CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 56/TT/2015

Coram:

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

Date of Hearing : 21.07.2015
Date of Order : 29.07.2016

In the matter of:

Approval of transmission tariff from COD to 31.03.2019 for Installation of 1x315 MVA, 400/220 kV ICT at Bhadravati HVDC back to back station under "Installation of Transformers and Procurement of Spare convertor Transformer at Bhadravati Back to Back Station" under Regulation-86 of Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999 and Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2014.

And in the matter of:

Power Grid Corporation of India Limited,
"Saudamani", Plot No.2,
Sector-29, Gurgaon -122 001 **…….Petitioner**

Vs

1. Madhya Pradesh Power Management Company Ltd.,
   Shakti Bhawan, Rampur
   Jabalpur-482 008.

2. Maharashtra State Electricity Distribution Company Limited,
   HongKong Bank Builidng, 3rd Floor,
   M. G. Road, Fort
   Mumbai-400 001.

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

4. Electricity Department, Government of Goa,
   Vidyut Bhawan, Panaji,

Near Mandvi Hotel, Goa-403 001.

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

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

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

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

For Petitioner : Shri A. M. Pavgi, PGCIL
Shri Piyush Awasthi, PGCIL
Shri M.M. Mondal, PGCIL
Shri S. K. Venkatesan, PGCIL

For Respondents : None

ORDER

The instant petition has been filed by Power Grid Corporation of India Limited (PGCIL), the petitioner, seeking transmission tariff for 1x315 MVA, 400/220 kV ICT at Bhadravati HVDC back to back station under “Installation of Transformers and Procurement of Spare Convertor Transformer at Bhadravati Back to Back Station” (hereinafter referred to as “transmission assets”) from COD to 31.3.2019 under Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2014.

2. The Investment Approval (IA) of the project was accorded by Board of Directors of the petitioner on 28.8.2013 at an estimated cost of ₹13565 lakh including Interest During Construction of ₹664 lakh on April, 2013 price level. The scheme was approved in the 33rd SCM of Western Region held on 21.10.2011 and further modified in the 34th SCM of WR held on 9.5.2012. It was decided in the 34th SCM that 220 kV bays associated with instant ICT would be taken up for implementation by the petitioner as and when requested by MSETCL. The transmission system was later discussed and agreed for implementation in the 21st WRPC meeting held on 9.11.2012. The petitioner vide affidavit dated 18.3.2016 has submitted the Revised Cost Estimate of the project decided by the Board of Directors of the petitioner in its 326th meeting held on 9.3.2016 of ₹16902 lakh including IDC of ₹955 lakh based on August, 2015 price level.

3. The scope of work covered under the scheme for Installation of Transformers & Procurement of Spare convertor Transformer at Bhadrawati back to back station is as follows:-

Sub-station:

a. Installation of 1x315 MVA, 400/220 kV ICT at Bhadrawati HVDC back to back station
b. Spare converter transformers (234MVA, 1-Ph 3 winding): 3 nos.

4. The instant petition covers Installation of 1x315 MVA, 400/220 kV ICT at Bhadrawati HVDC back to back station. As per the IA dated 28.8.2013, the instant asset was scheduled to be commissioned within 24 months, i.e. by 27.8.2015. The petitioner has claimed 19.3.2015 as the COD of the instant asset. The petitioner has

also submitted the "Certificate of completion of Trial Operation of Transmission Element" dated 1.4.2015 issued by WRLDC as required under Regulation 5(2) of the 2014 Tariff Regulations.

5. The matter was heard on 3.3.2015 for considering the petitioner's prayer for grant of AFC under Regulation 7(7) of the 2014 Tariff Regulations for inclusion in PoC charges. However, AFC was not granted as the utilization of the instant assets was not clear. The matter was also heard on 21.7.2015. The petitioner was directed to submit the status of 3 nos. of spare convertor transformer (234 MVA, 1-phase 3-winding) included in the IA, the status of line bays of the instant ICT and downstream system, the reason for inclusion of 220 kV bays in the scope of work despite discussion in the Standing Committee that the same to be taken up as and when required by MSETCL and how the COD of 315 MVA ICT can be allowed on account of loading in tertiary winding besides other information.

6. In response, the petitioner vide affidavit dated 13.7.2015 and 13.10.2015 has submitted as under:-

a) The 3 units of 234 MVA, 1 ph. 3 winding spare converter transformers are under manufacturing and scheduled to be supplied by October, 2015.

b) As regards the status of line bays of the instant ICT and downstream system, the 400/220 kV ICT at Bhadrawati was agreed alongwith bays at 400 kV and 220 kV level. However, MSETCL requested that provision of 220 kV bays should be deleted from the scope to avoid the cost of 220 kV bays. The 220 kV bays associated with the 400/220 kV ICT at Bhadrawati

HVDC station would be taken up for implementation by the petitioner as and when requested by MSETCL. The modified transmission scheme of the instant Project was discussed and approved in the 34th Standing Committee Meeting held on 9.5 2012 and was ratified in the 21st Meeting of WRPC held on 9.11.2012. Accordingly, in line with the decision taken in the above referred meetings, 220 kV bay is not considered in the instant petition for ICT at Bhadrawati. The said ICT at Bhadrawati shall be used for auxiliary Power Supply through tertiary (33kV) winding of the transformer. The 220 kV bays associated with the 400/220 kV ICT at Bhadrawati HVDC station would be taken up for implementation by PGCIL as and when requested by MSETCL. Similar arrangement for taking reliable power supply to HVDC station from tertiary of ICTs also exists in other HVDC Stations of the petitioner.

c) The reliability and quality auxiliary power supply is essential for smooth running of HVDC Back to Back System at Bhadrawati station. Number of tripping of this HVDC system took place in the past due to non-availability of quality uninterrupted auxiliary power supply. Non-availability of uninterrupted power supply shall lead to tripping of HVDC system as valve cooling system is desired to run continuously for cooling of thyristors used for AC to DC and DC to AC conversion. This HVDC system is also an inter-regional element, sudden load throw off due to outage of HVDC system may affect the stability of Western Region and Southern Region.

d) In order to avail reliable and quality auxiliary power supply, 315 MVA ICT installed by the petitioner and auxiliary power is drawn through tertiary winding of the ICT.

7. The petitioner has submitted that there are advantages and benefits of installation of 315 MVA ICT against the auxiliary power supply requirement of 2 MVA and has submitted the following justification for the same:-

a) The available source voltage for the ICT at Bhadrawati Sub-station to avail reliable and quality auxiliary power supply is at 400 kV level. Therefore, 400/220/33 kV transformer is required to be installed.

b) The 315 MVA is a standard designed transformer available and almost all the transformer suppliers in India manufacture the same. The petitioner could have gone for a lower MVA ICT for this auxiliary power supply at Bhadrawati Sub-station but that will be a non-standard product. Procuring such non-standard product needs design validation, manufacturing and type testing for establishing its design and manufacturing correctness, which will not only takes long time but also involves additional cost.

c) Only one transformer is installed in the Bhadravati Sub-station. In case of major outage due to breakdown/failure of this ICT (non-standard capacity), the source of auxiliary power will again be dependent on the DISCOM's supply (which is having problem). Therefore, spare ICT for this non-standard product is required to be kept in the sub-station which involves additional cost and hence additional burden on the beneficiaries.

d) Installed a 315 MVA ICT, which is a standard transformer and for which a spare 315 MVA ICT is available with the petitioner to take care of any contingency like major outage due to breakdown of failure.

e) As on date, there may not be any requirement of the state electricity board at 220 kV level. Due to rapid urbanization/development, number of new sub-stations are being created or upgradation of transformation capacity of the existing substations are taking place to take care of the growing load demand of that area. MSETCL may draw 315 MVA power supply at 220 kV level in future, if required. If lower capacity ICT is installed in Bhadravati sub-station now, then for any future load requirement by SEB, this present ICT of lower capacity may not be enough to cater the load. Therefore, additional ICTs would be required to install at additional cost. There may be space constraints in the sub-station resulting limitation of installation of additional higher capacity transformers in future. Hence, going for lower capacity transformer at this stage is not cost effective in long term view.

f) In additional to above advantages of installation of 315 MVA ICTs at Bhadrawati sub-station for auxiliary power supply, it takes care of grid stability and reliability of two grids and this outweighs the aspect of marginal increase in cost of installation of 315 MVA ICT instead of lower capacity. Similar arrangement for taking reliable power supply to HVDC station from tertiary of ICTs also exists in other HVDC Stations of the petitioner.

8. CEA and WRLDC were directed to submit their comments on the date of commissioning of the instant assets. We have not received any comments from CEA inspite of a reminder. WRLDC, vide affidavit dated 29.6.2016, has submitted that the ICT at Bhadrawati along with the associated elements was charged on 17.3.15 at 22:05 hrs and 24 hours successful trial operation was completed on 18.3.15 at 22:05 hrs. Reliability of auxiliary supply for HVDC was the primary reason for installing this ICT at Bhadrawati Sub-station, considering the high utilization factor of HVDC back to back inter regional HVDC link at Bhadrawati Sub-station. The matter was discussed in 17th, 18th, 19th WRPC meetings and 33rd and 34th Standing Committee Meetings of Western Region. As regards the status of commissioning of downstream assets of MSEDCL, WRLDC submitted that as per the minutes of the 474th OCC meeting of WRPC held on 13.8.2015 it can be inferred that the 33 kV inter-connection with MSEDCL was not ready at the time of trial operation of the 315 MVA, 400/220 kV Bhadrawati ICT.

Analysis and Decision

9. The instant scheme was approved in the 33rd SCM of Western Region held on 21.10.2011. The scheme was also deliberated in the 19th WRPC meeting held on 10.2.2012 wherein it was agreed that keeping in view high utilization factor of HVDC back-to-back station at Bhadrawati and large number of instances of auxiliary power supply failure, provision of 1x315 MVA ICT alongwith 2 No. of line bays for back-to-back station at Bhadrawati. The instant asset was to be commissioned alongwith the associated 220 kV bays alongwith the downstream assets of MSEDCL. In the 34th

meeting of the Standing Committee on System Planning of Western Region held on 9.5.2012, the issue was deliberated and the following decision was taken:-

> "(i) MSETCL representative informed that provision of 1x315 MVA ICT along with associated 220 kV bays at Bhadrawati for reliable auxiliary power supply to HVDC station has been agreed. There are many generation projects coming up in vicinity of Bhadrawati, therefore, utilization of 220 kV bays for drawl of power from Bhadrawati cannot be ensured. Therefore, it is suggested that POWERGRID may avail the auxiliary power supply at EHV level from MSETCL. And in case, POWERGRID was going ahead with the implementation of 315 MVA ICT, provision of 220 kV bays should be deleted from the scope to avoid bay charges.
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> (ii) POWERGRID stated that the provision of 1x315 MVA ICT along with 220 kV bays at Bhadrawati for reliable auxiliary power supply to HVDC station has been discussed and agreed in the last SCM and also in WRPC meeting. In view of the high utilization factor of this inter-regional link, for reliable auxiliary supply to the HVDC back-to-back station at Bhadrawati, 1x315 MVA ICT was essential. This kind of arrangement also exists at other HVDC stations.
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> (iii) After deliberations, it was decided that the 220 kV bays associated with the 400/220 kV ICT at Bhadrawati HVDC station would be taken up for implementation by POWERGRID as and when requested by MSETCL."

10. The above decision in the Standing Committee to execute 220 kV bays associated with 440/220 kV ICT at Bhadrawati HVDC station as and when requested by MSETCL was also ratified in the 21st meeting of WRPC. According to the petitioner, scheme was modified to cater for 315 MVA 400/220 kV ICT at Bhadrawati by deleting 220 kV bays. As per the investment approval dated 28.8.2013, instant asset, i.e. 1x315 MVA, 400/220 kV ICT at Bhadrawati HVDC back to back station was scheduled to be commissioned on 27.8.2015. The petitioner has claimed the date of commercial operation of the instant asset as 19.3.2015.

11. The petitioner was directed to justify the necessity to install 315 MVA 400/220 kV ICT for meeting the auxiliary power supply of 2 MVA at Bhadravati Sub-station. In response, the petitioner has submitted that reliability and quality auxiliary power

supply is essential for smooth running of HVDC Back to Back System at Bhadrawati Sub-station. There were numerous tripping of the HVDC system in the past due to non-availability of quality uninterrupted auxiliary power supply. This HVDC system is an inter-regional element, sudden load throw off due to outage of HVDC system may affect the stability of Western Region and Southern Region. In order to provide reliable and quality auxiliary power supply, 315 MVA ICT was installed against the requirement of 2 MVA auxiliary power supply. The petitioner has further submitted that the 315 MVA is a standard design transformer available easily in the market and it cannot be replaced with the spare transformer available with it, in case of any contingency and any change in the design would involve additional cost. The petitioner has also submitted that the instant transformer would take care of the growing load demand in future.

12. We have considered the submissions of the petitioner and WRLDC and the documents on record. The issue for consideration is whether the petitioner should be allowed tariff for 315 MVA ICT which is utilized only to the extent of 2 MVA in order to met the auxiliary power supply requirement of 2 MVA only. We consider this issue in the following paras.

13. The asset was approved in the 33rd Standing Committee meeting of Power System Planning of Western Region held on 21.10.2011 wherein it was mentioned that the tertiary winding of the ICT would be utilized for supply of reliable auxiliary power supply to HVDC back to back at Bhadrawati and 2 nos. of 220 kV line bays could be utilized by MSETCL for drawal of power. The auxiliary requirement is only 2

MVA, which is to be drawn from the tertiary winding of ICT at 33 kV level. During 34th Standing Committee meeting of Power System Planning of Western Region held on 9.5.2012, MSETCL suggested that the petitioner may avail Auxiliary Power Supply at EHV level from MSETCL and in case the petitioner was going ahead with the implementation of 315 MVA ICT, provision for 220 kV bays should be deleted from the scope of the work to avoid bay charges. The petitioner has submitted that in view of high utilization factor of Bhadrawati back to back link, for reliable auxiliary power, 315 MVA ICT is essential.

14. In our view, the reliable auxiliary power supply is very important for safe and secure operation of HVDC Sub-station. As regards auxiliary power supply, Regulation 6 of the Central Electricity Authority (Technical standards for connectivity to the Grid) Regulations, 2007 provides as follows:-

> "(6) Power supply to sub-station auxiliaries shall:
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> a) For Alternating Current (AC) supply 220 kV and above: Two high tension (HT) supplies shall be arranged from independent sources, one of the two high tensions shall be standby to the other. In addition, an emergency supply from diesel generating (DG) source of suitable capacity shall also be provided.
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> b) For Direct Current (DC) supply: Substation or transmission system for 132 kV and above and substation of all generating stations; There shall be two sets of batteries each equipped with its own charger."

15. As per the said above Regulation, the auxiliary supply shall be met from HT supply from two independent sources in addition to energy supply from DG set of suitable capacity. As per the petitioner's submission in Petition No.133/MP/2014, about 91% of the petitioner's EHVAC Sub-stations are having only one feeder connection from State Power Utility and therefore it also uses tertiary winding of

existing ICT to meet auxiliary power supply requirement as back-up. It is further observed that there is no precedence where the petitioner has installed new ICT for meeting its auxiliary power supply only. HVDC B2B Sub-station at Bhadrawati was commissioned in 1997 and two 33 kV feeders are already available there alongwith a DG set for auxiliary supply requirements which meet the requirements laid down in CEA Connectivity Regulations. It is further observed that in the Standing Committee Meeting, it was suggested that the petitioner might avail the auxiliary power supply at EHV level from MSETCL. It appears that this option was not explored by the petitioner and the petitioner rather went ahead with installation of 400/220 kV, 315 MVA ICT without 220 kV bays. In the instant case, there is no power flow in the winding of 220 kV side of ICT. Only 33 kV tertiary winding is being utilized for auxiliary power of 2 MVA.

16. It is also observed that as per 474th OCC meeting of WRPC held on 13.8.2015, the 33 kV interconnection with MSEDCL was not ready at the time of trial operation of the 315 MVA ICT. Further, the downstream system of the instant asset has not been commissioned. As per the second proviso to clause (3) of Regulation 4 of the 2014 Tariff Regulations, in case a transmission system or an element thereof is prevented from regular service for reasons not attributable to the transmission licensee or its supplier or its contractor, the transmission licensee shall approach the Commission through an appropriate application for approval of the COD. In the instant case, the petitioner has not made any such prayer for approval of COD under Regulation 4(3) of the 2014 Tariff Regulations.

17. Further, we do not agree with the petitioner's contention that 315 MVA transformer is the only standard product. Rather, the power transformers such as ICTs and GTs are customized products based on system requirements. The lower capacity ICTs are being used in North East and Eastern Regions by the petitioner. The petitioner should have gone for a power transformer commensurate with the requirement for meeting the auxiliary power requirement in Bhadravati back to back Sub-station.

18. In the light of above decision, we are of the view that installation of ICT of 315 MVA capacity transformer to meet requirements of 2 MVA load is not a prudent decision on the part of the petitioner as almost entire capacity of the transformer would remain unutilized. Accordingly, the petitioner's prayer for grant of tariff for 315 MVA ICT at Bhadravati back to back Sub-station is rejected. The petitioner is advised to shift the 315 MVA ICT to some other location where its capacity could be fully utilized and approach the Commission for tariff.

19. This order disposes of Petition No. 56/TT/2015.

(A.S. Bakshi)	**(A.K. Singhal)**	**(Gireesh B. Pradhan)**
Member	**Member**	**Chairperson**