IWPA comments on Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 under the provisions of CERC (DSM and related Matters) Regulations, 2024

The Indian Wind Power Association appreciates the opportunity to provide comments on the proposed amendments. While we fully support the objective of grid stability, the proposed tightening of the deviation framework will have **severe and disproportionate impacts on wind generators**, which must be carefully reconsidered. We would also like to respectfully highlight that the principal regulation is currently under challenge, and a **'no coercive action'** order has been issued by the Hon'ble Delhi High Court. Considering this, we submit that any further additions or amendments to the principal regulation should be kept **in abeyance** until the matter is conclusively adjudicated.

Without prejudice to the foregoing, we hereby submit our point-wise comments on the proposed amendments as follows:

Introduction and Overview of IWPA's Concerns

The Indian Wind Power Association (IWPA) appreciates CERC's efforts to improve grid stability and integrate renewable energy (RE) sources. We recognize the need for a robust Deviation Settlement Mechanism (DSM) to balance supply and demand. However, we have serious concerns regarding the **proposed mechanism of "X"** (i.e. shifting the deviation calculation from **Available Capacity (AvC)** to **Scheduled Generation**) and the tightened DSM framework outlined in Draft Order 9/SM/2025. We respectfully urge the Commission **not to proceed with the proposed "X" mechanism at this stage**. Instead, we recommend continuing with the principles of the **CERC DSM Regulations 2014** (with its tolerance bands for renewables) until fundamental forecasting infrastructure and data-transfer frameworks are significantly improved. Below, we summarize our key concerns and then provide **issue-wise comments in tabular form** for clarity.

It bears mention that Indian Wind Power Association ("**IWPA**") and its members have already challenged the deviation formula prescribed under Regulation 6(2) of the 2024 DSM Regulations before the Hon'ble Delhi High Court in Writ Petition (C) No. 5487 of 2025, wherein vide Order dated 29.04.2025, the Hon'ble Delhi High Court has directed that no coercive steps, pursuant to the impugned 2024 DSM Regulations, shall be taken against the members of IWPA, till the next date of hearing. The said interim relief is still in operation.

In view of the above interim relief and that the writ petitions challenging the constitutionality of the 2024 DSM Regulations, including Regulation 6(2), are pending before the Hon'ble Delhi High Court, this Hon'ble Commission ought not to have issued the draft proposal, without any leave from the Hon'ble Delhi High Court. Thus, the draft proposal shall be kept in abeyance till Hon'ble Delhi High passes its final order in the writ petition.

The following submissions / comments on the draft proposal have been made without prejudice to the above and IWPA's contentions in the writ petition.

Key Generic Issues and Observations:

IWPA comments on Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 under the provisions of CERC (DSM and related Matters) Regulations, 2024

- **Limitations of Wind/Solar Forecasting:** Despite advancements, wind and solar generation remain inherently variable and **forecasting accuracy is still inadequate** on a 15-minute block basis. Even the best forecasting service providers (QCA – Qualified Coordinating Agencies) struggle to keep errors within the current ±15% band for wind with old formula. Forecast models (e.g. WRF) operate on coarse spatial (~30 km) and temporal (6-hour) scales, with very sparse meteorological data in India, leading to significant **inaccuracies and uncertainty**. Being computer simulations, it is feasible to produce interpolated numbers with no claims to higher accuracy levels. These technical limits mean that tightening the deviation band (e.g. from 15% to 10% or 5%) is **premature and unrealistic**, as **even small wind speed errors can cause large power output deviations** beyond the proposed limits (due to the non-linear wind power curve).

- **Proposed "X" Mechanism & Revenue Impact:** The Draft Order proposes phasing in a new formula from April 2026, replacing the deviation reference from AvC to Scheduled Generation. IWPA is alarmed that this change (the "X" parameter being gradually reduced to 0%) would effectively eliminate the current accommodation of RE variability. **CERC's own simulation study** (Grid-India analysis) demonstrates the severe impact of this shift: Wind generators could see revenue losses ranging from ~2.8% up to **48.2%** under an "X=0" scenario. This huge loss reflects the **forecasting challenges and variability of wind power**, and notably, the study itself **highlights the need for plant aggregation and improved forecasting models** before such a change. Implementing the "X" mechanism now, without robust forecasting accuracy, would render many wind projects financially unviable.

- **Tightened DSM Bands and Steep Penalties:** The draft DSM 2024 framework significantly tightens deviation tolerance and raises penalties. For instance, solar/hybrid projects must keep deviations within **±10% (tightening to ±5% post-2026)**, and wind within **±15% (tightening to ±10%)**, with **penalties up to 200% of contract rate** for deviations beyond 25%. Moreover, deviation charges are now linked to volatile market prices (RTM, DAM, etc.), exposing generators to **high market risk for any deviation**. IWPA finds these provisions **unduly punitive**. The **financial burden on RE generators will increase drastically**. Such penalties for uncontrollable deviations **do not necessarily improve grid stability** but will severely erode project revenues, threaten debt servicing, and **deter future investment in renewables**.

- **Lack of QCA Accountability:** Under current arrangements, forecasting agencies/QCAs submit schedules on behalf of generators but **carry no financial responsibility for forecast errors**. The entire DSM penalty is borne by the generator, the entity with the least control over weather variations. After nearly a decade of experience, even well-established QCAs have not achieved consistent accuracy within ±15% bands. This underscores that **forecast errors are often beyond the control of generators and their service providers** given present technology. Imposing harsher penalties without any accountability on QCAs or system operators is inequitable. **We urge a re-examination of the role of QCAs, perhaps through performance-linked obligations or liability sharing, before tightening regulations on generators alone.**

IWPA comments on Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 under the provisions of CERC (DSM and related Matters) Regulations, 2024

- **Inadequate Data and Infrastructure:** The **basic infrastructure for weather forecasting and data exchange** in India needs strengthening. The accuracy of forecasts is constrained by **insufficient real-time weather data and telemetry**. The Indian Meteorological Department and other agencies are still improving local weather modelling; in fact, it is acknowledged that considerable work remains to enhance forecast precision. Many generators report that **data transfer between IMD, QCAs, REMCs, and LDCs is not yet seamless**. Without a robust data framework (dense weather sensor networks, radar coverage, timely data sharing, REMC tools, etc.), expecting near-perfect scheduling by generators is impractical. Even the National Load Despatch Centre (NLDC) struggles to achieve the DSM's required 15-min forecasting accuracy; if **NLDC's own forecasts "frequently miss the mark," it is unreasonable to expect individual RE generators to far outperform the system operator**. Thus, the **prerequisite infrastructure and tools are not in place** to meet the draft regulation's stringent demands.

- **Aggregation Benefits for Grid Stability:** Aggregation of multiple RE plants' forecasts can reduce net deviation and improve grid reliability. The **Indian Electricity Grid Code (IEGC) 2023** already permits aggregation at the pooling sub-station for inter-state projects. IWPA strongly supports **wider aggregation (pooling)**, even at regional levels. A larger geographically-dispersed portfolio yields smoother generation profiles, as underproduction in one area can be offset by overproduction elsewhere. International experience with better meteorological data and modelling confirms this. In other words, **forecast errors for a region are much smaller than for an individual site**. CERC's own analysis in the draft order shows that combining two wind stations under one pool (via a QCA) reduced the total DSM payable by about **20%** compared to treating them separately. This evidences that **aggregation directly benefits grid stability and reduces financial deviation burdens**. We urge the Commission to **facilitate and encourage aggregation** (pooling across larger areas or portfolios) rather than tighten bands as a trade-off. In fact, the Commission's study explicitly notes that the **impact of forecast errors on individual plants is less severe when a collective forecast drives scheduling**. Mere Leveraging aggregation is not a *solution* to better predictability. This aspect must be addressed before imposing stricter DSM limits.

- **Policy Alignment and Fairness:** Finally, we appeal to the Commission to align DSM policy with India's renewable energy growth objectives. The Hon'ble Supreme Court of India and the National Tariff Policy have emphasized that **renewable energy must be promoted in the larger public interest**, and regulatory frameworks should not place **undue burdens on RE generators**. The proposed DSM 2024 regime, in its current form, places an excessive onus on RE producers for factors beyond their control. Overly stringent penalties could **undermine the very sector the regulations aim to support**. We believe a balanced approach is needed: one that **incentivizes improved forecasting and grid discipline** without crippling the viability of RE projects. Notably, most countries have integrated renewables by **sharing balancing responsibilities** and investing in better forecasting tools, rather than by levying punitive charges. For example, in markets like Europe, system operators use advanced, granular forecasting systems (often developed in collaboration with meteorological services) to manage variability. Deviations are typically settled through normal balancing markets or modest fees, **not through bespoke penalties that double project risks**. We respectfully submit that India can achieve grid stability in a high-RE grid by

adopting international best practices, improved forecasting technology, ancillary services, and aggregation *instead of* intensifying penalties on generators.

A. There is no rationale behind determination of value of X and there has been no improvement in forecasting methodology

In the draft proposal, this Hon'ble Commission has observed that: -

(a) The deviation and revenue loss can be mitigated by plant aggregation and enhanced forecasting models.

(b) With improvement in the ability to predict generation levels, the margin for error between actual and scheduled generation will also be reduced further.

(c) Wind and solar are now considered mature technologies.

(d) Shifting from a deviation formula based on 'available capacity' to one based on 'scheduled generation' is necessary to encourage more accurate forecasting and scheduling by RE generators.

(e) With improvement in the ability to predict generation levels, the margin for error between actual and scheduled generation will also be reduced further.

Evidently, the basis for this Hon'ble Commission to introduce the stringent norms in deviation bands, especially for wind power developers, is based on the erroneous conclusion that there has been significant improvement in scheduling and forecasting techniques. The proposal in its current form fails to consider the intermittency of wind power generation.

It is submitted that in shifting from a deviation formula based on 'available capacity' to one based on 'scheduled generation' and the determination of value of X, this Hon'ble Commission has failed to consider the limitations in the existing meteorological infrastructure and accuracy of input data for weather forecasting and consequently the forecasting of wind power generation. In this regard, it is relevant to note that:

(a) Even the Central Electricity Authority ("CEA") and Ministry of New and Renewable Energy ("MNRE") in their comments to the Draft 2024 DSM Regulations have acknowledged that the accuracy of forecasting for wind power generation is still not adequate, and deviations are unavoidable to a large extent.

(b) The India Meteorological Department ("IMD"), Ministry of Earth Sciences in its Vision-2047 Report has itself admitted that there are considerable challenges in the existing forecasting models/techniques and that these models require considerable improvement to provide accurate and high-resolution forecasting predictions for wind and solar power generation. When the IMD, which is expert statutory entrusted to provide the forecasts, has itself admitted that the existing forecasting models and techniques are not adequate, it is irrational for this Hon'ble Commission to,

without any consultation with IMD, expect the wind generators to somehow use better forecasting techniques to avoid deviation from the schedule.

(c) The CEA vide its letter dated September 2024 also acknowledged that there are issues with current practices of forecasting and scheduling. The CEA further stated that one of the reasons for limited accuracies is the limitations of global forecasting due to insufficient meteorological data availability from the wind farming and solar farming areas and that accordingly, the CEA has set up a committee consisting of experts from Ministry of Earth Sciences, Ministry of Power and representatives from the industry to devise a methodology for more precise weather data collection so as to improve renewable energy forecasting.

(d) When institutions like Renewable Energy Management Centres ("REMCs") created by the Ministry of Power to enhance forecasting capabilities and the National Load Despatch Centres ("NLDCs") themselves are struggling to meet DSM-level forecasting accuracy, it is unreasonable to expect the wind energy generators to achieve higher accuracy and therefore, shifting from a deviation formula based on 'available capacity' to one based on 'scheduled generation' and the consequent, determination and gradual reduction of value of X over the years, is arbitrary and devoid of any rationale.

(e) Modelling of atmospheric motions to predict weather conditions over next hours, days and weeks is fraught with uncertainties and are not amenable to precise calculations. Even small variations in input values result in large differences. It is not possible to calculate the way weather changes in a small area, where the WTGs are situated, without considering the weather development over a geographical area. In other words, weather conditions cannot be modelled accurately. It is important to note that at present, the forecasting predictions are interpolated, therefore, there is tendency for errors to creep in. Interpolation of data from broader geographical regions to locations of the wind farms / WTGs is often impacted by errors and uncertainties.

Therefore, the rationale provided by this Hon'ble Commission in the draft proposal, that the revenue loss can be mitigated by better forecasting is irrational. In absence of any improvement in the input data infrastructure and utilization and no perceptible improvements in forecasting technologies, which is not in the generators' control.

B. Aggregation has not resulted in improvement

Even as per the findings of the study conducted by Grid-India during the period from 16.09.2024 to 29.06.2025 for Wind Projects regarding impact of the value of "X" without aggregation and with aggregation of RE Plants (figure 3), it can be seen that there is only a marginal difference between the deviation % in case of aggregation. Aggregation does not completely mitigate the impact of uncertain and variable nature of wind power generation.

Further, with the tighter deviation bands set to commence from 01.04.2026, even Grid India has observed that, "*on tightening of the DSM tolerance band for Wind from +/- 15% to +/- 10% the percentage of time the deviation remaining within the respective bands reportedly shrank to the range of 32% to 73% for Wind*

IWPA comments on Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 under the provisions of CERC (DSM and related Matters) Regulations, 2024

Generating Stations.". However, despite the drastic impact the tighter bands would have on deviations and penalty, this Hon'ble Commission has justified tightening of deviation bands and benefit of aggregation being made available to wind power developers on the erroneous basis that there would be an improvement in forecasting techniques which would be deployed at large scale.

C. Violative of Articles 14 and 19(1)(g) of the Constitution

The determination of value of X, which would admittedly, result in higher revenue loss to wind power generators, despite generation of wind power being uncertain and admitted limitations in forecasting of wind generation is arbitrary, irrational and violative of Articles 14 and 19(1)(g) of the Constitution.

The draft proposal fails to consider the fact that generation of power from wind projects is uncertain and variable and cannot be regulated, however, the conventional generators can easily regulate their fuel and control injection of power into the grid. Accordingly, the wind power generators cannot be equated with the conventional generators. Ease of grid management with conventional power generation alone cannot be the basis to insist that RE should follow dictates of regulators.

Further, given the inherent and well known drawbacks of forecasting science and technologies ~~nature of~~ associated with wind energy, the determination of value of X and its gradual reduction over the years, leading to higher deviation %, disproportionately disadvantages wind power generators when compared to conventional / fossil fuel-based generators, as the latter have greater control over generation and much higher degree of regulating fuel supply to regulate generation.

Accordingly, the shifting from a deviation formula based on 'available capacity' (which is currently applicable for wind power generators) to one based on 'scheduled generation' (which is applicable for conventional generators) and the consequent determination and gradual reduction in value of X, is arbitrary and irrational and violative of Article 14 of the Constitution.

It is submitted that the even as per the findings of the study conducted by Grid-India during the period from 16.09.2024 to 29.06.2025 for Wind Projects, the effect of DSM on the revenue of RE plants under different values of X, ranging from X = 100% to X = 0% for wind power plants was found to range from 2.8% to 48.2%. This extent of revenue loss would hinder financial health of the wind power projects and accordingly, is violative of Article 19 of the Constitution of India.

It is pertinent to mention that even the Hon'ble Supreme Court in *Shiv Shakti Sugars Ltd. v. Shree Renuka Sugar Ltd. & Ors*. (2017) 7 SCC 729 (Para 46-47), has observed that the interface between law and economics is relevant in today's time. It was held that there is a need to strike balance when economic interest competes with rights and consider the interdiscipline of law and economics on a sustainable basis. Evidently, this Hon'ble Commission ought to consider the economic consequences the proposed regulations would have on the entire renewable energy sector.

Since this Hon'ble Commission has already been apprised by Grid India and stakeholder submissions about the substantial impact on tariff and extent of revenue loss. Such losses would make the existing and planned Projects commercially unviable.

IWPA comments on Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 under the provisions of CERC (DSM and related Matters) Regulations, 2024

D. The determination of value of X in the draft proposal is contrary to the object of promotion of generation of power from renewable sources

One of the primary objectives of the Electricity Act is the promotion of generation of power from renewable sources. The Electricity Act, by its preamble, envisages not only *"taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers"* but also *"promotion of efficient and environmentally benign policies"*.

Further, the Hon'ble APTEL in *Tamil Nadu Spinning Mills Association vs. TNERC & Ors.* : 2021 SCC OnLine APTEL 5, has also recognized that promotion of and preferential treatment for the environment friendly renewable sources of power like wind energy is the declared State policy of India, it being directly connected with our national goals and commitments in relation to climate change. The Hon'ble APTEL further held that all organs and agencies of the State are duty-bound to sub-serve the cause espoused by the public policy rather than be in detriment thereof (Para 71, 72, 81).

However, the draft proposal undermines the stated objective of the Electricity Act i.e., promotion of renewable sources of energy and development of power.

E. Quantifying the extent of improvement in forecasting techniques is a prerequisite to adopt the same to reduce X factor.

Para 19 of the proposal states the following conclusion by the Hon'ble Commission:

> ***From the above, it is evident that the Hon'ble Commission is primarily relying on the anticipated "improvement in forecasting techniques" to reduce the "X" factor from 100 to 0 over the next five years. Logically, this implies that the improvements achieved in forecasting over the past eight years should correlate directly with a 20% reduction in the X factor during the forthcoming five-year period.***

However, the proposal does not quantify the extent of improvement in forecasting techniques. As stated, the Hon'ble Commission merely **"expects"** that such improvements would occur. Consequently, there is no scientific or empirical evidence presented to substantiate the claim of improvement. Until these improvements are quantified and their trajectory clearly established, the proposed 20% reduction in the X factor appears arbitrary and lacks substantive merit.

Moreover, the Grid-India simulation study referenced in the proposal covers only 41 weeks of data (September 2024 to June 2025), which is less than a full calendar year. This limited dataset may

not adequately capture the seasonal variability of wind patterns across different regions. To accurately assess the percentage improvement in forecasting techniques and to establish a credible trajectory for reducing the X factor, the Commission may need to analyse multiple years of data.

In view of the above concerns, IWPA **strongly recommends** that CERC **defers the implementation** of the proposed "X" mechanism and the tightened DSM provisions. We suggest **continuing with the first DSM framework (as per CERC 2014 DSM Regulations) until** the necessary forecasting accuracy, data infrastructure, and operational experience are demonstrably in place. In parallel, the focus should be on **building capacity** (better weather data, forecasting tools, REMC capabilities) and **implementing aggregation mechanisms** to naturally reduce deviations. This approach would maintain grid security **while safeguarding renewable generators** from undue financial distress, thereby supporting India's renewable growth trajectory.

We have provided below a point-by-point submission on specific proposals in the Draft Order 9/SM/2025 and the DSM Regulations 2024, covering technical limitations, policy implications, and international comparisons for each issue: -

S. No.	Proposed amendment	IWPA Suggestions/comments
1	*Reg 8 (4): tolerance band for Wind Generating Stations will reduce from +/- 15% to +/- 10% from 01.04.2026 onwards*	• Wind generators face higher challenges in forecasting accurately because atmospheric motions forecasting models lack high quality meteorological data with sufficient granularity both temporally and spatially. • The Grid-India simulation in the proposed notification (pg 5) shows that when the tolerance band is reduced, the percentage of time wind projects remain within the band drops from 73%–93% to only 32%–73% • Without addressing the scientific issues with global meteorological data shortage and the fact that we are dealing with chaos, tightening the band ignores this physical reality and will impose **disproportionate financial penalties on wind projects.** • **Recommendation:** Continue using Available Capacity as the reference for deviation percentage at least until substantial improvements in forecast precision are achieved. Any future move to a schedule-based metric should be considered only after extensive pilot studies and stakeholder consultations demonstrating minimal

IWPA comments on Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 under the provisions of CERC (DSM and related Matters) Regulations, 2024

		impact. Until then, the value of X should remain at 100% (status quo) to avoid unjustified revenue erosion for RE plants.
2	Reg 6 – clause(2)(a) From 01.04.2026, deviation will be computed using a hybrid formula based on (X% of Available Capacity) + (100–X)% of Scheduled Generation "X" will start at 100% and be reduced to 0% by 01.04.2031, after which the formula will depend entirely on scheduled generation	This transition to Scheduled Generation Based Deviation is highly detrimental to wind based projects. as X reduces, the denominator shifts away from *Available Capacity* to *Scheduled Generation*. • **Impact:** Even small absolute errors will translate into larger percentage deviations when scheduled generation is low (e.g., during low-wind periods). • **Financial Consequences:** Grid-India's analysis shows **wind plants may face revenue losses as high as 48.2% when X = 0%**, compared to only 2.8%–9.4% when X = 100% The proposed trajectory of X (100 → 80 → 60 → 40 → 20 → 0) will therefore **progressively tighten penalties each year**, severely impacting project IRRs and potentially rendering many projects financially unviable • **Recommendation:** Continue using Available Capacity as the reference for deviation percentage at least until substantial improvements in forecast precision are achieved. Any future move to a schedule-based metric should be considered only after extensive pilot studies and stakeholder consultations demonstrating minimal impact. Until then, the value of X should remain at 100% (status quo) to avoid unjustified revenue erosion for RE plants.
3	X will be reduced from **100% (2026-27)** to **0% (2031 onwards)** in five annual steps of 20% each	• **Grid India study** referred in the proposed draft only shows that while solar projects show losses of only 3.5%–11.1%, wind projects face losses up to 48.2% at X=0. This technology-neutral approach is inappropriate when forecasting accuracy and resource predictability differ so fundamentally between wind and solar. • Also, as evident from Grid India graph, the number of time blocks with zero penalty falls drastically as the X value starts going down as planned, the number of time blocks attracting penalties increases sharply. The steep loss progression for wind projects is evident in Grid India's study: X=80% → loss up to 14.8%

IWPA comments on Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 under the provisions of CERC (DSM and related Matters) Regulations, 2024

		X=50% → loss up to 25.7% X=0% → loss up to 48.2% • **Recommendation:** Continue using Available Capacity as the reference for deviation percentage at least until substantial improvements in forecast precision are achieved. Any future move to a schedule-based metric should be considered only after extensive pilot studies and stakeholder consultations demonstrating minimal impact. Until then, the value of X should remain at 100% (status quo) to avoid unjustified revenue erosion for RE plants.
4	**High Variability in Losses and Disproportionate Impact on Wind as per Grid India Study mentioned in the proposed notification**	• While solar plants show losses in the range of 3.5%–11.1%, wind projects face losses up to 48.2% at X=0 • This reflects the disproportionate impact on wind generators, given their inherently less predictable resource. These losses can significantly affect project IRRs and debt servicing ability. • Lenders will perceive wind projects as high risk, potentially leading to higher financing costs and lower valuations for future investments. • **IWPA Recommendation:** The proposed DSM framework, if implemented in present form, poses a serious risk to India's renewable energy expansion and energy transition commitments. By increasing financial uncertainty and downside risk for RE projects, it will raise the cost of capital and reduce investor confidence. Developers will factor in higher deviation risks into bids, leading to higher tariffs in auctions, ultimately passed on to consumers, or worse, some developers may shy away from new projects. This is contrary to the spirit of various government initiatives to promote RE.
5	The Draft Order notes that aggregation through Qualified Coordinating Agencies (QCA) can significantly reduce DSM impact	• The Draft Order highlights the benefit of aggregation through Qualified Coordinating Agencies (QCA). • In practice, aggregation is state-specific (currently allowed only in Karnataka and Andhra Pradesh) and cannot be mandated or achieved in all states without significant regulatory and operational changes. • Even at the state level aggregation (9000 GW) studies

		have shown that the number of time blocks not attracting penal charges will be just 34 %. Even during the high wind season it barely touches 54%. Aggregation at pooling substations will still be worse off for the generators. This coupled with non-payment for over injection will just close door on future investment. • Even where feasible, aggregation entails additional administrative costs, data-sharing challenges, and QCA fees, which is quite high & forms a significant part of cost **Accountability of Forecast Service Providers (QCAs) (Draft does not specify any liability on QCAs for forecast errors; generators bear all DSM charges).** • It should be acknowledged that the concept if introducing QCAs is a creation of regulatory framework and the scientific rules under which they are expected to work shall also be defined by the regulators. As a matter of fact they have to take responsibility of the accuracy of their forecasts cannot be thrust upon the generators. The onus of improvement in the forecasting rests entirely with QCAs and Hon'ble commission must obtain a binding commitment from the QCAs. This obligation **cannot be assumed or left to contractual discretion** but must form an integral part of the regulatory architecture governing the DSM framework. • Further, the current regulatory setup places 100% of deviation penalties on generators, even though forecasts are prepared by third-party agencies (QCAs). QCAs and other forecasting service providers enjoy a no-liability arrangement, meaning they face no direct consequences for poor forecast performance. This lack of accountability can lead to misaligned incentives, the party responsible for forecast accuracy (QCA) is not financially impacted by inaccuracy, while the generator who has no control over weather suffers the entire hit. • **Impact:** Generators currently have very limited recourse if a QCA consistently underperforms. While in theory a generator may switch to another QCA, in practice this is highly impractical because such a change requires the consent of all generators connected to the same pooling or grid substation. This collective consent mechanism makes replacement of a QCA extremely difficult, if not unachievable, for an individual generator. • Moreover, contractual penalties on QCAs are virtually

		non-existent, whereas the entire DSM exposure is imposed on the generator. This asymmetry results in no accountability on the part of QCAs and provides them with no real incentive to invest in improved models, tools, or forecasting techniques, beyond concerns of maintaining reputation. • The outcome is a fundamentally flawed framework where the entity responsible for forecasting accuracy bears no financial liability, while the generator, who has no control over weather variability, bears the full regulatory and financial burden. • **Suggestion:** It must be recognised that the concept of Qualified Coordinating Agencies (QCAs) is a **regulatory creation of CERC**, and therefore, their functioning and accountability must form part of the **regulatory framework itself**, not merely private contractual arrangements. As the Commission's own institutional mechanism, the QCA, being its conceptual and functional "brainchild", must be held to explicit standards of performance and accuracy. • Accordingly, **CERC should introduce formal, enforceable measures to ensure their accountability**. This could include requiring QCAs to **post a performance bond or regulatory guarantee**, from which penalties can be drawn if their forecast errors **persistently exceed prescribed accuracy thresholds**. Similarly, CERC may establish a **reference benchmark error** (for instance, based on persistence models or NLDC's own forecast accuracy). In cases where a QCA's performance is consistently inferior to this benchmark, they should be asked for corrective measures and penalties independent of their contract with the generators. • Such mechanisms would ensure that better QCAs, being the primary entities responsible for forecasting, are **promoted for their improved scientific methods and modelling accuracy**, rather than transferring the entire DSM burden to generators. This will also align the regulatory intent with operational reality and reinforce the principle that **accountability must rest with the entity empowered and recognised by regulation to perform the forecasting function**. • • **IWPA Recommendation:** IWPA requests CERC to

		include provisions in the DSM framework (or related procedures) that formalize the role of QCAs with defined standards. Accreditation or audit of QCA performance by regulatory authorities could be considered. The goal should be to ensure that forecasting agencies are equally striving to minimize deviations, creating a fair balance rather than a one-sided penalty regime. Until this is in place, tightening DSM norms further is unwarranted.
6	**From 01.04.2026, no payment will be made for over-injection during periods when the system frequency is ≥50.05 Hz**	• **Financial closure of wind projects is based a fundamental assumption that they must always maximize the power generation to the extent feasible. The basic premise of needing forecasts is the grid security. Commercial considerations cannot be imposed in this manner.** • **Denying compensation in such circumstances amounts to a direct loss of legitimate revenue, especially during high-resource periods that traditionally offset low-wind seasons**
7.	Limitations of Forecasting and Ground Realities	• Forecasting accuracy improvements cannot be assumed to progress in line with the proposed schedule. • There should be a binding commitment from the QCAs and other service providers that they will reach the accuracy levels expected in the time frame. It should be obtained in the form of an affidavit as part of the documentation for registering as a QCA. • The generators are not meteorologists or global weather modellers or forecasting experts. But they are the only ones who get penalised for lack of infrastructure, accountability of modellers. • It is a well-known fact that meteorological data collection in our country was never designed for use with weather modelling with outputs that will be as accurate as the regulations are expecting. Improvements in meteorological data collection, assimilation etc. fall entirely in the ambit of the Ministry of Earth sciences, and the wind generators cannot be expected to take on that role. • Notwithstanding that the generators are discussing voluntarily with CEA and NCMRWF very seriously about setting up some automatic weather stations. For some reason the program is not going forward because too many distractions are being introduced in a properly scientific exercise.

		• As noted in IMD's Vision 2047 document, India's meteorological infrastructure is still evolving, and high-precision weather modelling may take decades to mature. • Wind generators cannot reasonably be expected to achieve forecasting accuracy that exceeds even national meteorological capabilities within a few years. • Current forecasts prepared by generators are often used only for computing penalties, not for active grid management, defeating the purpose of the DSM framework. • Changes which are inevitable with renewable energy sources are consequences that cannot be captured with the expected levels of accuracy demanded. Spain (Saur Energy https://www.saurenergy.com/solar-energy-news/after-iberian-blackout-india-stresses-timely-transmission-rollout-for-re-evacuation-10472914) , with its world renown forecasting capabilities did have a regional black out. Penal systems are not a solution for such occurrences.
8.	Need for Evidence-Based Regulatory Justification	<u>The following critical issues must be addressed before implementing such stringent changes:</u> a) **Detailed Balancing Cost Analysis**: CERC must call for a transparent and impartial study of actual balancing costs to determine the true grid costs attributable to renewable deviations versus other grid events. DSM penalties cannot be based on subjective or incomplete data. **b) Utilisation of Forecasts:** The study must analyse how SLDCs are actively using generator provided forecasts for real-time balancing, not merely for computing penalties. **c) Role of REMCs:** The responsibilities of REMCs in both engineering and commercial terms need clear definition. Although REMCs are expected to prepare their own forecasts, no data or methodology is available in the public domain. Ideally, they should be tasked to carry out the whole exercise. They are in a much better position as they can work at aggregated levels. **d) Ancillary Services Evidence:**

CERC should provide evidence of actual use of spinning reserves or ancillary services specifically caused by wind generators, along with associated costs.

e) Comprehensive Financial Data:

Financial justification must be based on a large dataset (at least 5–6 GW of capacity over multiple years) rather than isolated pool-account bills.

f) SLDC Responsibilities:

Despite strict DSM penalties, there is no evidence of innovative steps by SLDCs to minimize backing-down orders or improve demand-side forecasting to strengthen grid security.

g) Accuracy Assurance:

CERC must provide a time-bound assurance, supported by evidence, that the accuracy levels required by the proposed schedule are realistically achievable.

h) Protection Against Commercial Backing Down:

There should be a clear and enforceable provision ensuring that once forecasts are provided, generators are not asked to back down for commercial reasons disguised as grid security concerns.

i) DSM charges levied should be computed as a %age of project Revenue

The draft to present the DSM charges as a percentage of the expected income from the project OR a study to be undertaken or WEGs be allowed to show how much DSM demand they have got in last 2-3 years for the project's vis-a vis Revenue from the project

<u>The following table extends the calculations to get an estimate of DSM as a percentage of the income:</u>

Number of operating days	16/04/2024	29/06/2025	439	Days
Assume a plf of	36%			
				DSM as a%
	MW	Rate/kWH	Income	of income
WF1	61.43	2.83	659,394,338	
WF2	116.1	2.76	1,215,400,931	
Total Income			1,874,795,268	
In crores			187.48	
If we assume the usual losses grid & Machine		15%	159.36	
availability, O & M costs, overheads etc. @				
DSM @ X=100			35.23	22%
DSM @ X=0			45.98	29%

		We have calculated the possible generation assuming a plant load of 36% which is a reasonable estimate of present-day wind turbines. These DSM charges form a high percentage of the income. At this rate there will be no point doing any wind projects anymore. Wind projects are planned with an IRR in the range of 10 to 15 % and high wind sites may reach 18 %. This implies that the Load Dispatch Centers will be sleeping partners (for income only) in the business!
9.	Empirical and Statistical Limitations of CERC's Analysis	While CERC's proposals are data-driven, it is important to scrutinize **limitations in the analysis** and underlying assumptions: • **Limited Sample Duration & Scope:** The Grid-India simulation study examined 41 weeks of data (Sept 2024 – June 2025). This is less than one full year and may not capture the full seasonal variability of wind across all regions. Wind generation in India is highly seasonal (e.g. strong monsoon winds in June–Aug in many states vs. low wind in winter months). A 41-week window might slightly under-represent the peak monsoon deviations or other rare events. Additionally, the study focused on **inter-state projects**; many wind farms in states like Tamil Nadu or Maharashtra are connected to state grids (intra-state) and may not have been included. Thus, the results might not fully generalize to all "wind states" or to legacy wind farms with older technology and less sophisticated forecasting. • **Selection Bias – "Poor to Best" Forecasting:** The study intentionally included some projects with "poor" forecasting and some with "best" to gauge a range. While this yields a broad performance spectrum (e.g. one wind site had 93% of intervals within ±15%, another only ~73%), it does not tell us the **average** state of forecasting. If the poorer-performing sites are outliers (perhaps due to very complex local terrain or subpar forecasting service), using them in setting nationwide policy might skew expectations. Conversely, the best performers might be using superior technology or benefiting from benign geography; not every project can immediately emulate those. A statistical analysis across a larger sample of wind farms would be needed to robustly estimate typical forecast error distributions in each state. The Commission's study, while insightful, may be too

		small-sample to capture that distribution fully. • **Forecast Error Distribution and Tail Risks:** Wind forecast errors do not follow a simple normal distribution, they often have fat tails (rare but large errors, especially during abrupt weather changes). The CERC analysis mainly reported the **fraction of time within certain error bands**, which is useful for understanding typical performance. However, it's not clear if they examined the magnitude of out-of-band errors or frequency of extreme deviations. For grid reliability, a few extreme forecast misses (e.g. an sudden storm causing a large drop or spike in generation) can cause disproportionate imbalance. A statistical limitation is that a 41-week period might or might not have witnessed such extremes. If not, the financial risk could be underestimated; if yes, the single event could exaggerate the revenue loss figures. **Empirically**, multiple-year data would give a better handle on tail risks (e.g. worst-case error one might see in 5 years). Without that, there is uncertainty in extrapolating the simulation results. • **No Behavioural Adaptation in Simulation:** Importantly, **CERC acknowledged a key limitation**: the simulation *"was based on existing data without factoring in the likely change in behavior and improvement in forecasting consequent on a change in the rules"*. In other words, the study assumed that wind farms would forecast the same way under a ±10% band as they did under a ±15% band. In reality, if penalties become harsher, generators and forecast providers might invest in better forecasting techniques, add more real-time measurements, or adjust their scheduling strategy (for instance, slightly under-scheduling if over-generation is less penalized than under-generation, or vice versa). Such adaptive responses could improve the within-band percentages compared to the static simulation. The **empirical challenge** is predicting how much improvement is achievable. The simulation likely represents a "status quo baseline," and actual outcomes by 2026 could be less severe if substantial improvements are made, or not much better, if improvements prove hard to come by which has been the case historically in India. This uncertainty is a limitation in using the study's exact numbers to set policy. • **Denominator Effect – Available vs Scheduled Capacity:** The transition from using Available Capacity (AvC) to Scheduled Generation in the error formula can

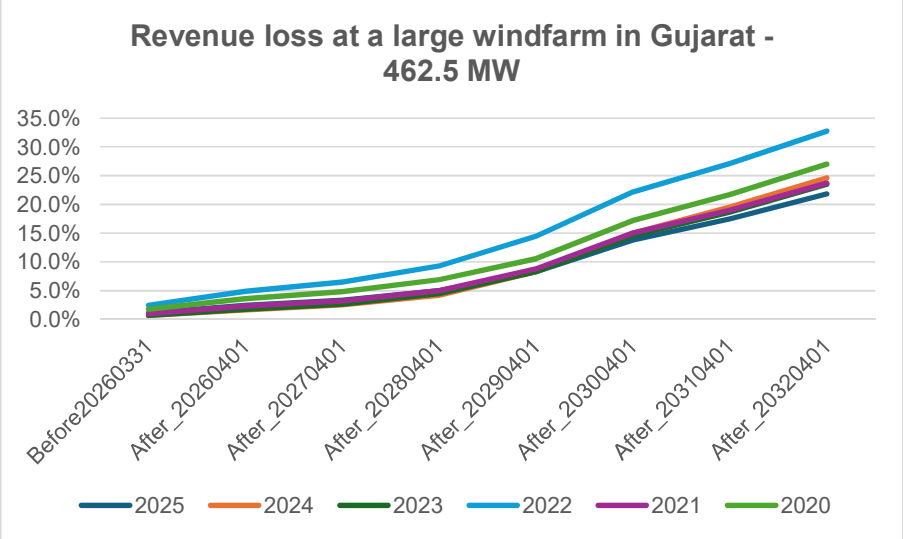
		significantly change the statistical nature of errors. Using AvC (essentially the forecasted or expected capability) in the denominator tends to **normalize the error by something close to the forecast magnitude**, whereas using the schedule in the denominator will inflate the percentage error whenever the schedule is low. For example, if a wind farm schedules only 10 MW (perhaps expecting low wind) but actual winds pick up to 20 MW, under the new formula the deviation % could be very high because the schedule (10) is in the denominator, an over-injection of 10 MW on a 10 MW schedule is +100% deviation. Under the old formula, if the available capacity was 20 MW, the same 10 MW difference is 50% of AvC. This shift could disproportionately penalize cases where wind ramps up unexpectedly from low levels (or vice versa). The CERC phased approach with factor X is meant to gradually ease into this, but a **statistical nuance** is that historical error distributions under the AvC method won't translate one-to-one under the schedule-based method. The proposal does not elaborate on this, but it means generators will need to strategize their scheduling to avoid very low or high schedules that could lead to outlier percentage errors. The **limitation** here is that the historical data analysis might not capture those future strategic scheduling adjustments or their reliability. • **Data Transparency and Quality:** CERC's analysis relied on REMCs for data. A practical issue in India has been data quality and transparency. Not all states publicly share forecast vs actual data in detail, and wind farm SCADA measurements can have errors or communication delays. If the underlying data has noise, the analysis of forecast errors could be affected. The **proposal** does not mention confidence intervals or statistical significance of results; it's presented deterministically. For a rigorous policy, one might expect measures of uncertainty (e.g. error bars on that 32–73% range), but such analysis wasn't detailed, perhaps due to limited data points. **In summary, while CERC made a commendable effort to base rules on empirical data, stakeholders should recognize these statistical limitations and treat the numbers as indicative rather than absolute.**
10.	Need for a Prudent Transitional Approach	CERC should restore the 2014 DSM framework until the forecasting program proposed by NCMRWF/IMD is implemented, tested, and validated.

		The Central Electricity Authority (CEA) should be directed to allow the core committee program to continue without introducing additional requirements that could delay progress. The proposed amendment—particularly the progressive reduction of the value of "X" to zero and the associated tightening of the tolerance band—will have disproportionate and potentially crippling effects on the wind energy sector. Given the strategic importance of wind energy in achieving India's 500 GW renewable energy target by 2030, we respectfully request the Hon'ble Commission to reconsider the proposed trajectory, adopt a technology-sensitive approach, and ensure that DSM regulations remain fair, evidence-based, and investment-friendly.

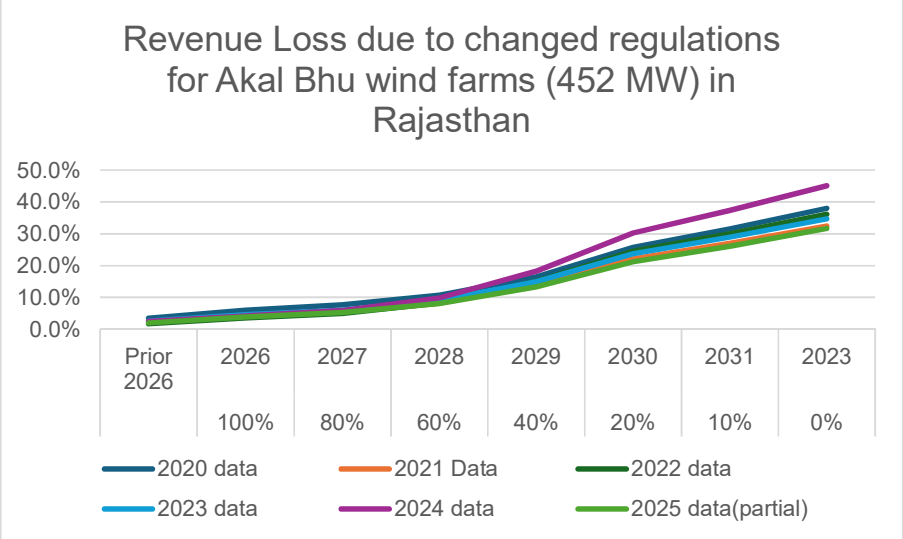
Conclusion: In light of the above points, IWPA respectfully submits that **CERC should refrain from continuing with the proposed "X" mechanism and the 2024 DSM draft provisions in their current form**. The **CERC 2014 DSM framework** has so far provided a workable balance by acknowledging forecast errors and providing full visibility of generating assets. . Until the **basic infrastructure and data frameworks are improved** (better forecasts, REMCs, QCA accountability, etc.), a reversion to or continuation of the earlier DSM approach is prudent. We also emphasize that **enabling measures like aggregation and advanced forecasting tools** must be prioritized as the first line of action to handle RE variability, rather than imposing stricter punitive measures.

We thank the Hon'ble Commission for considering our submissions. IWPA and its member wind power developers remain committed to improving forecasting capabilities and ensuring grid stability, and we seek a regulatory environment that supports these goals in a fair and sustainable manner.

IWPA comments on Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 under the provisions of CERC (DSM and related Matters) Regulations, 2024



Revenue loss calculated based on different year data



Just to illustrate further the impact of the regulatory change the following table is presented for a 300 MW wind farm for the financial years 2023-24 & 2024025. The figures are in energy terms. There are two very serious impacts that the generators – one is the extraordinary levels of penalties. Furthermore the conditions under which over injection quantum of energy will not get any revenue. Together the projects will become net NPAs.

IWPA comments on Determination of value of "X" for computation of the deviation (in %) for Wind and Solar (WS) Sellers from 01.04.2026 under the provisions of CERC (DSM and related Matters) Regulations, 2024

Gujarat state - Deviation statement for a 300 MW wind farm (fy 2023-24 & Fy 2024-25

	As per the existing formula based on Available capacity as denominator					Same data calculated based on schedule generation as denominator				
	Deviation					Deviation				
Month	within 10%	10 to 15%	15 to 20%	above 20%	Total	within 10%	10 to 15%	15 to 20%	above 20%	Total
Apr	92%	6%	1%	1%	100%	28%	11%	10%	51%	100%
May	91%	7%	2%	1%	100%	43%	12%	9%	36%	100%
Jun	84%	9%	3%	4%	100%	34%	11%	9%	46%	100%
Jul	88%	7%	2%	2%	100%	40%	13%	9%	39%	100%
Aug	94%	5%	1%	0%	100%	69%	14%	7%	10%	100%
Sep	90%	7%	2%	1%	100%	31%	11%	9%	49%	100%
Oct	94%	6%	0%	0%	100%	19%	8%	8%	65%	100%
Nov	88%	9%	2%	1%	100%	24%	10%	8%	59%	100%
Dec	88%	9%	2%	1%	100%	30%	11%	9%	50%	100%
Jan	88%	9%	2%	1%	100%	23%	9%	8%	60%	100%
Feb	89%	8%	2%	0%	100%	26%	10%	8%	55%	100%
Mar	90%	8%	2%	1%	100%	27%	11%	10%	52%	100%
Total-FY24	**89%**	**8%**	**2%**	**1%**	**100%**	**32%**	**11%**	**9%**	**49%**	**100%**
Apr	93%	6%	1%	1%	100%	28%	12%	10%	51%	100%
May	93%	6%	1%	1%	100%	39%	13%	10%	38%	100%
Jun	88%	8%	2%	2%	100%	38%	12%	9%	40%	100%
Jul	88%	9%	2%	1%	100%	33%	10%	8%	49%	100%
Aug	35%	13%	11%	40%	100%	36%	12%	9%	43%	100%
Sep	96%	4%	0%	0%	100%	19%	9%	8%	64%	100%
Oct	93%	6%	0%	0%	100%	15%	7%	7%	71%	100%
Nov	92%	8%	0%	0%	100%	14%	6%	6%	74%	100%
Dec	88%	9%	2%	1%	100%	33%	12%	9%	46%	100%
Jan	89%	9%	2%	1%	100%	29%	11%	9%	51%	100%
Feb	89%	8%	2%	1%	100%	19%	8%	8%	65%	100%
Mar	88%	8%	2%	2%	100%	24%	10%	9%	57%	100%
Total-FY25	**86%**	**8%**	**2%**	**4%**	**100%**	**27%**	**10%**	**8%**	**55%**	**100%**

% denote the energy generated falling within each block. It can be observed for FY25, that 86% of the energy was within 10% deviation while using the Available capacity as denominator and the same has substantially reduced to 27% when using the scheduled generation as the denominator. Only 4% of the energy was outside the deviation of 10% with Available capacity as denominator which substantially increases to 73% when the scheduled generation is considered as denominator. Following figures depict the grave risk the generators would be exposed to.

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