NATIONAL SOLAR ENERGY FEDERATION OF INDIA
Regd. No. 362 / IV of 8 May, 2013

NSEFI
MAKING SOLAR ENERGY AFFORDABLE

Without Prejudice

Ref.: NSEFI/APERC/DSM/02
Date: 4th March 2020

To,
The Secretary
Andhra Pradesh Electricity Regulatory Commission
11-4-660, 4th Floor, Singreni Bhavan, Red Hills,
Hyderabad- 500 004

Sub: Public notice dated 13.02.2020 regarding public hearing to be held on 10.03.2020 in respect of proposed amendment of Regulation 4 of 2017 i.e., APERC (Forecasting, Scheduling and Deviation Settlement of Solar and Wind Generation) Regulations, 2017

Ref.: NSEFI Earlier letter for the subject matter on 18.02.2020 to the Hon'ble Commission

Dear Sir,
National Solar Energy Federation of India (NSEFI) is a non-profit organization with the objective of solar power development. It is an umbrella organization representing solar energy companies active along the whole photovoltaic value chain: project developers, manufacturers, engineering companies, financing institutions and other stakeholders. NSEFI is founded in 2013 by solar energy industry leaders with the vision to promote solar energy, NSEFI is a public trust based in New Delhi.

NSEFI vide its letter dated 18.02.2020 requested to adjourn the above proceedings with regard to amendment of the said Regulation No. 4 of 2017 and also requested to adjourn the proposed public hearing until such time the Hon'ble High Court finally hears and pronounce its verdict on legal and constitutional validity of the Regulations.

In continuation of the said letter, NSEFI without prejudice in response to the detailed report furnished by the APTRANSCO, NSEFI is hereby submitting its detailed comments on para wise as enclosed herewith as Annexure-1. NSEFI submits that the objections are being without prejudice to the substantial issue of jurisdiction of APERC to levy DSM charges which is sub-judice before the Hon'ble AP High Court
Thanking you,
Yours faithfully

04/03/2020

Subrahmanyam Pulipaka
Chief Executive Officer

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6/3/2020

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Annexure-1

In response to the partiality detailed report furnished by the APTRANSCO, NSEFI is hereby submitting its detailed comments on para wise here as under.

Para 1: It is a matter of record and no need any explanation.

Para 2: ***"The System planning has become almost impossible and system operator is forced to handle several uncertainties"***

- The above contentions of the APDISCOMs is totally wrong. The impugned Regulation 5 allows aggregation of all solar and wind generating stations together as a virtual pool within the State Pool, for reducing the impact of payment of deviation charges on the generating stations using non-conventional energy sources and make it advantageous for them. Please to be noted that the Hon'ble Commission followed the FOR Model Regulations and Karnataka ERC has also allowed such aggregation. The Forum of Regulators also issued an Explanatory Memorandum giving reasons for various clauses of the Model Regulations including for allowing aggregation. Therefore it is a false argument that the System planning has become almost impossible and system operator is forced to handle several uncertainties.

Para 3: ***"No Power market mechanism is also available in to get the power at short notices ".***

- The above contentions of the APDISCOMs is totally wrong. The Central Commission, apart from the Day Ahead Market (DAM), term Ahead Market (TAM), with a view to providing the buyers and sellers an organized platform for energy trade closer to real time had proposed a regulatory framework for real-time market.

- Subsequently, the Commission notified regulations called the Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Sixth Amendment) Regulations, 2019. The said regulations will come into force from 1st April, 2020.

- The concept of Real-Time Market regulations is to cater to real-time energy needs, as also to integrate the intermittent renewable energy into the grid.

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- Such Real Time Market would not only provide APDISCOMs an alternate mechanism to access larger market at competitive price but would also allow them as well as generators to participate in the RTM with their un-requisitioned capacity.

- It means that any excess renewable energy generation bought by APDISCOMs, over and above the prevailing demand, can be sold in such real time market.

Para 4, 5: "The allowable deviation needs to be narrowed down and deviation settlement charges levied for deviation are to be raised"

- The objective of Regulation 4 of 2017 on Forecasting, Scheduling and deviation settlement of solar and wind generation is maintain grid discipline and grid security as envisaged under the Grid code through commercial mechanism for Deviation settlement.

- BECAUSE the objective of impugned regulations is to facilitate large-scale grid integration of solar and wind generating stations while maintaining grid stability and security as envisaged under the record, through forecasting, scheduling and commercial mechanism for deviation settlement of the generators. Penalising the generator is not the way for ensuring secure operation of the grid with wind/solar resources. The proposed amendment is contrary to the provisions of the Electricity Act, 2003 and Regulations made thereunder.

- A suitable mechanism or technical solution, such as centralised forecasting, allowing aggregation of forecast at state level as specified in FoR model regulations, creation of reserve capacity is, for meeting contingencies of variable generations should be enforced before making wind/solar generators responsible. SLDC may be entrusted with the responsibility of such forecasting, as is being done proposed and SLDC may be compensated for additional cost for forecasting instead of individual RE generator bearing the burden.

Point 5 and Proposed Amendment 1:

*"Proposed Error formula for the DSM charges as Absolute Error % = (Actual Injection – Schedule Injection) *100 / Schedule Injection.*

"Further, since RE generation never reaches of its maximum capacity i.e. available capacity, the denominator should be replaced with the scheduled generation.

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RE generation will reach of its maximum capacity i.e., available capacity on peak season i.e. on High wind and summer season.

- It is submitted that in the year 2015, the Central Commission, while introducing the Forecasting and scheduling Regulations dealt with the issue of Error definition in details. Accordingly, FOR framed its Model regulations for states and subsequently, all the State Commissions have followed the same, including all wind/solar energy resources rich states. The relevant portion the Statement of Reasons Order issued by the Central Commission reproduce as under:

6.2 Decision of the Commission

6.2.1 The Commission has reviewed the inputs of the stakeholders. 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).

6.2.2 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.

Revised definition shall be:

Error(%) = (Actual Generation – Scheduled Generation) / (Available Capacity)x100

Where, Available Capacity (AvC) is the cumulative capacity rating of the wind turbines/solar inverters that are capable of generating power in a given timeblock. A suitable procedure along with appropriate format shall be developed by the NLDC for the submission of Available Capacity by the wind/solar generators to the concerned RLDC.

6.2.3 AvC would be equal to the Installed Capacity, unless one or more turbines/inverters are under maintenance or shutdown. Any attempt at misdeclaration, that is declaration of capacity when it is actually not available due to reasons of maintenance or shutdown etc would be treated as gaming and would be liable to action under appropriate provisions of the Act or the Regulations.

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Absolute value of the Error could then be computed as follows:
Abs Error = absolute value [Error]

For every time block, Abs Error may be determined and deviation settlement done accordingly. Mean of Abs Error, also called the Mean Absolute Error or MAE, can then be calculated by taking average of Abs Error over a month or year. MAE will give an indication of the forecasting accuracy over a longer period of time.

Accordingly, suitable provision defining "Absolute Error" has been made in the final amendments to DSM Regulations. The revised definition as above shall take care of low or zero schedule scenario in the off-peak season for wind as well as solar.

- It is to be noted that the stakeholders like: WIPPA, Manikaran and Ernst & Young, Sterling Agro, OGPCL, MNRE had averred that in 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. Moreover, such stakeholder also suggested that 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. Central Commission finalised the DSM regulations considering all the above issues.

- **Considering the above, we request the Hon'ble commission not to touch upon the proposal of APDISCOM for reviewing the Error definition.**

Proposed Amendment 2.

"Considering the diversity factor as 0.7 and 250 MWs deviation limit permitted under CERCs regulations, the allowable forecast error will be 4.89 % or say 5 %.

- **No existing forecasters are competent to maintain the Current DSM permissible limit of 15 % as per F& S regulation and if same is again reduced to 5 % , the consequences / liabilities on generators will be intense and it will be difficult to continue the RE business . The APTRANSCO proposes to use a multiplier of 0.7 as "diversity factor" in calculation of "allowable forecast error". However, no where in the "detailed report" or any other place is such a "diversity factor" either defined, explained or any basis of the "0.7" multiplier elaborated upon.**

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- It is submitted that the CERC had did detailed study before finalizing the error band the relevant portion of the Statement of Reasons Order is as under:

7.3 Decision of the Commission

7.3.1 The Commission has carefully considered the comments received in the context of desirable operating / tolerance band. Several stakeholders have expressed concern that it is impractical for the forecast to be accurate as per the proposed tolerance band of +/-12% with the existing error definition, and that generators will lose a lot of revenue outside this band. Some submissions have presented studies to show that they were unsuccessful in achieving accuracy even within a larger band. Others have questioned the basis for deciding the band limits.

7.3.2 On the issue of feasibility, from the references quoted by REConnect in their comments, the day-ahead MAE ranges between ~8% and 10% for PJM and ERCOT. With 16 revisions now allowed, the Abs Error could be even lower. As models get trained with real-world data, the accuracy is expected to improve over the first few years considerably. Further with the introduction of real time markets, utilities will have an option to manage energy surplus/deficit on real time basis.

7.3.3 Various stakeholders have requested for studies in support of Framework for RE Forecasting and Scheduling. Therefore, some of the studies considered by the Commission in favour of the framework are as under.

7.3.4 The Commission received some simulation/analytical inputs from agencies engaged in wind forecasting- a generator and an aggregator. For various sites across India, based on one year of actual data, the error normalized to capacity has been simulated (pertaining to case where Available Capacity = Installed Capacity).

7.3.5 The chart on the left shows % of energy generated (over the full period) that lies within the error band, with error normalized to installed capacity. The simulation was conducted assuming 16 allowed revisions per day. As per this simulation, % of energy generated at this site of 25.5 MW within +/-15% was 93%, i.e. if a tolerance band of 15% Abs Error were to be proposed, only 7% of generated energy was outside the range. On the right is the scatter plot of error observed for every time-block, over 50 weeks. Mean Absolute Error over the full

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period was 6.21%. This shows that with increased number of revisions, and the revised error definition, forecasting accuracy, as measured by MAE, can be quite high.

Site B: 24 MW For this site, simulated with 16 revisions per day, 92% of energy generated was within the +/-15% band, with an overall MAE of 8.62%. Site C- real time data- 72 MW This is a real-world example of one year of forecasting algorithm that was run at the site based on previously allowed number of revisions i.e. 8 per day. Here, 94% of generated energy lies within +/-15% error band. This is a very relevant indication of what is possible with well calibrated forecasting algorithms even with only 8 revisions. The only factor that could have reduced accuracy if done remotely is non-availability (or intermittent availability) of turbine level (SCADA) data. Hence high data availability is critical to good forecasting. 34 Site D: 51.2 MW For a larger site of capacity 51.2 MW, simulation resulted in 89% of energy generated in +/-15% band, and an overall MAE of 7.78%. 35 Agency #2: An aggregator based in Gujarat Actual data recorded at the pooling sub-station level for calendar year 2014, for 4 different sites has been used for this analysis and is based on forecasting results received, with 8 revisions, for these sites for the calendar year 2014.

7.3.6 The charts below plot the total energy generated in time blocks for which the observed error was within the band corresponding to the value on the x-axis. Thus, percentage of energy that would lie outside the tolerance band (as per proposed deviation settlement methodology) would actually be lower. In the charts above, the % of energy observed within a +/-20% band varies between 72% and 92%, which is quite acceptable given 8 revisions per day. 36

7.3.7 Forecasting for solar power plants is a relatively new phenomenon. Solar power forecasting is comparable to wind power forecasting, but once the sun has risen, clouds are the main factor in the variability of solar power generation and the uncertainty of the solar power forecast. The short-term variability of a single PV plant can be high, although there are diversity benefits with multiple PV plants ("PJM Renewable Integration Study, Kevin Porter et al, November, 2012").

7.3.8 In a solar forecasting benchmarking exercise conducted by Sacramento Municipal Utility District (SMUD), 4 commercial forecasters provided detailed forecasts of solar irradiance and power for 8 sites under a trial conducted from August 2012 to December 2013 ("SMUD Solar Forecasting Benchmarking Trial Experience and Lessons Learned", Vargas et

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al, February 2015"). 1 year of forecast data analyzed for 3 forecasters and 6 months of data for the 4th forecaster saw a typical performance of 7-11% MAE for day-ahead forecasts.

7.3.9 An example of on-ground exercise conducted within India: An aggregator has submitted these results (similar to charts above) for a solar site of 40 MW. As plotted, 80.9% of energy enerated was during the time-blocks when the error was within the +/-10% error band, while 90.6% was for time-blocks within +/-20% band.

7.3.10 All the above inputs give the Commission confidence that with the error normalized to Available Capacity, and 16 revisions of schedule allowed, the generators shall be able to forecast well within a tolerance band of 15% for a high % of energy output.

7.3.11 With the altered error definition, this band is now determined with respect to Available Capacity (AvC). This itself makes the band much bigger, and keeps it mostly constant through the year (except during cases of maintenance or turbine outage). Within +/-15% band, there shall be no adverse commercial impact. While beyond 15%, a gradient band is proposed as follows: Abs Error (% of AvC) Deviation Charge 15%-25% 10% of PPA rate 25%-35% 20% of PPA rate >35% 30% of PPA rate Accordingly, suitable provisions have been made in the final amendments to IEGC and DSM Regulations. As evident from the simulations above, negligible % of energy generated shall lie outside 25% band, and hence the commercial impact of deviation charges shall be minimal. ***In fact, the no-impact band of 15% is quite liberal and the Commission is allowing it consciously so as to get the processes and discipline of forecasting and scheduling in place. The Commission reiterates that as stakeholders get experience, and forecasting models mature, the tolerance band may be tightened over time.***

7.3.12 Some stakeholders have also raised the issue of 150 MW deviation limit for the states. It should be appreciated that load-generation balancing is a prerequisite for secure grid operation. As such, relaxing the 150 MW limit may not be the optimal solution. The Commission is already working on regulatory framework for Ancillary Services, Reserves and has also enabled extended 24x7 market session in the exchange, with a view to help states balance their portfolio. 38 It may, however, be noted that this issue (of 150 MW limit) is beyond the scope of the present regulation.

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Proposed Amendment 3

"It is proposed to remove the option of rescheduling of forecast on one and half hourly basis during the day of operation"

- Regulation 3 which stipulates that there may be one revision for each time slot of one and half hours starting from 00.00 hours of particular day subject to maximum of sixteen (16) revisions during the day. Such revisions will be effective from fourth (4th) time block, the first being the time-block in which notice was given.

- Considering the maximum 11-12 hours solar generation hours during the day, only 7-8 revisions are practically possible. APDISCOM has lost sight of the fact that the solar and wind generating stations are largely dependent on weather parameters. With available weather prediction technology and models, local weather changes cannot be predicted 1.5 hours in advance to the accuracy of +/- 15% especially the local cloud movements during the monsoon season. By removing revision in schedule would reduce the flexibility and result in penalizing the solar/wind generating stations on account of unforeseen breakdown during any slot. In this regard, We request the Hon'ble Commission allowed to revise the schedule unlimited times, immediately based on revised weather prediction available to it from time to time.

- The impugned Regulations also subjecting the solar generating stations to a maximum of 8 revisions during the day is arbitrary and is disadvantageous to the solar generating stations as they ought to have been allowed revisions for a day ahead schedule to unlimited times like allowed to conventional generation, without any levy of charges for the same, in order to facilitate the accuracy of forecasting.

- **It is submitted that no existing forecasters are competent to maintain the Current DSM permissible limit of +/- 15 % in every block as per F& S regulation eventhough maximum of 16 intraday revisions are allowed. Day ahead weather Schedule is very difficult as if it is comparing with the Conventional sources. For conventional sources, the generators have their control over the system. But in RE , everything is depending on weather .**

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Proposed Amendment 3

"Power market mechanism is not mature".

- **CERC has approved the Real time market in Power Exchanges from Apr'20 onwards.**

Proposed Amendment 4

"Above allowable forecast Error the deviation charges / unit is Rs.2.00"

- Hon'ble Commission introduced only penalties in the name of deviation charge on wind/solar PV projects for none of the fault.

- Regulations regarding penalising wind/solar projects for deviations from schedules is basically expecting accuracy of forecast by solar/wind generator within the exempted band, while the actual generation is dependent on the ability of sun or wind, which is entirely natures phenomenon and totally out of control of the wind/solar developer.

- Thus, forecast relates to a phenomenon which is dependent on natures vagaries and may not materialise within the desired accuracy for no fault of the developer. Further, all the risk related to forecasting, scheduling, over injection and/or under injection have been thrust upon wind/solar generator only whereas, neither buyer of the wind/solar power nor any other agency has been entrusted to share the risk of environment friendly infirm power.

- It is submitted that the APDISCOM has not conducted any detailed study to arrive at these deviation charges numbers with reference to the projects operating in the State. Had such study has been carried out and brought out in the public domain for giving an opportunity to submit comments/suggestions, Hon'ble Commission could have specified the same based on realistic picture.

- It is submitted that the tariff discovered in the recent bidding is as low as of Rs. 2.44/kWh, against the said tariff to developers, imposing penalty of Rs 0.50/kWh, Rs. 1.00/kWh and Rs. 1.50/kWh for

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deviation from schedule in different error slabs are unreasonable and against the provisions made in Tariff Policy and the Electricity Act, 2003. It is further submitted that the TNERC and GERC has specified such penalties at the rate of Rs. 0.25/kWh, Rs. 0.50/kWh and Rs.1.00/kWh respectively.

- It is submitted that such proposed penalty should not be accepted.

- It is submitted that in the event of actual wind generation and solar generation are mostly dependent on climatic conditions and geographical conditions. The power from the renewable energies is not firm and are not predictable. The wind and solar power generators, within the State having an element either to supply power to State Distribution Licensees or having self-consumption or selling power to Open Access Consumers and whose interests are the responsibility of the petitioner are severely affected by the aforesaid regulations. If the above proposal of APDISCOM is accepted would definitely make projects of the wind/solar power projects unviable.

- It is further submitted that even the dedicated government departments using best of the forecasting technologies cannot accurately predict the phenomenon of the nature which is best known only to God. Thus, it would completely be unfair to penalise wind/solar generator for any inaccurate forecasting, that too at lowest tolerance band of +/- 5% and at Rs. 2.0/kWh.

- Detailed calculations of how APSLDC have arrived at this DSM penalty are not available. Honourable APERC, before considering these changes should require APTRANSCO to provide justification backed by evidence on the impact of Renewable power generation at state level and how the grid operator is balancing the grid Demand load Vs Generators. APTRANSCO to share the actual data of past 1 year on demand load Vs Scheduled power from all the generation sources.

- Proposed regulation will levy DSM charges equivalent to Approx. 20% of the revenue of the RE generators and will make RE project unviable in AP. This will eventually lead to RE project getting converted to NPA's. Levying such exorbitant DSM charge on RE generators will force them to claim DSM charges under Change in Law, which will ultimately be passed on to the DISCOMs and consumers ultimately.

- **It is also submitted that the no forecasters in the country can achieve proposed allowable forecast Error is 5 %. Almost 95 % of the time blocks observations would fall beyond the 5 % and generator would be ended up in paying DSM charge of Rs.2.00 / unit for their 95 % of the total generation.**

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Proposed Amendment 5

"The definition of phrase of virtual pool may be considered to be deleted from the regulation and this provision is not available in any state which were framed by respective regulatory commissions".

- The impugned Regulation 5 allows aggregation of all solar and wind generating stations together as a virtual pool within the State Pool, for reducing the impact of payment of deviation charges on the generating stations using non-conventional energy sources and make it advantageous for them.

- Hon'ble Commission followed the FOR Model Regulations and Karnataka ERC has also allowed such aggregation. The Forum of Regulators also issued an Explanatory Memorandum giving reasons for various clauses of the Model Regulations including for allowing aggregation. In respect of Clause 3.7 of the Model Regulations, the following explanation is provided in the Statement of reason:

3. Proposed Framework

3.1. Introduction of Aggregators

The fragmented nature of the industry which is evident from the large number of owners of wind turbines poses a challenge of direct interaction of these generators with the respective SLDCs. This process can quickly become unwieldy due to the sheer number of turbine owners. ***Secondly, benefits of aggregation on forecasting accuracy are well documented.*** *Keeping in view the above reasons, the Commission proposes to formalize a new aggregator entity, termed as Qualified Coordinating Agency or the QCA. This aggregator or the QCA shall coordinate all forecasting, scheduling and commercial settlement processes for all wind or solar generators connected to a pooling station.* ***The QCA might aggregate one or more pooling stations, and several QCAs may come together to aggregate even at the State level for leveraging maximum benefit of aggregation.*** *The QCAs shall interact with the SLDC (or RLDC, if required) on behalf of the generators. This significantly cuts down the complexity both for small generators as well as the SLDC, which now has to interact with a few number of agencies instead of thousands of generators.*

The QCA might be a Principal Generator, as recognized in the Central Electricity Regulatory Commission (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-State Transmission and related matters) (Third 19 Amendment) Regulations, 2013, or a third party. The proposed functions of the QCA are as follows:

- *Provide schedules with periodic revisions as per this regulation on behalf of all the Wind/Solar Generators connected to the pooling station,*

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- *Responsible for metering, data collection and transmission, communication, coordination with DISCOMS, SLDC and other agencies.*
- *Undertake commercial settlement of all charges on behalf of the generators, including payments to the State UI pool accounts through the concerned SLDC.*
- *Undertake de-pooling of payments received on behalf of the generators from the State UI Pool account and settling them with the individual generators*
- *Undertake commercial settlement of any other charges on behalf of the generators as may be mandated from time to time.*

The eligibility and empanelment of QCAs shall be outlined through a separate order. It must be noted that this is not a compulsory requirement for the process. Some large solar or wind plants in future may encompass one or more pooling stations themselves. Such large generators may choose to interact directly with the respective SLDC, if desired.

- The errors of forecasting wind/solar generation tend to reduce due to aggregation of schedule at QCA level or state level as per the FOR model regulations, while QCAs make you combine forecast of few developers, the error compensation would be insignificant due to limited number of generators. On the other hand, if SLDC does this forecasting for all developers, the overall error would be much less.

- Hon'ble Commission has rightly considered the above and allowed aggregation. Without a large aggregation, the solar and the wind generating s stations will suffer significant financial burden. An illustration of aggregation of schedules viz-a-viz individual scheduling is provided below:-

Individual vs Aggregated Scheduling – Illustrative example

Time Block	Generator Name	Cap (in MW)	Forecast (in MW)	Actual Generation (in MW)	Abs Error (in %)	Energy Deviation (In Units)	Penalty in Rs.
17/2/2020 00:30 to 00:45	Gen. 1	82	20	40	24.39	20000	3440
	Gen. 2	82	10	24	17.07	14000	1040
	Gen. 3	82	40	27	-15.85	-13000	790
	Gen. 4	82	40	23	-20.73	-17000	1940
	Agg. Gen	**328**	**110**	**114**	**-1.12**	**-4000**	**0**

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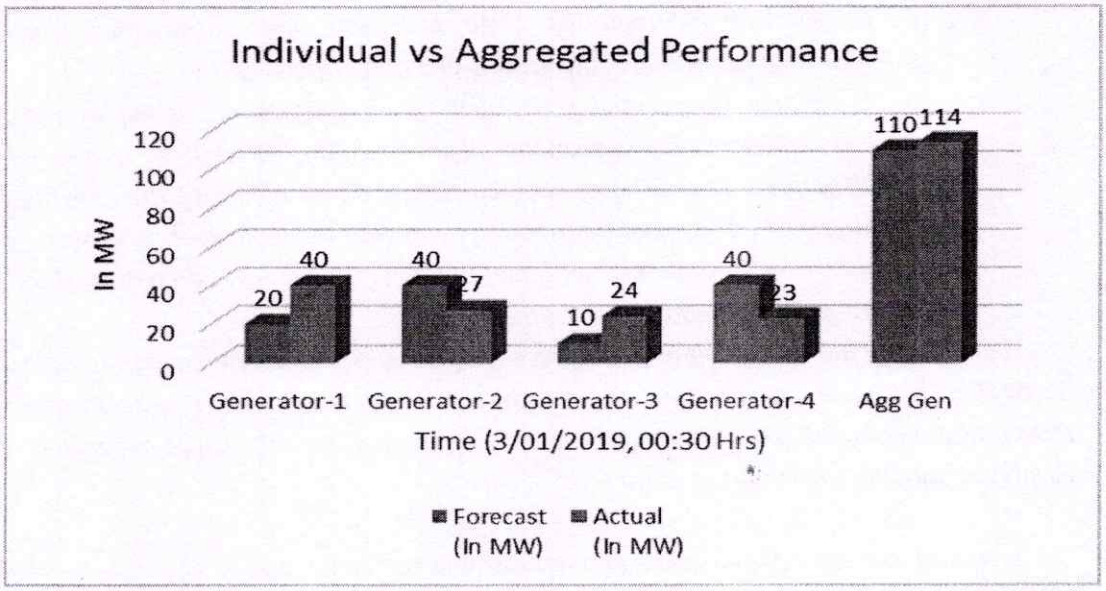

- Above Table shows that on Aggregation effective deviation reduced from 64,000 Units at PSS level to 4000 units at State Grid. Aggregation leads to negligible impact on System operator.

- **Aggregation of schedule and actual generation on the State level and/or with respect to each distribution licensee would ensure that the deviation from the schedule in generation of renewable power is averaged out and would result in minimum penalty on individual solar power generators. Such aggregation was proposed by the FOR Regulations and has been adopted by other State Commissions.**

- **The only reason given by APDISCOM that this provision is not available in any state which were framed by respective regulatory commissions. It is submitted that the said reasoning is without any basis.**

- It is also submitted that the recommendations given by GIZ for Wind and Solar India in its Report under an Indo German Technical Cooperation, that due to the large uncertainty of RE forecast on a local level I.e. for single site, GIZ strongly suggested not to concentrate on this spatial scale. Larger areas considered in forecasting and at SLDC level result in a smoothing due to the spatial averaging and thereafter led to lower uncertainties. This forecasting level also corresponds to the spatial scale on which decisions with respect to grid control, balancing and scheduling are usually taken. When

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forecasting is done on the SLDC level, there is no need for single power providers to forecast their own (local) production except for economic reasons given by the market mechanism.

An illustration of Comparative performance of 50 MW, Solar Plant in AP - Current Regulation Vs Proposed Regulation

The below table shows the forecasting performance for a 50 MW solar plant in AP at the plant level considering day ahead schedule and 5% forecast error, as proposed by APTRANSCO. The Proposed regulation shows high level of forecasting errors and the accuracy levels during monsoon within allowable limits are as low as 1%. On the other hand current regulation, which allows aggregation of forecasts at QCA level has shown accuracy levels as high as 90% within allowable bands.

Month	Schedule (MUs)	Actual (MUs)	As per proposed regulation			As per current regulation				DSM (As per current reg.) In Ps/kwh
			DSM Accuracy Limits		DSM charges (In Ps/Kwh) at Rs 2/kwh above 5% forecast error	DSM Accuracy Limits				
			<5%	>5%		<15%	15-25%	>25 to 35%	>35%	
July_18	6.79	6.77	1.25%	98.75%	60.08	91.27%	8.36%	0.36%	0.01%	1.18
Aug_18	7.45	7.51	4.82%	95.18%	73.61	95.33%	4.65%	0.01%	0.00%	0.28
Sep_18	8.96	8.93	6.39%	93.61%	58.64	89.98%	7.47%	2.18%	0.37%	1.14
Oct_18	10.23	9.21	19.86%	80.14%	46.15	94.28%	3.90%	1.21%	0.61%	0.48
Nov_18	9.80	8.92	26.04%	73.96%	45.50	91.70%	7.01%	1.19%	0.11%	0.61
Dec_18	8.11	7.66	19.01%	80.99%	48.83	91.59%	7.33%	0.90%	0.18%	0.68
Jan_19	9.74	9.63	36.30%	63.70%	20.74	83.59%	9.16%	6.38%	0.87%	0.60
Feb_19	9.63	9.74	35.71%	64.29%	12.43	95.86%	3.92%	0.22%	0.00%	0.14

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