To,

Mr. S.C Shrivastava,
Chief (Engineering)
Central Electricity Regulatory Commission (CERC),
3rd & 4th Floor, Chanderlok Building, 36, Janpath, New Delhi – 110 001

Date: 12.10.2018

Subject: Submission of Comments/Suggestion on amendments to be made in existing Indian Electricity Grid Code.

Reference:

1. **Public Notice issued by CERC captioned "Constitution of Expert Group to review "Indian Electricity Grid Code and other related issues" bearing no. ENGG/2012/1/2019-CERC, dated 10.06.2019. ("Public Notice")**

Dear Sir,

This is with reference to the Public Notice mentioned above as reference item no. 1, vide which Central Electricity Regulatory Commission ("CERC") invited comments/suggestions on the changes/modification in the existing Indian Electricity Grid Code ("IEGC") in light of large scale integration of renewable energy based generating capacity and changing power market scenario.

Accordingly, we are hereby enclosing comments and suggestions on the captioned amendment as Annexure I. We request the Honourable Commission to kindly consider the same while finalizing the Draft discussion paper.

Lastly, should there be any requirement, it would be a privilege for us to support the Honourable Commission by providing information/data relevant to the matter.

Yours truly,

For ReNew Power Limited

Parag Sharma
Chief Operating Officer

Annexure I:

Comments/Suggestions for modification in the Indian Electricity Grid Code in light envisaged power sector"

The Country is experiencing a rampant pace of Renewable Energy (RE) capacity additions, as on date the RE installed capacity stands at 79 GW which is further expected to grow at rate of 3GW per month till FY 2022. We broadly welcome the steps taken by Central Electricity Regulatory Commission ("CERC") in its capacity as sector regulator to facilitate integration of RE technology with the grid and to manage the transition of market due to huge penetration of RE. In our capacity as a stakeholder we are making suggestions in the following sections, which we feel is of utmost requirement and will assist CERC to manage the future power sector. Our detailed submission in the captioned matter is as follows:

1. **Introduction of Real Time Market and Ancillary Market**

In the recent past CERC has amended Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matter) Regulations, 2014 and aligned the deviations prices with the market determined price. It is very well understood that such amendments are made with an intent restrict grid users to adhere to schedule by making non-adherence to the schedule non-economically. Here it will be worth mentioning that deviation from schedule is not always under reasonable control of the grid user and may be dependent upon external factors, under such a scenario there should be market product operating in real time giving opportunity to gird users to make up for anticipated deviations. CERC as a way forward already published consultation paper on introduction of Real Time Market.

Further, with increasing penetration of RE based power sources the grid balancing exercise is getting tedious day by day. Availability of generation from RE based sources is highly uncertain due to its dependence on environmental factors, to deal with such deviations presently NLDC is designated as the nodal agency to manage the grid through ancillary services. It will be worth mentioning that volume of ancillary services required will be much more with increase RE penetration, a market based model will be required for ensuring availability of volumes which can be deployed. CERC as a way forward already published consultation paper on introduction of Ancillary Market.

The two markets mentioned above needs amendment in the IEGC to give effect to following:

I. Define Real Time Market and Ancillary Market.
II. Empowering System operator to issue approvals for transaction and manage these markets.
III. Platforms under which such trade will take place.

Also, all the comments/suggestions submitted while finalizing of staff paper of Real Time Market and Ancillary Market needs to be read as part of this document.

2. **Defining Gate Closure Time for facilitation of Real Time Market and adoption of 5 minutes time block energy accounting:**

Introduction of concept of gate closure is the utmost requirement for operation and settlement in a real time market. The Gate Closure time with reference to specific time block be defined at two levels which are as follows:

I. Gate closure time for finalization of contract.
II. Gate closure time for implementation schedule including revisions.

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Further, there is need to reduce down the time duration of a time block from 15 minutes to 5 minutes to facilitate RE grid integration. Generation form RE based sources is highly dependent upon weather forces which exhibits variability on real time basis, to give an opportunity to accommodate and take corrective actions the duration of time block needs to be reduced. Also, it will in the benefit of sector by making it more close to real time.

Presently, there is difference in time by which a revision for conventional and RE based project is put into effect which is 4 time block for conventional and 6 time block for RE. As real time adjustment is highly required for RE based projects they should be at least treated at par with conventional.

Basis above we are making following suggestions:

I. **Defining Gate Closure time with respect to finalization of trade in market.**
II. **Defining Gate Closure time with respect to scheduling.**
III. **Duration of time block to be reduced from 15 minutes to 5 minutes.**
IV. **To amend the minimum time block duration for scheduling and rescheduling from 4 time block to 6 time block**

3. **Delegation of commercial power to system operators for grid balancing**

Increased penetration of RE based sources have increased the frequency and magnitude of balancing requirement for balancing the grid. At present system operators at various level are empowered to finalize schedule and issue real time curtailment and ramp-up instruction to manage the grid. But, it is worth mentioning that at present there is no commercial arrangement under which the system operators can bring in more generations at its own will to balance the Grid. Commercial implications of such activity to be either met through the pool account available with system operators or need to be socialized among the states due to which the need for balancing was required.

The proposed system will facilitate creation of Ancillary system at state and reginal level and will ensure local balancing of the grid.

Basis above we make following suggestion:

I. **Delegate commercial power to system operator to enable grid balancing at real time basis.**
II. **Mechanism to ensure availability of funds for such despatchs to be ensured either through allocation of funds from pool account or by way of socialising the cost.**

4. **Real time curtailment in generation schedule**

System operators at various level are empowered to issue real time curtailment/ramp-up instructions to grid participant for safe operation of grid. The incumbent legislative framework accords a MUST RUN status to renewable energy projects. Despite such status, the wind and solar projects have been subjected to curtailment on a regular basis. This mostly happens on the pretext of grid safety and security concerns. However, there is no data or mechanism to determine whether there was any impending threat to grid safety and security when the curtailment was forced on RE projects.

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To avoid such discrepancy and to make the grid operation more transparent the system operators at all level should be mandated to communicate the reasons along with the each backing down instruction. Further there is need to establish a mechanism for regular reporting and tracking of curtailment, including reasons thereof. Such information should be collated from all the relevant agencies including the agency issuing curtailment instructions (SLDC and DISCOMs) and the RE generators.

Basis above we would like to make following suggestions:

I. **All system operators should be mandated to communicate reasons along with each backing down instruction.**
II. **All system operators i.e State Load Despatch Centre and Regional Load Despatch Centre should mandatorily create a repository containing details of backing down instruction, reasons and grid parameter for the duration of curtailment.**
III. **All system operators should mandatorily report this data to Central Electricity Authority which will then facilitate creation of central curtailment data repository.**
IV. **All stakeholder should be given access to such repository for confirmation and to avoid dispute in future.**

5. Grid Connectivity of Solar and Solar & Wind hybrid projects:

At present several states are objecting optimization of solar plant by way of deploying additional DC capacity. Here it is worth mentioning that such optimization under no way surpasses the quantum of power committed under Power Purchase Agreement and is capped to the rating of inverter capacity deployed. Further such optimization ensures optimal use of transmission infrastructure, under no way such optimization will tantamount as activity against the PPA or governing regulations. To deal with the situation there is need to impart more clarity by linking connectivity and transmission access with capacity of inverter installed in place of installed capacity of plant.

Similar problem will be encountered while deploying the hybrid projects as in all the cases the total cumulative installed capacity of wind and solar will surpass the quantum for which connectivity and transmission access is granted. Introduction of wind solar hybrid projects was with an intention of optimal utilization of transmission infrastructure. The linkage of connectivity and transmission access to the installed capacity of such hybrid plant will defeat the whole purpose and will eventually result in higher bidding tariff effecting public at large.

Basis above we would like to make following suggestion:

I. **Connectivity of transmission access of solar projects should be checked with reference to inverter capacity deployed.**
II. **Connectivity and transmission access of hybrid project should be delinked to the installed capacity of plant.**
III. **If required hybrid projects to be directed to put system in place restricting power injection upto the quantum of transmission access granted.**

6. Technical Minimum with reference to thermal plants to be defined

To accommodate RE power in the grid there is need to periodically define and review Technical Minimum for all the

The thermal based power plants. Presently no regulations define the Technical Minimum for thermal based plants, but in future with increased RE penetration there will be situation that almost all the thermal plants need to run on their Technical Minimum to fully offtake the generation from RE project. Operating a plant at Technical Minimum has its own consequence in terms of wear tear and additional cost implication, which need to be addressed to safeguard the interest of thermal generators.

Basis we would like to make following suggestions:

I. **CEA to be designated as central agency delegated with the responsibility of ascertaining the Technical Minimum for each thermal plant basis the technology employed.**
II. **Procedure for ascertaining and reviewing of Technical Minimum for thermal based plant to be formulated by CEA and approved by CERC.**
III. **Commercial mechanism to be devised for compensating thermal based power plants for additional cost implication incurred on account of operating on technical minimum**.

7. Definition for plant synchronization and commissioning with reference to RE based plants

SECI, NTPC and other entities of state and central government have in the recent past carried out several bids to fulfil the 175 GW renewable target of the central government. Government agencies have now carried out bids for large projects having individual project size of 250 MW and above. Several of these bids allow for commissioning in lot sizes of minimum of 50% of project capacity in some cases while 50 MW lot sizes in others. As a result, the projects are installed and ready for synchronization but cannot be commissioned due to aforementioned tender conditions and are in idle mode resulting in wastage of precious natural resource. At par with other generators solar and wind generating units should be allowed to synchronize to the grid and the power that gets injected between the period of synchronization and commissioning should be treated as infirm power and be paid for from the regional pool account.

To facilitate such treatment, synchronization should be allowed turbine wise and inverter wise in the case of wind and solar respectively. Also there in a need to define Generating units and Synchronization with reference to wind and solar based generators as follows:

Generating units:

"In case of Solar Photo voltaic generating station, each inverter along with associated modules will be reckoned as a separate generating unit"

"In case of Wind Generating station, each wind turbine will be reckoned as a separate generating unit"

Synchronisation:
"The condition where an incoming Generating Unit or System is connected to another System so that the voltage, frequencies and phase relationships of that Generating Unit or System, as the case may be, and the System to which it is connected are identical and the terms "Synchronise" and "Synchronisation" shall be construed accordingly"

Basis above we would like to make following suggestions:

I. **To include definition of Generating units for both wind and solar based generating station and synchronisation as mentioned above**.

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8. Centralized forecasting of RE based sources

Looking at the volume of RE based electricity which will be fed into the grid in the near future there will be a need of real time GRID management which will not be possible with the present mechanism of Deviation Settlement Mechanism in place for RE based sources. The present structure delegate such responsibilities at Generating substation level, which fails to address holistic schedule of RE power considering country as a single GRID and also burden the wind and solar based generators with high magnitude of charges.

It is known fact that centralized forecasting leads to better accuracy in forecasting results compared to that in case of distributed forecasting at individual project level. This is primarily due to aggregation of deviations over a larger area/ region leading to better accuracy level at the level of the larger area/ region (which could be Regional level in the Indian context). Coverage of a wider dataset as centralized forecasting would be done by state level entity/ organization and would cover all wind/solar projects in the state, this would provide better forecasts and in turn schedules resulting in a lower commercial impact as well as improved system stability.

Table below exhibits various aspects of centralized forecasting that is being followed in develop counties:

Item	Denmark	Germany	UK	USA (ERCOT)
Wind penetration in energy terms	30%; target of 52% in 2020	8%; 35% (all renewables) by 2020	6%; 30% (all renewables) by 2020	9%
Markets	Day-ahead. Intra-day market.	Day-ahead. Intra-day market (45 minute gate closure)	Bilateral trading, up to gate closure (1 hour)	Bilateral trading. Wholesale markets (day- ahead and balancing by ERCOT
Forecasting	TSO responsible. Forecast is published. BRPs may use own forecasts for trading purposes	Forecasting done by energy traders, both independents and TSOs.	Forecasting done by energy traders. TSO has its own forecasting process, for operational purposes.	Forecasting done by energy traders. ERCOT has its own forecasting process, for operational purposes.
Requirement of forecast by individual wind farm	No	No	No	No
Forecasting costs met by	TSO, BRPs (if additional forecast capability is considered useful)	Energy Traders	TSO, Energy Traders	TSO, Energy Traders
Forecast Details	60 minutes for energy trading. TSO uses 5-minute time step for internal short-term forecasts.	15 minutes for energy trading	30 minutes for energy trading	Driven by trading requirements (60-minute time step).

Basis above we would like to make following suggestion:

I. **To introduce concept of forecasting at Regional level mandating RLDC to perform all such related activities as per the DSM regulations concerning wind and solar based generating stations.**
II. **RLDC to be empowered to perform the balancing services on real time basis by way of plugging in and/or out the schedule generation.**
III. **Cost Incurred for providing balancing services shall be socialised among the states depending upon their contribution in deviation**

9. <u>Formulations of commissioning procedure at central level</u>

At present there is no common procedure adopted by states for synchronization and commissioning of generating stations. It will be worth mentioning that all states are allowing synchronization and commissioning in accordance with regulations framed by CEA but no reference document is available for generators to get upfront clarity. To deal with the situation we must designate CEA to come up with a detailed procedure for commissioning of generating projects which will followed for commissioning of all ISTS based project and will serve as guiding documents for all states.

Basis above we would like to make following suggestions:

I. **CEA must be designated as central agency to specify detailed procedure to be followed for synchronization and commissioning of generating stations.**
II. **All states to mandatory formulate detailed procedure to be followed for synchronization and commissioning of generating stations guided by procedure specified by CEA in this regard.**
III. **In case of any discrepancy procedure formulated by CEA shall supersede.**

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