

**TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED
ANDHRA PRADESH STATE LOAD DESPATCH CENTRE**

From
Chief Engineer (i/c)
APSLDC, APTRANSCO
Vidyut Soudha, Gunadala
Vijayawada

✓ To
The Secretary, APERC,
4TH Floor, Singareni Bhavan
Lakdi-ka-pool, Red Hills
Hyderabad

Lr.No.CE/APSLDC/SE-EBC/DE-DSM/F.AMEND20-21/D.No.41/20, Dt.11.05.2020

Sir,

- Sub: Amendments to Regulations 4 of 2017 of APERC – Submission of Replies to 41 objections raised by various Objectors/public to APERC – Regarding
- Ref: 1) APTRANSCO's Lr.No.CGM/HRD&Plg/EE/RAC&Reforms/APERC/
D.No.121/2019, dated.10.12.2019
- 2) APERC's Public Notice OP No.2 of 2020 dtd.13.02.2020

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It is to submit that APTRANSCO, vide ref 1st cited, had proposed certain amendments to Regulation 4 of 2017 towards Forecasting, Scheduling & Deviation Settlements of Solar and Wind generation. In the proposed amendments to APERC, it was discussed about the justification of each amendment with the experiences by APSLDC/APTRANSCO in the implementation with effect from 1.7.2018 to levy the DSM charges on QCAs who are scheduling the solar & wind power on day head basis as well as any revision intraday, on behalf of Generators.

After detailed examination of these proposals as submitted by APTRANSCO/APSLDC, the Hon'ble APERC had issued the public notice vide ref 2nd cited for conducting the public hearing on 10.3.2020 subject to objections from various stake holders/public to be received on or before 4.3.2020. Based on this public notice, a public hearing was conducted at APERC court hall for eliciting the views on these proposals of APSLDC/APTRANSCO from the stake holders/public and it was directed to submit the objections in written format to Hon'ble APERC. On these directions of APERC, total 41 objections /suggestions/appreciations were received by Hon'ble APERC from various stake holders/public on these proposals, however, detailed justification about the requirements of five proposed amendments to Regulation 4 of 2017.

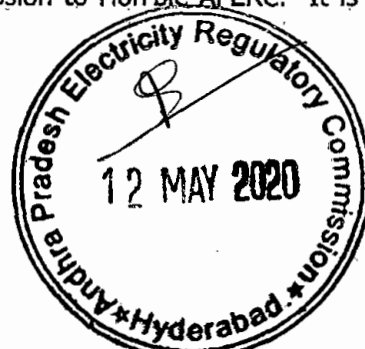
In view of this regulatory process, I am directed to submit the replies to 41 objections which were uploaded in APERC's web site and the same was prepared duly taking into consideration all aspects for submission to Hon'ble APERC. It is therefore,

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OP 2/2020

Law

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humbly requested to issue the consent to these proposed five amendments to Regulation 4 of 2017.

Encl :

- 1) Replies to objections.
- 2) CEATransmission planning criteria Manual
(Annexure- II, Table -II).
- 3) Annexure1 :Details of some instances of
sudden & large variations in VRE generation.

Yours faithfully,


Chief Engineer/APSLDC (I/c)

Copy to Chief Engineer/Plg, Commi &PS/Vidyut Soudha/Gunadala,Vijayawada



Reply to objections

➤ **Objections /suggestions /Appreciations are received from the following Developers/stake holders/ organizations/ persons against proposed amendments of APERC Regulation No:4 of 2017 for forecasting, scheduling & Deviation settlement of solar and wind generators.**

- 1) Venugopal Rao (Convener, center for power studies).
- 2) Society for water, power, & Natural Resources conservation Awareness and Monitoring (SWAPNAM).
- 3) APSEB Assistant Executive Engineers Association
- 4) suryaprakash rao (former director (comm), erstwhile APCPDCL, and former secretary, erstwhile APERC.
- 5) AAROH Solar Private Ltd & Rest 4 SPV'S (ACME)
- 6) VENA Energy Power Resources PVT LTD
- 7) Mytra Energy (INDIA) Pvt Ltd
- 8) SOLAR Power Developers Association.
- 9) Vayu Urja Bharat Pvt. Ltd. (HERO FUTURE ENGINEERS)
- 10) Waneep solar private Limited (HERO FUTURE ENGINEERS)
- 11) Wind Independent power Association (WIPPA)
- 12) National solar Energy federation of India
- 13) Azure power India private limited
- 14) India Wind power Association (I.W.P.A).
- 15) AXIS Wind Farms (MPR DAM) Pvt. Ltd.
- 16) Jindal Aluminium Limited
- 17) Sprang Energy Pvt. Ltd.
- 18) Tadas wind energy private Limited.
- 19) Khandle wind energy private Limited.
- 20) Ayana renewable power private Limited.

- 21) Veena Energy power resources Limited.
- 22) Orient green power company Limited.
- 23) Statkraft Markets Private Limited.
- 24) Waaneep solar private Limited (HERO).
- 25) PTC Energy Limited.
- 26) Council on Energy, Environment and Water (CEEW).
- 27) TATA power renewable Energy Limited.
- 28) Atria power.
- 29) Prayas (Energy group).
- 30) National Solar Energy Federation of India (NSEFI).
- 31) REConnect Energy solutions Pvt Ltd.
- 32) National Aluminium Company Limited (NALCO).
- 33) Weizmann Ltd.
- 34) Kreate Technologies
- 35) Manikaran Analysis Limited.
- 36) Sterling Agro Industries Ltd.
- 37) Axis Wind Farms (Anantapur) Private Limited.
- 38) Axis Wind Farms (Rayala seema) Private Limited.
- 39) ReNEW Power.
- 40) Indian Wind power Association (IWPA).
- 41) Ecoren Energy India Pvt. Ltd.

- **A).** The following wind/solar developers have requested the Hon'ble APERC to adjourn the public hearing dt :10-03-2020 on DSM Regulation no :4 of APERC due to various cases pending in the A.P.High court about the legal and constitutional validity of regulation No:4 of APERC.

AXIS WIND FARMS (MPR DAM) PRIVATE LIMITED, AAROHI SOLAR PRIVATE LIMITED & REST OF 4 SPV'S (ACME), VENA ENERGY POWER RESOURCES PVT LTD, Mytrah ENERGY (INDIA) PRIVATE Ltd, SOLAR POWER DEVELOPERS ASSOCIATION, VAYU URJA BHARAT PRIVATE LIMITED (HERO FUTURE ENGINEERS), Waneep solar private Limited (HERO FUTURE ENGINEERS), Wind Independent power Association (WIPPA), National solar Energy federation of India, Azure power India private limited, India Wind power Association (I.W.P.A).

Question : Aggrieved by the APERC (Forecasting, Scheduling & Deviation Settlement of solar and wind generation) Regulation 4 of 2017 , several renewable energy developers have filed the following Writ Petitions before the Hon'ble High Court of Andhra Pradesh and Supreme Court of India, **challenging the legal and constitutional validity of the Regulation No:4 of APERC.**

Status of writ petitions challenging the Regulation no :4 of APERC in High court of A.P.

Sl. No	Name of the company	court	Case No	Status/Date of interim order
1	Orange Uravakonda wind power Pvt.Ltd. Vs State of Andhra pradesh APERC & SLDC	High court of A.P	W.P.NO - 5706 of 2019	Interim orders passed on 25-04-2019 stating that the authorities shall not invoke the bank guarantee furnished , if not already invoked. Further, the W.P. was admitted for final hearing and interim orders was confirmed by the High Court on 30-12-2019.
2	Axis wind Farms (MPR dam) Pvt.Ltd & 7 others. Vs State of Andhra pradesh APERC & SLDC.	High court of A.P	W.P.NO - 13860 of 2019	Interim order passed on 20-09-2019 stating that the Authorities shall not invoke the bank guarantee furnished , if not already invoked. Further , The W.P. was admitted for final hearing and interim order was confirmed by the High court on 30-12-2019.
3	Animala wind power private Limited & 9 others.	High court of A.P	W.P.15513 of 2019	Interim order passed on 01-10-2019 stating that in the light of orders passed in W.P.5706/19 and 13860/19 status quo should be granted and the status quo as on toady shall be mainted. Further the WP was admitted for final hearing and interim order was confirmed by the High Court on 30-12-2019.
4	Greenko Energies Pvt.Ltd & 2 others	High court of A.P	W.P.781 of 2018	Disposed off vide order dated 22-11-2019, Reopened for re consideration vide order dated 26-04-2019 of S.C in Civil Appeal No. 4404 of 2019. Further , The WP was admitted for final hearing and interim order was confirmed by the High court on 30-12-2019.

The following I.A's have also been filed by relevant generators inter alia praying to **stay operation of public hearing** of proposed amendments on Regulation no :4 of APERC on 10-03-2020.

Sl. No	Name of the company	court	Case No	Prayer
1	Axis wind Farms (MPR dam) Pvt. Ltd & others.	High court of A.P	I.A.No.1 of 2020 in W.P.No.13860 of 2019	To stay the operation of the public notice Dt: 13-02-2020 issued by Hon'ble APERC.
2	Animala wind power Pvt.Ltd & others..	High court of A.P	I.A.No.3 of 2020 in W.P.No.15513 of 2019	To stay the operation of the public notice Dt: 13-02-2020 issued by Hon'ble APERC
3	Axis wind Farms (MPR dam) Pvt. Ltd & others.	High court of A.P	I.A.No.3 of 2020 in W.P.No.13860 of 2019	To stay the operation of letter the Letter bearing no . CGM/HRD &PLG/SE/Plg/RAC & Refroms/ APERC/ D.NO.121 /2019 Dt:10-12-2019.
4	Animala wind power Pvt.Ltd & others.	High court of A.P	I.A.No.2 of 2020 in W.P.No.15513 of 2019	To stay the operation of letter the Letter bearing no. CGM/HRD &PLG/SE/Plg/RAC & Refroms/ APERC /D.NO.121 /2019 Dt:10-12-2019.

In view of the above circumstances we (above developers) humbly request that **public hearing** scheduled on 10-03-2020 be adjourned and the **public notice dt.13.02.2020**, issued by Hon'ble APERC be kept in abeyance, until **the matter is disposed off by the Hon'ble High Court at Andhra Pradesh.**

Reply:

The following Writ petitions have filed by the different VRE developers in the A.P. High court **challenging the legal and constitutional validity of APERC DSM Regulation no:4 /2017** of VRE generators:

W.P.No:781 of 2018 has filed by the Greenco Enginners & others two on Dt: 4th January 2018. The above writ petition was disposed off vide order dt:22-11-2018 of A.P.High court. The above W.P. was again reopened vide order Dt: 26-04-2019 of Supreme court in C.A.No:44 of 2019.

W.P.No:5706 of 2019 has filed by the Orange Uravakonda wind power Pvt. Ltd on Dt:23-04-2019.

W.P.No:13860 of 2019 has filed by the Axis Wind Farms & 7 others on Dt:23-04-2019.

W.P.No:15513 of 2019 has filed by the Animala Wind power Pvt. Ltd & 9 others on Dt:23-04-2019.

Interim orders was passed by the A.P.High court on different dates and ordered that **authorities shall not invoke the bank guarantees furnished by the generators.** The Hon'ble High Court of Andhra Pradesh **is silent on legal and constitutional validity of Regulation of no: 4** and did not mention any thing on this part.

In the interim orders issued by Hon'ble high court could not preclude the APSLDC/ AP TRANSCO/ DISCOMS to seek certain amendments to the regulation.

On Dt 3rd March 2020 I.A.No.1 of 2020 in W.P.No.13860 of 2019, I.A.No:3 of 2020 in W.P.No.15513 of 2019 filed by the relevant generators in A.P.High court praying that **to stay the operation of the public notice Dt: 13-02-2020 issued by Hon'ble APERC.**

On Dt: 3rd March 2020 I.A.No.3 of 2020 in W.P.No.13860 of 2019, I.A.No.2 of 2020 in W.P.No.15513 of 2019 filed by the relevant generators in A.P.High court praying that **to stay the operation of the Letter bearing no . CGM/HRD &PLG/ SE/Plg/ RAC & Refroms/ APERC/ D.NO.121 /2019 Dt:10-12-2019**

APERC had **already commenced public hearing on 10- 03-2020** for the proposed amendments.

Amendment no :1 - clause 2.1 (a).

Substitute the term 'Available capacity' with 'Scheduled generation' for calculating Forecast error.

$$\text{Forecast error (\%)} = 100 \times \frac{(\text{schedule generation} - \text{Actual Injection})}{\text{Schedule generation.}}$$

I) The following organizations/persons **appreciated** the above proposed Amendment No:1.

Venugopal Rao (Convene, center for power studies), Society for water, power, & Natural Resources conservation Awareness and Monitoring (SWAPNAM), APSEB Assistant Executive Engineers Association.

II) Developers :

Jindal Aluminium Limited, Sprang Energy Pvt. Ltd, Orient green power company Limited, Council on Energy, Environment and Water (CEEW), National Solar Energy Federation of India (NSEFI), RE Connect Energy solutions Pvt. Ltd, National Aluminum Company Limited (NALCO), Weizmann Ltd, Sterling Agro Industries Ltd, Axis Wind Farms (Anantapur) Private Limited, Axis Wind Farms (Rayala seema) Private Limited, ReNeW Power, Indian Wind power Association (IWPA).

Question: 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).

Instances of low/no generation cases cannot be covered if scheduled generation is considered in the denominator.

Reply:

In case of zero scheduled energy, the DSM charges could be levied at the rate of Rs2/- per unit **over/Above "the allowable forecast error" of respective actual energy being pumped into grid** in that particular 15 minute block.

In the proposed amendments, the detailed justification was given for taking into consideration of "Scheduled Generation" in the denominator instead of existing Available capacity.

III) Developer: Council on Energy, Environment and Water (CEEW).

Question: If Absolute Error definition is removed, commission to **clarify if inter-state transactions** (as provided in Appendix I) will be governed by the 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.

Reply: These proposed DSM Amendments are not applicable to Inter-state transactions.

IV) Developers : ReNeW Power, Ecoren Energy India Pvt.Ltd, Manikaran Analysis Limited, Waaneep solar private Limited (HERO), Orient green power company Limited,

Ayana renewable power private Limited, Khandle wind energy private Limited, Tadas wind energy private Limited.

Question: Change in formula for error would be against the interest of justice and would create serious prejudice against VRE as Renewable Energy is predictable to some extent however, its forecasting and scheduling accuracies cannot be treated at par with conventional energy generators. For instance in case of a wind generating plant an error of 0.5 meter per second in wind speed may result in 15% variation in terms of power generated and 0.5 meter per second is the minimum error achieved worldwide and average error for wind plant is of around 0.7 meter per second. For another instance, in the case of solar Plant an error of 50 watt per meter square as GHI results an error of 10% variation in terms of power and average error for solar sites is 100 watt per meter square as GHI. Further, for day head basis, the average error is increased to more than 0.9 meter per second for wind plant which ultimately results an absolute error near to 25% and for solar plants 100 watt per meter second is an average error on day ahead basis which ultimately leads to an absolute error of 20%.....

Reply :

- The formula for error should invariably contain one of the two parameters in the numerator as well as in the denominator. The absolute error defined in the regulation contains an unrelated parameter in the denominator. By dividing the deviation with available capacity as stated in present regulations, the error becomes infinitesimal and the regulation becomes redundant or toothless.
- Further, since the RE generation never reaches of its maximum capacity, i.e. available capacity, the denominator should be replaced with scheduled generation.
- Grid requirements are planned duly taking into account of the forecast/schedules from Regeneration on day ahead basis which will be taken into account together with other sources. Any deviation of such forecast in VRE generation is burden to the utility.

Amendment No:2 - clause 2.1 (j) :

'Allowable forecast error' = 100 X (Quantum of deviation limit permitted under CERC's DSM regulation amended from time to time)/ {(Quantum of VRE installed capacity) X (Diversity factor 0.7 in control area in the beginning of financial year)}.

I) The following organizations/persons appreciated the above proposed Amendment No:2.

Venugopal Rao (Convener, center for power studies), APSEB Assistant Executive Engineers Association.

II) Developers:

APSEB Assistant Executive Engineers Association, Society for water power & Natural resources conservation awareness and monitoring (SWAPNAM), Manikaran Analytics Ltd, Prayas (Energy group).

Question: Allowable forecast error shown as 4.89% with 0.7 diversity factor. But it will be 2.39% with the given inputs.

Reply: Typo graphical error had inadvertently crept in the "Allowable forecast error" formula as 0.7 diversity factor is to be considered at denominator instead at numerator. With the above change **allowable forecast error will be 4.89 % or say 5.0%.**

III) Developers :

Jindal Aluminium Limited, National Solar Energy Federation of India (NSEFI), REConnect Energy solutions Pvt Ltd, National Aluminium Company Limited (NALCO), Weizman Ltd, Sterling Agro Industries Ltd, Indian Wind power Association (IWPA), Society for water, power, & Natural Resources conservation Awareness and Monitoring (SWAPNAM).

Question: The APTRANSCO proposes to use a multiplier of 0.7 as "diversity factor" in calculation of "allowable forecast error". However, nowhere 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.

Reply: Diversity factor 0.7 was taken from CENRTAL ELECTRICITY AUTHORITY "TRANSMISSION PLANNING CRITERIA".

(As per Annexure –III, Table –II).

IV) Developers: Jindal Aluminium Limited, Tadas wind energy private Limited , Khandle wind energy private Limited, Ayana renewable power private Limited, Waaneep solar private Limited (HERO), REConnect Energy solutions Pvt Ltd, National Aluminium Company Limited (NALCO), Weizmann Ltd, Sterling Agro Industries Ltd, Indian Wind power Association (IWPA), Ecoren Energy India Pvt. Ltd.

Question:

- the APTRANSCO cites that 15% error will result in a deviation of 1125 MW in AP. This is an illogical argument as it assumes that all sites will have equal or similar deviation in the same direction (i.e. either all will over-inject). In fact, projects spread out over a large and geographically diverse area will result in low overall error, as often errors of individual projects cancel each other.
- 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 upon weather conditions for their plant operation & generation and accurate projection of their electricity generation

and revenue cannot be ascertained in such a scenario reducing permissible band for deviation would totally take away the commercial viability of VRE generators.

Reply : The Hon'ble CERC allows a deviation limit of only +/- 250 M.W for RE rich states. For VRE capacity of 7500 M.W. in the state of A.P, forecast error of 15% will result in 1125 MW deviation which is not allowed by CERC.

The deviation of maximum allowable quantum of 1125 MW variation in downward direction will result in over drawl from grid beyond the permissible limits and in that event it would lead to load shedding in real time operation of grid since spinning reserves are not available from conventional sources.

The deviation in positive direction results in backing down of conventional generators and violation notices are served by SRLDC on SLDC to adhere to IEGC regulations while taking corrective steps for maintaining load generation balance. Deviation in negative direction results in deficit conditions which require resources to bridge gap between load and generation.

Majority of wind and solar generating stations located in same place i.e Anantpur and Kurnool districts. Hence occurrences of deviation in opposite directions are rare.

Amendment 3 - clause 4.1:

Removal of rescheduling of forecast of on one and hourly basis during day of operation and strictly adhere to scheduling on day ahead basis.

I) The following organizations / persons **appreciated** the above proposed Amendment No:3.

Venugopal Rao (Convener, center for power studies, APSEB Assistant Executive Engineers Association.

II).Developers : Ayana renewable power private Limited, Veena Energy power resources Limited.

Question : Overhead transmission lines are exposed to environmental events which many times leads to breakdown of lines and connected equipment resulting outages which can't be accounted on day ahead schedules hence intraday schedule is required to make the scheduling exercise more realistic and useful for making right generation mix at state level.

Reply : In any outgoing lines or connected equipment of power evacuated lines of particular generator breakdown occurs and evacuation of power to the grid is not possible, in that case it is considered as force measure and schedule will be replaced with actual. There will not be any deviation penalty in that case.

III) Developers :

1)Jindal Aluminium Limited, Sprang Energy Pvt. Ltd, Tadas wind energy private Limited, Khandle wind energy private Limited, Ayana renewable power private Limited,

Veena Energy power resources Limited, Orient green power company Limited, Statkraft Markets Private Limited, Waaneep solar private Limited (HERO), PTC Energy Limited, Council on Energy, Environment and Water (CEEW), TATA power renewable Energy Limited, Prayas (Energy group), National Solar Energy Federation of India (NSEFI), REConnect Energy solutions Pvt Ltd, National Aluminium Company Limited (NALCO), Weizmann Ltd, Manikaran Analysis Limited, Sterling Agro Industries Ltd, Axis Wind Farms (Anantapur) Private Limited, Axis Wind Farms (Rayala seema) Private Limited, ReNEW Power, Indian Wind power Association (IWPA), Ecoren Energy India Pvt Ltd.

Question:

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.

Forecasting accuracy improves as more updates are done aligned with shorter scheduling intervals. Removing provisions for intra-day revisions in schedule and reducing the accuracy band to 5%, would entirely make projects unviable for developers. Removing the scheduled revision capacity will hamper the quality of forecast and lead to greater instability in the grid.

Power plants based on conventional sources have the provision for multiple scheduled revisions. The same provision should also be made applicable for RE based projects.

Real Time Electricity Market in India Will become a reality soon, and the utilities will then have access to real time electricity trading market options so that the deficits/surplus can be better managed on a real time basis.

It is impractical to schedule on day-ahead basis because of the variable, infirm and uncontrollable nature of wind.

It is requested to continue the current provisions of intraday revision and for better forecasting accuracy levels, the limit on intraday revisions should be removed.

Reply: This proposed amendment is expected to bring in the VRE generators to forecast accurately which will be useful for planning the load generation balance in real time grid operation.

Further, this amendment was proposed after going through the practical difficulties & field experiences with variable nature intermittent VRE generation in last 2 to 3 years.

Planning of resources by discoms is done on Day ahead basis. The resources include all conventional and RE generators. Accordingly Discoms optimize the purchase and sell power through power exchanges. Any deviation from forecast during real time of VRE sources Would affect load generation balance. Consequently Discoms have to tie up or sell power which is not always feasible. Then they have to take corrective action by taking load shedding or curtailment of generation.

URS power and UI power are uncertainties. SLDC system operator has no control on it. Grid condition and RLDC may not permit the state to Overdraw/ Under draw from/to the grid. URS power is not always available. It depends on other state demand pattern, unit outages etc. Even URS available condition also DISCOMS have to pay high price for the power that is required to bridge the gap. That apart SLDC would suffer with violation notices by SRLDC, forcing DISCOMS to resort to load shedding. In case the above desired action is not realized.

Discoms are not able to cope up with the deficit/surplus arising due to sudden variation in VRE generation in real time operation, because of a) power market mechanism is not mature b) warm and cold start-up which will take longer time to reach full load. C) Discoms have to tie up power subject to availability from all sources.

The objective of bringing this regulation is to maintain grid discipline and grid security as envisaged under the grid code through commercial mechanism for deviation settlement.

In the Detailed Report of these proposals along with proposed 3rd amendment, it is categorically described about the necessity of this amendment to Regulations of 4 of 2017.

Some of the instances of sudden & large variations in VRE generation are enclosed at annexure-1.

Amendment 4 – clause 6.3

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

Sl.no	Forecast Error in the 15 Min. time block	Deviation charges payable to state pool Account.
1	< Allowable forecast Error.	None.
2	Above allowable forecast error.	At Rs 2.0 per unit for the shortfall or excess injection.

I) The following organizations/ persons **appreciated** the above proposed Amendment No:4.

Venugopal Rao (Convener, center for power studies), APSEB Assistant Executive Engineers Association.

II) Developers: Sterling Agro Industries Ltd, National Aluminium Company Limited (NALCO), Wind power Association (IWPA), Jindal Aluminium Limited.

Question: The APTRANSCO has proposed a price of Rs2/ unit above the "allowable forecast error". This is derived on the basis of "adequacy cost of Rs 1.6/ unit" and "Balancing cost of Rs 0.4/ unit". However, detailed calculations of how these costs have been arrived are not available. Before considering these changes, the Honorable APERC should require APTRANSCO to provide justification backed by evidence.

III) Developers : Weizmann, National Aluminium Company Limited (NALCO), REConnect Energy solutions Pvt. Ltd, PTC Energy Limited.

Question: In fact other states have taken an opposite approach – that of reducing per unit DSM charges. In Gujarat, DSM charges are Rs 0.25/ Rs 0.5 and Rs 0.75 per unit. This is done in conjunction with marginal reduction in accuracy thresholds. The reduction in per unit DSM charge is in line with the recent PPA tariffs, which have been significantly lower than the Rs 5/ unit benchmark used by FOR when determining the current DSM charges. Similarly, the Honorable APERC should consider reducing per unit DSM Charges.

Reply : to II & III

With regard to VRE generation, during the real time operation of grid, huge variations occur between the forecast schedules and actual generation. Due to error in forecast of RE generation, dependency on URS/UI gets increased, which has an uncertainty and price associated with it.

Discoms are resorting to purchase high cost power from power exchange.

Many occasions Discoms have purchased at the rate of more than Rs6 per unit. This means, Discoms are incurring Rs2 per unit more than the average VRE Power purchase cost.

Even in that eventuality, sufficient power is not available at that point of time. Hence Discoms have to go for load relief which has deleterious effect on state GDP. Considering an energy elasticity of GDP of 0.8 , this translates to crores of rupees in losses to the state GDP.

The deviation charges of Rs.2 per unit was computed by considering adequacy costs along with balancing costs and the same was proposed with Hon'ble APERC. The Adequacy cost is computed as differential cost between Weighted Average RE Tariff and the weighted average Thermal Variable Cost. The balancing cost is due to increase in specific coal consumption and increased oil consumption while operating in ramped down condition and reduced coal plant life etc., due to frequent ramp up/ ramp down or start/stop operations.

Tariff determined/Discovered =Rs 5/-

Weighted average Thermal variable Cost = Rs.3.5/-

Balancing cost = Rs 0.5/-

Additional cost incurred by Discoms on VRE Integration in the state is = Tariff determined/Discovered - weighted average Thermal variable Cost + Balancing cost.

$Rs (5 - 3.5 + 0.5) = Rs2/-$

The deviation settlement charges will not be levied below the allowable forecast error.

Even very high forecast error also penalty is same i.e. Rs2 per unit.

In the proposals submitted before Hon'ble APERC, a detailed justification has been given about seeking the penalty charges Rs.2 per unit either for over injection or under injection to the allowable error of 5 %.

IV) Developers : Council on Energy, Environment and Water (CEEW).

Question: Whether only wind and solar will be considered for VRE installed capacity or others forms of RE like biomass will also be included.

Answer: This regulation and amendments are meant for wind and solar generators only. Hence Installed capacities considered only for wind and solar generators.

Amendment 5 – clause 2.1 (aa)

The definition phrase of 'virtual pooling' may be considered to be deleted from definition 2.1 (aa) and also be deleted at clause 6.9 of regulation 4 of 2017.

I) The following organizations/Persons **appreciated** the above proposed Amendment No:5.

Society for water, power, & Natural Resources conservation Awareness and Monitoring (SWAPNAM), APSEB Assistant Executive Engineers Association.

II) Developers: Orient green power company Limited.

Question: In practice, it is not possible for scheduling of single/individual wind generator or wind farm but it can be done only for aggregation of various pooling stations. Aggregation is one of the best practices followed internationally for the larger area, better the accuracy. There would be compensating deviations between the substations that offset deviation and the accuracy is better. The objective of forecasting Regulation will not get fulfilled, if virtual pooling is removed from the regulation.

III) Developers : Jindal Aluminium Limited, Sprang Energy Pvt. Ltd, Statkraft Markets Private Limited, Waaneep solar private Limited (HERO), PTC Energy Limited, Axis Wind Farms (Anantapur) Private Limited, Axis Wind Farms (Rayala seema) Private Limited, ReNEW Power, Indian Wind power Association (IWPA).

Question : 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.

IV) Developers: Tadas wind energy private Limited, Khandle wind energy private Limited, Council on Energy, Environment and Water (CEEW),

Question: Having all the RE generators connected to Virtual pool is advantageous to many fronts. It reduces the number of QCA sending their schedules to SLDC thus removing multiple data analysis/entries.41ec.

Reply: to II, III & IV: The proposals of deletion of Virtual Pooling concept may be considered in the existing regulations and justification for this deletion is to bring grid discipline.

V) Developers : Jindal Aluminium Limited, Tadas wind energy private Limited, Khandle wind energy private Limited, National Solar Energy Federation of India (NSEFI), Sterling Agro Industries Ltd, Indian Wind power Association (IWPA).

Question: 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 .

Reply : Except Karnataka no other state is following the virtual pooling method.

Table-II**(Capacity Factors – for Renewable Energy Source (wind/solar) generation) ****

Capacity factor, considering diversity in wind/solar generation, is the ratio of maximum generation available at an aggregation point to the algebraic sum of capacity of each wind machine / solar panel connected to that grid point. Actual data, wherever available, should be used. In cases where data is not available the Capacity factor may be calculated using following factors:

Voltage level/ Aggregation level	132kV / Individual wind/solar farm	220kV	400kV	State (as a whole)
Capacity Factor (%)	80 %	75 %	70 %	60 %

Table- III**(Region-wise Demand Factors for seasonal variation of load) ****

Actual data, wherever available, should be used. In cases where data is not available following Region-wise factors for seasonal variation of peak and light load demand may be assumed:

Sl. No.	Season / Scenario	Region-wise Demand Factors (%)				
		NR	WR	SR	ER	NER
1.	Summer Peak Load (S-PL)	100	95	98	100	100
2.	Summer Light Load (S-LL)	70	70	70	70	70
3.	Monsoon Peak Load (M-PL)	96	90	90	95	95
4.	Monsoon Light Load (M-LL)	70	70	70	70	70
5.	Winter Peak Load (W-PL)	95	100	100	95	95
6.	Winter Light Load (W-LL)	70	70	70	70	70

(Where 100% is for the annual peak load of a region)

** - The above factors may be revised from time to time.

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED
ANDHRA PRADESH LOAD DESPATCH CENTRE

From
Chief Engineer (i/c)
APSLDC, APTRANSCO
Vidyut Soudha, Gunadala
Vijayawada

To
The Secretary, APERC
4th Floor, Singareni Bhavan
Lakdikapool, Red Hills
Hyderabad

Lr.No.CE/APSLDC/SE-EBC/DE-DSM/F.AMEND-DSM/D.No. 39 /20, Dt: 24.2020

Sir,

Sub: APSLDC's proposed amendments to Regulation 4 of 2017 before Hon'ble APERC for approval to notify in AP Gazette – Submission of Supplementary Information – Requested – Regarding.

Ref: 1) APTRANSCO's proposals with Hon'ble APERC dtd. _____

I am directed to submit supplementary information before Hon'ble APERC for amendments to DSM Regulations 4 of 2017 in case of VRE Generators.

In this regard, APSLDC had made certain observations on 7.4.2020 & 8.4.2020 in real time grid operation which support the essentiality for amendments to DSM regulations. It is to submit that there was steep drop of about 900MW solar generation within a span of 30 minutes from 14.05hrs to 14.35 hrs on 07.04.2020 against normal ramp down of 60-70MW in each 15 minute time block resulting in over drawl of 500MW from the grid at frequency of 49.99Hz which is not in order as per prevailing IEGC Regulations. Similarly on 08.04.2020 at 14.35 hrs a drop of 550MW in solar generation was witnessed in a span of 20 min and the solar generation recovered by about 300MW. Again on the same day at about 15:30 hrs solar generation fell by 500 MW in 30 min. This was not captured by QCAs in their forecast. On 07.04.2020 all the available resources were being utilized to the maximum extent and there was no spinning reserve to meet this deficit. However, this deficit was mitigated to a certain extent on 07.04.2020 by taking into service of SRBPH units which takes about 10 to 15 minutes to ramp up to the maximum generation. Meanwhile, SRLDC objected APSLDC for such overdrawl (500MW) beyond permissible limits and instructed to initiate immediate remedial measures to adhere to IEGC regulations. APSLDC had made concerted efforts to avoid not only the notices from SRLDC during this critical period but also load shedding to end consumers in this current summer season. The variation in solar generation on both these days is depicted in graphs as shown at annexure.

It is to submit that APSLDC has been facing many difficulties to operate the grid in secure, safe & reliable, economical manner with huge VRE integration in the State. Furthermore, it is to submit that APSLDC had utilized precious hydel reserves to address issues arising from uncertain VRE sources for adhering to IEGC regulation, to avoid penalties for deviation beyond permissible limits and load shedding which could otherwise have been used for critical contingency. This kind of phenomenon is more pronounced during monsoon season from June to October every year. So, the proposals of APTRANSCO/APSLDC before Hon'ble APERC submitted before Hon'ble APERC for amendments are rationale and in the interest of public & end consumers.

Under these prevailing circumstances, the Hon'ble APERC is humbly prayed to approve proposed amendments to Regulation 4 of 2017.

Yours faithfully,


Chief Engineer/APSLDC (i/c)

ANNEXURE

