

AXIS WIND FARMS (ANANTAPUR) PRIVATE LIMITED

Date: - 4th March 2020

To,
The Secretary,
Andhra Pradesh Electricity Regulatory Commission (APERC),
D.No. 11-4-660, 4th Floor, Singareni Bhavan,
Red Hills,
Hyderabad- 500 004

Subject: - Suggestions / comments on the proposed amendments of Regulation 4 of 2017 i.e., APERC (Forecasting, Scheduling and Deviation Settlement of Solar and Wind Generation) Regulations, 2017 ("Regulations") by APTransco.

Reference: -

1. Draft Amendments proposed by APTRANSCO, towards the Regulation 4 of APERC Forecasting, Scheduling and Deviation Settlement of Solar and Wind Generation Regulation, 2017.
2. Public notice issued by Hon'ble APERC for holding a public hearing on March 10, 2020, regarding amendment of the said Regulation No. 4 of 2017

Dear Sir,

We, Axis Wind Farms (Anantapur) Private Limited (AWARPL), own and operate a 105 MW wind power project located at MPR Dam /Kuderu /Pampanoorthanda, Anantapur District, Andhra Pradesh (Project) and have executed a long-term power purchase agreement with Southern Power Distribution Company of Andhra Pradesh Limited (APSPDCL) dated 30th Nov 2016 (PPA) to supply power to APSPDCL. We have been reliably supplying wind power to APSPDCL from the date of commissioning of the Project and will be severely affected by proposed amendments of Regulation 4 of 2017 by AP Transco.

With reference to the above subject, we would like to thank you for the opportunity to raise our key concerns & suggestions. We have enclosed our comments and suggestions on the matters pertaining to the proposed amendments of Regulation 4 of 2017 by AP Transco in the attached document (Annexure-1). We are hopeful that our suggestions on the issues described in the attached document will restore sound, strategic market balancing decisions.

Also, we request you to publish draft amendments of Regulation 4 of 2017 prepared by APERC after consideration of views/suggestions submitted by stakeholders and hold the public hearing for the same.




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6/3/2020

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Thanking You.

Yours Sincerely.

For Axis Wind Farms (Anantapur) Private Limited



Authorized Signatory



Encl :- Annexure-1

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ANNEXURE I

Amendment 1

Current Regulation

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 15-minute time block.

Absolute Error (%) = $100 \times [\text{Actual Injection} - \text{Schedule Generation}] / \text{Available Capacity (AVC)}$

Amendment Proposed

Substitute the term 'absolute error' with 'forecast error'

Substitute the term 'Available Capacity' with 'Scheduled Generation' for calculating forecast error as following formula.

Forecast Error (%) = $100 \times (\text{Scheduled Generation} - \text{Actual Injection}) / \text{Scheduled Generation}$.

Comments / Suggestions

The proposed forecast error shows the forecast error in relation to the forecast. However, such metric can be mis-leading when applied on renewable energy, as the numerator in the proposed forecast error i.e. (Schedule Generation - Actual Injection) represents the MW difference of generation between the generation scheduled and the power actually injected; however, when divided by Scheduled Generation it represents the MW difference of generation in relation to the Scheduled Generation which is variable. Thus, even if the mean absolute error (Schedule Generation - Actual Injection) is low; the resultant 'forecast error' will be on higher side contributing to high deviation charges with low impact on the grid.

The Honorable Central Electricity Regulatory Commission ("CERC") observed the following on the error formula in the RRF regulation (which computed error on the basis of schedule as the denominator)

"The present error definition has been pointed out to be insufficient to handle varying seasons, especially very low or zero schedules, and not aligned with direct grid impact (MW deviations)" (Para 6.2.1 of SOR)

The current method has also been stated as the scientific method in the Model Regulation by FoR. The SoR given by CERC for the Framework for Forecasting, Scheduling and Imbalance Handling of Variable RE Sources, states the following with regards to the MAE based on Available Capacity:



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"The Commission has noted that with the current definition, instances such as low/no generation cases cannot be covered. With due regard to these constraints and with a view to ensuring optimum and genuine forecasting, the Commission has decided to define the error percentage normalized to available capacity, instead of schedule. This will ensure that the error quantity corresponds to the physical MW impact on the grid, the forecasting models are aligned to minimize the actual MW deviations, and the error definition holds valid in all seasons." (Para 6.2.2 of SOR)

As per CERC DSM Regulation 2014, the Commission has used Available Capacity (AVC) as the denominator for calculating Absolute Error.

Also, as per Forum of Regulators on Model Regulation, the Central Commission, in the Statement of Reasons (SOR) accompanying the Framework on Forecasting, Scheduling and Imbalance Handling for Variable Renewable Energy Sources (Wind and Solar), has noted that the definition of error, calculated w.r.t. schedule, does not adequately address instances such as low/no generation cases, such as during low wind season, where close to zero schedules would result in high numerical errors but with no real impact on grid. Additionally, incentives to generators for better forecasting must be aligned with the objective of grid management, which is to minimize actual MW deviations from schedule. As commercial impact on generators is directly proportional to the error percentage, forecasting models will be designed to minimize MW deviations only if the denominator is a constant (and not a variable such as 'schedule'). This will ensure that the error quantity corresponds to the physical MW impact on the grid, and the error definition holds valid in all seasons.

Therefore, considering the present change in formula and other proposed amendments, avoiding penalties for VRE Generators would be inevitable without any fault or role by VRE Generators and entire purpose of the RE Regulation would be defeated. We request Hon'ble Commission not to deviate from current Regulation No. 4 of 2017 i.e. calculate error in absolute terms and not the proposed 'forecast error', keeping it consistent with CERC DSM regulation, 2014.

Amendment 2

Current Regulation

Clause 2.1 (j)

"deviation in a time block for a seller means its total actual injection minus its total/ scheduled generation.

Current absolute error deviation with zero penalty is + / - 15%

Amendment Proposed

The definition of phrase 'Allowable forecast error in percentage should considered for inclusion.

'Allowable forecast error = $100 \times (\text{diversity factor } 0.7 \text{ in control area in the beginning of financial year}) \times (\text{quantum of deviation limit permitted under CERCs DSM Regulation amended from time to time}) / (\text{quantum of VRE installed capacity}) \text{ or estimated } + / - 5\%$.



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Comments / Suggestions

It is difficult to accommodate higher RE integration in the system only through better Forecasting and Scheduling. The system balancing should also be through:

- a. Improvement in demand side management
- b. Consumers would be incentivized to forecast loads and provide demand response products

Furthermore, due to infirm nature of RE sources, CERC has exempted it from UI deviation charges as applicable for other generating stations. As per Forum of Regulators, 2015, the Central Commission, while proposing the DSM amendments for solar & wind regional entities, considered simulations and analytical inputs from agencies engaged in wind forecasting. The Central Commission, in view of simulation studies as well as international research reports on observed mean absolute error (MAE), had put forth the framework for computing deviation charges as well as error, with a tolerance band of 15% initially, which shall be tightened over time as the ecosystem gains experience.

If renewable energy generators are treated at par with conventional energy generators that would seriously defeat the very target of Government of India to meet its renewable energy target since VRE Generator has a very narrow scope for mismatch with respect to their revenue requirement. VRE Generators are firmly dependent on weather conditions for accurate projection for the energy generation and revenue cannot be ascertained. In such situations, reducing permissible band for deviation would totally take away the commercial viability of VRE Generators. In this context, it is proposed that no amendment is made to the definition of Absolute Error and its calculations.

We request commission not to include any diversity factor as it is against the Model Regulations on Forecasting, Scheduling & Deviation Settlement of Wind & Solar Generator by Forum Of Regulators which has suggested to have no penalty +/- 15% deviation as in the current CERC DSM, 2014 and APERC DSM Regulation, 2017.

Amendment 3

Current Regulation

Regulation 4, clause 4.1

"The Methodology for day-ahead scheduling of wind and solar energy generating stations which are connected to the Grid and rescheduling them on one and half-hourly basis and the methodology of handling deviations of such wind and solar energy generating stations shall be as stated hereunder and accordingly forecasting tools shall be provided by the generator concerned."

Amendment Proposed



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It is suggested to remove the option of rescheduling of forecast on one and half-hourly basis during the day of operation and strictly adhere to schedule on a day-ahead basis over violation notices to the Discoms

Comments / Suggestions

The suggestion for removal of one and half hourly revision on the basis that the DISCOMS have to plan on a day ahead basis is not in the right spirit due the following reasons:

- Variability of generation from VREs, can only be bridged if revisions are allowed close to real time, so that the variations can be kept at a lower level. Allowing only Day Ahead schedule for VREs may significantly escalate the deficit/surplus scenario for the DISCOMS, due to much higher variations in the Day Ahead forecast, and this has been discussed and documented in several meetings of SLDC with the stakeholders involved.
- The same has also been recognized by forecasting agencies worldwide, and also quoted in the SoR by CERC:
"The Commission recognizes that accuracy of forecasting improves as one gets closer to time of dispatch. This is borne out by plenty of research that is available on how forecasting accuracy improves as more updates are done aligned with shorter scheduling intervals."

There is a requirement of intraday revisions to achieve the goal of successful RE integration. The forecast accuracy improves the closer it is to real time (more accurate for short term than long term). Currently we are restricted to 16 revisions for wind and 9 revisions for solar. However, we should be given flexibility of revising as many times as possible for better accuracy. Removing the schedule revision capacity will hamper the quality of forecast and lead to greater instability in the grid. Conventional sources have the provision for multiple schedule revisions. The same provision should also be applicable for renewable.

We request Hon'ble Commission not to deviate from current Regulation No. 4 of 2017 and keep it in line with Forum of Regulator on Model Regulations 2015 i.e. "16 revisions allowed in a particular day. One revision for each time slot of one and half hours starting from 00:00 hours."

Amendment 4

Current Regulation

Regulation 4, Clause 6.3: Error calculation table for under or over - injection for sale/supply of power within the state.

S. No	Forecast Error	Deviation Charges in Rs per Unit
1	<15%	Zero
2	15-25%	Rs. 0.5



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3	25-35%	Rs. 1.0
4	>35%	Rs. 1.5

Amendment Proposed

The levy and collection of DSM charges should be amended as shown in the table given below:

Absolute Error in the 15- minute time block	Deviation Charges payable to State Pool Account
< Allowable Forecast Error	None
Above allowable forecast error	At Rs. 2.00 per unit for the shortfall or excess injection

Comments / Suggestions

According to CERC DSM Regulations, 2014, the penalty is based on percentage of fixed rate with each error band and not an absolute penalty value as proposed by APTransco. The proposed absolute penalty of Rs 2/kWh is extremely harsh and unviable.

Also, as per Forum of Regulators, 2015, the Central Commission, while proposing the DSM amendments for solar & wind regional entities had considered simulations and analytical inputs from agencies engaged in wind forecasting. The Central Commission, in view of simulation studies as well as international research reports on observed mean absolute error (MAE), had put forth the framework for computing deviation charges based on error, with a tolerance band of 15% with no deviation charge. Penalty will be levied beyond 15% deviation and will be different for different deviation bracket. Also, the penalty should not be in absolute value (as suggested) and should be in percentage of tariff in line with the CERC framework (Regulation 5 Clause 1).

We suggest Hon'ble Commission to align DSM charges as per CERC DSM Regulation 2014 with deviation penalty charges in percentage basis of Tariff and with similar error bands.

Amendment 5

Current Regulation



V

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Regulation 4, Clause 2.1 (aa):

"Virtual Pool means the virtual/ grouping of various pooling stations wherein the generators in such pooling stations have an option for accounting their deviational in an aggregated/combined manner through a QCA for the purpose of availing the benefit of larger geographical / area and diversity."

Amendment Proposed

Suggestion for removal of virtual pooling from clause 2.1 (aa) and clause 6.9 accordingly

Comments / Suggestions

Variable Renewable Energy and demand are both variable components in power system. As demand forecasting is done at state level, it is appropriate to do power forecasting at the state level as well.

Aggregation of power in the form of virtual pool is beneficial to the grid. A large interconnected power system is beneficial because it enables aggregation of imbalances from a large geographical area. The errors are not uniformly distributed in time within a region therefore forecasting errors for a region are smaller than for a single site. Aggregation lowers the uncertainty of power by reducing forecast error. GIZ's Report on Forecasting, Concept of Renewable Energy Management Centre's and Grid Balancing stated that "typical accuracies for German wind power forecasts show 10-15% root mean square error of installed wind capacity for a single wind project, drop to 5-7% for day-ahead forecasts for a (regional) control area, and reduce to 4-6% for day-ahead wind forecasts for complete Germany. More importantly, with aggregation, the impact of forecast errors on individual plants is not as severe because the aggregate forecast of all plants drives the generation scheduling".

In this regard, in the Report of the Expert Group: Review of Indian Electricity Grid Code, proposes to "notify a procedure for aggregation of pooling stations for the wind/solar/hybrid generating stations".

Further, Lawrence Berkeley National Laboratory (LBNL), USA in SOR for Forecasting, Scheduling and Imbalance Handling for Variable Renewable Energy Sources (Wind and Solar) has submitted that in the case where there is no aggregation of schedules, "if two RE generators deviate in the opposite direction with no net deviation from the aggregate schedule, both generators are expected to be penalized depending on the extent of their individual deviation even though they may not impose any additional costs on the overall system. Their research shows that the aggregate variation (in percentage terms) over multiple sites is typically lower than the variation in output on one site; moreover, the forecasting accuracy is higher for aggregate forecast over multiple sites. Therefore, for scheduling purposes it is desirable to use the aggregate (total balancing area) level forecasts of RE generation."

The concept of Aggregation had been proposed in the For Model Regulation, and in the most recently it has been proposed at the Inter-State RE DSM in the draft IECG 2020 code.



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Further, Karnataka has successfully implemented Aggregation along with Andhra Pradesh, and the result of Aggregate level schedules and revisions have resulted in much lower overall deviation at the state levels.

In light of the above, we suggest Hon'ble Commission not to remove Virtual Pooling from the regulation as this helps all the stakeholders, for the above mentioned reasons.



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