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Date: 17.10.2025

To,

The Secretary
Central Electricity Regulatory Commission
6th, 7th & 8th Floors, Tower B, World Trade Centre,
Nauroji Nagar, New Delhi- 110029

Subject: **Submission of Comments on Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 onwards under the provisions of the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2024**

Respected Sir,

Greetings from National Solar Energy Federation of India (NSEFI)!

NSEFI is a non-profit organization with the objective of advocating for renewable power development. It is an umbrella organization representing Renewable energy companies active along the whole photovoltaic value chain: project developers, manufacturers, engineering companies, financing institutions and other stakeholders. NSEFI was founded in 2013 by solar energy industry leaders with the vision to promote solar energy, NSEFI is a public trust based in New Delhi. Our members have executed Solar as well as Wind power projects across the country, under the State and Central Schemes across India.

This with reference to the Hon'ble CERC's proposal on **Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 onwards under the provisions of the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2024 (Draft Order 9/SM/2025 (Suo-Motu) dated 10.09.2025**).At the outset, we would like to thank the Hon'ble Commission for extending the timeline for the submission of the comments which gave our members enough time to consult and share their views on the aforementioned subject.

While we appreciate the Hon'ble Commission's effort in bringing out the proposal, our members have unanimously pointed out limitations of the study along with an adverse financial impact on the RE Plants. At the same time, they have also proposed recommendations beneficial for the overall sector.

India's present capacity of Wind and Solar generation sources is ~171 GW and accounts for 35% of the total installed capacity of 490 GW. Government of India has already committed to achieving 500 GW of non-fossil fuel-based electricity generation capacity by 2030. In alignment with this goal various policies, rules, regulations and orders are required to be introduced with an objective to promote renewable energy (RE) generation.

However, the draft CERC proposal dated 10th September 2025 for determination of "X" factor along with the previously notified DSM framework, further treating RE plant at par with general seller and linking DSM with frequency, imposes significant challenges for RE generators. These provisions could result in substantial financial burden for RE developers, potentially undermining project viability at current tariffs and deterring future investments in the RE sector.

In the draft proposal, CERC has noted that since forecasting and scheduling framework for WS sellers has been in place since 2017, it expected that based on the experience gained over the last 8 year there would be an improvement in forecasting techniques which could be deployed in the larger interest of grid security.

However, CERC has not specified or provided any valid data in the proposal to show that such forecasting improvement has actually taken place over the last 8 years.

By equating, WS seller with General seller CERC has ignored the fact that the generation output is largely within control of General seller which is not in the case of WS seller. Conventional sources can control their generation depending on the market and grid condition by controlling the fuel input. Whereas the generation output from WS seller is dependent on nature and no operation cost is associated with the WS generation. Therefore, WS seller resorting to varying generation depending on market condition has not arisen. It is mainly for this reason, Wind / Solar / Hybrid projects are given "Must Run" power plant status by Ministry of Power. The proposed regulation is in a way taking away the "Must Run" status for WS seller and thus is not consistent with MoP Rules. There are enough evidences making it clear that the forecasting techniques have not improved at a level required and much needs to be done in that aspect.

Under this circumstance, the proposal to decrease the band from 10% to 5% for Solar / Hybrid plants and 15% to 10% for Wind plants, without ascertaining that whether the expected improvement in forecasting techniques have really being in place, is not in the interest of end consumer as it will deprive them of cheaper and clean power at cost as low as Rs.2.15 / kWh discovered in recent bids as against more than Rs.4.00 / kWh fixed cost alone of coal based generation sources. Even in situations of technical constrain (Grid Frequency > 50.05 Hz), it is necessary to first regulate costlier conventional source before asking no cost RE sources to curtail output.

There are ample provisions in various Rules and Regulations specified under the Electricity Act to regulate even the RE resources whenever a situation arises for grid security. Instead of finding the technical solutions, curtailing no cost RE generation is not a wise and economical principle. It basically goes against the mandate under the Electricity Act of promoting RE sources. We therefore strongly object to the proposed amendment and humbly request the Hon'ble Commission to review the proposal and defer its implementation till proven forecasting techniques are in place.

In the above context, Key concerns regarding the implementation of the Draft proposal for determination of "X" under DSM Framework for RE Generators are as follows:

1. Operational Challenges for RE Generators: The key elements of the draft proposal include:

- ✓ Reduction of the tolerance band for deviations:

- For solar and wind-solar hybrid generators: from ±10% to ±5%.
- For wind generators: from ±15% to ±10%.

✓ Phased reduction of the "X" factor used in deviation calculations:

- From 100% (Available Capacity) in 2026 to 0% (Scheduled Generation) by 2031

The draft proposes to treat RE generators deviations at par with conventional generators from April 2031 onwards i.e. linking of DSM charges with grid frequency and market rate. This approach is not consistent with the operational realities of RE plants. Unlike conventional (thermal) plants, RE generation is entirely dependent on weather conditions, which are inherently unpredictable due to immature forecasting technologies and dynamic weather patterns. Renewable energy sources like solar and wind are inherently variable and weather-dependent, making their generation infirm and intermittent. Unlike thermal power plants, RE generators cannot control output based on demand or grid requirements. Treating both categories under the same DSM framework violates the principle of fairness and equality under Article 14 of the Constitution. Additionally, the variability and unpredictability of RE generation are much higher compared to coal or thermal power. The National Institute of Wind Energy (NIWE) and MNRE have acknowledged the site-specific and intermittent nature of wind energy. Over 900 wind monitoring stations have been installed, but even with extensive mapping, forecasting remains a challenge due to micro-climatic variations, sudden weather changes, limited predictive capability of existing models. The operational behavior and control mechanisms for RE plants are distinct from those of thermal technologies.

Therefore, it is not appropriate or viable to apply such measures to RE plants deviations treating them at par with general sellers. Therefore, this Hon'ble Commission is requested to reconsider the said proposal in view of the unique characteristics of RE generation while finalizing the Regulations.

2. Imposing "X" Factor and no revenue for over injection at grid frequency > 50.05 Kz: The proposed trajectory for reducing the "X" factor appears to be based on the analysis of data retrieved from simulation studies conducted by Grid-India and operational experience of Renewable Energy Management Centers (REMCs). The data presented in the draft proposal clearly shows that reducing deviation bands and introducing the "X" factor in the denominator of the deviation formula, will decrease the probability of RE generators to remain within the revenue-neutral deviation band. In other words, it would certainly result in higher DSM charges as most of the time it will remain outside the window of revenue neutral band and would further lead to impact negatively the cashflow/revenue of RE generators.

In practice, the reduction in deviation band combined with the new denominator ("X" factor) does not support normalization of deviations owing to the fact that current limitations in weather forecasting technologies. Current forecasting technologies despite ongoing advancements are not yet capable of consistently achieving the accuracy required under the DSM regulations. This is due to the inherent unpredictability of weather conditions and the limited availability of high-resolution meteorological data, particularly at RE sites. Even globally, forecasting tools have not matured to a level that ensures compliance with such stringent norms. Moreover, aligning operational practices alone is insufficient even with improved tools and effective adaptation will require time, investment, and detailed analysis. Without accounting for these limitations, the proposed framework risks penalizing RE developers for

deviations that are technologically unavoidable.

Furthermore, in cases of over-injection when grid frequency exceeds 50.05 Hz, generation from RE are subject to total revenue loss. This is contrary to the basic commodity exchange principle as the injected power is consumed and paid for by consumers/DISCOMs, yet no revenue is allowed to be realized by the generators. This creates an additional financial burden on RE generators for the reasons beyond their control.

The proposed trajectory for the reduction of the 'X' factor—from 100% in 2026 to 0% by 2031 and reduction in tolerance band (Solar/Hybrid: from ±10% to ±5%, and Wind: from ±15% to ±10%) — raises serious concerns. The underlying assumption that forecasting accuracy has significantly improved is not supported by ground realities. The proposal also fails to account for the economic impact on existing renewable energy projects, particularly wind power, which is inherently variable and difficult to forecast.

The DSM formula itself has been legally challenged, and the Delhi High Court has granted interim protection to affected stakeholders. Proceeding with the proposed framework while the matter is sub-judice undermines the judicial process and creates regulatory uncertainty.

Further, the methodology used to determine the values of 'X' has not been explained. The absence of a transparent and data-backed rationale makes the proposed values appear arbitrary and pre-judged, rather than the outcome of a consultative and evidence-based process.

In summary, the proposed changes do not account for the unique operational challenges faced by RE generators.

3. Implications of High DSM Penalties on Forecasting and Tariff Structures: Stringent DSM Regulation, treatment of RE generation at par with Thermal plant and high DSM penalty are unlikely to yield significant improvements in forecasting accuracy for renewable energy (RE) generators with current limitations. Developers are already leveraging the most advanced forecasting technologies available both domestically and globally, including AI-driven models and satellite-based systems. However, forecasting for solar and wind generation remains inherently limited by unpredictable weather patterns and infrastructural constraints such as sparse weather stations and inconsistent real-time data.

Excessive penalties do not incentivize better performance beyond what is technologically feasible; instead, they introduce financial strain on developers, who may be compelled to factor these penalties into their tariff proposals. This cost escalation will ultimately be passed on to consumers, undermining the affordability of renewable energy. DSM regulations should therefore serve as instruments to promote grid discipline and reliability, not as mechanisms for revenue generation through punitive charges. A balanced regulatory approach that acknowledges operational realities while encouraging continuous improvement is essential for a sustainable growth of renewable energy capacity in the country.

4. Major limitations/Challenges on Forecasting of RE plants: Forecasting remains a major challenge. Renewable energy (RE) generation, particularly from solar and wind sources, is inherently dependent on local weather conditions and can vary significantly from site to site. Factors such as solar irradiance, wind speed and direction, temperature, humidity, and cloud cover directly influence the output of RE systems. For instance, a solar plant in a desert region will perform differently than one in a coastal or mountainous area due to differences in sunlight availability and atmospheric conditions. Similarly, wind turbines require consistent wind patterns, which can be disrupted by terrain features or seasonal shifts.

The Indian subcontinent's complex geography characterized by a mix of coastal, plain and mountainous regions and bounded by the Himalayas to the north and the ocean to the south creates highly varied physical processes that influence weather across the country. Tropical weather systems are particularly difficult to forecast, especially when it comes to predicting localized phenomena such as thunderstorms, cloud formation and dissipation, fog and sudden changes in wind speed. These rapid developments, common in tropical climates, differ significantly from the more predictable, advective weather patterns found in mid-latitude regions.

- **Impact of Climate Change:** Increasing atmospheric instability due to climate change and global warming has amplified convective activity, resulting in greater departures from established weather patterns and increased uncertainty in forecasts.

- **Limitations of Global Weather Models:** Global Numerical Weather Prediction (NWP) models such as the European Centre for Medium-Range Weather Forecasts (ECMWF) operated by the European Union and the Global Forecast System (GFS), developed by the National Centers for Environmental Prediction (NCEP), USA are among the most widely used forecasting systems worldwide. These models provide global coverage and predict key meteorological parameters including temperature, wind speed, solar irradiation, and precipitation. However, both ECMWF and GFS are primarily optimized for regions like Europe and North America, and their performance in Indian climatic conditions—especially during adverse or rapidly changing weather events—has been found to be suboptimal. Models developed by national weather agencies (IMD, NCMRWF, IITM Pune) are not customized for Renewable energy generation forecasting for every 15 minutes and are far from accuracies as per CERC guidelines.

- **Site/Plant-Level Forecasting Challenges:** ECMWF, GFS & NWP models do not directly report forecasts at specific points. Instead, they generate forecasts on a rectangular grid. Specifically, GFS and ECMWF produce forecasts and interpolate at a more localized level (such as a specific plant location), errors can occur due to spatial discrepancies. Additionally, the model forecasts are available at an hourly resolution. This means that any weather changes occurring within an hour are not captured by the model. For instance, if the sky is clear at 16:00Hrs and 17:00Hrs, but cloud movement occurs between those hours, the model cannot account for it. These discrepancies introduce errors into both weather and energy forecasts, known as temporal errors.

- **Instrumentation Limitations:** While installing weather measuring instruments like Skycam

at the farm could enhance forecasts, they are limited to collecting data for 30 mins – 45 mins. Beyond that timeframe, their effectiveness diminishes further.

- **Cloud Movement Uncertainty:** There is no method of predicting the direction of movement of clouds, as at times wind causes the diversion/deviation of clouds from the predicted path at local level. CMV/sky-imager methods improve 0–2 hrs irradiance prediction and can yield modest gains at 2–4 hrs in simple cloud scenes, but correlations with ground winds are only moderate and performance degrades in complex or convective conditions.

- **Insufficient Weather Stations:** There are inadequate number of automatic weather stations and radars which are not aligned with RE intense zones.

- **Limitation of AI & Machine Learning:** AI global weather models (e.g., GraphCast, FourCastNet, Pangu) run fast and can match NWP on many routine cases, but they underperform for many record-breaking extremes and fine-scale hazards; physics-based models remain essential. However, these models are still in the early stages of deployment and have not yet demonstrated consistent reliability for operational use.

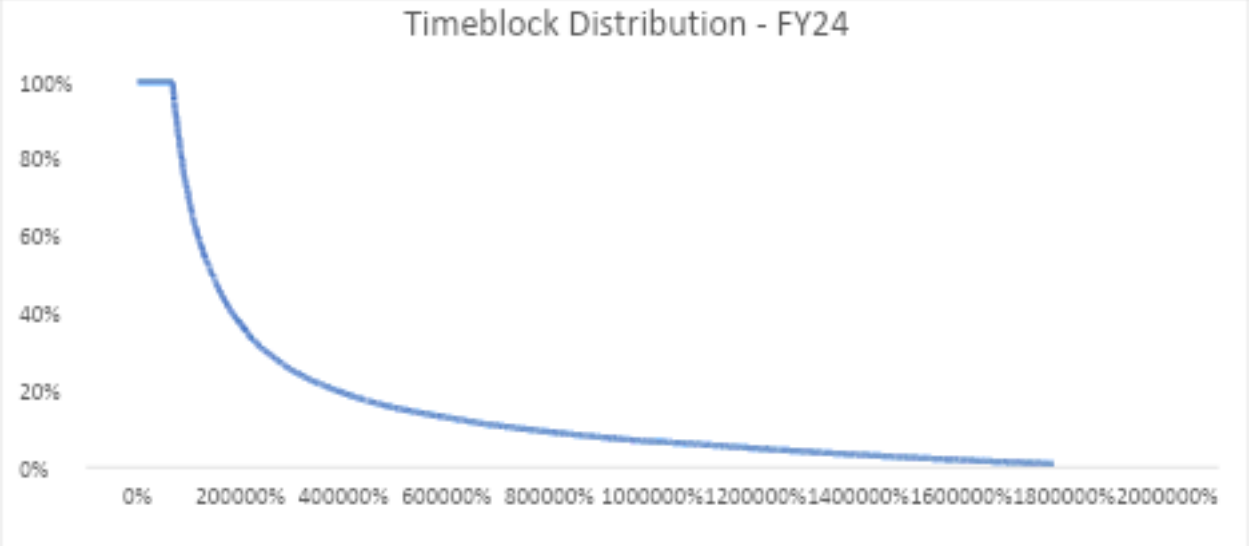
- **Regulatory Constraints & Contradictions:** The feasibility of the power forecasts, under the new regulations are crippled both by the bands on which the penalties are imposed and the nature of revisions, by which the minimum update interval is 2 hours. While over injection and under injection may be different mechanisms in the energy ecosystem, they cannot be modelled separately in a numerical weather prediction system. As an example, in the case of forecasting errors caused due to the formation, dissipation or movement of clouds, the same cloud system that might be causing an under injection over one location may be causing an over injection at another location. In India's tropical climate system, convective cloud systems are one of the major drivers of uncertainty of irradiance forecasts. The clouds can form or dissipate within 1.5 / 2 hours, and under the new regulations, the dissipation (which would cause over injection) would be penalized unfairly.

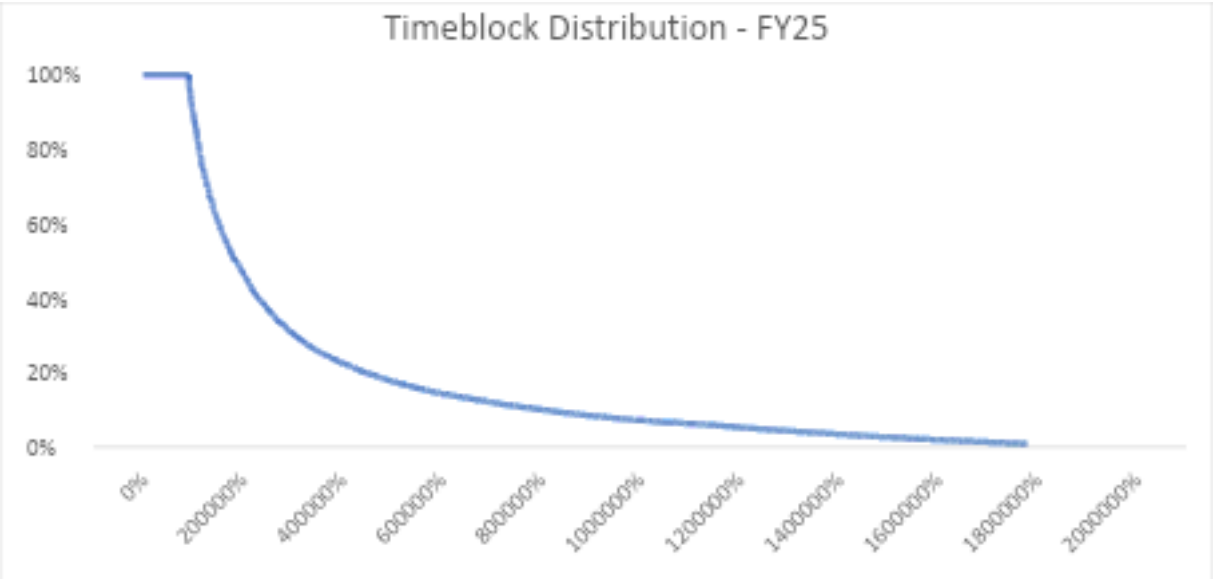
  Existing projects, which were conceptualized and bid under different regulatory assumptions, are particularly vulnerable. Applying new DSM rules retroactively to these projects breaks the principle of regulatory certainty and undermines investor confidence. These projects cannot absorb the financial shock of such drastic changes, especially when tariffs are locked in for 25 years.

  Lastly, the proposed framework contradicts the broader goals of the Electricity Act, which promotes the generation of electricity from renewable sources. By imposing disproportionate penalties and rigid compliance expectations, the draft order risks discouraging investment and slowing the growth of the wind energy sector.

Erratic Generation Behavior: The assumption that forecasting improvements will mitigate deviation risks is contradicted by actual generation data. Analysis of time-block-wise deviations shows **high volatility and erratic behavior,** especially in wind generation. These deviations are not due to poor forecasting practices but are a direct consequence of the **inherent intermittency** of renewable sources.

Yearly Deviation: -





FY24	
Deviation in consecutive time blocks	**% Occurrence**
0-10%	65%
10%-20%	17%
>20%	18%

FY25	
Deviation in consecutive time blocks	**% Occurrence**
0-10%	53%
10%-20%	19%
>20%	28%

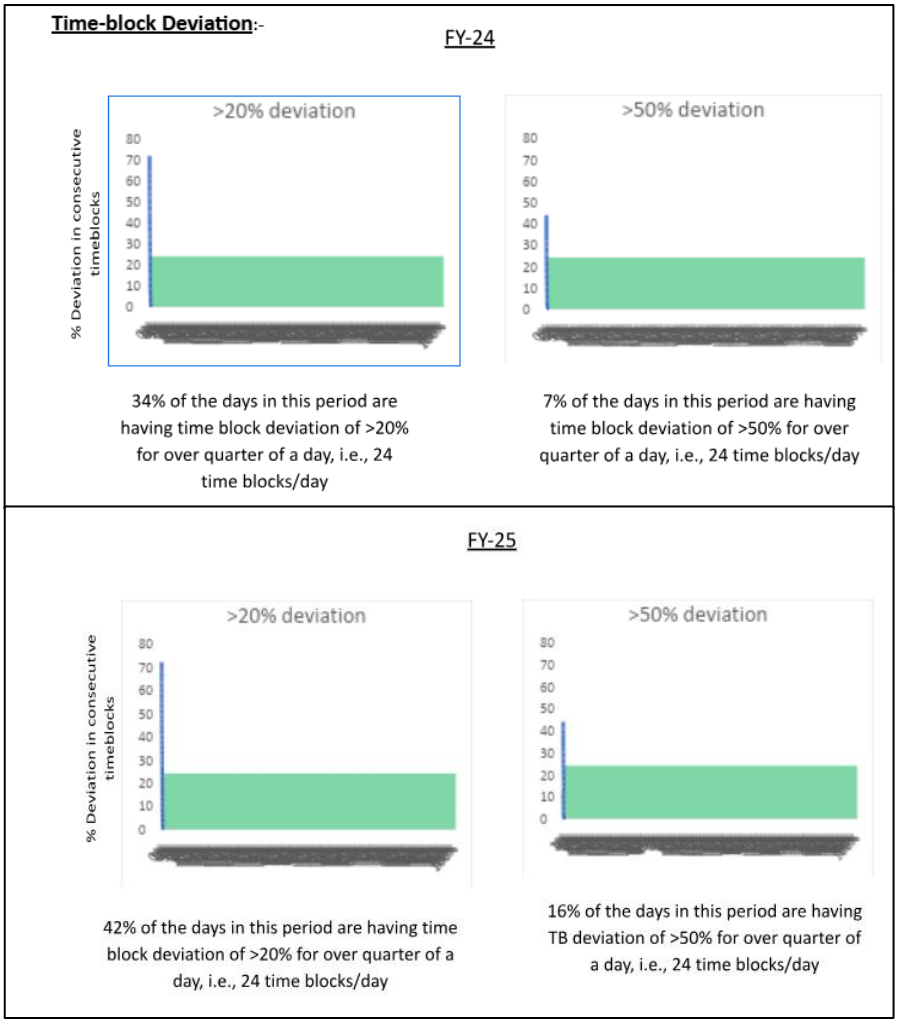
The analysis presents a **time block-wise frequency distribution** of the **percentage change in actual power generation** for a sample wind power plant, comparing data from **FY24** and **FY25.** The percentage change is calculated between two consecutive time blocks to capture the **short-term variability** in generation.

The data reveals a **notable increase in the number of instances** where the generation output changes by **more than 20% between two consecutive time blocks** in FY25 compared to FY24. This means that the wind plant's output is fluctuating more frequently and more sharply in FY25.

This trend is significant because it indicates that the **generation profile has become more volatile** in FY25. In other words, the wind plant is experiencing **larger and more frequent swings in output** over short periods.

The **persistence of this trend**—as suggested by the data—implies that this increased volatility is **not a temporary anomaly** but rather a **systemic shift** in the generation pattern. This could be due to a variety of factors such as changing wind patterns.

Time-block Deviation:



The analysis of time block wise generation data reveals not only an increase in overall year-on-year variability but also a **marked rise in time-of-day volatility**. This means that the fluctuations in generation are not just more frequent on an annual average basis, but they are also becoming more

pronounced at specific times of the day.

In **FY-24**, it was observed that on **34% of the days**, there were **at least 24 time blocks**—equivalent to **6 hours**—during which the deviation in actual generation from expected values exceeded **20%**. This already indicates a significant level of intra-day variability. However, in **FY-25**, this figure increased to **42% of the days**, showing a clear escalation in the **frequency and persistence of high-deviation periods.**

This shift suggests that the system is experiencing **more frequent and sustained episodes of significant deviation** from expected generation patterns. Such deviations are not isolated or random but appear to follow a **recurring daily pattern**, particularly during certain times of the day. This pattern of volatility has critical implications for **system reliability and operational predictability.**

The increase in both the **magnitude and frequency** of these deviations implies that the power system is becoming more sensitive to short-term fluctuations, likely driven by the growing share of variable renewable energy sources like wind and solar. These sources are inherently weather-dependent and can exhibit sharp changes

It is evident that Forecasting remains a major challenge. Agencies such as IMD, CEA, and MNRE have acknowledged that forecasting for wind generation is still inaccurate and subject to significant limitations. Even the IMD's Vision-2047 report highlights the need for significant improvements in forecasting infrastructure. Expecting wind generators to match the forecasting precision of conventional generators is unrealistic and unfair, given the inherent variability of wind resources.

Given these persistent limitations, the continuous tightening of deviation bands and the imposition of the "X" factor, treating RE generators as general sellers without accounting for practical realities results in severe commercial impacts for RE generators as mentioned. We urge the Commission to consider these challenges and adopt a more balanced regulatory approach that reflects the operational realities of renewable energy forecasting in India.

5. Financial Impact of RE Developers and control measure: Under the current deviation band, which is applicable up to 31.03.2026, RE developers face an average revenue loss of 1%-3% due to deviation penalties. However, with the proposed changes effective from 01.04.2026, this loss could potentially rise multiple times (Approx 6 to 8 time). In addition to DSM charges, several other charges such as RTDA/RTA charges, Congestion charges etc. are already being imposed on RE projects, which also contributes to financial burden, affecting the economic viability of RE projects which are deterrent to the investment to be made in renewable energy sector.

Clause 45(11)(b) of the CERC's IEGC, mandates the aggregation of pooling stations for the purpose of combined scheduling and deviation settlement for wind, solar, or renewable hybrid generating stations. This provision is a critical enabler for improving grid efficiency and reliability, particularly in the context of increasing renewable energy penetration. Aggregation allows multiple renewable energy generators connected to a common or nearby pooling station to be treated as a single entity for scheduling and DSM compliance. This approach helps in smoothing out generation variability, as deviations from individual generators can offset each other, thereby reducing the overall deviation and

associated penalties. It also facilitates better forecasting accuracy at the aggregated level and simplifies grid monitoring and control for system operators.

However, Aggregation, while conceptually useful, does not offer a complete solution. Combining multiple projects has shown only marginal improvements in deviation percentages. In cases where projects are located in the same geographical area, forecast errors tend to be correlated, thereby limiting the effectiveness of aggregation. The Grid India study relied upon by the Commission analyzed only **16 projects**—a sample size too small to represent the national RE landscape, which exceeds **175 GW.**

The recent CERC GNA (Third Amendment) regulation have introduced the concept of "Cluster of ISTS Substations" which supports aggregation to combine multiple renewable sources at cluster level. The aggregation of multiple ISTS substations at regional level or multiple PSS level would be beneficial for RE generator to minimize the penalty as well enhance grid stability, security and ease of grid monitoring by grid operator. Currently aggregation for DSM has been allowed for entities connected to single ISTS substation and has stabilized. We urge the Commission to allow multiple ISTS substation aggregation and stabilize same before implementation of the proposal.

The members have also pointed out that as per the current proposal, the **"X" factor would lead to the following revenue losses for renewable energy (RE) generators.** The analysis is based on a 41-week study (Sept 16, 2024 – June 29, 2025), covering 16 RE plants—solar, wind, and hybrid—across the Northern, Western, and Southern regions with varying forecasting accuracies.

S. No	Project Type	Range of Revenue Loss for X-100% and 0%
1.	Solar	-3.5% to -11.1%
2.	Wind	-2.8% to -48.2 %
3.	Hybrid	-2.4% to -11.8%

Each 1% reduction in topline revenue lowers the Project IRR by approximately 0.5%. Currently, projects are being developed with IRRs of 14–15% (under Section 63 PPAs) and 17–18% (for C&I PPAs). DSM loss assumptions in these PPAs range between 0.75% for Solar/Hybrid and 1.5% for Wind. However, if revenue losses reach 11% (Solar/Hybrid) and 48% (Wind), the corresponding IRR erosion would be around 5.5% and 24% respectively, resulting in IRRs that fall below the cost of capital or even turn negative. This would severely damage the economic viability of RE projects, leading to large-scale closures—essentially "throwing the baby out with the bathwater".

While the proposed mitigation via aggregation of schedules offers some relief (at pooling substation level), it does not sufficiently prevent IRR erosion. For instance, even with DSM within 10.95%, the erosion is around 5.5%; when X = 80%, it falls to 2.45%, but further reductions in X (40% or 20%) would exacerbate Project IRR losses.

The recent regulatory narrowing of deviation bands—from ±15% to ±10% for wind and ±10% to ±5% for solar—has already triggered 2.5–3% revenue impact for ISTS-connected RE projects. The proposed "X" factor would compound this burden, nearly doubling DSM exposure and threatening project viability.

Thus, the financial implications of the proposed changes are severe. **CERC's own study indicates that wind projects could suffer revenue losses of up to 48.2%.** Such losses are not sustainable and could render many projects financially unviable, especially those commissioned under earlier regulatory frameworks.

6. Limitations of the Study: Members have informed us that the study employs a limited sample of 16 RE projects—all under Section 63 PPAs. It does not capture the impact on C&I supply projects, particularly wind, where DSM is linked to the integrated ACP instead of contract price. This linkage could amplify DSM-related revenue erosion by 40–50%, especially given that night-time ACP values can reach ₹10/kWh. 380 MW of solar

Additionally, the sample size is too small to represent national dynamics—just 1610 MW solar aggregated and 177.53 MW of wind aggregated for study, against India's installed capacities of 52 GW (wind) and 125 GW (solar) as of June 30, 2025. Given that around 45 GW of renewable energy is ISTS connected with nearly 35GW solar and 15 GW wind/hybrid, a 10% sample size—around 3.5 GW solar and 1.5 GW wind—would provide more robust conclusions.

It is important to acknowledge that systemic challenges in forecasting infrastructure remain unresolved. Indian weather models—such as the NCUM-R (NCMRWF Unified Model – Regional) and IMD's GFS-based models—operate at spatial resolutions of approximately 4 km, which, while advanced, are insufficient to capture hyperlocal cloud dynamics. Sudden cloud formation, dissipation, and movement—especially convective clouds—can occur at sub-kilometer scales and evolve within minutes. These events are typically unresolvable by satellite imagery or coarse-grid numerical models and are not reflected in schedule revisions due to gate closure constraints.

Such cloud events can drastically alter solar irradiance, leading to sharp generation drops or spikes within a single 15-minute block. The awaited CEA report on forecasting efficacy is expected to address these limitations. Until such improvements are implemented, introducing additional penalty-linked mechanisms like the "X" factor may be premature and could inadvertently penalize generators for deviations driven by atmospheric phenomena beyond their control.

Multiple statutory and expert institutions—including CEA, MNRE, IMD, and REMCs—have acknowledged the persistent limitations in forecasting accuracy for wind generation. IMD's Vision-2047 report and CEA's July 2025 AWS Guidelines both highlight the need for improved high-resolution models and localized meteorological data. Forecasting errors, often stemming from interpolated data and insufficient sensor coverage, continue to result in DSM penalties despite generators' best efforts. The shift from 'available capacity' to 'scheduled generation' in the DSM formula, and the proposed reduction of the "X" factor, fails to account for these systemic constraints. Moreover, Grid-India's 41-week simulation study (Sept 2024–June 2025) does not capture full seasonal variability, making its conclusions on forecasting improvement statistically limited.

Equating wind and solar generators with conventional sellers under a uniform DSM formula overlooks their inherent variability and forecasting limitations. Institutions like CEA, MNRE, and IMD have acknowledged persistent gaps in forecasting accuracy. Without corresponding infrastructure improvements, reducing the "X" factor risks penalizing RE generators for deviations beyond their

control.

7. Use of BESS for Grid Management and Renewable Integration: BESS offers a flexible and scalable tool to address these challenges by enabling energy time-shifting, frequency regulation, voltage support, and reactive power compensation. Pilot projects in India, such as those led by POWERGRID under the Greening the Grid (GTG) initiative, have demonstrated the effectiveness of BESS in supporting grid operations. These systems have been deployed for applications such as RE firming, load following, and dynamic frequency response, showcasing their potential to stabilize grid fluctuations and reduce curtailment of clean energy.

Globally, countries like the United Kingdom and Australia have implemented regulatory incentives to accelerate the deployment of energy storage. The UK's Long Duration Electricity Storage (LDES) Investment Scheme, backed by Ofgem, provides a cap-and-floor revenue model to de-risk investments and unlock billions in funding for storage infrastructure. Similarly, Australia's Powering Australia Plan and Renewable Energy Transformation Agreements (RETAs) offer targeted funding and long-term contracts to support large-scale solar and storage projects.

Despite policy efforts such as VGF and transmission charge waivers to promote BESS, the deployment of operational storage projects specifically designed for grid support and participation in ancillary services markets remains limited in India. Most BESS installations are either in pilot stages or focused on commercial arbitrage, rather than providing primary, secondary, or tertiary grid services such as frequency regulation, ramping support, or deviation mitigation. The use of BESS for DSM compliance is particularly underutilized, even though it offers a technically viable solution to manage the variability of RE generation. BESS can absorb excess generation during peak RE output and discharge during shortfalls, thereby reducing deviations and enhancing grid reliability.

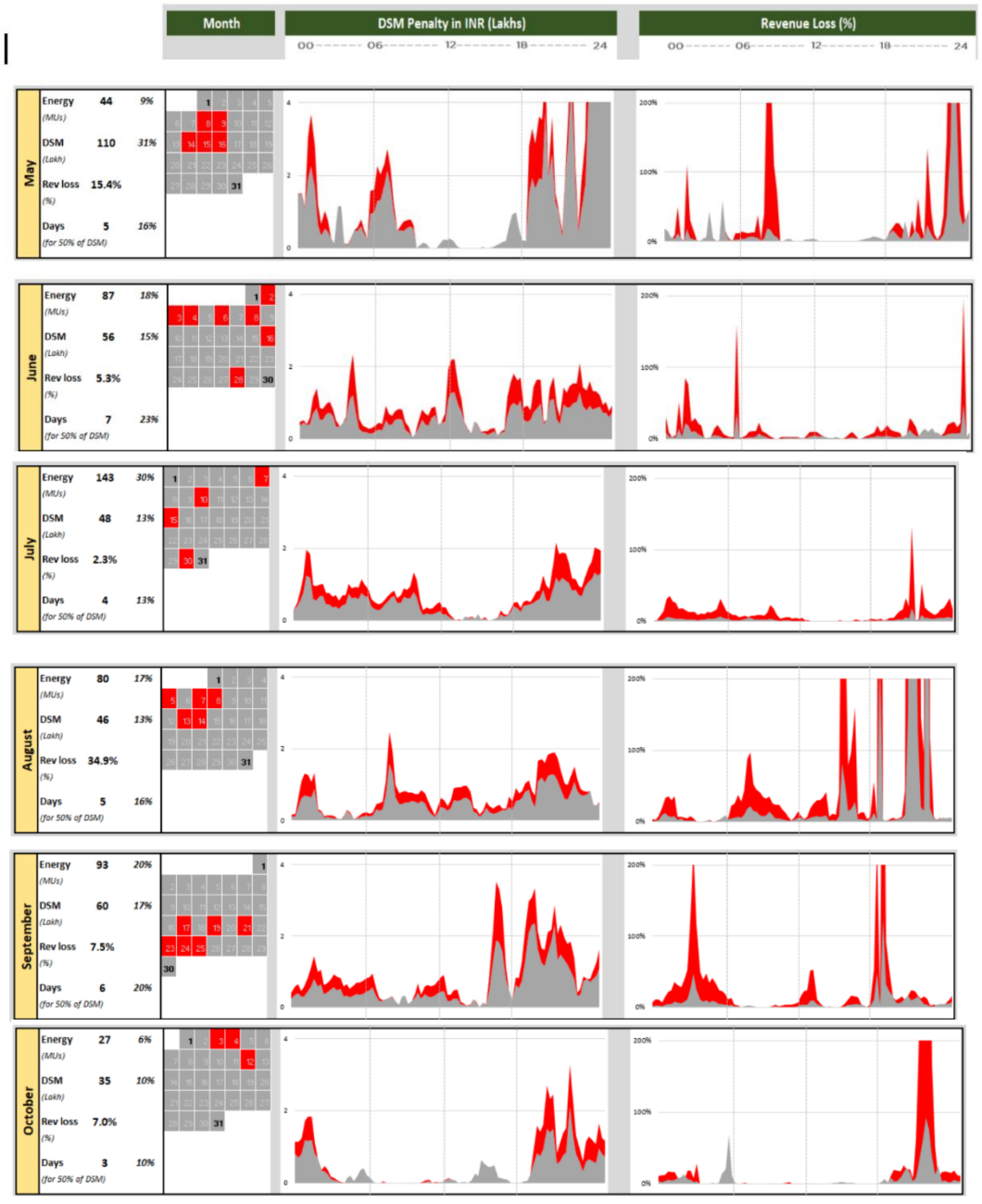
8. DSM Penalty-Day wise Distribution

An in-depth review of monthly DSM (Deviation Settlement Mechanism) penalty data reveals a striking pattern: more than 50% of the total monthly penalty is consistently concentrated in just 4 to 5 days each month. This means that while the remaining 25 to 26 days of the month contribute relatively little to the overall penalty, a small number of days are responsible for a disproportionately large share of the financial burden.

What makes this insight particularly important is that these high-penalty days are not predictable. They do not follow any discernible pattern based on historical trends, seasonal behavior, or known operational parameters such as weather forecasts, maintenance schedules, or load patterns. This unpredictability suggests that the penalties are not the result of ongoing systemic inefficiencies or persistent operational flaws. Instead, they are likely caused by isolated, high-impact events—such as sudden weather changes, equipment failures, or unforeseen grid conditions—that lead to sharp deviations from scheduled generation.

This finding has significant implications for how DSM penalties are assessed and managed. The current approach, which may treat all deviations uniformly across the month, does not account for the concentrated and erratic nature of these penalty spikes. As a result, operators may be penalized heavily

for a few outlier days, even if their overall monthly performance is relatively stable and compliant.



Some additional input and comments are tabulated here:

S. No	Proposal	Comments
1.	Further, Grid-India was also directed to carry out the analysis by	Aggregation of renewable energy (RE) generators should not be restricted to the pooling station level but

	assuming aggregation of WS sellers at a pooling station through the Qualified Co-ordination Agency (QCA) with different values of X%. It is observed that with aggregation of the WS sellers at a pooling station, the impact of DSM charges reduces significantly. The following table shows the reduction in DSM payable for different WS sellers if they opt for aggregation at a pooling station.	rather implemented at the RLDC (Regional Load Despatch Centre) level to encompass a wider geographical area. Aggregation at the RLDC level would ensure equitable distribution of the benefits from reduced DSM (Deviation Settlement Mechanism) charges among all generators, regardless of the number of generators connected to a particular pooling station. To illustrate, a pooling station with a larger number of connected generators would otherwise realize greater DSM benefits compared to one with fewer generators. Aggregation at the RLDC level would eliminate this imbalance and ensure fairness across all participating generators.
2.	In view of the above, the Commission acknowledges the importance of shifting from a deviation formula based on available capacity to one based on scheduled generation. This change is necessary to encourage more accurate forecasting and scheduling by RE generators. The Commission also notes the efforts being made by various institutions and agencies for the advancements in technology and the availability of real-time data on wind speeds and cloud coverage. With improvement in the ability to predict generation levels, the margin for error between actual and scheduled generation will also be reduced further. India's ambitious goal of achieving 500 GW of renewable energy installed capacity by 2030 underscores the need for stricter deviation criteria to ensure grid stability. As renewable energy plays a larger role in the energy mix, grid security becomes increasingly critical. Deviations in	Shifting from a deviation framework based on available capacity to one based on scheduled generation presents significant challenges for RE generators, primarily due to the risk of substantial revenue losses. The following key concerns highlight the need for careful consideration before implementing such a shift: 1. **Limitations in Weather Forecasting Capabilities**: Indian RE forecasting agencies are currently required to adopt hybrid approaches combining public and private weather data, local site measurements, and AI/ML models as a best practice to achieve acceptable forecasting accuracy. However, several issues persist, particularly with national-level weather forecasts, which impact the reliability of generation scheduling. These include: i) Indian weather agencies have limitations when it comes to precision, granularity, and lead time especially for operational (short-term) forecasting. ii) Cloud cover and irradiance forecasts still face challenges in high-temporal accuracy (especially intra-hour forecasting), which is crucial for solar PV variability. iii) These are still in development or pilot stages;

	renewable energy generation can pose significant challenges to grid stability, and transitioning to a schedule-based deviation mechanism is essential for mitigating these risks.	real-time updates and nowcasting (0–2hour forecast) for solar/wind parameters aren't yet consistently reliable. iv) High-resolution local weather phenomena (e.g., convective storms, sudden wind gusts) are hard to predict accurately. v) Compared to agencies in countries like Germany or the U.S., forecast errors in India are generally higher, especially during monsoon and transition seasons. vi) Precision at high temporal and spatial resolution, especially for real-time operations, remains an area needing further development. For instance, wind generation can vary significantly due to sudden changes in wind speed caused by gusts, while solar output fluctuates sharply with varying cloud cover at different altitudes and the movement of scattered clouds. Currently, there is no robust mechanism available to accurately measure parameters such as wind gust intensity or the precise height and density of cloud cover. Despite advancements in forecasting techniques, the accuracy of forecasts remains heavily dependent on future weather conditions. Weather variables likely to affect generation within a 15-minute time block cannot be predicted with high precision, often resulting in deviations beyond the permissible tolerance band. Until these shortcomings are addressed, transitioning to a deviation model based on scheduled generation would unfairly penalize RE generators for forecast errors that are often beyond their control. 2. **Operational Constraints in Schedule Revisions**: Under current DSM regulations, revisions in generation schedules take effect **only from the 7th or 8th time block** after submission. This delay makes it difficult for generators to respond swiftly to sudden changes in weather conditions, often leading to deviations beyond the permissible tolerance limits.

<table>
<tr><td></td><td></td><td>Given the inherent variability of renewable generation and the current forecasting limitations, there is a strong case to advance the implementation of schedule revisions to the 4th time block. This would provide generators with a more responsive framework to mitigate deviations and reduce financial exposure under the DSM mechanism.</td></tr>
<tr><td>3</td><td>Therefore, it is proposed that for the Existing Projects (WS Sellers), the trajectory for reduction of “X” shall be as follows:
<table><tr><td>With Effect From (w.e.f.)</td></tr><tr><td>01.04.2026 to 31.03.2027</td></tr><tr><td>01.04.2027 to 31.03.2028</td></tr><tr><td>01.04.2028 to 31.03.2029</td></tr><tr><td>01.04.2029 to 31.03.2030</td></tr><tr><td>01.04.2030 to 31.03.2031</td></tr><tr><td>01.04.2031 onwards</td></tr></table>Dws% = 100 x [(Actual Injection in MWh) – (Scheduled generation in MWh)] / [(X% of Available Capacity) +</td><td>While we principally oppose the concept of ‘X’, till the aforementioned forecasting challenges are addressed, if it must be imposed, we have the following suggestion:

The proposed trajectory for reducing the value of “X” to zero percent (0%) is too aggressive and not supported by any data representation or justification.

However, the value of “X” could be more appropriately linked to the metric of ‘percentage of time within the permissible band’. Explanation- As per table in para 11 of the proposal, the percentage of time RE Generators remained within the revenue neutral deviation bands to be applicable from 1.04.2026 (which is stricter than that which is applicable currently) is as follows:
<table><tr><th>RE Generating Stations</th><th>Tolerance Band</th><th>%Time Within Band</th></tr><tr><td>Solar</td><td>+/-5%</td><td>45% – 58%</td></tr><tr><td>Wind</td><td>+/-10%</td><td>32% – 73%</td></tr><tr><td>Hybrid</td><td>+/-5%</td><td>38% – 47%</td></tr></table>The above table indicates that even with the stricter bands, generators remain within the revenue neutral bands for % time which varies depending upon the source of energy. This means that with the existing value of X at 100% and the stricter band, the deviations beyond the revenue neutral band was as follows:
<table><tr><th>RE Generating</th><th>Tolerance Band</th><th>%Time Outside</th></tr></table></td></tr>
</table>

	(100-X) % of Scheduled Generation) Accordingly, in terms of clause (2)(b) of Regulation 6 of the DSM Regulations, 2024, and in view of the above, the Commission invites comments from stakeholders on the determination of the value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers applicable from 01.04.2026 onwards. The comments may be sent by 05.10.2025.	**Stations** | **Band** Solar | +/-5% | 42%- 55% Wind | +/-10% | 27%- 68% Hybrid | +/-5% | 53%-62% Therefore, the value of X needs to be reduced progressively only to the extent of % time outside the band indicated above. Further, with aggregation at RLDC levels as suggested above, the % of time outside the band would decrease. Our suggestion on X, taking into consideration the value addition due to aggregation is as follows. These values of X must be different for different sources of energy as explained above and should be achieved progressively **over a period of next 5 years**. **RE Generating Stations** | **Value of X** Solar | 100%-65% Wind | 100%-65% Hybrid | 100%-70% This will provide renewable energy (RE) generators an incentive to improve scheduling accuracy over time. An annual review mechanism should also be introduced to reassess the value of "X" based on this performance metric.
4	Further, the Commission is of the view that the green transition needs to align with the principle of equitable treatment of all grid-connected generators and should reflect the increasing maturity of the renewable energy sector. The Commission also believes that in the future, the intermittency of wind and solar needs to be addressed by way of improved forecasting, scheduling, and operational experience. The new	Renewable Energy (RE) generators should not be treated at par with conventional generators under the Deviation Settlement Mechanism (DSM) due to the inherent differences in the nature, predictability, and controllability of their generation. Following are the key reasons, backed by technical, operational, and regulatory perspectives: i) **Inherent Variability and Uncertainty of RE Generation**: RE sources like wind and solar are weather-dependent and cannot be dispatched on demand. Their output fluctuates with cloud

	WS projects are now expected to demonstrate the same level of discipline and compliance as conventional generators. This step marks a shift towards a more grid-supportive framework for renewable energy integration, which is crucial for ensuring long-term grid reliability amidst the rising share of RE in the generation mix.	cover, wind speed, solar irradiance, etc., which are not entirely within the generator's control. In contrast, conventional generators (coal, gas, hydro) are fully controllable and can adjust generation based on grid requirements or economic signals. **Equating variable and uncontrollable generation with controllable generation for DSM treatment leads to unfair financial penalties for RE developers**. ii) **Forecasting Limitations:** While forecasting tools are improving, weather forecasting in India still lacks the accuracy, granularity, and real-time reliability required for precise RE scheduling (especially intra-day and intra-hour). Forecast errors due to unpredictable local weather phenomena (e.g., sudden cloud formation, wind gusts) are systemic limitations, not generator faults. **Penalizing RE generators for forecasting errors beyond their control undermines the principle of fair treatment under DSM.** iii) **Lack of Flexibility in Scheduling Revisions:** Current regulations allow schedule revisions to be implemented only from the 7th/8th time block (i.e., with a 1.5–2 hour delay). **RE generators face real-time variability, but cannot revise their schedules quickly enough to reflect sudden changes, leading to deviations.** iv) **System-Wide Benefits of RE Not Accounted for in DSM** RE generators contribute to reduced carbon emissions, fuel savings, and energy security. However, the DSM framework focuses only on deviation penalties, without recognizing the broader environmental and economic benefits that RE brings to the grid. **A differentiated approach is needed to acknowledge the public-good dimension of RE generation.**

		i) **Global Best Practices Support Differential Treatment:** Countries with high RE penetration like Germany, UK, and Australia adopt differentiated or relaxed deviation frameworks for RE generators, especially for smaller or variable producers. These frameworks often include tolerance bands, incentivized forecasting improvements, or exemptions from penalties for uncontrollable deviations. **India's DSM policy should align with international best practices to foster a RE-friendly regulatory environment.**
5	All new Wind & Solar projects with bid submission date on or after 01.04.2026, shall be treated at par with General Sellers. No payment shall be made to the existing Wind and Solar (WS) Sellers for any over injection during periods when the system frequency is at or above 50.05 Hz.	Treating RE generators at par with conventional generators under DSM is technically inappropriate and economically inequitable, given the uncontrollable nature of their output and existing forecasting limitations. A differentiated DSM framework, with performance-linked incentives and realistic deviation bands, is essential to ensure fair treatment of RE generators, alignment with India's RE targets and Grid stability without discouraging clean energy investments. It is respectfully submitted that the Commission may consider extending compensation to Wind and Solar (WS) sellers for under-injection at frequencies above 50.05 Hz, in parity with the provisions applicable to general sellers — i.e., at 85% of the contracted rate for energy within the prescribed volume limits and 100% of the contracted rate for energy beyond the specified volume limits. In conclusion, until weather forecasting capabilities in India improve significantly, particularly in terms of real-time accuracy and resolution, RE generators should not be burdened with deviation charges based on scheduled generation. A phased approach, supported by regulatory adjustments such as earlier schedule revision windows, would ensure a more equitable and technically sound transition.
6	Additional comment	Incremental loss due to the proposed regulatory changes

		to be allowed under **Change in Law** for existing Wind and Solar projects It was proposed that all New Wind and Solar projects, with tendering or bid submission dates on or after 01.04.2026, shall be treated at par with GS sellers, hence the IPPs will be considering the same in the bid. However, the for the bid out projects and operational wind and solar project have not considered these changes in the tariff. The impact is as high as 10% of the revenue, hence the commission is request to allow the incremental loss to be considered under change in law.
7	Aggregation/QCA appointment at State level	Clause 45 (11) of IEGC mentions about scheduling of WS seller and ESS by QCA: (a) The regional entity renewable energy generating station(s) or Projects based on energy storage system(s) connected at a particular ISTS substation or at multiple ISTS substations located in a State may appoint a QCA on their behalf to coordinate and facilitate scheduling for such generating stations or energy storage system(s). The responsibility of QCA is listed at Annexure-6 to these regulations. **(b) NLDC shall submit a procedure for aggregation of pooling stations for the purpose of combined scheduling and deviation settlement for wind or solar or renewable hybrid generating stations that are regional entities, within six (6) months of notification of these regulations for approval of the Commission.** Currently, the QCA appointment is happening at PSS level which is resulting in reducing the revenue loss by 30% to 50%; by allowing the aggregation at state level this loss is further expected to reduce by 30% to 50%. Hence, we request the commission to operationalize the proposed X factor after the issuance of procedure for aggregation of pooling stations at state level by NLDC.
8	Payment to the existing Wind and Solar (WS) Sellers for any over-injection during periods when the system frequency is at or above 50.05 Hz	It was proposed in the draft that **no payment shall be made to the existing Wind and Solar (WS) Sellers for any over-injection during periods when the system frequency is at or above 50.05 Hz. And the New WS sellers shall be treated at par with General sellers. We**

		request the commission to compensate the WS sellers those who are under-injection at frequency above 50.05 Hz in line with General sellers that is - i.e. at 85% of contract rate payable within volume limits and 100% payable outside volume limits.

In light of above stated challenges, we request the Hon'ble Commission to acknowledge these limitations and to ensure that the DSM framework remains fair and reflective of ground realities for RE generators. We urge the Hon'ble Commission to reconsider the proposed provisions and adopt a more balanced approach that supports the growth of renewable energy while maintaining grid discipline.

Despite these limitations, the intent to better integrate RE into the grid through the "X" factor is commendable. To strengthen the approach, we recommend the following:

i. **Portfolio/Regional-Level Aggregation of Schedules:** Aggregation should be implemented at the regional grid level instead of merely at pooling substations. This approach aligns with the IEGC, 2023 framework and should build upon learnings from substation-level aggregation. Voltage-based regional aggregation—by grouping generators connected at 220 kV, 400 kV, or 765 kV—can help significantly reduce forecasting errors and improve RE integration. This would better utilize geographic diversity and reduce net deviations.

ii. **Market Mechanism for Managing RE Imbalances:** Introduce, via regulation, a market for settling generation imbalances arising from weather-based forecasting errors, similar to Germany's EPEX-SPOT balancing market. In Germany, the Balance Responsible Party (BRP) aggregates generators, manages deviations, and settles them financially in the spot market. Deviations due to over- or under-generation can be addressed within 5 minutes, with settlement in immediate next time block, ensuring grid stability and fair compensation through market pricing. Over injection is sold in market and money received by RE generator, under injection triggers balancing energy paid by RE generator at the balancing price.

In contrast, India's real-time market opens one hour before delivery, which is too late for managing short-term renewable deviations. Further, under-injections must be addressed through strengthening ancillary markets—particularly primary and secondary reserve services, which is still evolving in India.

RE generators should be allowed to purchase power in Real Time Market (RTM) to manage deviations. This is standard practice in European markets and helps balance portfolios in real time. Further, India's current gate closure of 4 time blocks (delivery in the 6th) is too rigid. A phased reduction to 2 blocks or less would improve responsiveness and deviation management.

Under the earlier DSM framework, schedule revisions were permitted until the 4th time block prior to delivery, offering generators a degree of flexibility to respond to evolving weather

conditions. In the current regime, however, schedules are effectively locked by the 7th or 8th time block, which translates to a lead time of approximately 1.75 to 2 hours. This extended lock-in period limits the ability of RE generators to adjust for intra-block variability—particularly short-duration cloud events that can significantly impact generation within a single 15-minute interval. In this context, a market-based mechanism for managing real-time imbalances would be more aligned with the operational characteristics of renewable energy, offering a constructive alternative to purely penalty-driven approaches.

iii. **Battery Storage at the Regional Grid Level:** Establish large-scale battery banks in RE-rich regions/substations to provide instantaneous MW balancing—absorbing over-generation and supporting under-generation. This centralized model, coordinated by RLDC/NLDC, would complement ongoing decentralized battery initiatives by RE developers. Such installations should be tendered akin to STATCOM (MVAR) systems under transmission TBCB guidelines.

The cost could be shared among DICs benefiting from grid stability, reduced to the extent of net balance from RE generators that could pay (under injection) or receive PPA-rate compensation (over injection) during deviations (for stored or drawn power). This approach would narrow deviation bands to parity levels with conventional generators, improving grid safety and reliability.

The "X" factor introduces a material shift in the commercial framework of existing PPAs and must be recognized as a "Change in Law" event. Alternatively, we strongly urge its complete withdrawal until supporting infrastructure—balancing markets, storage, and forecasting accuracy—is demonstrably in place.

iv. **Revised 'X' Band:** To enable the suggestions mentioned at ii and iii above, it is requested that X band should be kept 100% for atleast first 2-3 years and then basis the experience gained till then, revised trajectory may be suggested for X. This will ensure a graded way of transitioning providing least shock to the industry.

v. **The trajectory for reduction of "X" for Existing Projects (WS Sellers):** The draft proposal suggests a phased reduction of the "X" factor from 100% to 0% for existing WS Sellers between 01.04.2026 and 01.04.2031. This approach requires reconsideration, taking into account the practical challenges faced by RE plants, particularly in forecasting accuracy and the dynamic nature of weather conditions as highlighted above.

Additionally, the draft proposal references a simulation study of 16 regional RE generators over 41 weeks, which indicates a significant decline in forecasting accuracy and increased impact on revenue loss of RE generators as the "X" factor is reduced from 100% to 0%. Specifically, the impact on revenue loss increased from 4.6% to 8.5% for solar plant (nearly double), 4% to 18.3% for wind plant (over fourfold), and 4.6% to 11.1% for hybrid (nearly three times) demonstrating a substantial increase. We have also conducted a simulation across pan-India level for RE plants under aggregation and the findings show that with a 5% reduction band and the transition from X=100% to X=0%, increases the DSM impact on RE generators by 6 to 8 times compared to existing DSM regulation.

Reduction of the deviation band to 5% w.e.f. 01.04.2026 along with the "X" factor will disproportionately penalize RE generators. The proposed order itself acknowledges that forecasting accuracy deteriorates with a reduced deviation band. As previously stated, current technological limitations hinder the achievement of the desired forecasting accuracy. Thus, reducing the band and introducing the "X" factor will penalize RE generators rather than support grid stability through improved forecasting. The changes in deviation band analyzed by us for month of April-25 (Summer) and July-25 (Monsoon) shows significant impact.

- **No penalty Band:**

Apr-25		
RE Generator	As per CERC DSM Regulation 2024 up to 31.03.2026 (± 10% for Solar/Hybrid & ± 15% for wind)	As per CERC DSM Regulation 2024 w.e.f 01.04.2026 ((± 05% for Solar/Hybrid & ± 10% for wind)
Hybrid	77.99%	42.64%
Solar	93.53%	76.84%
Wind	72.68%	60.46%

July-25		
RE Generator	As per CERC DSM Regulation 2024 up to 31.03.2026 (± 10% for Solar/hybrid & ± 15% for wind)	As per CERC DSM Regulation 2024 w.e.f 01.04.2026 ((± 05% for Solar/Hybrid & ± 10% for wind)
Hybrid	71.77%	43.15%
Solar	68.73%	50.43%
Wind	71.84%	57.17%

- **Maximum Penalty Band:**

Apr-25		
RE Generator	As per CERC DSM Regulation 2024 up to 31.03.2026 (>15% for Solar/Hybrid & >20% for wind)	As per CERC DSM Regulation 2024 w.e.f 01.04.2026 (>10% for Solar/Hybrid & >15% for wind)
Hybrid	6.44%	21.93%
Solar	2.94%	5.75%
Wind	16.48%	23.56%

July-25		
RE Generator	As per CERC DSM Regulation 2024 up to 31.03.2026 (>15% for Solar/Hybrid & >20% for wind)	As per CERC DSM Regulation 2024 w.e.f 01.04.2026 (>10% for Solar/Hybrid & >15% for wind)
Hybrid	15.93%	28.20%
Solar	19.15%	31.26%
Wind	16.69%	25.27%

Moreover, the Hon'ble Commission has noted that waivers granted to RE generators since 2017 were based on the assumption that forecasting technology has matured. However, this assumption does not reflect ground realities.

To address the forecasting issues, RE developers have initiated multiple efforts to enhance forecasting accuracy, including:

- Advanced techniques using high-resolution global and Indian weather models
- Collaborations with national and international agencies
- Hiring weather scientists for data analysis and daily monitoring
- Integration of AI-based weather models

Despite these world-class efforts, the proposed forecasting accuracy remains unachievable at present. A balanced approach is needed—one that supports RE generators while ensuring grid reliability. Measures such as aggregation at state/regional/multiple PSS levels, reducing revision windows, and allowing revisions for STOA-operated plants will support grid operators and enhance grid security, which remains a shared priority.

Therefore, regarding the reduction of the deviation band by 5% and introduction of the "X" factor in

deviation error calculation, we respectfully request the Hon'ble Commission to defer implementation until at least FY 2031 for "X" factor and amend the CERC DSM Regulation 2024 for further relaxation for not imposing 5% band reduction effective from 01st April 2026.

vi. **Treating RE plant as conventional/General seller:** In the draft proposal, the Hon'ble Commission has proposed to treat existing RE plants at par with General Sellers for DSM calculation from 01.04.2031 and new plants with tendering or bid submission date on or after 01.04.2026 to be treated at par with General Seller. However, as highlighted above, both types of plants operate on fundamentally different technologies. Conventional plants are dispatchable and predictable, with controllable and schedulable output, allowing them to adhere strictly to their schedules. Deviations from schedule are therefore penalized uniformly. In contrast, RE plants are intermittent and weather-dependent, making accurate forecasting inherently more challenging. Hence, this proposal contradicts the principles of fairness and equity. It is a well-established legal principle under Article 14 of the Constitution of India that 'un-equals cannot be treated equally'. In this case, general sellers and WS/RE sellers are inherently unequal and hence deserve different treatment. **We respectfully urge the Hon'ble Commission not to proceed with this implementation.**

The Hon'ble Commission has directed its staff to amend DSM Regulation 2024 to treat all new Wind and Solar (WS) projects as general sellers, applicable to projects with tendering or bid submission dates on or after 01.04.2026. This change, coupled with the significant commercial impact, will adversely affect future RE investments in India and may delay the country's target of achieving 500GW of renewable capacity by 2030.

vii. **No Receivable for WS Seller for over-injection when the system frequency is at or above 50.05 Hz:** RE generation is entirely dependent on weather conditions, and sudden ramps may occur during real-time operations due to fluctuations, leading to over-injection beyond the scheduled generation. As per IEGC grid code 2023, schedule revisions become effective only from the 7th to 8th time block. With the implementation of this proposal, RE generators will again face revenue loss as no compensation is provided for the units generated and injected into the grid, even though the power is consumed and paid for by the consumers/Discoms. However, no revenue is allowed to be realized by the generators.

We acknowledge that during high-frequency conditions, generators are expected to avoid over-injection to support grid reliability. However, over-injection in RE generation occurs due to factors beyond the control of generators. Therefore, we respectfully request the Hon'ble Commission not to impose such regulation on RE generators.

viii. **Grandfathering for Existing Projects**: The proposed changes should not be made applicable to projects commissioned prior to their effective date. Retroactive application violates regulatory certainty and investor trust.

ix. **Post-Delivery Settlement Mechanism**: Deviations should be allowed to be settled through market mechanisms after delivery, as practiced in Germany and other European markets

Conclusion:

The proposed DSM framework and reduction of the "X" factor are based on flawed assumptions and risk undermining the viability of renewable energy projects. The erratic nature of wind generation, coupled with forecasting limitations, makes it impractical to impose tighter deviation bands and penalties.

Instead, a **market-driven, flexible, and equitable DSM framework** should be adopted—one that supports grid stability without compromising the growth and sustainability of India's renewable energy sector.

With Best Regards,



Subrahmanyam Pulipaka
Chief Executive Officer
National Solar Energy Federation of India