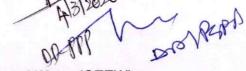Dear Sir,

Greetings from Council on Energy, Environment and Water (CEEW) .

Many thanks for providing us with the opportunity to provide comments on the amendments proposed to the APERC (Forecasting, Scheduling and
Deviation Settlement of Solar and Wind Generation) Regulation, 2017.

CEEW is one of South Asia's leading not-for-profit policy research institutions. The Council uses data, integrated analysis, and strategic outreach to explain – and change – the use, reuse, and misuse of resources. At the CEEW Centre for Energy Finance we are working towards bridging information asymmetries and increasing policy and data transparency for various stakeholders.

Further to the above, please find attached herewith our comments on the proposed amendment. We also propose to attend the public hearing scheduled for the 10th of March (Tuesday). Please do let us know if you would require any clarifications or information from our side. We would be happy to provide the same.

Regards,
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CEEW | **10 YEARS**
THE COUNCIL

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Comments on proposed amendments to the APERC (Forecasting, Scheduling and Deviation Settlement of Solar and Wind Generation) Regulation, 2017

Provision	Existing Provision	Proposed Amendment	Comments
Clause 2.1 (a)	'Absolute Error' means the absolute value of the error in the actual injection of wind or solar generators with reference to the scheduled generation and the 'Available Capacity' (AvC), as calculated using the following formula for each fifteen (15) minute time block: Absolute Error (%) = 100 X [Actual Injection – Scheduled Injection] / (AvC)	Substitute Absolute Error with Forecast Error Substitute 'Available Capacity' with 'Scheduled Generation' Forecast Error (%) = 100 X Scheduled injection – Actual Generation)/Scheduled Generation'	**Observation** - The new term and formula are redundant. In case the amendments are made, the revised term 'Forecast Error' will not be applicable for intra-state transactions as charges for intra-state sale of electricity will be determined based on *Allowable Forecast Error* as per proposed amendment - If Absolute Error definition is removed, Commission to clarify if Inter-State transactions (as provided in Appendix I) will be governed by new formula for 'Forecast Error'. If yes, this will increase charges to be paid to solar and wind generators from the State Pool Account for excess injection. **Observation** - This amendment may reduce the chances of gaming arising due to mis-declaration of available capacity. - However, this error definition can be insufficient to handle cases of zero schedules / zero generation / low resource period. The deviation calculation change with forecasts, is high in non-peak times and infinitely large in zero forecast times. - The formula is essentially a construct to arrive at a means of calculating error and imposing penalties on the generator. The actual impact on the grid due to the deviation is not changed due to these mathematical computations. The only effect is the available band for deviation for the generators is reduced. **Recommendation** - The existing definition should be retained. It is according to the central DSM regulations and the model regulations issued by FoR. - There should be a separate band (or exemption) for measurement of deviation in different seasons, i.e., different tolerance band for windy and non-windy season in case of wind; and monsoon and rest of year in case of solar.

Provision	Existing Provision	Proposed Amendment	Comments
Clause 2.1 (j)	'deviation' in a time-block for a seller means its total actual injection minus its total scheduled generation	Insert definition of 'Allowable Forecast Error' = 100 X (diversity factor) 0.7 in of the financial year) X (quantum of deviation limit permitted under CERC'sDSM Regulation amended from time to time) / (quantum of VRE installed capacity)	**Observation** - Power generation from solar and wind are inherently unpredictable due to their dependence on weather. At the present levels of technology, the forecast cannot be completely accurate. - The resulting variations in power injected to the grid are being effectively managed by the scheduling mechanism in various states, including Andhra Pradesh, and the national grid. - The current regulations are market standard and the permissible error bands have to be progressively reduced as technology improves.

For Clause 6.3 the table contains nested sub-tables.

Clause 6.3 — Existing Provision

Deviation charges:

Sr. No.	Absolute Error in the 15-minute time block	Deviation Charges payable to Regional DSM Pool
1.	<= 15%	None
2	>15% but <= 25%	At Rs.0.50 per unit for the shortfall or excess for absolute error beyond 15% and upto 25%
3.	>25% but <=35%	At Rs.0.50 per unit for the shortfall or excess for absolute error beyond 15% and upto 25%+ Rs. 1 per unit for balance energy beyond 25% and upto 35%
4.	> 35%	At Rs.0.50 per unit for the shortfall or excess for absolute error beyond 15% and upto 25%+ Rs. 1 per unit for balance energy beyond 25% and upto 35%+ Rs. 1.50 per unit for

Clause 6.3 — Proposed Amendment

Sr. No.	Absolute Error in the 15-minute time block	Deviation Charges payable to Regional DSM Pool
1.	< Allowable Forecast Error	None
2	Above Allowable Forecast Error	At Rs.2 per unit for the shortfall or excess injection

Clause 6.3 — Comments

Observation

- Error band is unreasonably low. The proposed definition of the allowable forecast error will shrink the band as low as 3 percent if the current installed capacity of grid connected renewable energy power is considered.
- This will have an adverse impact on existing PPAs, interconnection agreements, transmission agreements, etc. and a sudden increase in deviation charge as earlier it was at 15 percent.
- The proposed penalty of Rs. 2 per unit coupled with the extremely low permissible deviation band is excessive and can make the projects unviable.
- A sudden lowering of the error band and increase in penalty may lead to institution of change in law petitions before the APERC, the APTEL and other judicial forums.
- The justification provided for the change is incorrect. The deviation figure of 1125MW has been arrived at considering the total available installed capacity while in practice the deviation is with respect to the scheduled generation and not the available capacity.

Clarifications

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Provision	Existing Provision	Proposed Amendment	Comments
	balance energy beyond 35%		- Whether installed capacity of VRE will be considered only in relation to the control area or the entire state. - Basis for determination of diversity factor as 0.7 - Whether only solar and wind will be considered for VRE installed capacity or other forms of RE like biomass will also be included **Recommendation** - The 15% error band was approved by the Commission based on commercial and technological considerations and should not be changed without suitable transition period for existing RE generators. - Considerations should be given to market-driven mechanisms or processes as stringent norms may deter renewable energy development in the state. - An independent third party should conduct statistical modelling and analysis of existing wind and solar energy forecasting to establish statistically sound forecasting variance band as the basis for allowable forecast error definition. - The DSM charges may be levied as a certain percentage of the PPA tariff or a fixed rate, whichever is lower. - The DSM charges become applicable from the first day of operation. For a new project, forecasting is difficult due to paucity of historic weather and generation data. Keeping this challenge in mind, we suggest levying of DSM charges in a gradual manner so that enough breathing space is provided for a new project. **Observation** - The CERC in its Statement of Reasons for the DSM Regulations arrived at the 15% toleration band based on the number of revisions allowed. If no revisions are to be allowed than the tolerance band has to be increased accordingly.
Clause 4.1	The methodology for day-ahead scheduling of wind and solar energy generating stations which are connected to the Grid and re-scheduling them on one and half-hourly basis, and the methodology of handling deviations of such wind and solar	Revising intra-day ahead schedules not permitted and permit only day ahead basis.	

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Provision	Existing Provision	Proposed Amendment	Comments
	energy generating stations shall be as stated hereunder and accordingly Forecasting Tools shall be provided by the generator concerned.		- The regulations have to be based on model regulations of the FoR and the CERC regulations both of which permit intraday revisions. **Observation** - The CERC is proposing to implement Real Time Market (RTM) wherein consumers including discoms can purchase power and make revisions at a gap of five time blocks with round the clock trading in contrast to the present Day Ahead Market (as per the Explanatory Memorandum for RTM issued by the CERC). - This will require capacity of the SLDC to consider the intraday revisions. Hence, it is unclear why the provision to make intraday revisions is being proposed to be removed. **Observation** - Intraday revisions accommodate the high variability in RE generation arising due to local cloud phenomena, monsoon etc. - Given that the thermal generators are allowed infinite revisions, this imposition on RE developers is discriminatory and undue way to penalise them for causes behind their control. - Any tightening of the band has to be based on technological advancement and improvement in forecasting technology and accuracy and commercial considerations. - Further, this will not contribute to grid stability as the developers will not be able to revise their schedule inspite of knowing the correct forecasts.
Clause 6.9	In order to aggregate the forecasting and scheduling of different pooling stations to avail the benefit of larger geographical area and diversity, a QCA in agreement with the generators in different pooling stations shall have the freedom to go for the option of Virtual Pool. Under a 'Virtual Pool', the	Delete option of virtual pooling	**Observation** - Achieving high accuracy in forecasts at small pool substation (PSS) level (a pooling substation size varies from 5 MW to >500 MW) is impossible even with advanced forecasting models and high-quality data.

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Provision	Existing Provision	Proposed Amendment	Comments
	declaration of the availability/ schedule in respect of the generators shall be made available pooling station wise to SLDC, in order to maintain the sanctity of a control area. However, while computing the deviations, they shall be considered as a combined pool and the QCA shall be responsible for de-pooling the deviations, first among the different pooling stations and then amongst the different generators of the respective pooling station.		- This variation is penalised by the regulation but at the same time such variation does not have any impact on the grid as most RE rich states have > 10,000 MW grid. - Allowing aggregation of forecasts and deviation settlement at boundary can lead to higher accuracy for day-ahead forecasts, and thus may also lead to better grid operations and planning at discoms' end. - Pooled data will be easier for the SLDC/RLDC to plan for despatch and drawl. **Recommendation** - Aggregation option should be retained.