

Proposed First Amendment to the KERC (Forecasting, Scheduling, Deviation Settlement and related matters for Wind and Solar Generation sources) Regulations, 2015

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KERC published the [draft first amendment](#) to these regulations on 8th August, 2022 and asked for public comments within 30 days. The Commission has proposed to amend the Forecasting and Scheduling Regulations of 2015 after seven years. However, without an Explanatory Memorandum and accompanying detailed analysis of the past experience of implementing F&S regulations, it is difficult to effectively comment on many of the proposals.

As the preamble to the amendment notes, bills for deviation settlement have been issued by SLDC since December, 2018. Thus, there is a rich 15-min F&S data available with the SLDC for just under 4 years. A detailed analysis of this data showing the effectiveness of the error bands, frequency and quantum of levied penalty, violation of permissible deviation limits – frequency and quantum of violation etc. would have presented the actual picture of implementation and issues with the prevalent provisions related to forecasting and scheduling (F&S). This would have helped generate more critical debate amongst stakeholders and given a stronger analytical support to the amendments.

The framework of F&S is very significant for the state, especially when the state is one of the leading states in terms of total installed RE capacity (16 GW as of July 2022¹) and the state has recently set a target of adding 10 GW of additional RE capacity by March 2027. Also, the penetration of solar and wind power in the state grid is breaching 50% of total demand at a few instances of the year. Hence, an effective F&S framework is very critical for the state's grid reliability.

In this context, we would like to make certain suggestions to the Commission for an effective F&S framework and its implementation in the state. The detailed suggestions are given below.

1. Reducing the allowable deviation bands and stopping aggregation

The proposed amendment calls for reduction of the permissible deviation (for which no DSM charges are levied) from present level of $\pm 15\%$ to $\pm 10\%$ for all wind and solar plants. The subsequent bands have been changed accordingly (10-20%, 20-30% and more than 30%). Furthermore, the charges for these bands have been halved from the present charges. (From Rs 0.5/kWh to 0.25; Rs 1/kWh to 0.5 and Rs 1.5/kWh to 0.75 for each respective band)

While we agree with tightening of the DSM tolerance band from the perspective of minimising deviations due to RE on the state grid, it would have been better if the proposed reduced charges and deviation band ranges were decided based on a comprehensive study conducted for the commission by the SLDC. The study should look into the present provisions of DSM for RE generators in the state, the impact of

¹ https://mnre.gov.in/img/documents/uploads/file_s-1660112864286.pdf

relaxed bands on state grid operation and DSM charges at state periphery and other stakeholders of the state. Also, it should look into the possible alternatives to the present framework (especially in terms of impact of aggregation, error calculation formula, error bands, DSM charges for RE generators and sharing of DSM charges at state level). The [FoR study of 2015](#) had recommended the level of error (10% for new projects / 15% for old projects) for which there would be no penalties way back in 2015. Certainly forecasting accuracies have increased significantly since then and maybe a threshold for no penalties could be even lower at 7-8% based on past experience.

1.1. Need to increase the responsibility of RE generators as a whole towards stable state grid operation

Under the existing framework in the state, the DISCOMs bears the cost of deviation penalties by wind and solar generators up to 15% absolute error (and now proposed 10% tolerance limit). To begin with while RE generators enjoyed an exemption from DSM charges up to a limit, it is time that the deviation penalty caused due to wind and solar should be borne by these generators. To operationalise this, we suggest an approach.

- a. First the SLDC calculates the contribution of solar and wind deviation to the total deviation charge for the state at its periphery.
- b. Secondly, they collect deviation charges for wind and solar deviation in accordance to absolute error at each pooling station.
- c. Thirdly, if the total deviation penalties collected from the wind and solar projects are lower than what wind and solar power deviation contributed to the state deviation penalty, then **the balance is additionally recovered from the generators (through their QCAs) in proportion to their deviation.**

In essence, the entire cost of deviation caused due to wind and solar is finally passed back to the generators, thereby allaying the fears of the DISCOM which would have had to bear the brunt in the absence of this provision. We feel that this is the right approach and **absolutely necessary for the reliable growth of renewables in the long run.** Maharashtra had adopted a similar approach. The provision 12.1(d) of Maharashtra Electricity Regulatory Commission (Forecasting, Scheduling and Deviation Settlement for Solar and Wind Generation) Regulations, 2018 states that

“Any shortfall in the aggregate amount of Deviation Charge payable by Solar and Wind Energy Generators at the State periphery and the amount receivable from them by the Pool Account shall be paid by the respective QCAs in proportion to their deviation reflected at the State periphery.”

The Karnataka Commission should consider a similar provision in the regulation. This is specifically pertinent for the state considering the increasing penetration of RE generation in the state grid. In line with MERC’s approach, we recommend amending Regulation 7 as follows.

“7. Deviation settlement mechanism (DSM) for wind and solar generators:

*Every wind and solar generator as referred in clause 3.2 Applicability shall henceforth be under purview of DSM. **The methodology for deviation settlement for the State shall be as follows:***

(a) The Deviation Charge payable or receivable for the State as a whole at the State periphery shall be determined by the SLDC.

(b) The SLDC shall compute the impact of the deviation of the Solar and Wind Energy Generation and its contribution to the Deviation Charge at the State periphery.

(c) The SLDC shall compute the Absolute Error, i.e. the difference between the scheduled and the actual energy injected, in respect of each Pooling Sub-Station and each Generator feeding energy directly to another Sub-Station, and shall accordingly determine the amounts payable on account of the Deviation Charge in accordance with Regulations 7.

(d) Any shortfall in the aggregate amount of Deviation Charge payable by Solar and Wind Energy Generators at the State periphery and the amount receivable from them by the Pool Account shall be paid by the respective QCAs in proportion to their deviation reflected at the State periphery.”

1.2. Aggregation and levels of allowable absolute error

The '[Model Regulations on Forecasting, Scheduling and Deviation Settlement of Wind and Solar Generating Stations at the State level](#)' issued by the FoR in 2015 stipulated a recommended level (10/15%) of allowable absolute error at each pooling station based on studies done at few sample pooling stations. For details on this, please see pp.22-23 of the report. **Given that the estimation of the stipulated level was based on studies at the pooling station level, the recommended level of error (10% for new projects / 15% for old projects) for which there are no penalties, holds true only when errors are calculated at the level of each pooling station and not aggregated at the level of the state.** Errors estimated for the system would necessarily be lower than those estimated for individual pooling stations.

What matters in terms of system balancing is the aggregate schedule for wind and solar generation. Permissible errors if such a system (aggregation across pooling stations and QCAs) were to be followed would have to be much lower. Thus stopping the aggregation route in Karnataka is appropriate given the high tolerance band with no penalties of 15% (proposed 10%). This is in sync with the prevalent practices in other states of the country. We suggest that the Commission should direct SLDC to determine the impact of aggregation of deviation errors for RE generators in the state after analysing the past data.

If aggregation is to be continued, the error bands would have to be tightened much more, subject to analysis of past data (with and without aggregation).

2. Need to move to intra-state ABT based accounting

Deviation penalties for inter-state transactions and for regional entities are parameterised (linked to tariff under their PPAs), while those for intra-state transactions are based on absolute value (absolute value in Rs/kWh). Such absolute values need careful attention and regular revision in line with the wind and solar market prices. Charges are being revised after 7 years while market prices of wind and solar have reduced dramatically in that period. Ideally, Karnataka should move to intra-state ABT based accounting and align the state framework for RE forecasting and scheduling in line with the CERC framework for regional entities. Or else there might arise a situation in which deviation charges under these two frameworks may vary quite widely, even when projects are situated next to each other geographically. This would also remove the need for constant revision of deviation penalties for intra-state transactions.

3. Applicability of regulations

The proposed amendment has kept the minimum applicability capacity for solar (5 MW) and wind (10 MW) generators intact. These generators supply power to ESCOMs or 3rd party consumers through OA or for captive consumption through open access within state.

Considering the increasing installed capacity within the state and increasing OA/CPP transactions, there is a need to reduce the minimum capacity for wind projects (from 10 MW to say 5 MW). After 2-3 years, this limit for both solar and wind generators could be revisited by the Commission. This should be done with due diligence on cost implication on state grid operators and project developers.

In addition, it should be noted that other RE rich states have applicability for wind and solar generators at the level of 5 MW (refer the table below).

State	Wind	Solar	Sale of power
Maharashtra ²	5 MW	5 MW	Within or outside the state
Gujarat	1 MW	1 MW	Within or outside the state
Madhya Pradesh	10 MW (combined)	5 MW	Within or outside the state
Tamil Nadu	All	All (except rooftop solar systems)	Within or outside the state
Rajasthan ³	5 MW	5 MW	Within or outside the state

4. Increasing role of state SLDC

4.1. Data reporting and analysis for F&S framework

Clause 5.1 has been amended such that the QCA will now have to maintain monthly metering data in a database. This is a welcome step. However, it would be better to clarify that the QCA will have to maintain all past data and store it in the database. Similarly, the provision of forwarding the monthly meter reading data by the QCA to the SLDC should be continued and not dropped as proposed in the amendment.

While data collection from QCAs by the SLDC is a good beginning, by itself it will not help in improving RE integration and grid operation in the state. SLDC should be asked to create a database and analyse the data received from various QCAs if it has not done so already. The data should also be made publicly available for independent analysis. The SLDC should be mandated to analyse the past data and submit a yearly report on the same within 3-6 months of the end of each financial year. Amongst other things, this report shall provide analysis on formula for error calculation (Available capacity or scheduled generation as denominator), tolerance band for deviation, deviation bands, DSM charges for different deviation bands, impact of all these on state grid operation.

It is suggested that SLDC should be further given responsibility to publicly report the DSM data for each RE generator (intra-state and inter-state if additionally possible) on its website on weekly basis. The data reporting should include project details (name, installed capacity, QCA) and block wise data for each day

² Combined capacity connected to pooling sub-station

³ Combined capacity connected to pooling sub-station

like Available capacity, Schedule, Actual generation and deviation charges. A similar data is being reported by other states like Madhya Pradesh⁴ and Maharashtra⁵.

Existing clause 4.4 related to REMCs is not proposed to be amended. It is unclear whether the REMC is regularly preparing aggregated forecasts for RE generation in the state since no public data is available on the SLDC website. Further it is not known whether the SLDC is using these forecasts from the REMC for reliable grid management. We feel that the forecasts from the REMC should be in the public domain and should be used for the SLDC appropriately. The REMC link on the KSLDC website points to <https://karemc.com/> a site, which needs a login for access and hence not available in the public domain thereby hampering transparency and accountability

SLDC should be entrusted to provide a roadmap within a stipulated time to move towards schedule generation-based F&S framework in the state (deviation accounting and payment charges linked to scheduled generation instead of Available capacity and Actual generation respectively).

4.2. Smooth implementation of the regulations in the state

There are various responsibilities given to QCA or other stakeholders in regard to data reporting, registration, etc. The SLDC is best placed to monitor proper implementation of those provisions in the regulations and report the same to the Commission on a six-monthly / annual basis.

Along with this, SLDC should also report to the Commission on a six-monthly / annual basis whether they have implemented provisions applicable to them in the regulations.

4.3. RE curtailment data reporting

A new clause 7.7 has been added to the regulations. Information about any planned curtailment / shutdown or system constraint shall be intimated by SLDC and shall also be uploaded on the website. This is a welcome step. Ideally, SLDC should report following data on RE curtailment in public domain on monthly basis:

- Details of the project: Project name, Developer Name, RE Source, installed capacity of project
- Project connected to which PSS
- Instances of RE curtailment (frequency and time duration for each instance)
- Quantum of energy curtailed in each instance
- Reason of curtailment for each instance

Similar format has been proposed by CEA under recent amendment to Central Electricity Authority (Furnishing of Statistics, Returns and Information) Regulations, 2007 (Format 82 and sheet 2 of Format 83)⁶.

⁴ <http://223.31.122.114:9080/ABT/REDSMAccountMain.jsp?check=3&sbmt=1&scr=1024>

⁵ <https://mahasldc.in/home.php/weekly-deviation-statements/>

⁶ https://cea.nic.in/wp-content/uploads/regulations_cpt/2022/04/DraftFurnishingofStatisticsReturnsandInformationregulations_Englishversion_for_uploading_on_CEA_website-3.pdf

5. Provisions which need clarity

Revised regulation 5.4 notes that the procedure is enclosed as an annexure to these regulations. It is not clear if the SLDC can still come up with revised F&S procedure (as mandated in the existing regulations) to operationalise proposed amendments. Hence, we suggest that the power to frame/amend procedures should remain with the SLDC. Proposed procedure should be approved by the Commission after due consultation.

There is a need for further clarity on 2nd para of Regulation 7.7. It notes that *“No deviation charges shall be payable for any deviation in case of any curtailment imposed on injection of energy for secure grid operation in emergency situations.”* It is unclear whether this provision is only for unplanned curtailment or for planned curtailment as well which is clearly noted in the 3rd para.

Guidelines for PSDF (Regulation 9): It is not clear if these guidelines are already in place. In case they are not framed till date, the Commission should frame them within three months and the same timeline should be included as a provision of the regulations.

6. Week-Ahead forecast

Submission of week-ahead forecast every day for next 7 days to SLDC (as proposed in regulation 4.6) is welcome step.

7. New penal provision

Considering the various data reporting, sharing and archiving related to forecasting, scheduling, actual generation, penalties, deviation, curtailment, metering status etc. the Commission can consider levying penalties if these mandatory requirements are not adhered to by the relevant agencies within a period of 3 months.
