

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Coram: Dr. Pramod Deo, Chairperson  
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**Date: 26.3.2012**

**In the matter of:**

Central Electricity Regulatory Commission (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-State Transmission and related matters) (Third Amendment) Regulations, 2013

**Statement of Reason**

The Commission had notified the Central Electricity Regulatory Commission (Grant of Connectivity, Long-Term Access and Medium-Term Open Access in Inter-State Transmission and related matters) Regulations, 2009 (hereinafter "Connectivity Regulations") which came into force with effect from 1.1.2010. With the objective of facilitating grid connectivity to the generating stations based on Renewable sources of energy, the Commission issued an amendment to the Connectivity Regulations vide notification dated 3rd September, 2010, wherein, the threshold capacity for connecting to inter-State grid was reduced from 250 MW to 50 MW for the generating stations using Renewable sources of energy. The relevant Regulation 2 (b) (i) of the Connectivity Regulations, as amended, defines the term "Applicant" for Grant of Connectivity as under:

- "(a) A generating station with installed capacity of 250 MW and above, including a captive generating plant of exportable capacity of 250 MW and above or;*
- (b) A Hydro Generating station or generating station using renewable source of energy, of installed capacity between 50 MW and 250 MW.*
- (c) One of the Hydro Generating stations or generating stations using renewable sources of energy, individually having less than 50 MW installed capacity, but collectively having an aggregate installed capacity of 50 MW and above, and acting on behalf of all these generating stations, and seeking connection from CTU at a single connection point at the pooling sub-station under CTU, termed as the lead generator, or; ...."*

2. Existing generating stations connected to the inter-state grid and having surplus land, can add a small capacity of renewable source of energy in the same premises. By co-locating this new and renewable energy source with the existing infrastructure and the associated interconnection and transmission facilities, existing generating stations can maximize use of their land and transmission systems. However, existing Connectivity Regulations do not allow connectivity for such small generating plants based on renewable sources of energy. Presently, such plant is required to be connected with the State transmission system, which may require laying down long transmission lines for evacuation of its power. It will, apart from other problems related to the construction of the transmission lines including RoW issues, increase not only the cost of evacuation but also the transmission and wheeling losses.

3. In order to facilitate development of renewable energy projects in the premises of existing generating stations, the Commission proposed an amendment in the Regulation 2 of the Connectivity Regulations, by including a specific provision for renewable energy generating station of 1MW and above to grant connectivity to such stations at the existing connection point with Central Transmission Utility as under:

“e. Any renewable energy generating station of 1 MW capacity and above developed by a generating company in its generating station of description referred to in sub clauses (b)(i)(a) to (c) of this clause and seeking connectivity at the existing connection point with inter-State Transmission System subject to availability of transmission capacity margin.”

4. Comments/suggestions/objections to the proposed amendment were invited from the stakeholders and other interested persons by 15.03.2013. NTPC, POSOCO, CTU, CEA and M/s Transtech Green Power Pvt. Ltd. have made their suggestions/comments on the draft amendments. The comments of the stakeholders on various issues are discussed in subsequent paragraphs.

### **Connectivity and Metering**

5. NTPC has submitted with regard to connectivity at the existing connection point that in a generating station, various facilities like Railway sidings, MGR, make up water system, colony, Ash dyke & Ash Water Recirculation System (AWRS) etc would not be located within the boundary of power plant. These plant facilities could be located away from power house based on the land/water source availability. It has been further submitted that the renewable capacities could also be planned by co-locating along with such facilities/ in the surplus land available away from the power house premises. A renewable generating station shall be generating electricity at voltage level of a few hundred volts (e.g. in case of Dadri Solar PV plant, generation is at 400-800 V DC which shall be inverted to 265 V AC). Depending upon techno-economic feasibility and available voltage levels in the generating

station, such renewable power generating station located away from the power plant boundary but near the facilities such as MGR, Colony, AWRS etc. can be integrated at nearest available voltage levels such as 11 kV/ 33KV etc. which in turn would already be connected with the ISTS systems. By doing so, the existing generating stations can maximize use of their land and available Transmission System Connectivity. The Connectivity of renewable projects may be allowed at such available connection points in the generating station associated facilities as mentioned above i.e. 11 kV/33 kV etc. Stepping up small capacity renewable power to EHV level (400 kV /765 kV) would entail transformer iron losses and accordingly would make renewable energy generating station uneconomical and unviable. Besides this would also entail incurrence of constant losses in the EHV transformers used for stepping up to ISTS Connection point & these would be quite significant considering that utilization factor of the solar station is only in the range of 17-19%.

6. NTPC has, therefore, submitted that such small capacities even if located away from the power house be allowed to be connected at available electrical systems ( such as 11 kV/ 33kV, etc.) through any electrical device or line already existing in the station or created for this specific purpose.

7. NTPC has further submitted that incorporating connectivity at available MV bus voltage level within the power house would also be consistent with existing provisions of Regulation 2(n) CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 which is extracted as under:

*"(n) 'Inter-connection Point' shall mean interface point of renewable energy generating facility with the transmission system or distribution system, as the case may be:*

*i. in relation to wind energy projects and Solar Photovoltaic Projects, inter-connection point shall be line isolator on outgoing feeder on HV side of the pooling sub-station;*

*ii. in relation to small hydro power, biomass power and non fossil fuel based cogeneration power projects and Solar Thermal Power Projects the, inter-connection point shall be line isolator on outgoing feeder on HV side of generator transformer."*

The definition of pooling substation as explained in the SOR is extracted as under:

*"The term "Pooling sub-station" is very commonly understood in the industry meaning a sub-station developed by the developer*

*/generator where pooling of generation from individual turbine is done for interface with receiving sub-station."*

8. In view of above, NTPC has submitted that for renewable energy generating station being developed at existing generating station, Connectivity & metering should be at line isolator on outgoing feeder on HV side of the pooling sub-station for wind energy projects and Solar Photovoltaic Projects & on line isolator on outgoing feeder on HV side of generator transformer for small hydro power, biomass power and non fossil fuel based cogeneration power projects and Solar Thermal Power Projects as provided vide above CERC Regulations. Such integration of renewable power with the generating station system would enable power flow to ISTS on displacement basis.

9. The NTPC further submitted that such as renewable power is green power and should be harnessed with techno-economically feasible option based on the capacity of renewable plant and available voltage source nearby. In future, renewable capacities can be planned on existing building/ township of power plant. Hence, it has been requested to include the capacity less than 1MW (say 500KW) also in order to harness Solar on roof tops of power plant buildings.

10. NTPC has submitted that to facilitate such renewable energy generating stations seeking Connectivity at electrical systems of such generating station, the proposed proviso to Clause (1) of Regulation 2 may be modified as:

*"Any renewable energy generating station, developed by a generating company in its existing generating station of the description referred to in sub -clauses (b)(i)(a)to(c) of this clause and seeking connectivity at electrical systems of such generating station through existing connection with inter-state Transmission system subject to availability of transmission capacity margin"*

11. CTU has submitted that in the last line of amendment it has been mentioned that "-----subject to availability of transmission capacity margin". The aspect should be a part of LTA and not connectivity. Therefore, the amendment be modified as follows:

*"Any renewable energy generating station of 1 MW capacity and above developed by a generating company in its existing generating station of the description referred to in sub-clause (b) (i) (a) to (c) of the clause and seeking connectivity at the existing connection point with inter-state transmission system."*

Metering should also be provided at renewable energy generating station so that renewable energy can be scheduled and metered separately.

12. With regard to connectivity and metering, POSOCO has submitted that the metering shall be done at 'Inter-connection Point'. For Renewable (wind energy projects and Solar Photovoltaic Projects) inter-connection point with the existing conventional generator shall be line isolator on outgoing feeder on HV side of the pooling sub-station, where power generated by all renewable generators at the station would be pooled.

13. In our view, it may be desirable that the generation from the renewable power generating station whether situated within the power plant boundary or facilities located away from the power plant boundary of the existing generating station like Railway siding/MGR, Ash Dyke, Colony, etc. can be integrated at the nearest voltage level such as 11 KV /33 KV available within the power plant. This is in order to avoid Stepping up small capacity renewable power to EHV level (400 kV /765 kV) which would entail transformer iron losses and accordingly would make renewable energy generating station uneconomical and unviable. However, it should not be connected to the state transmission system. Further, the generating station shall have to ensure that power generated from the renewable generating stations is measured separately and responsibility of separate declaration and measurement of this renewable power should rest with generating stations and should be communicated to respective RLDCs/ RPCs. The meter shall be installed at the inter connection point as per CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012.

14. Though the draft amendments provide for connectivity to the renewable capacity of 1 MW developed in the existing generating station connected to the ISTS. However, this also is not in not conformity with the Para 7 of the complementary commercial mechanism of of Annexure -1 of IEGC which reads as follows:

"7. In case of solar generation no UI shall be payable/receivable by Generator. The host state, shall bear the UI charges for any deviation in actual generation from the schedule. However, the net UI charges borne by the host State due to the solar generation, shall be shared among all the States of the country in the ratio of their peak demands in the previous month based on the data published by CEA, in the form of regulatory charge known as the Renewable Regulatory Charge operated through the Renewable Regulatory Fund as referred to in clause 5 above.. This provision shall be applicable ,with effect from 1.1.2011, for new solar generating plants with capacity of 5 MW and above connected at connection point of 33 KV level and above and ,

who have not signed any PPA with states or others as on the date of coming into force of this IEGC. Illustrative calculations in respect of above mechanism are given in Appendix."

In the past from operational feasibility point, Commission has provided that renewable capacity of 50 MW and above should only be given connectivity to the ISTS. As a special dispensation Commission had proposed connectivity to the renewable capacity of 1 MW developed in the existing generating station connected to the ISTS. However, it is felt that it is not desirable to dispatch and grant connectivity to a renewable generating station of less than 5 MW capacity. Accordingly, a renewable generating station of capacity 5 MW and above but less than 50 MW developed in the existing generating station connected to the ISTS may be granted connectivity.

15. In the light of above, it is not desirable to grant connectivity to renewable generating stations including roof top solar for a capacity less than 5MW to ISTS. Such plants may use solar generation for captive consumption and get the REC issued for the solar generation.

16. The CTU has suggested deleting the words "subject to availability of transmission capacity margin" after the proposed amendment as it is a part of LTA and not connectivity. There is merit in their contention.

### **Scheduling**

17. With regard to scheduling POSOCO has submitted that the renewable energy generating station of 1 MW capacity and above with connection point at 33 KV and above, developed by a generating company in its generating station, shall be subjected to scheduling and despatch code as specified under Indian Electricity Grid Code .(IEGC) -2010, as amended from time to time.

IEGC Regulation 6.5.34:

"While availability declaration by ISGS shall have a resolution of one (1) MW and one (1) MWh, all entitlements, requisitions and schedules shall be rounded off to the nearest two decimal at each control area boundary for each of the transaction, to have a resolution of 0.01 MW and 0.01 MWh."

Since Renewable plants are of small capacity, as such resolution of 0.1 MW is desirable. Till necessary changes in IEGC regulations 6.5.34 are made, Renewable plants shall declare the availability of their Plant to RLDC with a resolution of 1 MW

18. The suggestion of POSOCO is reasonable and the same may be incorporated in the amendment to IEGC. However, till the IEGC is amended it is directed that for availability declaration in respect of renewable generating stations shall have resolution of 0.1 MW by invoking Commission's power under part 7 of IEGC.

### **Principal Generator**

19. CEA has submitted that the objective of proposed amendment is laudable but it is not specifically mentioned in the draft Regulations if the scheduling of such 1MW and above RES generator would be done directly by the RLDC or the operational responsibility for the same would be that of the existing generator. In the first amendment to the Connectivity Regulations of CERC, in order not to burden the operational and commercial responsibilities of such small generators on the RLDC, a concept of *lead generator* has been considered for individual generators less than 50MW and having a collective capacity of 50MW and above. The relevant regulations, Regulation 2(1)(b) (relevant portion highlighted) and second proviso to Regulation 8(1) is placed below.

#### **Regulation 2(1)**

*"(b) Applicant" means*

*(i) The following in respect grant of connectivity:*

*(a) A generating station with installed capacity of 250 MW and above, including a captive generating plant of exportable capacity of 250 MW and above or;*

*(b) A Hydro Generating station or generating station using renewable source of energy, of installed capacity between 50 MW and 250 MW.*

*(c) One of the Hydro Generating stations or generating stations using renewable sources of energy, individually having less than 50 MW installed capacity, but collectively having an aggregate installed capacity of 50 MW and above, and acting on behalf of all these generating stations, and seeking connection from CTU at a single connection point at the pooling sub-station under CTU, termed as the lead generator, or;*

*(d) A bulk consumer."*

#### **Second proviso to Regulation 8(1)**

*" Provided further that the application by the applicant defined under Regulation 2(1) (b)(i) (c) shall be considered by CTU only if all the generators, whose aggregate capacity is connected at the single connection point, formalize a written agreement among themselves that the lead generator shall act on behalf of all the generators to undertake all operational and commercial responsibilities for all the collective generators connected at that*

*point in following the provisions of the Indian Electricity Grid Code and all other Regulations of the Commission, such as grid security, scheduling and dispatch, collection and payment/ adjustment of Transmission charges, UI charges, congestion and other charges, etc., and submit a copy of the agreement to the CTU, with the application of connectivity, along with a copy to the respective RLDC in whose control area it is located.*

*Provided further that the CTU shall suitably incorporate the requirement of formal agreement amongst such generators in the detailed procedure and Connection Agreement signed with such lead generator."*

It would, therefore be preferable that the existing generating stations, in whose premises the renewable generator is located, coordinate all the operational and commercial responsibilities based on the instructions given by the RLDC. Then such proviso would have to be added to regulation No. 8.

20. POSOCO has further submitted that in case of Renewable energy generating station(s) of 1 MW capacity and above developed by a generating company in its generating station is/are connected to ISTS through existing generating station, then existing generating station will act as the principal generator. Principal Generator will coordinate with RLDC for Metering & Scheduling on behalf of Renewable Plant(s) located at the same location.

21. It may also be possible that the existing generating station may have more than one renewable generating plant in the generating station premise or near its plant facilities. In such situation the existing generating station should act as "Principal Generator" and all such renewable generating stations shall be inter connected one single point for the purpose of scheduling and metering.

22. It is also proposed to add the following proviso after the second proviso to Regulation 8 (1):

"Provided further that the application by the applicant defined under Regulation 2(1) (b)(i) (e) shall be considered by CTU only if the generating station agrees to act as the lead generator on behalf of other renewable generating stations to undertake all operational and commercial responsibilities for the renewable generating stations also and formalize a written agreement among them in this respect and in following the provisions of the Indian Electricity Grid Code and all other Regulations of the Commission, such as grid security, scheduling and dispatch, collection and payment/ adjustment of Transmission charges, UI charges, congestion and other charges, etc., and submit a copy of

the agreement to the CTU, with the application of connectivity, along with a copy to the respective RLDC in whose control area it is located.

### **Transmission Losses**

23. POSOCO has submitted that as per the Central Electricity Regulatory Commission (Sharing of Inter State Transmission Charges and Losses) Regulations, 2010, no transmission losses for the use of ISTS network shall be attributed to solar based generation. This shall be applicable for the useful life of the projects commissioned in next three years from the date of notification of the sharing Regulations. This could also be as per the regulations of CERC in force from time to time.

The Central Electricity Regulatory Commission (Sharing of Inter State Transmission Charges and Losses) Regulations, 2010 would take care of this aspect. However, for the renewable generators the boundary line for metering shall be the HV side of first-setup transformer. The metering at this boundary of renewable generator shall be considered for the computation of net injection of principal generating station at its metering point. Any loss in the electrical system of the generating station due to integration of renewable energy sources shall be borne by the principal generator. The POSOCO shall clearly bring out the scheduling procedure with illustrative examples for the sake of clarity of all concerned.

### **Transmission Charges**

24. POSOCO has also submitted that as per the Central Electricity Regulatory Commission (Sharing of Inter State Transmission Charges and Losses) Regulations, 2010, no transmission charges for the use of ISTS network shall be charged to solar based generation. This shall be applicable for the useful life of the projects commissioned in next three years from the date of notification of the sharing Regulations. This could also be as per the regulations of CERC in force from time to time.

The Central Electricity Regulatory Commission (Sharing of Inter State Transmission Charges and Losses) Regulations, 2010 would take care of this aspect also.

### **Control Area**

25. POSOCO has also submitted that renewable energy generating station of 1 MW capacity and above, developed by a generating company in its generating station & interconnected to existing generating station shall have its own metering and telemetry to control its generation & maintaining its interchange schedule. Each such Renewable energy generating station shall be considered as a separate control area in already identified control area.

This aspect may be taken care in the amendment to the IEGC.

26. POSOCO has also submitted that the CTU shall install special energy meters on all inter connections between the Renewable energy generating station of 1 MW capacity & above and principal generator. The principal generator shall take weekly meter readings and transmit them to the RLDC by Tuesday noon. The RLDC shall compute actual net injection / drawal of principal and interconnected Generators separately, 15 minute-wise, based on the above meter readings. The above data along with the processed data of meters shall be forwarded by the RLDC to the RPC secretariat on a weekly basis for the seven day period ending on the previous Sunday mid-night, to enable the latter to prepare and issue the unscheduled inter-change (UI) account. This could also be as per the relevant regulations of CERC in force from time to time.

The relevant Regulations would take care of this aspect.

### **RLDC Charges**

27. POSOCO has also submitted that scheduling, metering and energy accounting of Renewable energy generating station of 1 MW capacity & above with principal Generator shall be done by RLDC and such Renewable energy generating station shall pay applicable RLDC fees and charges.

This would be as per fees and charges of Regional Load Despatch Centre and other related matters Regulations, 2009.

### **Renewable Generation at Sub-Stations for captive consumption**

28. POSOCO has also submitted that there are almost 150 sub-stations owned by Inter-state transmission licensees and land available at the sub-station can be utilised for renewable generation for captive consumption. REC could be issued for the quantum of power injected by such generators.

This issue is not connected with the connectivity regulation and can be dealt as per Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation Regulations, 2010.

### **Gaming**

29. The POSOCO has submitted that there is not much of experience with RLDCs to take care of gaming and other difficulties likely to be encountered during executions. RLDCs will approach to the Hon'ble Commission for the redressal of the same from time to time. The Commission shall take appropriate view on the question of gaming and other difficulties as and when brought before it.

30. CEA has also submitted that the tariff of such renewable generator would have to be examined, since the land and evacuation facilities may be common between the existing generator and the renewable generator. In case, the tariff for sale of this power is being taken as the CERC regulated tariff, then some part on account of common usage of land and evacuation facilities may have to be reduced from the tariff, or these assets may have to be shared between the existing generating station and the renewable generator for the purpose of tariff.

This aspect may be dealt in the amendment to the CERC Tariff Regulation for Renewable Energy Sources.

31. Based on the deliberations in the above paragraphs, the following provisions after sub-clause b (i)(d) of clause 1 of Regulation 2 of the Principal Regulations, namely through 3<sup>rd</sup> amendment to the Connectivity Regulations of CERC:

"(e) Any renewable energy generating station of 5 MW capacity and above but less than 50 MW capacity developed by a generating company in its existing generating station of the description referred to in sub-clauses (b)(i)(a) to (c) of this clause and seeking connectivity to the existing connection point with inter-State Transmission System through the electrical system of the generating station ."

32. Further, the following proviso has been added after the third proviso to Regulation 8 (1) :

"Provided further that the application by the applicant defined under Regulation 2(1) (b)(i) (e) shall be considered by CTU only if the existing generating station agrees to act as the "Principal Generator" on behalf of the renewable generating station(s) seeking connectivity through the electrical system of the generating station and formalizes a written agreement/arrangement among them to undertake all operational and commercial responsibilities for the renewable generating stations in following the provisions of the Indian Electricity Grid Code and all other Regulations of the Commission, such as grid security, scheduling and dispatch, collection and payment/ adjustment of Transmission charges, UI charges, congestion and other charges, etc., and submit a copy of the agreement to the CTU, with the application of connectivity, along with a copy to the respective RLDC in whose control area it is located."

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