CENTRAL ELECTRICITY REGULATORY COMMISSION NEW DELHI

Petition No. 67/TT/2015

Coram:

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

Date of Hearing : 23.12.2015 Date of Order : 08.01.2016

In the matter of:

Approval of transmission tariff of i) Asset-I (HVDC Portion) and ii) Combined Asset-II (AC Portion) from anticipated COD to 31.3.2019 under the transmission system associated with "North East-Northern/Western Interconnector-I Project" in North Eastern, Northern & Western Region 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 "Saudamini", Plot No.2, Sector-29, Gurgaon -122 001

.....Petitioner

Vs

- 1. Assam Electricity Grid Corporation Limited, Bijulee Bhawan, Paltan Bazar, Guwahati-781001
- 2. Meghalaya Energy Corporation Limited, Lumjingshai, Short Round Road. Shilong-1
- 3. Government of Arunachal Pradesh, Department of Power, Itanagar-791111
- 4. Power & Electricity Department, Government of Mizoram, Aizwal-796001



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- 5. Manipur State Electricity Distribution Company Limited, Keishampat, Imphal-795001
- 6. Department of Power, Government of Nagaland, Kohima-797001
- 7. Tripura State Electricity Corporation Limited, Bidyut Bhawan, North Banamaliupr, Agartala-799001
- OTPC (ONGC Tripura Power company Limited), 6th Floor, A Wing, IFCI Towers, New Delhi-110019
- 9. NTPC, NTPC Bhawan, Scope Complex, Institutional Area, Lodhi Road, New Delhi-110003
- 10. Rajasthan Rajya Vidyut Prasaran Nigam Ltd., Vidyut Bhawan, VidyutMarg, Jaipur- 302 005.
- 11. Ajmer Vidyut Vitran Nigam Ltd.,400 kV GSS Building (Ground Floor), Ajmer Road,Heerapura, Jaipur.
- 12. Jaipur Vidyut Vitran Nigam Ltd.,400 kV GSS Building (Ground Floor), Ajmer Road,Heerapura, Jaipur.
- 13. Jodhpur Vidyut Vitran Nigam Ltd.,400 kV GSS Building (Ground Floor), Ajmer Road,Heerapura, Jaipur.
- 14. Himachal Pradesh State Electricity Board Vidyut Bhawan, Kumar House Complex Building II Shimla-171 004
- 15. Punjab State Electricity Board, The MalL, Patiala-147 001.
- Haryana Power Purchase Centre, Shakti Bhawan, Sector-6 Panchkula (Haryana)-134 109



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- 17. Power Development Department, Govt. of Jammu and Kashmir, Mini Secretariat, Jammu.
- Uttar Pradesh Power Corporation Ltd., Shakti Bhawan, 14, Ashok Marg, Lucknow-226 001.
- 19. Delhi Transco Ltd., Shakti Sadan, Kotla Road, New Delhi-110 002.
- 20. BSES Yamuna Power Ltd., Shakti Kiran Building, Karkardooma, Delhi-110 092.
- 21. BSES Rajdhani Power Ltd., BSES Bhawan, Nehru Place, New Delhi.
- North Delhi Power Ltd., Power Trading & Load Dispatch Group, Cennet Building, Adjacent to 66/11 kV Pitampura-3, Grid Building, Near PP Jewellers, Pitampura, New Delhi-110 034.
- 23. Chandigarh Administration, Sector-9, Chandigarh.
- 24. Uttarakhand Power Corporation Ltd., Urja Bhawan, Kanwali Road, Dehradun.
- 25. North Central Railway, Allahabad.
- 26. New Delhi Municipal Council, Palika Kendra, SansadMarg, New Delhi-110 002.
- 27. Madhya Pradesh Power Management Company Ltd., Shakti Bhawan, Rampur Jabalpur-482 008.



- 28. Maharashtra State Electricity Distribution Company Limited, Prakashgad, 4th floor Andehri (East), Mumbai-400 052.
- Gujarat UrjaVikas Nigam Ltd., Sardar Patel VidyutBhawan, Race Course Road, Vadodara-390 007.
- Electricity Department, Government of Goa, Vidyut Bhawan, Panaji, Near Mandvi Hotel, Goa-403 001.
- Electricity Department, Administration of Daman and Diu, Daman-396210.
- Electricity Department, Administration of Dadra Nagar Haveli, U.T. Silvassa-396 230.
- Chhattisgarh State Electricity Board, P.O. Sunder Nagar, Dangania, Raipur Chhattisgarh-492 013.

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For petitioner

Shri Udit Grover, Advocate for PGCIL Shri V. Srinivas, PGCIL Shri Rakesh Kumar, PGCIL Shri Bhoj Paul, PGCIL Shri UpendraPande, PGCIL Shri UpendraPande, PGCIL Shri H.K Mallick, PGCIL Shri Y.K. Sehgal, PGCIL Shri S.S. Raju, PGCIL Shri S.S. Raju, PGCIL Shri Jasbir Singh, PGCIL Shri ShashiBhushan, PGCIL Shri ShashiBhushan, PGCIL Shri R.K. Guter, PGCIL Shri R.K. Guter, PGCIL Shri Vivek Kumar Singh, PGCIL Shri Vivek Kumar Singh, PGCIL Shri Rakesh Prasad, PGCIL



Shri M.M. Mondal, PGCIL Shri S.K. Venkatesan, PGCIL

For respondents

:

Shri S.K. Agarwal, Advocate, JVVNL Shri S.P. Das, Adocate, JVVNL Shri H.M. Sharma, APDCL Shri S.R. Narasimhan, POSOCO

<u>ORDER</u>

The petitioner, Power Grid Corporation of India Limited (PGCIL) has filed the instant petition seeking transmission tariff for (i) Asset-I (HVDC Portion) and (ii) Combined Asset-II (AC Portion) from anticipated COD, 31.3.2015 to 31.3.2019 under the transmission system associated with "North East-Northern/Western Interconnector-I Project" in North-Eastern, Northern & Western Regions in accordance with the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2014 (hereinafter referred to as "the 2014 Tariff Regulations"). The petitioner has also prayed for allowing 90% of the Annual Fixed Charges claimed, in terms of proviso (i) of Regulation 7(7) of the 2014 Tariff Regulations for inclusion under PoC mechaism.

2. The petitioner initially in the petition claimed tariff for HVDC portion and AC portion separately with anticipated date of commercial operation as 31.3.2015. Subsequently, vide affidavit dated 18.12.2015, the petitioner has submitted that HVDC portion was commissioned on 1.11.2015 and AC portion has been split into three parts. The petitioner has submitted that parts of AC system were commissioned on 1.10.2015, 28.10.2015 and 27.10.2015 and the remaining portion of the system is anticipated to be commissioned on 31.12.2015. The details of the assets and their scheduled and

actual/anticipated date of commercial operation submitted by the petitioner are as under:-

Asset		Name	Scheduled COD	Anticipated COD/Actual COD*
Asset-I Portion)	(HVDC	±800 kV HVDC Biswanath Chariali-Agra Pole-I (1500 MW HVDC terminals at Biswanath Chariali and Agra each along with ±800 kV Hexa Lapwing transmission line)	31.3.2015	1.11.2015 (actual)
Asset-II Portion)	(AC	132 kV D/C Biswanath Chariali (PG)-Biswanath Chariali (AEGCL) T/L along with associated bays at Biswanath Chariali (AEGCL) & Biswanath Chariali Pooling Station (PGCIL)	31.3.2015	1.10.2015 (actual)
Asset-II Portion)	(1.a):(AC	Loop in and Loop out (LILO) of 400 kV Ranganadi-Balipara-I T/L at Biswanath Chariali PS alongwith associated bays at Biswanath Chariali PS (Asset-II (1.b))	31.3.2015	28.10.2015 (actual)
Asset-II Portion)	(1.b):(AC	Loop in and Loop out (LILO) of 400 kV Ranganadi-Balipara-II T/L at Biswanath Chariali PS alongwith associated bays at Biswanath Chariali PS (Asset-II (1.b))	31.3.2015	27.10.2015 (actual)
Asset-II Portion)	(3):(AC	200 MVA, 400/132/33kV ICT-I at BiswanathChariali PS (Asset-II(3))	31.3.2015	31.12.2015 (revised anticipated)

3. The matter was heard on 3.3.2015. The petitioner was directed to submit the information regarding time over-run, cost over-run, CEA certificate, minutes of RPC meetings, PPAs signed by beneficiaries, BPTAs for the instant assets and status of their commissioning. The petitioner has submitted the information vide affidavits dated 25.3.2015 and 13.5.2015.

4. The petition was again heard on 23.12.2015. No other respondent DIC except Assam appeared during the hearing. We have heard the petitioner and the respondent



present during the hearing. In this order, we proceed to determine the transmission charges under proviso (i) to clause 7 of Regulation 7 of the 2014 Tariff Regulations.

5. Clause 7 alongwith proviso (i) of Regulation 7 of the 2014 Tariff Regulations provides as under:-

"(7) In case of new projects, the generating company or the transmission licensee, as the case may be, may be allowed tariff by the Commission based on the projected capital expenditure from the anticipated COD in accordance with Regulation 6 of these regulations:

Provided that (i) the Commission may grant tariff upto 90% of the annual fixed charges claimed in respect of the transmission system or element thereof based on the management certificate regarding the capital cost for the purpose of inclusion in the POC charges in accordance with the CERC (Sharing of Inter State Transmission charges and losses), Regulation, 2010 as amended from time to time:"

The petitioner has made the application in accordance with Regulation 6 and Annexure-I of the 2014 Tariff Regulations for determination of tariff of the instant assets. The petitioner has also complied with the requirements of the Central Electricity Regulatory Commission (Procedure for making of application for determination of tariff, publication of the application and other related matters) Regulations, 2004, such as service of the copy of the application on the respondent DICs, publication of notice and web hosting of the application, etc. No comments have been received in response to the public notice.

6. UPPCL and APDCL have filed their replies. UPPCL in its reply vide affidavit dated 28.2.2015 has raised the issue of time over-run, over-estimation of initial spares

and cost over-run. The petitioner has filed the rejoinders to the replies of UPPCL and APDCL.

7. After taking into consideration the time over-run and cost over-run in case of the instant assets, which shall be looked into in detail at the time of issue of final tariff, the Commission has decided to grant tariff of the assets covered in the petition in terms of proviso (i) of Regulation 7(7) of the 2014 Tariff Regulations.

8. The details of AFC claimed by the petitioner and tariff allowed by the Commission are as under:-

Α.	Annual transmission	charges	claimed b	y the j	petitioner	are as	follows:-
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				(` in lakh)
Assets	2015-16	2016-17	2017-18	2018-19
Asset I	48140.82	120377.89	121915.16	120024.78
Asset II	299.71	659.47	682.09	670.35

B. Annual transmission charges allowed are as follows:-

		(` in lakh)
Assets	2015-16	2016-17
Asset I	12497.16	75537.13
Asset II	95.87	423.04

9. The transmission charges allowed in this order shall be subject to adjustment as after determination of AFC in accordance with clause (7) of the 2014 Tariff Regulations.



Sharing of Transmission Charges

10. The Commission vide RoP of the hearing held on 3.3.2015 directed the petitioner to submit information regarding the utilization of the transmission assets for which tariff has been sought in the present petition. The petitioner vide affidavit dated 25.3.2015 has submitted that the North-Eastern Region of the country has a very large hydro generation potential of the order of 50,000 MW apart from approximately 4500 MW in the State of Sikkim. In addition, about 5000 MW of hydro generation was envisaged to be developed in Bhutan and power from such generation would be consumed in India. This huge quantum of hydro potential was planned to be developed in a phased manner to meet the growing energy requirement in the country in the long run. To evacuate such a huge quantum of power, the petitioner as the Central Transmission Utility planned and executed the transmission systems associated with "North East-Northern / Western Interconnector-I Project". The petitioner has submitted that the transmission lines covered under the transmission systems had to traverse through the difficult terrains of NER and ER and the limited corridor available in "Chicken Neck" area which is a narrow patch of land measuring 22 km in width and 18 km in length near Siliguri having borders of Nepal on one side and Bangladesh on the other side and the area is largely habitated. The petitioner has submitted that all transmission lines, railway lines, gas pipe-lines, telecommunication lines, etc., from NER to the other parts of the country have to pass through the "Chicken Neck" area and therefore, the petitioner keeping in view the requirement of evacuation of power over a long distance with optimal utilization of RoW available in that area and the limitation of longer AC system due to requirement of reactive compensation and other economic constraints, planned to

construct 5-6 high capacity HVDC power transmission corridors connecting NER Grid with National Grid. Regarding capacity of transmission assets, the petitioner vide affidavit dated 25.3.2015 has submitted that keeping in view the phased generation addition, HVDC corridor was planned for 6000 MW while the terminal stations were planned in modules of 3000 MW. The petitioner has submitted that the sending end HVDC terminal stations of 3000 MW at Biswanath Chariali and 3,000 MW at Alipurduar (under "Transmission System for development of pooling station in Northern part of West Bengal and transfer of power from Bhutan to NR / WR") are under implementation and the receiving end HVDC terminal stations would be of ultimate capacity 6000 MW, to be installed in two stages at Agra from where power can be transferred to deficit Northern/Western Regions.

11. Regarding the basis of planning of transmission systems, the petitioner vide affidavit dated 25.3.2015 has submitted the following:-

(a) Keeping in view the long term perspective it was desirable to implement the subject transmission systems as a transmission infrastructure which would facilitate the transfer of power even as the major hydel projects get completed. The Scheme was deliberated in various Standing Committee Meetings (SCMs) on Power System Planning and Regional Power Committee (RPC) Meetings in Northern Region, Eastern Region, Western Region and North-Eastern Regions and based on the deliberations and discussion in these forums, the transmission systems have been planned as a Regional System Strengthening Scheme. In the meeting taken by the Secretary (Power), Government of India on 22.2.2005, it



was decided to plan transmission corridors in the "Chicken Neck" Area to meet the evacuation requirement for next 10 to 15 years.

(b) The NER Grid is presently connected to the rest of the National Grid through series of AC lines passing through Bongaigaon Sub-station. NER Grid has been connected with rest of the National Grid through radial AC lines and on account of transmission constraints on AC lines, such types of radial connections are not desirable from the point of view of Grid Stability and Security. Moreover, tripping of inter-connecting lines with NER also leads to grid disturbance.

(c) Biswanath Chariali - Agra HVDC line will help in strengthening links of rest of the National Grid to NER Grid. The petitioner has further submitted that during monsoon, with high hydro generation in NER, North Bengal and Bhutan, loading of 400 kV Binaguri - Purnea 2 x D/C and Purnea - Muzaffarpur D/C remains high. Therefore, Biswanath Chariali - Agra HVDC line will provide a parallel path and relieve loading of these lines.

(d) The Teesta-III generating station is expected to be commissioned in 2015-16, while Rangpo-Kishanganj D/C line is expected to be delayed. The HVDC line would help in evacuation of hydro power of Sikkim, even in the absence of Rangpo-Kishanganj line.

12. Further, the petitioner has submitted that the HVDC assets of the transmission systems for which tariff have been sought in the present petition are for benefit of the entire country on account of the following reasons:-

(a) The HVDC lines will relieve the load in the intervening AC network. The petitioner has cited the examples of Mundra-Mohindergarh and Talcher-Kolar HVDC lines which have been modulated to control flow through AC lines. According to the petitioner, Mundra-Mohindergarh HVDC lines are relieving the load on 765 kV Gwalior-Agra lines.

(b) HVDC lines will help in Voltage control, as power flow through parallel AC line can be increased/ decreased as per the requirement.

(c) HVDC lines will enhance the power transfer capability of the transmission systems.

(d) HVDC lines will accommodate renewable-variation and intermittency can be taken care of.

13. In response to the Commission's query through letter dated 11.5.2015 regarding the planning of the subject transmission system, CEA has submitted the following vide its letters dated 1.7.2015 and 2.9.2015:

"(i) The capacity of $\pm 800 \text{ kV}$ HVDC bipole as agreed in the various standing committee meetings on power system planning (SCMPSP) of Northern, Western and North Eastern regions and TCC/RPC meeting of North Eastern Region is 6000 MW with 3000 MW rectifier module at Biswanath Chaiyali.

(ii) As desired, copies of the minutes / extracts of the minutes of the meetings in which the above scheme was discussed and agreed are enclosed as below:

- a) 20th SCMPSP of Northern region held at Nanital, Uttranchal on 22.04.2006.
- b) 26th SCMPSP of Western Region held on 23.02.2007 at WRPC, Mumbai.
- c) 2nd SCMPSP of North-Eastern Region held on 25.06.2008 at Guwahati.
- d) 25th SCMSP of Northern region held on 17.07.2008 at NRPC, New Delhi.
- e) 6^{th} TCC & 6^{th} NERPC meeting held on $7^{\text{th}} 8^{\text{th}}$ Aug. 2008 at Gurgaon.



(iii) The HVDC bipole line was agreed as a part of associated transmission system/inter-regional system for Lower Subansiri (8x250 MW) and Kameng (4x150 MW) HEPs. As per the information available in CEA, the work on Lower Subansiri HEPs is held up since Dec., 2011 due to agitation by anti dam activists and the latest commissioning schedule is 2018-20. The Kameng project is likely to be commissioned by 2016-17. Until these generation projects are commissioned, HVDC module at Biswanath Chariali would remain unutilized."

14. CEA vide its letter dated 22.9.2015 has submitted the original and revised/latest

SI. No.	HEP	Original Schedule	Revised/Latest Schedule
1.	Kameng	2009-10	2016-17
2.	Lower Subansiri	2010-11	Work held up since
			December, 2011
3.	Punatsangchhu-I	2015-16	Beyond 2017-18
4.	Punatsangchhu-II	2017-18	Beyond 2017-18
5.	Mangdechhu	2017-18	Beyond 2017-18

schedules of commissioning of these HEPs as under:-

CEA vide letter dated 22.9.2015 has stated that HEPs have been considerably delayed and in the absence of these generation projects, the HVDC interconnector-I would not be utilized in the manner it was planned. CEA has submitted that the implementation of a transmission project may not be possible to be delayed beyond a certain time on account of contractual obligations of the petitioner with various EPC contractors. CEA has further stated that as recorded in the minutes of the 14th meeting of NERPC held on 4.9.2013, the petitioner had slowed down the implementation of the transmission systems.

15. The Commission vide letter dated 26.8.2015 sought the views of POSOCO with regard to the utilization of ± 800 kV Biswanath Chariali- Agra HVDC line in the backdrop of partial commissioning/non-commissioning of associated generation projects. POSOCO vide letter dated 24.9.2015 has submitted that one pole of the HVDC Biswanath Chariali-Alipurduar-Agra line was expected to be commissioned in September, 2015 would be the first Multi-terminal HVDC with terminals located at Biswanath Chariali (NER), Agra (NR) and Alipurduar (ER) and would be operating at ±800 kV. Considering the seasonality of hydro generation, it would also be the 1st HVDC bipole having flows in either direction depending on the season and would provide the flexibility and function as a pseudo phase-shifter. A report dated 17th September, 2015 has been prepared by POSOCO for the operational modalities of HVDC BNC-Agra which has been circulated to RLDCs/RPCs/ CTU/CEA/ POWERGRID. POSOCCO has submitted that generation and load of NER is seasonal and so is the flow on ER-NER corridor. In order to cater to the seasonal changes in the load, generation and line flows, flexible transmission in the form of HVDC is essential. Any new element added to the network is adding to the reliability of the system and is being utilised by the system operator to the maximum extent. POSOCO has emphasised that the transmission assets are normally planned for a life of 35 years and the advantages need to be assessed over the entire life cycle of the assets rather than the initial years. POSOCO has submitted that the maximum power order on this HVDC shall be initially restricted to maximum 1000 MW depending upon real time conditions till the time 400 kV Ranganadi-Balipara D/C is looped in looped out (LILO) at 400 kV BNC Sub-station. POSOCO has also submitted that low frequency oscillations have been observed few

times in NER. HVDCs have controllers such as Power Oscillation Damping (POD) which could be tuned to mitigate such oscillations in inter-area mode. Similarly, the frequency controllers at BNC should also help in operation of NER system, if it were to get islanded due to any reasons. POSOCO has submitted that the area around Binaguri is prone to lightning strikes which have led to multiple outages of 400/220 kV circuits from Binaguri many times and leads to evacuation problem of hydro generation in NER during high hydro conditions and curtailment of NER drawl from the grid. With the BNC-Agra, commissioning of HVDC it is expected that the outages (planned/emergency/forced) in the underlying 400 / 220 kV network would not impact the evacuation of hydro generation or drawl of NER.

16. Assam Power Distribution Company Limited (APDCL), one of the respondents, in its reply filed vide affidavit dated 1.10.2015 has submitted that the subject HVDC network along with AC portion was conceived as the ATS of Subansiri HEP (200 MW) of NHPC and Kameng HEP (600 MW) of NEEPCO at 1st TCC & 2nd Power Committee Meeting of NERPC on 28/29.7.2006 in which it was decided that NER beneficiaries would share the transmission charges and beneficiaries outside NER and having allocation from NER projects would also share transmission charges of AC portion. APDCL has also submitted that there shall be mismatch of commissioning generation station with respective ATS and requested the Commission to look into the matter and not to burden the beneficiaries like Assam for failure on the part of generating station in commissioning the units. APDCL has further submitted that a number of hydro projects are coming up in NER and at present NER has no permanent allocation of power from

sources located in other regions. During the hydro season, the region is always in surplus and the seasonal shortfall is nominal which is being maintained through existing AC network. APDCL has submitted that under the present funding system, the bidirectional flow seems to be not necessary immediately.

17. The petitioner in its rejoinder filed vide affidavit dated 18.12.2015 has submitted that the subject transmission systems were not built only for evacuation of power from Kameng HEP of NEEPCO and Subansiri HEP of NHPC. The original plan was conceived in the year 2003. In this regard, several meetings were held in the Ministry of Power, Government of India at the Secretary and Joint Secretary levels during the period 2003 - 2005. In the meeting taken by the Joint Secretary, Ministry of Power in October 2003, CEA suggested that for connecting NER with rest of India, the only option would be to construct the HVDC bipole from NER to NR with the capacity of the order of 3500 to 4000 MW. Accordingly, the subject transmission system was planned as a strengthening scheme in order to provide for important transmission service connecting the NE Region to the Northern and Western Regions. Therefore, the petitioner is entitled for timely grant of tariff. The petitioner has submitted that there is no mismatch between commissioning of generating stations and the subject transmission assets as generators in NER (Lower Subansiri and Kameng) had earlier proposed their commissioning schedule as March, 2010 and December, 2010 respectively. However, the commissioning schedule has been revised by generation developers from time to time. The petitioner has submitted that after commissioning of this link, power up to 900 MW in both the directions is being transferred over this link and thus, the need for

bidirectional flow of power has been proved in just few days of the operation of the link. The petitioner has further submitted that that the NER –NR / WR Interconnector –I, shall provide the following benefits to the DICs:-

- a) The link provides flexibility of power transfer in the seasonal varied hydro power generation of NER and would function as a pseudo phase-shifter.
- b) Surplus power to the extent of 1500 MW can be exported / imported between NER and other regions.
- c) Power can be imported by NER during low hydro season.
- d) The link would enhance the power transfer capacity between ER and NR. With the commissioning of many generation projects coming up in NER, Bhutan and Sikkim in next 2-3 years, power flow over this link shall increase.
- e) This link would provide stability to interconnection of NER with National Grid.
- f) This shall reduce maximum angle spread across the NER–NR grid by 35-40 degree.

18. The petitioner has submitted that the precise issue being raised by APDCL was considered in the Report of Sub-Committee of CAC on Congestion chaired by Shri R.V. Shahi, Ex-Secretary (Power) which included Members from CEA, CERC, GRIDCO, APTRANSCO, POSOCO, IIT, MERC, APP in June, 2015. The following has been recorded in the said meeting:-

"(xix) NER States have huge Hydro potential. It would be wrong to assume that all projects will be developed in the same time frame. It would be also be a wrong strategy to develop transmission systems adequate enough only for the projects already under implementation. Long term planning would require development of transmission systems in a manner that they are normally underutilized in the initial years but later utilized well."



19. With specific reference to the submission of APDCL for sharing of transmission charges of the subject transmission systems, the petitioner has submitted that as per the decisions taken in the 1st TCC and 2nd Power Committee Meeting of NERPC held on 28.7.2006 and 29.7.2006, "Assam supported commissioning of strong transmission corridor from NER to other regions and agreed to share/pay the cost of transmission system as per CERC norms." Therefore, APDCL cannot renege on its commitment at this stage. The petitioner has prayed that the sharing of transmission charges shall be in accordance with the provisions of the Sharing Regulations, as amended from time to time.

20. During the hearing on 23.12.2015, the representative of the petitioner submitted that based on various discussions and deliberations in various meetings taken in Ministry of Power (MoP) during 2003-05 wherein a need was felt to establish a high capacity transmission infrastructure to interconnect North Eastern Region (NER) to other regions of the country. This link is the backbone of National Grid. He submitted that based on the master plan prepared by CEA in March, 2006, a Detailed Project Report (DPR) for high capacity HVDC corridor including corridors in "Chicken Neck" area was submitted to Ministry of Power in 2006. He further submitted that the Planning Commission (Project Appraisal and Management Division) initiated Public Investment Board (PIB) on 7th April, 2008; however, after the petitioner was notified as a 'Navratna' company, PIB clearance was no longer required. He submitted that the Investment Approval was obtained from the Board of Directors of the petitioner on 27.2.2009 with an estimated cost of ₹ 11,130.19 crore. Further, the Board of Directors of the petitioner

has vide letter dated 9.12.2015 approved Revised Cost Estimate (RCE) of ₹13762.71 crore including Interest During Construction (IDC) of ₹1747.32 crore. He submitted that the 1500 MW module of ±800 kV Biswanath Chariali-Agra HVDC system has been commissioned and power up to 900 MW in both directions has been transferred over this link. He also submitted that presently NER is connected to rest of the country vide AC system emanating from 400 kV Bongaigaon Sub-station and in case of major contingency, the NER will be cut out of the entire country. With the Commissioning of the HVDC system, NER would be able to draw reliable power from National Grid irrespective of major contingency in AC interconnections. He prayed that as per proviso (i) of Regulation 7(7) of the 2014 Tariff Regulations, the Commission may grant tariff up to 90% of the AFC of the transmission system or element thereof for the purpose of inclusion in POC charges in accordance with the Sharing Regulations.

21. During the hearing, the representative of POSOCO stated that the link was tested for 1500 MW from BNC to Agra and for 1000 MW from Agra to BNC on 30.10.2015. All the HVDCs existing in the Country prior to commissioning of this link were associated with thermal projects, but this link is associated with hydro projects. He also stated that in the absence of Binaguri – Purnea D/C line since last 2 weeks, TTC /ATC of NER –NR is not affected only because this link is available. Representative of Assam stated that since generation projects have not come up, beneficiaries should not be burdened with transmission charges for the link. On a query of the Commission whether the link is carrying any power, representative of petitioner replied that the link is currently carrying 900 MW from Agra to BNC.

22. We have considered submissions of the petitioner and respondents. Central Electricity Regulatory Commission (Sharing of Transmission Charges) (3rd Amendment) Regulations, 2015 provides the guidelines for sharing of HVDC charges as under:

"1.....

"2. Treatment of HVDC: Flow on HVDC systems is regulated by power order and remains constant for marginal change in load or generation. Hence, marginal participation (MP) of HVDC systems is zero. Since the HVDC systems were specifically set up for transfer of bulk power to specific Region, the DICs of the Region shall share the cost of HVDC systems. HVDC system also helps in controlling voltages and power flow in inter-regional lines and some benefits accrue to all DICs by virtue of HVDC system. Accordingly, 10 % of the MTC of these systems be recovered through Reliability Support Charges. The balance amount shall be payable by Withdrawal DICs of the Region in proportion to their Approved Withdrawal. In case of Injection DICs having Long Term Access to target region, it shall be payable in proportion to their Approved Injection. Where transmission charges for any HVDC system line are to be partly borne by a DIC (injecting DIC or withdrawal DIC, as the case may be) under a PPA or any other arrangement, transmission charges in proportion to the share of capacity in accordance with PPA or other arrangement shall be borne by such DIC and the charges for balance capacity shall be borne by the remaining DICs by scaling up of YTC of the AC system included in the PoC........"

23. The SoR of the 3rd Amendment to the Sharing Regulations, 2010, provides as under:

"45.17 For any new HVDC line, the Commission shall decide the methodology through an order. However, the above principle of sharing of transmission charges of HVDC lines may be reviewed based on the national transmission planning, if certain HVDC systems are planned to cater to multiple needs i.e. evacuation or reliability or Renewable integration or change in the benefits derived by the stakeholders."

24. Keeping in view the above provisions of Sharing Regulations, we proceed to

decide the proposed methodology for sharing of transmission charges for the HVDC link

(Asset-I).

25. Government of India mooted a proposal for development of hydro projects with a capacity of 50000 MW and accordingly, 50000 MW Hydro Electric Initiative was



launched in May 2003 by the then Hon'ble Prime Minister of India. About 40000 MW of power was planned to be evacuated from NER / Sikkim and Bhutan. The transmission system for all the generation projects was to traverse through "Chicken Neck" area having a length of 18 km and width of 22 km and would require about 1.5 km wide transmission corridor to evacuate the quantum of power. In a meeting taken by Jt. Secretary (Hydro), Ministry of Power on 2.11.2004, it was decided that the hybrid system of HVDC and AC was the desirable option for evacuation of 12000 MW of power from NER by the end of 12th plan. In the meeting taken by Secretary (Power) on 8.12.2004, it was decided that corresponding to the ultimate capacity of hydro projects in NER, the evacuation system would require 14-16 transmission corridors passing through the "Chicken Neck" area. During the meeting taken by Secretary (Power) on 22.2.2005, it was decided that for security, reliability as well as for reservation of right of way, it would be desirable to go ahead with the building of transmission corridors in the "Chicken Neck" area. In another meeting taken by Secretary (Power) on 6.12.2005, the phased development of NER / Sikkim and Bhutan projects was deliberated and it was decided that the transmission system should be developed for phased development of generation at the rate of 2000 MW each during 2009-10, 2010-11 and 2011-12 respectively. Central Electricity Authority submitted a comprehensive note to Ministry of Power on 17.03.2006 on the transmission system for evacuation of power for major generation projects in the North Eastern Region along with power from projects coming in Sikkim and Bhutan during the 11th plan and 12th plan period. CEA in the said note has suggested that the option of hybrid network of HVDC and high capacity 400 kV line has been found to be most suitable from cost, corridor, operational and phased

development consideration. Further, CEA has also stated that as the transmission distance from NER / WR is quite long i.e. 2000 to 2500 km, the requirement of keeping the losses within reasonable and cost effective limits suggests strongly in favour of adopting as high a HVDC transmission voltage as possible. The planning of the transmission system as stated by CEA in the Note to the Ministry of Power is as under: -

"The first 800kV HVDC bi-pole line has been planned from a pooling substation at Bishwanath Chariyali in North-eastern Region to Agra in Northern region. This is being programmed for commissioning matching with Subansiri Lower HEP in 2011-12. The transmission line would be for 6000 MW capacity and HVDC terminal capacity would be 3000 MW between Bishwanath Chariyali and Agra. In the second phase, for transmission of power from hydro projects at Sikkim and Bhutan pooled at Sliguri, another 3000 MW terminal modules would be added between Siliguri and Agra."

Accordingly, CEA suggested for implementation of the transmission system under a scheme titled "Inter-regional transmission system for power export from NER to NR / WR". CEA further suggested to adopt national approach for development of the transmission system in which the beneficiaries outside NER would share the transmission charges of identified transmission system based on the power allocation from the NER Hydro projects. In a meeting dated 13.3.2007 taken by Secretary (Power), it was decided that the transmission system from NER to NR / WR would be required and the proposal for Public Investment Board (PIB) clearance for the project be initiated. Accordingly, a note for Public Investment Board was initiated by the Planning Commission (Project Appraisal and Management Division) on 7th April, 2008 in which the project was found suitable and optimal considering the right of way. In the mean time, the petitioner was notified as a 'Navratna' company and PIB clearance was no longer required. Investment approval was obtained from the Board of Directors of the

petitioner. The development of subject transmission systems were also discussed in the Standing Committee Meetings on Power System Planning of Northern Region, Western Region and North-eastern Region from time to time.

26. In view of the process of planning, development and execution of the transmission system as discussed hereinabove, we are of the view that the subject transmission systems are of strategic and national importance and are in the long term interest of the economy and consumers of the country. The ±800 kV Biswanath Chariali-Agra HVDC link is the first of its kind in India and is passing through the "Chicken Neck" area. This HVDC asset once created will serve multiple purpose of evacuating hydro potential of North East, Sikkim and Bhutan to the rest of the country and would also carry power from Agra to Biswanath Charaiali during lean hydro season in NER, thereby serving needs of North East Region as well. In addition to this, the link is serving very important role of integrating the entire Indian Electrical Grid through a robust link. This asset is a unique asset due to its location and strategic importance. This link is a strategically important and vital connection for harnessing the present and anticipated exploitation and optimal utilization of hydro, thermal and renewable energy resources in the country. The strategic importance of the line is established by the fact that a secure and strong linkage for the North-Eastern Region and the rest of the country is now firmly established. Pertinently, the extremely narrow "Chicken Neck" which is 18 km X 22 km has been optimally utilized solving any future right of way issues in this critical, sensitive and vital area. Therefore, the setting up of such a powerful link is not only important but infuses a high degree of confidence, certainty and assurance for development of hydro

power potential in North-East Region of the country, underlining the fact that no hydel development will have to face bottling up of power or backing down on account of transmission constraints.

27. The Commission agrees with POSOCO that the usefulness and importance of the subject transmission assets should not be seen in the narrow prism of its immediate utilization during the initial years but needs to be assessed over the entire life cycle of the assets which will carry the hydro power from the huge potential in North East for the benefit by the entire country. POSOCO has rightly pointed out that this link would provide the flexibility in power transfer, function as a pseudo phase-shifter and help in mitigating oscillations in inter-area mode and above all, the frequency controllers at BNC would help in operation of NER system, if it were to get islanded due to any reasons. Further, this bi-directional HVDC technology would enable optimal hydrothermal mix and successful integration of renewable energy resources of the country due to its connectivity with the hydro surplus North Eastern Region on one end and balance part of the country through National Grid. Strong interconnection through AC links between all the regions of National Grid would enable exchange of power between North–East Region and rest of the country. Moreover, this high capacity interconnection between North–East Region comprising of huge hydro potential would go a long way for integration of large renewable energy resources being developed in different parts of the country. Due to direct interconnection, hydro generation can support the variability and intermittent nature of renewable generation. Thus, this vital link is a flagship endeavor of the Indian Power Sector which will benefit the entire country.

28. Since the transmission assets are of strategic and national importance whose benefits shall be derived by the entire country, we are of the view that the charges for the HVDC assets covered in the present petition should be shared by all the regions of the Country.

29. The Commission is conscious of the fact that the capital investments in the assets of the subject transmission systems are huge and the entire assets may not be utilised to their intended level on account of the delay in commissioning of planned hydro potential in NER. The Commission feels that there is a strong necessity to share the burden of capital cost of transmission scheme by way of assistance from the Power System Development Fund (PSDF) by way of one time grant. Accordingly, we direct the petitioner to take up the matter with the Monitoring Committee of the PSDF for assistance in the form of one time grant from the PSDF and with Ministry of Power for grant to reduce the burden of transmission charges on the DICs. We also request Ministry of Power, Government of India to arrange for funds from the PSDF as well as Government grant, considering the subject transmission systems as assets of strategic and national importance, keeping in view the utility of these assets in the long term perspective to the economy of the country.

30. Since, these assets are proposed to be considered as assets of national importance and all the regions are proposed to bear the transmission charges, we consider it necessary to hear the DICs of all the regions. Accordingly, we direct the petitioner to file a revised memo of parties and serve copy of the petition on the DICs

(other than those on whom petition has already been served) by 18.1.2016. The hearing of the petition will take place on 28.1.2016 and all DICs are directed to participate in the hearing and share their views.

31. Recovery of the transmission charges determined through this order shall be made as per the principle/methodology to be decided by the Commission after hearing all DICs.

-sd-(Dr. M.K. lyer) Member -sd-(A.S. Bakshi) Member -sd-(A.K. Singhal) Member -sd-(Gireesh B. Pradhan) Chairperson

