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Ministry of Power
Central Electricity Authority
System Planning & Project Appraisal Division
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[ISO: 9001:2008]

No: 234 / 27 / 2014-SP&PA / 2172

Date: 28-Nov-2014

To

The Secretary,
Central Electricity Regulatory Commission,
3rd Floor, Chanderlok Building,
36, Janpath,
New Delhi - 110001

Subject: Draft (3rd Amendment Regulation in the Sharing of inter-state transmission charges and losses regulation of CERC)

Reference: (i) CERC's letter File No. 7017/2011 dated 18.11.2014
(ii) CERC Public Notice No. L-1/44/2010/CERC dated 07.02.2014

Madam,

This has reference to CERC's letter dated 18.11.2014 and a presentation made by staff of the Commission to Chairperson, CEA on 21.10.2014 in respect of the proposed draft Amendment (3rd) to the sharing of inter-State transmission charges and losses Regulation of CERC.

Our views on various aspects for determination and application of Point of Connection (PoC) rates for sharing of transmission charges and losses, in respect of inter-State transmission system in the country, are given at Annex-1.

This issues with the approval of Chairperson, CEA.

ID-7499/Secy
3/12/14

Yours faithfully,

28/11/2014
(Pardeep Jindal)
Director(SP&PA)

Chief (E)

Annex-1

CEA's observations on proposed amendments in the CERC regulation on – 'Sharing of inter-state transmission charges and losses'

1. **Use of DC load flow versus AC load flow for determination of PoC rates**

The philosophy of Marginal Participation (MP) Method is based on linear relationship between cost of transmission line and change in power flow on the line due to small perturbation of loads/generations, where in it is assumed that small perturbation can be scaled up to actual flow. Presently, AC load flow method is being used for calculation of Marginal participation factors, which is non-linear in nature. Therefore, it is suggested that instead of AC load flow method, DC load flow may be carried out for determining Marginal participation factors for allocation of transmission charges.

2. **Abolition of Slab rates**

In the proposed amendment, the provision of slab rates is being deleted. In the existing provisions, there are three slab rates for transmission charges and also for transmission losses. As given in the explanatory memorandum, we agree that removal of slab rate would be in conformity with the basic principle of sharing regulations i.e. transmission charges allocation should be sensitive to distance, direction and usage. However, if the Commission considers it appropriate, a lower and upper cap on PoC rates may be decided by CERC to avoid extremely high or low PoC rates. In this regard, it is suggested that minimum PoC rates may be capped at 33% of all-India Postage Stamp Rate and maximum may be 300% of all-India Postage Stamp Rate.

3. **Abolition of half of the charges as all-India Postage Stamp(Uniform charges)**

We agree with proposal given in draft regulation for dispensing with uniform charges as given in the explanatory memorandum. This will be in accordance with basic philosophy of sharing in conformity with the basic principle of sharing regulations i.e. transmission charges allocation should be sensitive to distance, direction and usage.

4. **Inclusion of transformers as branches for determination of PoC rates**

Presently, the costs attributed to the substations are not explicitly considered for calculation of PoC rates and neither the flow through the transformer is considered in the marginal participation algorithm for cost allocation of transformer branch. In this regard, it is important to note that the transformers are in fact branches having specific impedance and they must be treated in the same manner as the transmission lines. The methodology adopted for assigning per kilometer cost for various types of transmission lines i.e. 400 kV/ 765kV/ or SC/ DC or twin/Quad, etc. can be extended to include cost of substations based on voltage levels and MVA capacity. Ignoring perturbation through transformer impedance in the marginal participation algorithm would not be appropriate from electrical engineering point of view.

5. **Treatment of HVDC bi-pole/multi terminal /back-to-back links**

In the present methodology, the impact of PoC rate on account of HVDC bipole/multi-terminal/back-to-back links is being determined through a 'with and without' methodology in marginal participation algorithm. In this regard, it is suggested that instead of the with without methodology for HVDC, the power order on the HVDC link, as given in the base case under consideration, may be reduced by 1% to account for the impact of cost of HVDC on PoC rates of various nodes. This methodology would be in line with basic principle of marginal participation i.e. to have a small perturbation.

6. **Base case for calculation of PoC rate**

In the existing regulations, the PoC rates are determined using average load demand scenario on quarterly basis. This average load is determined taking energy consumed during the quarter in the previous year and an appropriate growth for the current year. In the new amendment, it is proposed to determine the PoC rates based on peak load scenario for the quarter under consideration. It is understood that, the load demand of each State will be taken as was at the instant of all-India peak that arrived in the same quarter in the previous year and an appropriate growth factor to take care of the yearly growth in load demand. In this regard, we have following suggestions:

(i) We agree with the proposal to take peak load for calculation of PoC rates instead of the average rate. However, as the peak load achieved in some States during a particular quarter may not coincide with the all India peak, therefore, the load demand of such States corresponding to the instant of all-India peak load, would not reflect the demand of the State. In fact because of diversity, only a few States may be peaking at the instant of all-India peak.

(ii) In this regard, it is worthwhile to note that any base case scenario assumed for calculation of PoC rates would only be a projected theoretical load flow case and which may not happen in any day of the quarter. However, the base load flow case should reflect injections and withdrawals corresponding to 'LTA/allocations+MTOA' quantum which were basis of investment into the transmission system. It is essentially this investment which is required to be recovered from ISTS customers (DICs).

(iii) Therefore, while constructing the base load flow case corresponding to the quarterly peak scenario for calculating PoC rates, following principles may be adopted:

a. It is suggested that peak load of each State arrived during the same quarter in previous year may be summed up and normalized with the projected all-India peak of the quarter under consideration for the current year.

b. The net injection of each State from ISTS (i.e. Load – self generation) may be taken equal to its 'LTA/allocations+MTOA' quantum. The auxiliary consumptions if any may be considered as per norms.

c. The ISGS generators having long term PPAs/allocations or MTOA may be dispatched as above.

d. The generators who have target beneficiaries, and do not have an operative MTOA in the said quarter may be dispatched as proposed in draft i.e. the maximum dispatch happened in same quarter previous year or the proposed maximum dispatch for the quarter under consideration. This would then become approved injection for such generators.

e. Because of 'd' above, the sum of total ISGS dispatches may be more than the sum of total withdrawal over ISTS. The dispatches for ISGS may be proportionately reduced to match sum of total withdrawal over ISTS.

7. Actual use v/s designed use for application of PoC rate based sharing mechanism

The transmission charges payable are equal to approved injection/withdrawal multiplied by the nodal/zonal PoC rate. In this regard, the tariff policy mandates that transmission charges may be payable on usage basis. Therefore, CERC has suggested for calculating transmission charges based on the maximum actual usage of the ISTS during a quarter. This maximum injection/withdrawal may be more than or less than the 'LTA+MTOA' quantum. If the ISTS Customers (DICs) are using ISTS for injecting more than 'LTA+MTOA' /approved quantum, they must be charged accordingly, however, if they are using less than 'LTA+MTOA' /approved quantum they must be charged at least for the 'LTA+MTOA' /approved quantum for which the system has been made available for use by them. However, it is observed that this may result in total collection which may be more than the Monthly Transmission Charges (MTC). In this respect, it is proposed that the Commission may consider normalization of the total transmission charges payable by each DIC so as to match the total MTC required to be recovered. A sample calculation in this regard is given in following table:

		Injectors				Drawaees			
	Node/Zone/DIC	A	B	C	D	E	F	G	Total
1	Approved Injection/Withdrawal (LTA+MTOA) as taken for calculation of PoC rates, MW	500	1200	1600	1700	1500	1000	2500	
2	PoC rate as calculated for the Quarter, Rs**(Lakh)**/MW/Month	0.80	2.00	0.40	1.20	1.20	0.60	2.00	
3	Total collection as per PoC calculations, Rs**(Lakh)**/Month	400	2400	640	2040	1800	600	5000	12880
4	Approved Injection/ Withdrawl(LTA+MTOA etc) **or** actual Withdrawl/Injection, whichever is higher in a month, MW	800	1200	1800	2200	1600	1400	3000	
5	Total collection as per Maximum of Approved/ Actual Injection/ Withdrawal, Rs**(Lakh)**/Month	640	2400	720	2640	1920	840	6000	15160
6	Total Collection **after normalization**, Rs**(Lakh)**/Month	544	2039	612	2243	1631	714	5098	12880

8. **Truncation verses complete system and Netting**

The draft proposes to abolish the practice of computing PoC charges on transacted system. This is alright provided each state generation is also perturbed and cost of State transmission network is accounted for in computation of PoC charges. The net charges payable by (or to, if any) the State may thus be arrived.

9. **Transmission charges and Losses for solar power projects for use of ISTS**

In the original regulation dated 15.06.2010, it is stated that – no transmission charges or losses for the use of ISTS network shall be charged to solar based generation. This shall be applicable for the useful life of the project commissioned in next 3 years. In support of this provision, the Statement of Reasons dated 11.02.2010 has mentioned the following:

> *"1.5.6 The regulations facilitate solar based generation by allowing zero transmission access charge for use of ISTS and allocating no transmission loss to solar based generation. Solar power generators shall be benefited in event of use of the ISTS. Since such generation would normally be connected at 33 kV, the power generated by such generators would most likely be absorbed locally. This would cause no / minimal use of 400 kV ISTS network and might also lead to reduction of losses in the 400 kV network by obviating the need for power from distant generators. Further, this is also aligned with the objectives of the section 3(1), section 4, section 61 of the Electricity Act 2003 and the Jawaharlal Nehru National Solar Mission which is "to establish India as a global leader in solar energy, by creating the policy conditions for its diffusion across the country as quickly as possible." The cost of energy from solar based generation is in the range of Rs 14- 18 / kWh and application of ISTS charges and losses would further reduce the acceptability of power generated from solar sources. This regulation encourages solar based generation."*

As is evident from above, it was anticipated that the solar generations would cause no/minimum burden on the 400 kV ISTS and as such no additional/new Inter State Transmission System may need to be planned for solar generation. The amendments under consideration propose to extend the above duration for further three year i.e. up to 30-06-2017. In order to conform with the spirit of the Statement of Reasons, it is suggested that the proposed amendment to regulation 7(u) and 7(v) may be modifies as –

"(u) No transmission charges for the use of ISTS network shall be charged to the solar based generation, provided no additional transmission system is required to be created because of the solar generation, or provided there is no additional flow on any of the ISTS elements because of the solar generation. This shall be applicable for the useful life of the projects commissioned in next three years i.e. between 1.7.2014 to 30.6.2017."

"(v) No transmission losses for use of ISTS network shall be attributed to the solar based generation provided no additional transmission system is required to be created because of the solar generation or provided there is no additional flow on any of the ISTS elements because of the solar generation. This shall be applicable for the useful life of the projects commissioned in next three years, i.e. between 1.7.2014 to 30.6.2017."

10. **Regarding allocation of transmission losses**

In the previous paragraphs, it has been suggested to use DC load flow for calculation of PoC rates for transmission charges. However, the AC load flow may be continued to be used for allocation of transmission losses under PoC mechanism till a better alternative could be found.

11. **PoC rate for Short Term Open Access**

The general PoC rates are in the form of 'Rupees per MW per Month' whereas PoC rates for Short Term Open Access transactions are in the form of 'Rupees per Unit'. The PoC rates for Short Term transactions are arrived at considering a PLF of 100%. However, as the Short Term transactions are only for few hours in a year say even less than 20% of the total number of hours. It would be pertinent to calculate the PoC rates for Short Term transactions considering at the most a PLF of 20%. For example, if PoC rate is Rs. 1 Lakh per MW per Month, the Short Term transaction rates in Rs./Unit is presently calculated as: Rupees 100000/ (720 hrs x 1000) = 13.8 Paise/Unit. Instead of this, the rate may be calculated as: Rupees 100000/ (20% of720 hrs x 1000) = 69.4 Paise /Unit.

12. **Subsequent actions**

(i) The Sharing regulations may need to be further amended after amendments in the connectivity/long term access regulations for which CERC staff has already circulated a concept paper.

(ii) The procedure for computation of PoC charges would also need to be amended.

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