India). No back to back HVDC system has been commissioned in PGCIL transmission system after March' 2005. In order to have latest cost data, cost of the above said project has been considered. This is the cost of single pole of 500 MW capacity. Total capacity of Vindhyachal HVDC system is 500 MW but there are two poles of 250 MW each. Having two poles is a better option with higher reliability and availability. With two poles, additional equipments will be required, hence the cost of new installation will be more than ₹110000 lakh.

52. As regards the increase in life of the HVDC back to back system, the petitioner has submitted that only problematic equipments are being replaced in Vindhyachal HVDC system for smooth operation of grid with reliability and stability of the system as well as the connected grids (Northern Region and Western Region). This replacement is around 30% of the total assets. Balance 70% of total equipments are in service for more than 27 years and continue to remain in service till it is not reliable or techno-economically viable to keep the same in system. Since majority of the equipments in this project are older by more than 27 years, it is very difficult to predict the extension of the service life of overall system. It is expected to run the system at least by another 10 years on replacement of these problematic/defective equipments, however, the system will be put to use as long as possible to derive the maximum economic benefit till

system is not viable techno-economically. It is proposed to keep the useful life of this additional capitalisation portion as 10 years for the purpose of calculation of depreciation, but the system will be kept in use till the HVDC back to back system runs. This is in line with other additional capital expenditure proposal already approved by the Commission during the tariff block 2009-14 and 2014-19.

53. We have considered the submissions made by the petitioner and documents available on record. It is observed, from the data submitted in respect of monthly availability of Vindhyachal HVDC back to back station, that the availability of the system is less than the normative target availability during number of months. These equipments are in service for more than 25 years and most of these equipments have been phased out by OEMs or have become obsolete. Further, on perusal of the ABB (OEM) report submitted by the petitioner and submissions in respect of the deliberations of the petitioner's board regarding the proposed additional capital expenditure, we are convinced that there is a need for replacement of the elements.

54. The petitioner has claimed additional capital expenditure of ₹260.52 lakh during 2014-15, as balance and retention payment towards procurement of spare smoothing reactor, which is in addition to ₹2004.25 lakh, claimed in 2013-14 towards the capital cost of smoothing reactor, but has been disallowed as additional capital expenditure during 2013-14 in this order. Further, in response to the direction of the Commission, the petitioner, vide affidavit dated 8.7.2016, has submitted the gross block of the old smoothing reactor and accordingly ₹76.68 lakh has been considered towards decapitalisation during 2014-15 on account of

the old smoothing reactor being replaced. Thus, as discussed at para-16, the new smoothing reactor has been considered to have been put under commercial operation during 2014-15, instead of 2013-14 as claimed by the petitioner. Therefore, the additional capital expenditure allowed in 2014-15 is ₹2188.09 lakh (₹2004.25 lakh+₹260-52 lakh-₹76.68 lakh) against ₹2264.77 lakh, claimed by the petitioner during 2013-14 and 2014-15.

55. However, the petitioner has not provided details of the contingency expenses of ₹363.29 lakh claimed during the 2017-18 and the same is not allowed. Therefore, the details of net additional capital expenditure allowed considering add-cap and de-cap of respective years, under Regulation 14(3)(ix) read along with Regulation 14(3)(vii) of the 2014 Tariff Regulations are as under:-

(₹ in lakh)

Admitted Capital Cost as on 31.3.2009	Allowable Expenditure during						Total estimated expenditure
	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	
17712.57	-	2188.09	625.13	10323.76	14577.85	2821.64	48249.04

56. The additional capital expenditure allowed hereinabove is based on the "In-principle technical approval" of Director (Operations) of the petitioner. The petitioner is directed to submit the approval of its Board of Directors at the time of truing-up. The additional capital expenditure as discussed at para-55 above would be reviewed at the time of truing-up, subject to prudence check and submission of relevant information by the petitioner.

Debt: Equity Ratio

57. Clause (1), Clause (3) and Clause (5) of Regulation 19 of the 2014 Tariff Regulations specify as follows:-

"(1) For a project declared under commercial operation on or after 1.4.2014, the debt-equity ratio would be considered as 70:30 as on COD. 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:

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

(ii) the equity invested in foreign currency shall be designated in Indian rupees on the date of each investment:

(iii) any grant obtained for the execution of the project shall not be considered as a part of capital structure for the purpose of debt : equity ratio.

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, only if such premium amount and internal resources are actually utilised for meeting the capital expenditure of the generating station or the transmission system."

"(2)----------

(3) In case of the generating station and the transmission system declared under commercial operation prior to 1.4.2014, debt: equity ratio allowed by the Commission for determination of tariff for the period ending 31.3.2014 shall be considered."

"(4)----------

(5) Any expenditure incurred or projected to be incurred on or after 1.4.2014 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."

58. The debt: equity ratio of 53.07: 46.93 for the existing gross block has been admitted after true-up for the tariff period ending 31.3.2014 in the instant petition. In view of, the petitioner being allowed to incur additional expenditure only as a special case, in the interest of all the beneficiaries concerned, to extend the life of instant asset by at least another ten years as well as at a cost lower than the cost of a new HVDC system, we are inclined to allow RoE on the equity of the existing asset, though it has completed its 25 year's life. Therefore, as specified in clause

(3) of the 2014 Tariff Regulations, the debt: equity ratio considered as on 1.4.2014 and 31.3.2019 is as under:-

(₹ in lakh)

Particulars	Admitted gross block as on 1.4.2014		Admitted gross block as on 31.3.2019	
	Amount	%	Amount	%
Debt	9399.70	53.07	30775.23	63.78
Equity	8312.87	46.93	17473.81	36.22
Total	**17712.57**	**100.00**	**48249.04**	**100.00**

59. In case of net additional capital expenditure during 2014-19, the debt: equity ratio is considered as 70: 30, as specified in Clause (5) of the 2014 Tariff Regulations. Though, strictly speaking, the additional capital expenditure allowed in this order is not an expenditure which qualifies for renovation and modernisation for life extension, but is allowed only as a special case, in the interest of all the beneficiaries concerned, to extend the life of instant asset by at least another ten years at a cost lower than the cost of a new HVDC system. The details of the debt: equity ratio considered for the purpose of tariff during 2014-19 tariff period are as follows:-

(₹ in lakh)

Particulars	Additional capital expenditure						
	Amount	Amount	Amount	Amount	Amount	Amount	% age
	2014-15	2015-16	2016-17	2017-18	2018-19	Total	
Debt	1531.66	437.59	7226.63	10204.50	1975.15	21375.53	70.00
Equity	656.43	187.54	3097.13	4373.36	846.49	9160.94	30.00
Total	**2188.09**	**625.13**	**10323.76**	**14577.85**	**2821.64**	**30536.47**	**100.00**

Interest on Loan ("IOL")

60. Regulation 26 of the 2014 Tariff Regulations with regard to Interest on Loan specifies as under:-

> "(1) The loans arrived at in the manner indicated in regulation 19 shall be considered as gross normative loan for calculation of interest on loan.

(2) The normative loan outstanding as on 1.4.2014 shall be worked out by deducting the cumulative repayment as admitted by the Commission up to 31.3.2014 from the gross normative loan.

(3) The repayment for each of the year of the tariff period 2014-19 shall be deemed to be equal to the depreciation allowed for the corresponding year/period. In case of decapitalisation of assets, the repayment shall be adjusted by taking into account cumulative repayment on a pro rata basis and the adjustment should not exceed cumulative depreciation recovered upto the date of decapitalisation of such asset.

(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 depreciation allowed for the year or part of the year.

5) The rate of interest shall be the weighted average rate of interest calculated on the basis of the actual loan portfolio after providing appropriate accounting adjustment for interest capitalized:

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."

61. The actual loans and notional loans in respect of existing asset have been repaid as on 31.3.2014. Thus, no interest on loan has been allowed for the debt portion of the existing asset. However, the petitioner, vide affidavit dated 8.7.2016, has submitted that the additional capital expenditure during 2014-19 has been financed with totally 100% equity. Therefore, in case of additional capital expenditure, notional equity and notional loan are being allowed for tariff calculation purpose for period 2014-19. Further, the entire actual loans and notional loans had already been repaid for the instant asset. Therefore, the weighted average rate of interest for the whole company is worked out for 2014-15 and has been considered for the 2014-19 tariff period, as per Proviso 2 of 26 (5) of the 2014 Tariff Regulations, which would be reviewed at the time of truing-up.

62. The IOL for additional capital expenditure has been worked out in accordance with Regulation 26 of the 2014 Tariff Regulations. The details of weighted average rate of interest are placed at Annexure-1 and the IOL for additional capital expenditure has been worked out and allowed is as under:-

(₹ in lakh)

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Gross Normative loan	-	1531.66	1969.25	9195.89	19400.38
Cumulative Repayment upto previous year	-	98.46	337.59	1192.59	3648.41
Net Loan-Opening	-	1433.20	1631.66	8003.30	15751.97
Additions during the year	1531.66	437.59	7226.63	10204.50	1975.15
Repayment during the year	98.46	239.13	855.00	2455.82	3760.78
Net Loan-Closing	1433.20	1631.66	8003.30	15751.97	13966.34
Average Loan	716.60	1532.43	4817.48	11877.64	14859.16
Weighted Rate of Interest	6.91%	6.91%	6.91%	6.91%	6.91%
Interest	**49.52**	**105.91**	**332.94**	**820.88**	**1026.93**

Return on Equity ("ROE")

63. Clause (1) and (2) of Regulation 24 and Clause (1) and (2) of Regulation 25 of the 2014 Tariff Regulations specify as follows:-

> " **24. Return on Equity**: (1) Return on equity shall be computed in rupee terms, on the equity base determined in accordance with regulation 19.
>
> (2) Return on equity shall be computed at the base rate of 15.50% for thermal generating stations, transmission system including communication system and run of the river hydro generating station, and at the base rate of 16.50% for the storage type hydro generating stations including pumped storage hydro generating stations and run of river generating station with pondage:
>
> Provided that:
>
> (i) in case of projects commissioned on or after 1st April, 2014, an additional return of **0.50 %** shall be allowed, if such projects are completed within the timeline specified in **Appendix-I**:
>
> (ii) the additional return of 0.5% shall not be admissible if the project is not completed within the timeline specified above for reasons whatsoever:
>
> (iii) additional RoE of 0.50% may be allowed if any element of the transmission project is completed within the specified timeline and it is certified by the Regional Power Committee/National Power Committee that commissioning of the particular element will benefit the system operation in the regional/national grid:

(iv) the rate of return of a new project shall be reduced by 1% for such period as may be decided by the Commission, if the generating station or transmission system is found to be declared under commercial operation without commissioning of any of the Restricted Governor Mode Operation (RGMO)/ Free Governor Mode Operation (FGMO), data telemetry, communication system up to load dispatch centre or protection system:

(v) as and when any of the above requirements are found lacking in a generating station based on the report submitted by the respective RLDC, RoE shall be reduced by 1% for the period for which the deficiency continues:

(vi) additional RoE shall not be admissible for transmission line having length of less than 50 kilometers."

"25. Tax on Return on Equity:
(1) The base rate of return on equity as allowed by the Commission under Regulation 24 shall be grossed up with the effective tax rate of the respective financial year. For this purpose, the effective tax rate shall be considered on the basis of actual tax paid in the respect of the financial year in line with the provisions of the relevant Finance Acts by the concerned generating company or the transmission licensee, as the case may be. The actual tax income on other income stream (i.e., income of non generation or non transmission business, as the case may be) shall not be considered for the calculation of "effective tax rate".

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

Rate of pre-tax return on equity = Base rate / (1-t)

Where "t" is the effective tax rate in accordance with Clause (1) of this regulation and shall be calculated at the beginning of every financial year based on the estimated profit and tax to be paid estimated in line with the provisions of the relevant Finance Act applicable for that financial year to the company on pro-rata basis by excluding the income of non-generation or non-transmission business, as the case may be, and the corresponding tax thereon. In case of generating company or transmission licensee paying Minimum Alternate Tax (MAT), "t" shall be considered as MAT rate including surcharge and cess."

64. The petitioner has computed ROE at the rate of 19.610% after grossing up the ROE with MAT rate of 20.961% as per the above Regulations. The petitioner has submitted that the grossed up ROE is subject to truing up based on the actual tax paid along with any additional tax or interest, duly adjusted for any refund of tax including the interest received from IT authorities, pertaining to the tariff period 2014-19 on actual gross income of any financial year. Any under-recovery or over-

recovery of grossed up ROE after truing up shall be recovered or refunded to the beneficiaries on year to year basis.

65. The petitioner has further submitted that adjustment due to any additional tax demand including interest duly adjusted for any refund of the tax including interest received from IT authorities shall be recoverable/ adjustable after completion of income tax assessment of the financial year.

66. We have considered the submissions made by the petitioner. Regulation 24 read with Regulation 25 of the 2014 Tariff Regulations provides for grossing up of return on equity with the effective tax rate for the purpose of return on equity. It further provides that in case the generating company or transmission licensee is paying Minimum Alternative Tax (MAT), the MAT rate including surcharge and cess will be considered for the grossing up of return on equity. The petitioner has submitted that MAT rate is applicable to the petitioner's company. Accordingly, the MAT rate applicable during 2013-14 has been considered for the purpose of return on equity, which shall be trued up with actual tax rate in accordance with Regulation 25 (3) of the 2014 Tariff Regulations. The gross equity for existing asset determined as on 31.3.2014/1.4.2014 and normative equity for additional capital expenditure as admitted during 2014-19 have been considered separately for working out RoE. Accordingly, the ROE determined is under:-

(₹ in lakh)

Particulars	**RoE on existing gross equity**				
	2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**
Opening Equity	8312.87	8312.87	8312.87	8312.87	8312.87
Addition due to Additional Capitalisation	-	-	-	-	-
Closing Equity	8312.87	8312.87	8312.87	8312.87	8312.87
Average Equity	8312.87	8312.87	8312.87	8312.87	8312.87
Return on Equity (Base Rate) (%)	15.50%	15.50%	15.50%	15.50%	15.50%
MAT rate for the year (%)	20.9605%	20.9605%	20.9605%	20.9605%	20.9605%
Rate of Return on Equity (Pre Tax) (%)	19.610%	19.610%	19.610%	19.610%	19.610%

Return on Equity (Pre Tax)	1630.15	1630.15	1630.15	1630.15	1630.15
Particulars	**RoE on normative equity for additional capital expenditure**				
	2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**
Opening Equity	-	656.43	843.97	3941.09	8314.45
Addition due to Additional Capitalisation	656.43	187.54	3097.13	4373.36	846.49
Closing Equity	656.43	843.97	3941.09	8314.45	9160.94
Average Equity	328.21	750.20	2392.53	6127.77	8737.70
Return on Equity (Base Rate) (%)	15.50%	15.50%	15.50%	15.50%	15.50%
MAT rate for the year (%)	20.9605%	20.9605%	20.9605%	20.9605%	20.9605%
Rate of Return on Equity (Pre Tax) (%)	19.610%	19.610%	19.610%	19.610%	19.610%
Return on Equity (Pre Tax)	**64.36**	**147.11**	**469.18**	**1201.66**	**1713.46**

Depreciation

67. Regulation 27 of the 2014 Tariff Regulations with regard to depreciation specifies as follows:-

> **"27. Depreciation:**
> (1) Depreciation shall be computed from the date of commercial operation of a generating station or unit thereof or a transmission system including communication system or element thereof. In case of the tariff of all the units of a generating station or all elements of a transmission system including communication system for which a single tariff needs to be determined, the depreciation shall be computed from the effective date of commercial operation of the generating station or the transmission system taking into consideration the depreciation of individual units or elements thereof.
>
> Provided that effective date of commercial operation shall be worked out by considering the actual date of commercial operation and installed capacity of all the units of the generating station or capital cost of all elements of the transmission system, for which single tariff needs to be determined.
>
> (2) The value base for the purpose of depreciation shall be the capital cost of the asset admitted by the Commission. In case of multiple units of a generating station or multiple elements of transmission system, weighted average life for the generating station of the transmission system shall be applied. 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
>
> (3) 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:
>
> Provided that in case of hydro generating station, the salvage value shall be as provided in the agreement signed by the developers with the State Government for development of the Plant:
>
> Provided further that the capital cost of the assets of the hydro generating station for the purpose of computation of depreciated value shall correspond to the percentage of sale of electricity under long-term power purchase agreement at regulated tariff:

Provided also that any depreciation disallowed on account of lower availability of the generating station or generating unit or transmission system as the case may be, shall not be allowed to be recovered at a later stage during the useful life and the extended life.

(4) 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.

(5) Depreciation shall be calculated annually based on Straight Line Method and at rates specified in **Appendix-II** 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 the effective date of commercial operation of the station shall be spread over the balance useful life of the assets.

(6) In case of the existing projects, the balance depreciable value as on 1.4.2014 shall be worked out by deducting the cumulative depreciation as admitted by the Commission upto 31.3.2014 from the gross depreciable value of the assets."

68. The instant asset was put under commercial operation on 6.6.1989 and has already completed its useful life of 25 years. As such, as specified vide clause (3) of Regulation 27 of the Tariff Regulations, no further depreciation is allowed in this order on the existing gross block admitted as on 1.4.2014 i.e. ₹17712.57 lakh and there is no need to adjust cumulative depreciation as well, beyond 31.3.2014. However, the additional capital expenditure during 2014-19 is allowed as a special case, in the interest of all the beneficiaries concerned, to extend the life of instant asset by at least another ten years at a cost lower than the cost of a new HVDC system. Therefore, depreciation from 2014-15, relating to additional capital expenditure of smoothing reactor has been worked out by spreading out over a period of next ten years. Similarly, the depreciation corresponding to the year wise additional capital expenditures is considered to be recovered till the end of ten years of extended life by spreading it over accordingly.

69. The details of the depreciation allowed for additional capital expenditure during 2014-19 are given hereunder:-

(₹ in lakh)

Particulars	Depreciation on additional capital expenditure				
	2014-15	2015-16	2016-17	2017-18	2018-19
Opening Gross block	-	2188.09	2813.22	13136.98	27714.83
Additions during the year due to projected additional capitalization	2188.09	625.13	10323.76	14577.85	2821.64
Closing Gross block	2188.09	2813.22	13136.98	27714.83	30536.47
Average gross block	1094.05	2500.66	7975.10	20425.91	29125.65
Rate of Depreciation (%)	9.000%	9.562%	10.721%	12.023%	12.912%
Depreciable Value	984.64	2250.59	7177.59	18383.31	26213.09
Elapsed Life at beginning of the year	0	1	2	3	4
Balance Useful life of the asset	10	9	8	7	6
Remaining Depreciable Value	984.64	2152.13	6840.00	17190.73	22564.68
Depreciation	**98.46**	**239.13**	**855.00**	**2455.82**	**3760.78**

Operation & Maintenance Expenses ("O&M Expenses")

70. Regulation 29 (4) (a) of the 2014 Tariff Regulations specifies the norms for operation and maintenance expenses for the transmission system based on the type of sub-station and the transmission line. Norms specified in respect of the elements covered in the instant petition are as follows:-

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
400 kV S/C twin conductor (₹ lakh/km)	0.404	0.418	0.432	0.446	0.461
HVDC back to back stations (₹ lakh/500 MW)	578.00	627.00	679.00	736.00	797.00

71. The petitioner has claimed O&M Expenses as per sub-clause (a) of clause (3) of Regulation 29 of the 2014 Tariff Regulations. Accordingly, the petitioner's entitlement to O&M Expenses has been worked. The details are as given overleaf:-

(₹ in lakh)

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
3.34 km 400 kV S/C twin conductor T/L	1.35	1.40	1.44	1.49	1.54
HVDC back to back station	578.00	627.00	679.00	736.00	797.00
Total	**579.35**	**628.40**	**680.44**	**737.49**	**798.54**

72. The petitioner has submitted that O&M Expenses for the tariff period 2014-19 have been arrived on the basis of normalized actual O&M Expenses during the period 2008-13. The petitioner has further submitted that the wage revision of the employees of the petitioner Company is due during 2014-19 and actual impact of wage hike, which will be effective at a future date, has not been factored in fixation of the normative O&M rate specified for the tariff period 2014-19. The petitioner has prayed to be allowed to approach the Commission for suitable revision in the norms of O&M Expenses for claiming the impact of such increase.

73. Both BRPL and MPPMCL have submitted that any financial impact of wage revision during 2014-19 tariff period must be taken care of by the respondent itself and the burden, if any, should not be passed on to the beneficiaries. The O&M Expenses have been worked out as per the norms of O&M Expenses specified in the 2014 Tariff Regulations. As regards impact of wage revision, any application filed by the petitioner in this regard will be dealt with in accordance with the appropriate provisions of the 2014 Tariff Regulations.

74. The details of O&M Expenses allowed are as given hereunder:-

(₹ in lakh)

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
O&M Expenses allowed	579.35	628.40	680.44	737.49	798.54

Interest on Working Capital ("IWC")

75. Clause 1 (c) and 3 of Regulation 28 and Clause 5 of Regulation 3 of the 2014 Tariff Regulations specify as follows:-

"**28. Interest on Working Capital:** (1) The working capital shall cover:

(a)-------

(c) Hydro generating station including pumped storage hydro electric generating station and transmission system including communication system:

(i) Receivables equivalent to two months of fixed cost;

(ii) Maintenance spares @ 15% of operation and maintenance expenses specified in regulation 29; and

(iii) Operation and maintenance expenses for one month"

(3) Rate of interest on working capital shall be on normative basis and shall be considered as the bank rate as on 1.4.2014 or as on 1st April of the year during the tariff period 2014-15 to 2018-19 in which the generating station or a unit thereof or the transmission system including communication system or element thereof, as the case may be, is declared under commercial operation, whichever is later"

"(5) 'Bank Rate' means the base rate of interest as specified by the State Bank of India from time to time or any replacement thereof for the time being in effect plus 350 basis points;"

76. The interest on working capital is worked out in accordance with Regulation 28 of the 2014 Tariff Regulations. The rate of interest on working capital considered is 13.50% (SBI Base Rate of 10% plus 350 basis points). The interest on working capital as determined is as follows:-

(₹ in lakh)

Particulars	**IWC on existing cost of the asset**				
	2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**
Maintenance Spares	-	-	-	-	-
O & M expenses	-	-	-	-	-
Receivables	277.95	277.95	277.95	277.95	277.95
Total	**277.95**	**277.95**	**277.95**	**277.95**	**277.95**
Rate of Interest	13.50%	13.50%	13.50%	13.50%	13.50%
Interest	**37.52**	**37.52**	**37.52**	**37.52**	**37.52**
Particulars	**IWC on additional capital expenditure portion**				
	2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**

Maintenance Spares	86.90	94.26	102.07	110.62	119.78
O & M expenses	48.28	52.37	56.70	61.46	66.55
Receivables	138.10	194.43	402.21	893.28	1248.91
Total	**273.28**	**341.06**	**560.98**	**1065.36**	**1435.24**
Rate of Interest	13.50%	13.50%	13.50%	13.50%	13.50%
Interest	**36.89**	**46.04**	**75.73**	**143.82**	**193.76**

Annual Transmission Charges

77. The Annual Transmission Charges allowed after considering the existing cost as on 1.4.2014 combined with additional capital expenditure for the instant asset are as under:-

(₹ in lakh)

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Depreciation	98.46	239.13	855.00	2455.82	3760.78
Interest on Loan	49.52	105.91	332.94	820.88	1026.93
Return on Equity	1694.52	1777.27	2099.33	2831.81	3343.62
Interest on Working Capital	74.42	83.57	113.26	181.35	231.28
O&M Expenses	579.35	628.40	680.44	737.49	798.54
Total	**2496.27**	**2834.27**	**4080.97**	**7027.34**	**9161.15**

Filing Fee and Publication Expenses

78. The petitioner has sought reimbursement of fee paid by it for filing the petition and publication expenses, in terms of Regulation 52 of the 2014 Tariff Regulations. BRPL has submitted that the application filing fee and the expenses incurred on publication of notices can be allowed at the discretion of the Commission. The petitioner shall be entitled for reimbursement of the filing fees and publication expenses in connection with the present petition, directly from the beneficiaries on pro-rata basis in accordance with clause (1) of Regulation 52 of the 2014 Tariff Regulations.

Licence Fee and RLDC Fees and Charges

79. The petitioner has requested to allow the petitioner to bill and recover License fee and RLDC fees and charges, separately from the respondents. The

petitioner shall be entitled for reimbursement of licence fee and RLDC fees and charges in accordance with Clause (2)(b) and (2)(a), respectively, of Regulation 52 of the 2014 Tariff Regulations.

Service Tax

80. The petitioner has made a prayer to be allowed to bill and recover the service tax on transmission charges separately from the respondents, if notification regarding granting of exemption to transmission service is withdrawn at a later date and it is subjected to such service tax in future the beneficiaries shall have to share the service tax paid by the petitioner. We consider petitioner's prayer pre-mature and accordingly this prayer is rejected.

Deferred Tax Liability

81. The petitioner has sought recovery of deferred tax liability before 1.4.2009 from the beneficiaries or long term consumers/ DICs as and when materialized under Regulation 49 of the 2014 Tariff Regulations. In our view, as the original asset has completed its useful life of 25 years, the deferred tax liability, if any should have already been recovered. However, if any, deferred tax liability remains the same shall be dealt as per Regulations 49 of the 2014 Tariff Regulations, as amended. Accordingly, the petitioner is entitled to recover the deferred tax liability upto 31.3.2009 whenever the same materializes, directly from the beneficiaries or long term transmission customers /DICs.

Sharing of Transmission Charges

82. 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, as provided in Regulation 43 of the 2014 Tariff Regulations.

83. This order disposes of Petition No. 543/TT/2014.

sd/-	sd/-	sd/-	sd/-
(M.K. Iyer)	**(A.S. Bakshi)**	**(A.K. Singhal)**	**(Gireesh B. Pradhan)**
Member	**Member**	**Member**	**Chairperson**

Annexure-1

(₹ in lakh)

From PGCIL Balance Sheet (As a whole)				
Year	**2014-15**			
Loan	**As on 31.3.2015**	**As on 31.3.2014**	**Average Loan during the year**	**Weighted Average Rate of Interest**
Long Term Borrowing	8937584.00	7679022.00	8308303.00	
Total Loans	8937584.00	7679022.00	8308303.00	
(a) Average Loans during the year			**8308303.00**	
Interest on loan and Finance Charges	619970.00	528422.00	574196.00	
(b) Average Interest during the year			**574196.00**	
Weighted Average Rate of Interest {(b)/(a)}				**6.9111%**