

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

**Draft Central Electricity Regulatory Commission (Indian Electricity Grid Code)
(First Amendment) Regulations, 2024**

Explanatory Memorandum

1. Background

(a) Central Electricity Regulatory Commission vide Notification No. L-1/265/2022/CERC, dated 29.05.2023, notified Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023 (hereinafter referred to as “Principal Regulations”), which has been made effective from 01.10.2023.

(b) After the notification of the Principal Regulations, some difficulties were brought to the notice of the Commission by the stakeholders, including generating stations, Grid-India, and RPCs. The Commission vide Order dated 30.09.2023 and 18.12.2023 through Suo-Motu Petition No. 14/SM/2023 and 18/SM/2023 addressed some of the difficulties indicated by the different stakeholders under the provisions of ‘Power to relax’ and ‘Power to remove difficulties’ of the Principal Regulations.

2. In light of the Suo-Motu Orders dated 30.09.2023 and 18.12.2023 in Petition No. 14/SM/2023 and 18/SM/2023, the relevant provisions of the Principal Regulations have been proposed to be amended. The detailed justifications for the proposed changes are already included in the said Suo-Motu Orders and are not repeated here for brevity. The following provisions are proposed to be amended in the Principal Regulations:

(a) ‘D’ referred to in Clause 2 of Regulation 27 of the Principal regulations shall be construed as the date when a generating station intimates the commercial

operation of the generating station or unit thereof, and the scheduling shall start from 0000 hours of D+2 day.

- (b) Amendment under sub-clause (f) of Clause (3) of Regulation 22 of the Principal Regulations:

In the case of the Pumped Storage Plant, if it is not possible to demonstrate the design capabilities up to the rated water drawing levels due to insufficient reservoir levels, the COD may be declared after demonstrating the capabilities at available water drawing levels, subject to the condition that design capabilities up to the rated water drawing levels shall be demonstrated immediately when the sufficient reservoir level is available after COD. However, if such a generating station is not able to demonstrate the design capabilities when sufficient water is available, the generating company shall have the option to either go for a repeat trial run or de-rate the capacity. If the generating company decides to de-rate the unit capacity in terms of sub-clause (b) of Clause (2) of Regulation 22 of these Regulations, such de-rating shall be effective from the COD.

- (c) Amendment under sub-clause (l) of Clause (1) of Regulation 49 of the Principal Regulations:

The generating station, whose tariff is determined under Section 62 of the Act, may sell its un-requisitioned surplus power in the Day Ahead Market without the consent of the beneficiary.

- (d) Amendment under sub-clause b(ii) of Clause (4) of Regulation 49 of the Principal Regulations:

Under sub-clause b(ii) of Clause (4) of Regulation 49 of the Grid Code 2023, the buyers were allowed for downward revision of the schedule from the generating stations, whose tariff is determined under Section 62 of the Act. Under the suo-motu order 14/SM/2023, it was directed that such downward revision of

schedules by the buyers for 'D' day, after 1430 hrs on 'D-1' day in the generating station shall not be allowed below their respective share of minimum turndown level in the generating station. The same has been proposed to be inserted in sub-clause b(ii) of Clause (4) of Regulation 49 of the Grid Code 2023.

For example, a generating station with a DC of 1000 MW has a Minimum turndown level of 500 MW. Suppose it has two buyers (buyer no.1 and buyer no. 2) with a 50% share each. Hence, the respective share of the minimum turndown level for each buyer comes out as 250 MW. Suppose buyer no.1 requests a schedule of 200 MW and buyer no. 2 requests 300 MW at 8 AM on 'D-1' day, considering 'D' as a day of scheduling. Under the proposed regulation, buyer No. 1 shall not be allowed to revise the schedule downwards after 1430 hrs on 'D-1' day since it has scheduled only 200 MW, which is already less than its share of the minimum turndown level, although it has full freedom to request for a scheduling prior to the opening of the day ahead market at 10.00 am. Similarly, buyer no. 2 shall not be allowed to revise the schedule downwards by more than 50 MW after 1430 hrs on 'D-1' day since it scheduled 300 MW and considering the share of buyer no.2 in the minimum turndown level as 250 MW, it can revise its schedule only up to 250 MW.

(e) Insertion of a new Clause (7-a) after Clause (7) of Regulation 49 of the Principal Regulations:

- Revision of Declared Capacity and schedule of a generating station or ESS (as an injecting entity) as below:
 - (i) The Generating station (other than lignite, gas based thermal generating station, and hydro generating station) or ESS shall be allowed a maximum of 4 (four) revisions of Declared Capacity and schedule per day subject to a maximum of 60 (sixty) revisions during a month, due to reasons such as a partial outage of the unit or variation of fuel quality or any other technical reason.

- (ii) The generating station based on lignite, gas, or hydro generating station shall be allowed 6 (six) revisions of Declared Capacity and schedule in a day subject to a maximum of 120 (One hundred twenty) revisions during a month, due to reasons such as partial outage of the unit or water availability for hydro generating stations or fuel quality or variations in supply of gas for gas generating stations or any other technical reason.

Amendment to Regulation 19:

3. As per Regulation 19(1) of the Principal Regulations, all the Generating Stations are allowed to inter-change power with the grid during the commissioning period, including testing and full load testing before the COD after obtaining prior permission from the concerned Regional Load Despatch Centre. However, as per Regulation 19(2)(b) of the Principal Regulation injection of infirm power shall not exceed one year from the date of first synchronization.
4. Grid-India vide letter dated 12.06.2024 submitted as follows:

“Prior to implementation of IEGC-2023, RE generators used to apply for First Time Charging (FTC) after completion of all pre-commissioning activities when the plant used to be ready for scheduling. The plant used to declare its Commercial Operation Date (CoD) after completing the FTC process and telemetry data validation. In the pre IEGC-2023 period, most of the RE generators usually declared its CoD within a reasonable time of 2-10 days after successful completion of FTC process....

- 2 *Post implementation of IEGC-2023, subsequent to FTC approval and telemetry data validation, RE generators are mandated to go through the process of trial run before declaring the CoD and are permitted to schedule their infirm power in the intervening period between FTC and CoD as per the provisions in the DSM Regulations 2022 (including subsequent orders by CERC). The maximum period of injection of infirm power can be up to 1 year as per Regulation 19(2) of IEGC2023.*

.....

The RE Generators need to seek standing clearance from the concerned RLDC for Scheduling of the infirm power. It is also pertinent to mention that NOC to such generators are generally issued by RLDCs after getting consent from SECI/REIA wherever applicable. It is being observed that many-a-times these generators are seeking Standing Clearance from RLDC and selling the infirm power in the Power Exchange/through bilateral transaction but failing to commence the trial run or delay in

demonstration of trial run.

...

Clause 19(7) of IEGC states that, infirm power can be interchanged with the grid only for specific purposes such pre-commissioning activities, testing and commissioning. The concerned RLDC is mandated to seek information related to the purpose of injection of infirm power on each occasion of the interchange of power before COD. The generating station is mandated to furnish the details related to the specific commissioning activity, testing, and full load testing, its duration, the intended period of interchange. However, these RE generators are citing vague reasons to get the Standing Clearance issued from RLDC intending only to sell infirm power in the Power Exchange or through bilateral contracts with no seriousness towards achieving successful trial run and CoD.

It may be appreciated that prolonged testing and injection of infirm power is not desirable as it may create various issues in the grid such as congestion etc., thereby endangering grid security mandated to be ensured by RLDC as per Regulation 19(1) of the IEGC.

..
In view of the above, it is proposed that to avoid prolonged injection of infirm power in the grid, the total period between FTC and COD by Regional Entity RE Generators may be reviewed and restricted to a reasonable timeline, say a maximum of 45 days.”

5. We have taken note of submissions of Grid-India vide the abovesaid letter. We observe that as per Regulation 19(7) of the Principal Regulations, the purpose of providing the provision for the interchange of infirm power from the unit(s) of the generating station is for the purpose of pre-commissioning activities, testing, and commissioning only. It cannot be the case that a generating station is continuing the injection of infirm power not for testing and pre-commissioning activities but as commercial injection without carrying out a trial run and declaring commercial operation. Accordingly, Sub-Clause (b) of Clause (2) of Regulation 19 of the Principal Regulations is proposed to be substituted with sub-clauses (b) and (c) as follows:

“(b) Injection of infirm power shall not exceed one year from the date of first synchronization for generating stations other than REGS and ESS.

- (c) Injection of infirm power shall not exceed 45 days from the date of FTC approval for REGS and ESS.”*

6. It has also been proposed that for REGS and ESS, extension of period for injection of infirm power beyond the stipulated period may be allowed (a) for a period up to six months by respective RLDC on an application(s) made by such generating station or ESS to respective RLDC along with detailed reasons, at least 10 days in advance of the completion of the stipulated period, (b) for a period beyond six months by the Commission on an application(s) made by such generating station or ESS along with detailed reasons, at least 30 days in advance of the completion of the stipulated period.

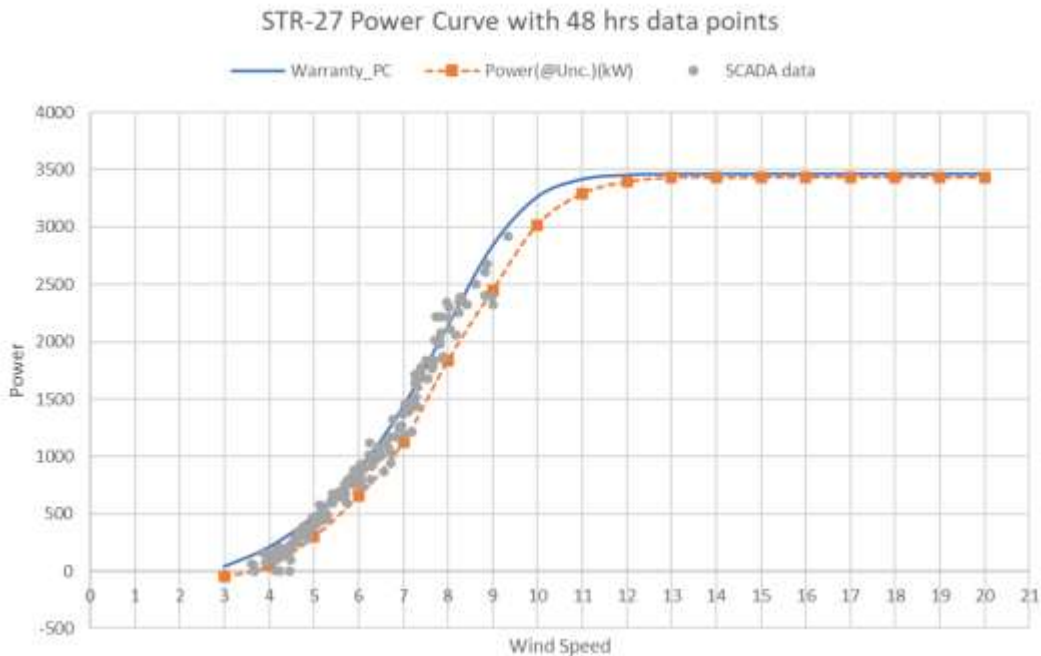
Amendment to Regulation 22:

7. With regard to the trial operation of wind turbine(s), it has been provided under Regulation 22(3)(d) of the Principal Regulations that the trial operation of wind turbine(s) shall mean the flow of power and communication signal for a period of not less than continuous four (4) hours during periods of wind availability with the requisite metering system, power plant controller, telemetry and protection system in service.
8. M/s Renew Power vide letter dated 16.04.2024 has brought to our notice that due to intermittency of the wind speed, it is difficult to demonstrate the performance of a wind turbine for a continuous period of four hours. Renew has stated as follows:

“during trial run, the wind power developer needs to demonstrate the output of each wind turbine corroborated with wind speed for continuous four hours. This is done by matching the power curve as recorded during the trial run through SCADA system with respect to power curve given by the manufacturer.

(b) The SCADA system records the generation for every 10-minutes duration and the same is plotted against the power curved warranted by the manufacturer and the lower threshold as shown in the graph below. (c) Each grey dot in the graph below indicates the 10-minutes generation during trail run. On close examination of the graph, it can be seen that in the duration of every 4 continuous hours, 1-2 grey dots are falling below the lower threshold line (orange line in the graph) and hence, the wind power developers are not able to

complete the trial run as their generation for any continuous four hours is not above the lower threshold.



(d) As per Regulation 22(3)(b) of the IEGC 2023, the solar power developers are required to demonstrate ‘the flow of power and communication signal for not less than four (4) hours on a cumulative basis between sunrise and sunset in a single day’. Accordingly, they take any four (4) hours data point and successfully clear the trial run. Similarly, if we can do the same exercise for the WTGs over the period of two (2) days, it becomes easy for the wind power developers to demonstrate the output and match the power curve.”

Keeping in view the difficulties stated by the Developer , it is proposed that the wind turbine(s) shall demonstrate their performance for a period of not less than four (4) hours cumulatively in a single day.

Amendment to Regulation 45:

9. Clause 12 of Regulation 45 of the Principal Regulations includes provisions for part load compensation for generating stations under Section 62 or Section 63 of the Act as follows:

“Provided also that the regional entity thermal generating stations whose tariffs are determined under Section 62 or Section 63 of the Act, shall be compensated for part load operation, that is, for generation below the normative level of operation, in terms of the provisions of the contract entered into by such

generating stations with the beneficiaries or buyers, or in the absence of such provision in the contract, as per the mechanism to be specified by the Commission through separate regulations or through Order:

Provided also that till the mechanism of part load compensation is notified by the Commission, the mechanism in this regard already in force under the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 shall continue to be in operation”.

As per the above, since the mechanism of part load compensation is yet to be specified separately under the Principal Regulations, the mechanism already in force under the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 continues to be in operation.

10. We note that for Section 62 generating stations, normative values for Heat rate, Auxiliary Power consumption, and specific oil are specified at normative loading, and the variable charges for such generating stations are determined based on the specified norms. In case such generating stations are operated at a load factor less than the normative load factor, the heat rate, APC, and specific oil consumption may increase, thereby making the variable charges non-representative of actual parameters. This has been noted in the Explanatory Memorandum to Draft (Indian Electricity Grid Code) Regulations, 2022 as follows:

“(iv) The compensation mechanism for the regional entity thermal generating stations operating on loads below normative level upto technical minimum, was included as part of the 2010 Grid Code in 2017. The compensation was introduced mainly because the norms for Section 62 projects under the Tariff Regulations have been specified considering specific past data and if loading is below the data based on which norms were specified, the variable charge based on norms may not correspond to the actual parameters of Station Heat rate, Auxiliary power consumption etc. Further since norms for generating stations under Section 62 are determined under the Tariff Regulations, the appropriate placement of compensation for such projects should be through Tariff Regulations...”

The provisions for the compensation for part load operation have been in vogue since 2017. Under the recently notified Tariff Regulations, 2024, the normative parameters of Heat Rate and APC have been tightened based on

recommendations of CEA. NTPC, vide letter dated 8.4.2024, has submitted as follows:

“

1) *Incorporation of Part load compensation as recommended by CEA:*

a) *Part Load Compensation for Coal based generating stations:*

- (i) *It may Kindly be appreciated that the norms for Part Load compensation which were fixed by Hon'ble Commission in IEGC Regulations 2016 (4th Amendment) need to be reviewed as the same is grossly inadequate for thermal stations, particularly the super critical units.*
- (ii) *Further, CEA vide its letter dated 19.12.2023 has furnished its recommendations on the operational norms & part-load degradation factors (Heat Rate & APC) for thermal stations.*
- (iii) *The revised degradation factors (for Heat rate & APC) as recommended by the CEA for part-load operation of thermal stations have not been included in the Tariff Regulations, 2024 applicable from 1st April 2024 onwards.*
- (iv) *Therefore, it is requested to include degradation factors (Heat Rate & APC) recommended by CEA for coal-based stations in the CERC Tariff Regulations 2024 so that the financial losses in thermal station operating at par load may be prevented...”*

We observe that CEA, while proposing the tighter norms, has considered % degradation to be considered for part load compensation. Hence, the revised part load compensation suggested by CEA is directly linked with normative parameters suggested by CEA. Since the normative parameters have been made applicable from 1.4.2024, there is a need to consider suggestions for revised parameters for part load compensation for thermal generating stations whose tariffs are determined under Section 62 of the Act. Since the revised norms for Heat rate and APC have been specified in the Tariff Regulations 2024, the revised part load compensation parameters are also suggested in the Tariff Regulations 2024. It has also been proposed that the proposed amendment in this regard shall come into effect from 1.4.2024.

Accordingly, the third and fourth proviso to Clause 12 of Regulation 45 of the Principal Regulations is proposed to be substituted as under:

“Provided further that the regional entity thermal generating stations whose tariffs are adopted under Section 63 of the Act, shall be compensated for part load operation,

that is, for generation below the normative level of operation, in terms of the provisions of the contract entered into by such generating stations with the beneficiaries or buyers, or in the absence of such provision in the contract, as per the mechanism already in force under the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010:

Provided further that the thermal generating stations whose tariffs are determined under Section 62 of the Act, by the Commission, shall be compensated for part load operation as per the provisions of applicable Tariff Regulations.”

Amendment to Regulation 49

Issue of Schedules below Minimum Turndown level (MTL)

11.NTPC, vide their letter dated 28.12.2023, has submitted as follows:

“Accommodating supply obligation through SCED as per IEGC provisions:

In regards with arrangement of power by a regional entity generating station participating in SCED to meet schedules below minimum turndown level, Regulation 49 (2) (a)(vi) of IEGC 2023 provides that.

(vi) Arrangement of power by a regional entity generating station participating in SCED to meet schedules below minimum turndown level:

a. In case a regional entity generating station gets schedule below minimum turndown level and wishes to arrange power scheduled by its buyers through SCED, it shall submit consent to NLDC before gate closure for arranging the scheduled power for such generating station through SCED.

b. NLDC shall consider the drawal schedules in respect of such generating station, under SCED subject to availability of scope of optimisation, that is, if the energy charge or SCED Compensation Charge, as applicable, of such generating station is higher than that of the marginal generating station in the stack prepared under and after completion of step at sub-clause (iv) of this clause, and also subject to the condition the entire drawal schedule against such generating station can be accommodated under SCED.

It is observed that even when sufficient URS was available in the marginal NTPC stations participating in the SCED matrix, but the request made to NLDC to accommodate the obligation of supply for unit under USD through the SCED mechanism is not being considered. This is causing stations to under inject and bear the DSM penalty. (The details of URS available in cheaper NTPC stations compare to Barh Stage II & Unchahar Stage III is attached in Annexure A)...”

As per the above, NTPC had stated that NLDC has not accommodated the supply obligations for the units under Unit Shutdown (USD) through the SCED mechanism even when sufficient URS was available in the marginal NTPC stations participating in the

SCED matrix.

12. We note that Regulation 49 (2) (a)(vi) of IEGC 2023 allows adjustment through SCED only if the energy charge or SCED Compensation Charge, as applicable, of such generating station is higher than that of the marginal generating station in the stack prepared under and after completion of the step at sub-clause (iv) of this clause, and also subject to the condition that the entire drawal schedule against such generating station can be accommodated under SCED. This clause does not allow adjustment of part drawal schedule if the same can be accommodated. We observe that adjustment through SCED is the last mile adjustment for such a generating station and needs to be allowed for a part drawal schedule also. Accordingly, the words “, and also subject to the condition the entire drawal schedule against such generating station can be accommodated under SCED” under sub-clause (a)(vi)(b) of Clause (2) of Regulation 49 of the Principal Regulations have been proposed to be deleted.

13. NTPC vide letter dated 13.03.2024 has submitted as follows:

“It has been seen that on many instances, beneficiaries are giving full schedule during peak hours and negligible or less than Minimum Turndown Level (MTL) schedule during non-peak hours. (Scheduling pattern of NPGC, Solapur, Farakka, Khargone, Barh-1 and Unchahar-IV in the recent days are enclosed as Annexure-1 for ready reference) It is submitted that for safe and reliable operation of the machines, units are required to be operated at or above MTL. MTL limitations and guidelines are as per the CEA Standards. Due to these technical imperatives of the generating Unit, fulfilling the Beneficiaries scheduling pattern post IEGC 2023 is impractical...”

NTPC has offered the said power in Energy Market also, but power could not be scheduled via market due to low MCP in off peak blocks. The option of taking the Unit Shut down when $SG < MTL$ is also not feasible as fulfilling the supply obligation (Requirement of supply obligation introduced in the IEGC 2023) through Bilateral contracts, Markets or from own stations is also not possible due to non-availability of power during peak hours...”

In view of the said difficulties and to honor the technical imperatives of the Unit, beneficiaries may be directed to give MTL schedules during non-peak hours if power is availed during peak hours otherwise generating stations may be allowed to take the Unit under shut down (USD) without any supply obligations, if feasible scheduling is not ensured by Beneficiaries...”

14. We observe that the IEGC 2023 provides flexibility to beneficiaries/drawee DICs to schedule power on day ahead basis based on their contracts and requirements with the following condition under regulation 49(1)(f) of the IEGC 2023:

“(iii) The SLDC on behalf of the intra-State entities which are drawee GNA grantees, as well as other drawee GNA grantees while furnishing time block-wise requisition under this Regulation shall subject to technical constraints, duly factor in merit order of the generating stations with which it has entered into contract(s):

Provided that the renewable energy generating stations shall not be subjected to merit order despatch, and subject to technical constraints shall be requisitioned first followed by requisition from other generating stations in merit order.”

As per the above, renewable generating stations are required to be requisitioned first, followed by requisition from other generating stations in merit order. During peak solar hours, a complex problem arises where a distribution licensee needs to place requisition of schedules keeping in view the (a) end demand and accordingly drawl schedule through ISTS (b)renewable generating stations to be requisitioned first(c) follow merit Order while requisitioning schedules. A situation may arise where generating stations with high variable charges may not get schedules up to minimum turndown level due to the availability of more RE generation (which is required to be scheduled first) and the demand which can be met through generating stations higher up in merit order.

A generating station that gets a schedule below the minimum turndown level, can sell its power in the power market to reach schedules above the minimum turndown level to cater to such a situation. But NTPC has submitted that despite efforts to sell power in the power market, in case such power is not sold, it leads to over-injection by the generating station in blocks with schedule less than MTL. These generating stations may not be taken under USD as such generating stations are required to meet their obligations to supply power to beneficiaries during peak demand hours.

15. We observe that it may not always be prudent for a generating station that gets schedule above the minimum turndown level for peak hours but schedule below the minimum turndown level for other hours to go under USD as this may deplete the reserve availability. Some of such generating stations may be considered under Unit Commitment (SCUC) by the system operator for the purpose of reserves. However,

with increasing penetration of renewables, may lead to large fleet of thermal generators with schedule below MTL and it may not be possible that all such generators are considered under SCUC.

16. We note that there is a stack of generating stations under SCED. A generating station should not over-inject in a planned manner to reach the minimum turndown level when another generating station is operating much above the minimum turndown level. Hence, in order to achieve overall system optimization, it has been proposed that the regional entity generating station, whose tariff is determined under Section 62 of the Act, gets schedule below minimum turndown level for off peak hours of the day; however, gets schedule above minimum turndown level for peak hours of the day, the schedule below the minimum turndown level may, on the request by such generating station to NLDC be adjusted under SCED. However, such adjustments shall be made only after the generating station has taken adequate steps to sell such power in the market. It is also observed that such a situation is likely to arise with generating stations that are lower down in the merit order, i.e., whose variable charges are high. Adjustment through SCED would lead to a situation where a generating station with a lower variable charge is required to be back down to adjust such generating station with a higher variable charge. The difference between such variable charges is to be paid for. It has been proposed that such difference shall be paid for by the entity that has caused the schedule of the generating station or unit thereof to be below the minimum turndown level.

17. Accordingly, a new sub-clause (a)(v-a) is proposed to be added after sub-clause (a)(v) of Clause (2) of Regulation 49 of the Principal Regulations as follows:

“(v-a) In case a regional entity generating station, whose tariff is determined under Section 62 of the Act, gets schedule below minimum turndown level for off peak hours of the day, however, gets schedule above minimum turndown level for peak hours of the day, the schedule below the minimum turndown level may, on the request by such generating station to NLDC be adjusted as follows:

- a. the schedule below the minimum turndown level shall be adjusted under SCED such that the schedule in all time blocks of the day is at least at minimum turndown level. The schedule of the marginal generating station (s) ('A'), that is the generating with the highest energy charge in the stack prepared under and after completion of step at sub-clause (iv) of this clause shall be reduced, subject to ramp up or ramp down*

rate, response time, transmission congestion and such other parameters as stipulated in the Detailed Procedure.

- b. *In case the SCED energy charge or SCED Compensation Charge, as applicable, of such generating station ('A') which was required to be issued SCED down, is lower than the energy charge of the generating station ('B') whose schedule was increased up to the minimum turndown level, the difference between the SCED energy charge or the SCED Compensation Charge (for 'A') and the energy charge (for 'B') shall be payable by the entity which has caused the schedule of the generating station or unit thereof below minimum turndown level.*
- c. *In case the SCED energy charge or SCED Compensation Charge, as applicable, of such generating station ('A') which was required to be issued SCED down, is higher than the energy charge of the generating station ('B') whose schedule was increased up to the minimum turndown level, the difference between the SCED energy charge or SCED Compensation Charge (for 'A') and the energy charge (for 'B') shall be adjusted in accordance with sub-clauses (viii) to (x) of this clause.*
- d. *The above steps shall be carried out only after the generating station furnishes to the RLDC, the efforts made by such generating station to achieve schedule of Minimum turndown level through sale of power in the Power market (under bilateral or collective transaction)."*
