17 October 2025

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

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,

We wish to introduce the Wind Independent Power Producers Association ("WIPPA"), a national level registered body having the association of 51 Independent Power Producers ("IPPs") of capacity around 30,000 MW with an asset base of more than Rs. 2,00,000 Crores and a healthy pipeline in the wind energy sector in India through policy advocacy and presenting independent views/ suggestions/analysis to various stakeholders at various forums to provide a fillip to the sector.

We write to share a few suggestions from the Wind Independent Power Producers Association (WIPPA) for the consideration of the Honourable Commission with respect to the 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. Our comments/suggestions are attached as **Annexure-1**.

Yours Sincerely
For **Wind Independent Power Producers Association**



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Enclosed: Annexure-1

Annexure-1

Submissions/Suggestions on behalf of Wind Independent Power Producers Association (WIPPA) on the Draft proposal dated 10.09.2025 regarding "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" in Petition No. 9/ SM/2025 (Suo-Motu).

1. Regulation 6(2) of the CERC (Deviation Settlement Mechanism and Related Matters) Regulations, 2024 ("**2024 DSM Regulations**") provides that for WS Sellers (solar, wind or hybrid, with or without storage), the deviation in a time block, from 01.04.2026, will be computed as under: -

Deviation-WS seller (DWS) (in MWh) = [Actual Injection – Scheduled generation]

Deviation-WS seller (DWS) (in %) =

$$100\ \text{X}\frac{[\text{Actual Injection} - \text{Scheduled Generation}]}{\text{X\% of Available Capacity} + (100 - \text{X})\% \text{ of Scheduled Generation}}$$

Value of 'X' shall be stipulated by this Hon'ble Commission through separate order after public consultation.

2. Accordingly, by way of the draft proposal dated 10.09.2025, this Hon'ble Commission has proposed the value of 'X' in the deviation formula provided under Regulation 6(2) of the 2024 DSM Regulations, to be considered for the Existing Projects as per the following trajectory: -

With effect from	Value of X
01.04.2026 to 30.03.2027	100%
01.04.2027 to 30.03.2028	80%
01.04.2028 to 30.03.2029	60%
01.04.2029 to 30.03.2030	40%
01.04.2030 to 30.03.2031	20%
01.04.2031 onwards	0%

3. It bears mention that the Wind Independent Power Producers Association ("**WIPPA**") has *inter-alia* 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. 5481 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 WIPPA, till the next date of hearing. The said interim relief is still in operation. It is trite that imposition of such stringent penalties for deviation as proposed to be introduced by this Hon'ble Commission, which would be applicable for commissioned projects and projects where bids have been submitted, would tantamount to initiating of coercive action against the members of WIPPA.

4. 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 the Hon'ble Delhi High passes its final order in the writ petition.

5. No basis and rationale has been provided as to the methodology basis which the value of 'X' under Regulation 6(2)(b) of the DSM Regulations 2024 is being determined. This Hon'ble Commission has pre-judged the issue on how 'X' is being calculated. Rather, an attempt has been made to justify the values of 'X', after having arbitrarily reached such figures. Instead, the Hon'ble Commission ought to have elucidated on the methodology it used for arriving at the value of 'X'.

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

A. This Hon'ble Commission has admitted to the adverse impact on revenue of wind Projects

7. Even as per this Hon'ble Commission's own assessment, there is going to be a significant impact of the proposed regime on the revenue stream of members of WIPPA. It is admitted by this Hon'ble Commission that, "*However, the highest impact was seen in wind power plants, where the percentage loss is from 2.8% to 48.2%, reflecting their higher variability and forecasting challenges.*"

8. Evidently, despite being aware that the proposed methodology would have a significant adverse impact on the revenue of the private wind power developers, has proposed to go ahead with determining the value of 'X' for the purposes of Regulation 6(2)(b) of the DSM Regulations 2024. It is most humbly prayed that this Hon'ble Commission ought to undertake its regulatory functions, under Section 79, with a view that principles of the Electricity Act, 2003 are not violated in letter and spirit. However, despite being cognizant of the adverse revenue impact on commissioned projects and projects where bids have been submitted, going ahead with the proposed values of 'X' will be in contravention of the following objectives of the Electricity Act:

(a) Promotion of generation of electricity from renewable and environmentally benign sources of energy

(b) Promotion of private sector participation in the electricity sector

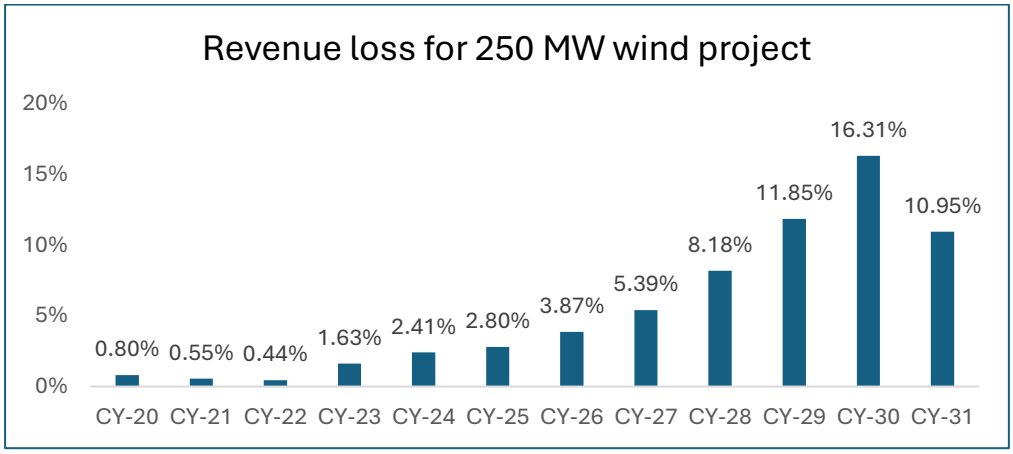
(c) Generation of electricity to be done on commercial principles with a view to encourage efficiency, good performance and optimal return on investments.

(d) Ensuring recovery of costs of generation of electricity in a cost effective manner.

9. The financial burden of such stringent deviation penalties on wind power developers with existing commissioned projects will increase progressively and drastically year on year as the value of

'X' goes on decreasing. Such penalties for uncontrollable deviations may not even end up ensuring grid stability but will severely erode project revenues, threaten debt servicing, and deter future investment in renewables.

Data for revenue loss for 250 MW wind developer over a period of time is as under:



10. It is submitted that the even as per the findings of the Grid India study, wherein the impact of DSM on the revenue of RE plants under different values of X, ranging from X = 100% to X = 0% was ascertained, **it was found that at the value of X = 100, even after considering the benefit of aggregation, the RE projects considered for the study recorded revenue loss of around 3.35%. In contrast, the RE projects had recorded approximate revenue loss of 1.49% based on 2024 Regulations – the increase being around 125%. Further, the revenue impact for a wind project which was commissioned in 2018-19 based on then prevalent regulations was 0.5%. This is a sharp rise of around 700%.** No wind power project can absorb such huge loss of revenue. Thus, the change in the deviation % formula and the consequent determination of value of 'X' will render these wind power projects unviable and accordingly, is violative of Article 19 of the Constitution of India.

11. 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, as under:

> "*46. Even in those cases where economic interest competes with the rights of other persons, need is to strike a balance between the two competing interests and have a balanced approach. That is the aspect which has been duly taken care of in the instant case, as would be discernible from the concluding paragraph of this judgment.*
>
> *47. Although Law and Economics trace back to the period of Jeremy Bentham [Utilitarian Theory, which is essentially economic theory.] i.e. the 18th century, in the last few decades, interplay between Law and Economics has gained momentum throughout the world. Indian judiciary has resorted to economic analysis of law on ad hoc basis. Time has come to consider the interdiscipline between Law and Economics as a profound movement on sustainable basis.*

These are the additional relevant considerations which have weighed in our mind in adopting a particular course of action in the instant case."

Evidently, this Hon'ble Commission ought to consider the economic consequences the proposed regulations would have on the entire renewable energy sector.

12. The existing Projects will not be able to bear the impact of such huge reduction in revenue as same had not been envisaged at the time of conceptualisation and planning of the already commissioned / projects where bids have been submitted. Therefore, **the applicability of changed deviation % formula with X should not be made applicable on the already commissioned / projects where bids have already been submitted.**

13. In addition, it may be noted that determination of value of X, which would admittedly, result in exorbitant 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.

14. 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.

B. There is no rationale behind determination of value of X

15. 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.

16. Evidently, the basis for this Hon'ble Commission to introduce stringent norms, including the change in the deviation% formula, especially for wind power developers, is based on the erroneous conclusion that there has been significant improvement in the scheduling and forecasting techniques and that aggregation would lead to reduction in deviations (Para 21 and 17). No analysis or basis has

been provided to support such assumption. The proposal in its current form fails to consider the intermittency of wind power generation and that aggregation does not change the intermittent nature of wind power generation.

B1. There has been no improvement in forecasting methodology

17. 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 uncertain and variable nature of power generation from wind power plants and the limitations in the existing meteorological infrastructure and accuracy of input data for 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 respective 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. A copy of CEA's letter of September 2024 is attached.

(d) The CEA, vide its letter dated 07.07.2025, issued Guidelines for Automatic Weather Stations (AWS) for Solar and Wind Power Plants July-2025 and *inter-alia* admitted that there are issues of not getting accurate weather forecast and that many times, the forecasting errors result in significant financial penalties under the DSM framework.

(e) 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 and the institutions like CEA, IMD and MNRE have admitted the inaccuracy of forecasting of wind power generation, it is unreasonable to expect the wind energy generators to achieve higher accuracy of forecasting like conventional generators. Therefore, the shift from a deviation formula based on 'available capacity' to one based on 'scheduled generation' (like conventional generators) and the consequent determination and gradual reduction of value of X over the years as proposed in the draft proposal, especially for already commissioned projects and projects where bids have been submitted, is arbitrary and devoid of any rationale.

(f) 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.

18. Further, an analysis of time block wise deviations of a wind power plant in CY24 and CY25 carried out by one of the members of WIPPA shows that high volatility and erratic behaviour, especially in wind generation. The analysis shows that: -

(a) In addition to deviations due to poor forecasting practices, deviations are also attributable to the inherent intermittency of renewable sources, especially wind.

(b) The wind plant's output is fluctuating more frequently and more sharply in CY25, which indicates that the generation profile has become more volatile in CY25. 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, which is not predictable.

19. 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 forecasting technologies, which is not in the generators' control, this Hon'ble Commission ought not to have tinkered with the deviation% formula to be brought in force the changed formula with effect from 01.04.2026.

20. This Hon'ble Commission has reached the conclusion that there has been improvement in forecasting basis Grid-India's simulation study based on examination of data for 41 weeks (Sept 2024 – June 2025). It is submitted that such a sample size of approximately 9 months does not account for the full seasonal variability of wind. Wind generation in India is highly seasonal and thus, a 41 week window may not be an accurate sample study.

B2. Aggregation has not resulted in improvement

21. Despite introduction of the concept of aggregation, there has not been much improvement in scheduling and adherence to deviation norms since: -

(a) **Forecasting & Uncertainty Remains High:**

Renewable energy sources (especially solar, wind) are inherently variable. Even with aggregation, weather variability (cloud cover, wind speed fluctuations, etc.) can change rapidly in ways that are hard to predict. Forecast errors for individual plants are still significant, and aggregation helps only to the extent that errors are uncorrelated. ***If many plants are in the same geography or under similar weather, their forecast errors may be correlated, so aggregation doesn't reduce deviation much.***

(b) **Aggregation Institutional / Regulatory Barriers:**

Setting up aggregation at pooling stations through QCA involves coordination, schedule aggregation, schedules submission, real-time dispatch or revisions in schedules, coordination between RE plant & QCA etc. In many cases, these institutional or contractual frameworks are still evolving and are not fully mature.

(c) **Misaligned Incentives ("Gaming" or Under-Scheduling):**

As deviation penalties or charges are asymmetric (e.g. under-injection vs over-injection, or having zero payment beyond certain over-injection thresholds), some generators may "game the system." The generators may engage in over-scheduling (forecasting higher than expected) to avoid over-injection loss (zero payment), hoping that aggregation offsets will reduce the risk. However, over-scheduling itself increases deviations when actual generation falls short. Hence, aggregation will not help in improvement in scheduling and adherence to deviation norms.

(d) **Scale and Geographic Correlation Effects:**

Aggregation works best when aggregated units are diverse in location, technology, weather exposure etc., so errors of individual units cancel each other out. But many units are geographically clustered (solar plants with shared boundaries, solar plants in solar parks or wind projects in the same wind zone), so their variability is correlated, reducing the effectiveness of aggregation.

22. It may be noted that the sample size of the study conducted by Grid India, that has been relied upon by this Hon'ble Commission in the draft proposal is too small. Grid-India's analysis covered only 16 regional renewable generating plants (solar, wind, and hybrid) across the Northern, Western, and Southern regions. In contrast, as per CEA monthly report dated 31.08.2025, the installed capacity stands at 52,681.20 MW for wind and 1,23,130.13 MW for solar, totalling 1,75,811.33 MW across India. Grid-India evaluated only 380 MW of solar (cumulative capacity of two projects in the Southern Region) and 177.53 MW of wind (cumulative capacity of two projects in the Western Region) for aggregation at pooling stations level.

23. Even otherwise and 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 improvement in the deviation % in case of aggregation. Aggregation does not completely mitigate the impact of uncertain and variable nature of wind power generation, for reasons mentioned above.

24. As per the Grid India study, wherein the impact of DSM on the revenue of 16 RE plants (6 solar + 6 wind + 4 hybrid) under different values of X, ranging from X = 100% to X = 0% was ascertained, it was found that: -

(a) The solar plants experienced a moderate range of revenue loss, varying from around 3.5% to 11.1%. Hybrid plants showed a slightly wider loss range from 2.4% to 11.8%. **However, the highest impact was seen in wind power plants, where the percentage loss is from 2.8% to 48.2%, reflecting their higher variability and forecasting challenges**. [*Para 15, 16(b)*]

(b) Even at the value of **X = 100**, the six (6) wind power projects considered for the study recorded loss of revenue within the range of 2.8% to 9.4%, the **average revenue loss being 5.0%. The revenue loss for all RE plants considered for the study is around 5.45% and even after considering the benefit of aggregation, the revenue loss is still around 3.35%**. [*Para 16(b) & 18*] It may also be noted that for such wind projects which were commissioned earlier till 2020 had the revenue loss less than 1%. These projects were conceived and bids were submitted based on the DSM regulations applicable at that time. Further, there was no proposal of change in deviation calculation formula in future and thus, the wind generators had no way of estimating revenue loss purely due to change in DSM regulations, so the same can be considered

(c) In comparison, even considering aggregation, the average revenue loss for RE plants considered for the study in terms of the extant 2024 Regulations, is around 1.49%. This would increase to around 3.35% after 01.04.2026 at X = 100. **This is around 125% increase in the revenue loss, which will increase to around 230% for the next year at X = 80 and will keep increasing as the value of X is gradually reduced over the years.**

25. It is evident from the above findings that while aggregation of projects at the pooling substation level results in slight reduction in the deviation, it does not solve the issue of wind intermittency and deviations. Even considering aggregation, the proposed framework would result in levy of exorbitant deviation charges.

26. Further, with the tighter deviation band of +/- 10% for Wind projects set to commence from 01.04.2026, even Grid India has observed that: -

(a) Considering the tolerance band of +/- 15% for Wind (applicable till 31.03.2026), the percentage of time the deviation remained within the tolerance band was in the range of 73% to 93%. [*Para 9*]

(b) However, when the tolerance band is decreased from +/- 15% to +/- 10% for Wind (applicable from 01.04.2026 onwards), the percentage of time the deviation remained within the tolerance band drastically reduces to the range of 32% to 73%. [*Para 10*]

Thus, despite the drastic impact the tighter bands which would come into effect from 01.04.2026 onwards 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

27. The determination of value of X, which would admittedly, result in exorbitant 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.

28. 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.

29. Further, given the inherently variable and infirm / non-dispatchable nature of 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.

30. 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.

D. RE generators cannot be equated with conventional generators / 'general seller'

31. The concept of equitable treatment of all grid-connected generators is flawed, since by their very nature, conventional generators / General Sellers and Wind & Solar (WS) Sellers operate under fundamentally different conditions and constraints. Conventional generation technologies are different, and their output variations are controllable and predictable, being dependent on controllable fuels like coal and gas. Wind and solar generation, however, depend on natural and inherently variable resources. Equating them under the same regulatory framework, by shifting the deviation % formula from 'Available Capacity' / installed plant capacity to 'Scheduled Generation', overlooks these inherent differences.

32. The distinction was rightly acknowledged by the Forum of Regulators, which had previously advocated for a differentiated treatment for WS Sellers. Aligning WS Sellers with General Sellers disregards the unique challenges of variability and forecasting that are intrinsic to renewable energy generation.

33. However, by seeking to equate WS Sellers with general sellers, this Hon'ble Commission is looking to do away with the fundamental basis that distinguishes RE Power Developers (WS Sellers) from thermal / conventional power developers (general sellers). This is tantamount to treating unequals, equally. Such treatment is in contravention of Article 14 of the Constitution, as held by the Hon'ble Supreme Court in in ***U.P. Power Corpn. Ltd. v. Ayodhya Prasad Mishra*, (2008) 10 SCC 139** has held as under:

> *"40. It is well settled that equals cannot be treated unequally.* ***But it is equally well settled that unequals cannot be treated equally. Treating of unequals as equals would as well offend the doctrine of equality enshrined in Articles 14 and 16 of the Constitution.*** *The High Court was, therefore, right in holding that Executive Engineers placed in Category I must get priority and preference for promotion to the post of Superintendent Engineer over Executive Engineers found in Category II."*

34. Further, the study conducted by Grid India, itself indicates that the solar plants experienced a moderate range of revenue loss, varying from around 3.5% to 11.1%. Hybrid plants showed a slightly wider loss range from 2.4% to 11.8%. However, the highest impact was seen in wind power plants, where the percentage revenue loss is from 2.8% to 48.2% with varying values of X.

35. Accordingly, increasing the DSM burden on WS Sellers, without corresponding improvements in weather forecasting accuracy, risks being punitive rather than corrective. Despite regulatory expectations, forecasting quality has not significantly advanced over the years, leaving WS Sellers vulnerable to deviations beyond their control

36. For supporting compliance with the stricter deviation limits & X factor for future projects, it is imperative that weather forecasting capabilities be enhanced. The Improved forecasting from the IMD will be critical in enabling renewable generators to align with the principle of equitable treatment of all grid-connected generators, thereby minimizing deviations and associated penalties.

E. Objective of DSM Regulations – Commercial Penalties Cannot Substitute Technical Measures

37. While the stated objective of the amendments to the DSM Regulations is to ensure grid security, stability, and reliability, the Hon'ble Commission appears to be addressing this inherently technical issue through commercial penalties. Grid stability challenges arising from the variable and intermittent nature of renewable generation stem primarily from limitations in forecasting infrastructure, real-time weather data availability, and system balancing tools. These issues can only be effectively mitigated through technical interventions, such as enhanced forecasting models, improved Automatic Generation Control (AGC) integration, flexible balancing capacity, and investment in grid modernization, rather than by penalizing generators for deviations beyond their control.

38. Imposing stringent commercial penalties on renewable energy generators—particularly wind and solar—does not address the root cause of grid instability. Instead, it shifts the burden of systemic inadequacies (such as inadequate forecasting data from IMD and limited storage or balancing infrastructure) onto project developers. This approach is punitive rather than corrective, and risks undermining investment confidence in the renewable sector.

39. Accordingly, this Hon'ble Commission is requested to reconsider the approach of using DSM charges as a deterrent mechanism for deviations that are non-controllable and weather-driven, and instead, adopt a more technical and system-oriented framework to achieve grid stability and reliability.

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

40. 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"*.

41. 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).

42. A critical aspect towards such preservation of environment is to generate energy from renewable sources, which has a much smaller environmental footprint than energy generated from fossil fuel and other resources. In view thereof the Hon'ble Supreme Court, in the matter of ***Hindustan Zinc Ltd. v. Rajasthan Electricity Regulatory Commission*, (2015) 12 SCC 611,** has held as under: -

> *"It has been rightly contended by the learned Senior Counsel for the respondents that Para 4.2.2 of the National Action Plan on Climate Change and the Preamble to the 2003 Act emphasise upon promotion of efficient and environmentally benign policies to encourage generation and consumption of green energy to subserve the mandate of Article 21 read with Article 48-A of the directive principles of State policy and Article 51-A(g) of the fundamental duties enlisted under Chapter IV-A of the Constitution of India."*

Thus, it is imperative and essential for this Hon'ble Commission to take such measures, which shall promote generation and viability of renewable energy generators such as the members of WIPPA.

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

G. Applicability of the new deviation % formula with X on Existing Projects would undermine the principle of regulatory certainty and be violative of Article 14

44. The Existing Projects (commissioned or under-construction or projects where bid submission date is prior to coming into effect of this draft order) were conceptualized on the applicable / prevalent technical norms and parameters at the time of bidding / determination of tariff. Since the tariff under the PPA is fixed for a term of 25 years and cannot be altered thereafter, the applicability of the changed deviation % formula with X-factor on the Existing Projects would defeat the purpose of 'regulatory certainty' since: -

(a) The Existing Projects will be adversely impacted by the changed deviation % formula with X-factor since it would lead to computation of higher deviation %. The reduction in the value of X would further increase the adverse impact, Notably, the deviation % formula with X factor had not been envisaged at the time of conceptualization and planning of the Existing Projects.

(b) However, the future projects would be able to factor in the impact of the changed deviation % formula with X factor, while setting up projects and/or bidding in future.

45. Therefore, the applicability of the deviation % formula with X factor on the Existing Projects will result in 'regulatory uncertainty' and changes the level playing field between the Existing Projects vis-à-vis the future projects, which is not permissible. This will also impact investor confidence and adversely impact growth of the renewable energy sector.

46. It bears mention that the concept of 'regulatory certainty' is a statutorily recognized concept under Clause 5.8.8 of the National Electricity Policy and Clause 4.0 of the Revised Tariff Policy, which are extracted as under: -

(a) Clause 5.8.8 of the National Electricity Policy, 2005:

"5.8.8 Steps would also be taken to address the need for regulatory certainty based on independence of the regulatory commissions and transparency in their functioning to generate investor's confidence."

(b) Clause 4.0 of the Revised Tariff Policy, 2016:

"4.0 OBJECTIVES OF THE POLICY

(b) Ensure financial viability of the sector and attract investments;

(c) Promote transparency, consistency and predictability in regulatory approaches across jurisdictions and minimise perceptions of regulatory risks;"

The National Electricity Policy and the Tariff Policy have been held to have force of law.

47. The Hon'ble Supreme Court in ***Vodafone International Holdings BV vs. Union of India*** : (2012) 6 SCC 613 (**Para 180, 186**), held and recognised that the certainty in law is part of rule of law.

48. Further, the Hon'ble APTEL in ***Tamil Nadu Spinning Mills Association v. TNERC & Ors.*** : 2021 SCC OnLine APTEL 5 (**Para 76**), held that it is necessary to maintain continuity of policy and certainty for the investor and it would be unfair and unjust to modify the terms adverse to its interest during the life of the Wind Power Project.

H. No payment for over generation at higher grid frequency while penalty for under generation is arbitrary

49. It is proposed that in case of grid frequency is at or above 50.05Hz, no payment shall be made to the existing wind and solar sellers for any over injection. On the similar lines, It is submitted that no penalties should be imposed on existing Wind and Solar (WS) generators for under-injection during periods when the grid frequency is at or above 50.05 Hz. In such high-frequency conditions, a reduction in generation—whether intentional or due to natural variability—actually contributes positively to grid stability. By under-injecting during these times, the generator is effectively aiding the system in maintaining frequency within acceptable operational limits, thereby supporting overall grid reliability.

I. Proposal to amend the 2024 CERC Regulations

50. Notably, in Para 25 of the draft proposal, this Hon'ble Commission has also directed its Staff to initiate the process of amendment to the 2024 DSM Regulations, to provide for the following: -

(a) All existing Wind and Solar (WS) Projects shall be treated at par with General Sellers from 01.04.2031 onwards.

(b) All new Wind and Solar (WS) projects, with tendering or bid submission dates on or after 01.04.2026, shall be treated at par with General Sellers.

(c) 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.

51. It is submitted that by outlining the above amendments in the present draft proposal, this Hon'ble Commission has already pre-judged these issues before issuance of a draft amendment and has rendered the mandatory public consultation process an empty formality.

52. Even otherwise, WIPPA reserves its right to make its submissions as and when the draft amendment is issued.

53. The para-wise inputs on the draft proposal are as under: -

Para-wise Inputs:

S No	Draft Order	Suggested Change	Comments/Remarks
1.	14. A total of 16 regional renewable energy (RE) stations were considered for the study, out of which six were solar power projects (three from the Western Region and three from the Southern Region). Similarly, six wind power projects were included, three from the Southern Region and three from the Western Region. Additionally, four hybrid power projects were selected from the Northern Region. A total of 41 weeks of time-block-wise data for selected renewable generating stations were analysed for the study to account for seasonal variation. 15. The study assessed the impact of DSM on the revenue of RE plants under different values of X, ranging from X = 100% to X = 0%. The findings indicate that the solar plants experienced a moderate range of revenue loss, varying from around 3.5% to 11.1%. Hybrid plants showed a slightly wider loss range from 2.4% to 11.8%. However, the highest impact was seen in wind power plants, where the percentage loss is from 2.8% to		The Grid India study conducted on 16 regional renewable energy (RE) stations itself recognises the fact of huge financial implication on the already commissioned projects: *"15. The study assessed the impact of DSM on the revenue of RE plants under different values of X, ranging from X = 100% to X = 0%. The findings indicate that the solar plants experienced a moderate range of revenue loss, varying from around 3.5% to* ***11.1%.*** *Hybrid plants showed a slightly wider loss range from 2.4% to* ***11.8%.*** *However, the highest impact was seen in wind power plants, where the percentage loss is from 2.8% to* ***48.2%,*** *reflecting their higher variability and forecasting challenges."* It may be noted that as per Grid India's own analysis and even after considering benefit of aggregation, the loss of revenue by wind and solar projects even at zero value of X is 3.35%. This is around 125% increase from the revenue loss of 1.49% based on 2024 Regulations. In contrast, the revenue impact for a project which was commissioned in 2018-19 based on the extant regulations was around 0.5%. These already commissioned projects would see a sharp rise of 700%. No project can absorb such huge loss of revenue. Further increase in value of "X" will lead to these projects being unviable to operate.

<table>
<tr><th>S No</th><th>Draft Order</th><th>Suggested Change</th><th>Comments/Remarks</th></tr>
<tr><td></td><td>48.2%, reflecting their higher variability and forecasting challenges.</td><td></td><td>The existing Projects will not be able to bear the impact of such huge revenue loss as the same had not been envisaged at the time of conceptualisation and planning of the already commissioned / projects where bids have been submitted.

Therefore, the applicability of the changed deviation % formula with X should not be made applicable on the already commissioned / projects where bids have been submitted.</td></tr>
<tr><td>2.</td><td>22. Therefore, it is proposed that for the Existing Projects (WS Sellers), the trajectory for reduction of “X” shall be as follows:
<table><tr><th>With Effect From (w.e.f.)</th><th>Value of “X”</th></tr><tr><td>01.04.2026 to 31.03.2027</td><td>100%</td></tr><tr><td>01.04.2027 to 31.03.2028</td><td>80%</td></tr><tr><td>01.04.2028 to 31.03.2029</td><td>60%</td></tr><tr><td>01.04.2029 to 31.03.2030</td><td>40%</td></tr><tr><td>01.04.2030 to 31.03.2031</td><td>20%</td></tr><tr><td>01.04.2031 onwards</td><td>0%</td></tr></table></td><td>22. Therefore, it is proposed that for the Existing Projects (WS Sellers), (commissioned or under-construction or projects where bid submission date is prior to coming into effect of this order) “X” shall be 100%. ~~the trajectory for reduction of “X” shall be as follows:~~
<table><tr><th>~~With Effect From (w.e.f.)~~</th><th>~~Value of “X”~~</th></tr><tr><td>~~01.04.2026 to 31.03.2027~~</td><td>~~100%~~</td></tr><tr><td>~~01.04.2027 to 31.03.2028~~</td><td>~~80%~~</td></tr><tr><td>~~01.04.2028 to 31.03.2029~~</td><td>~~60%~~</td></tr><tr><td>~~01.04.2029 to 31.03.2030~~</td><td>~~40%~~</td></tr><tr><td>~~01.04.2030 to 31.03.2031~~</td><td>~~20%~~</td></tr><tr><td>~~01.04.2031 onwards~~</td><td>~~0%~~</td></tr></table></td><td>The Existing Projects (commissioned or under-construction or projects where bid submission date is prior to coming into effect of this draft order) were conceptualised on the applicable / prevalent technical norms and parameters at the time of bidding for the Project. Since the tariff under the PPA is fixed for a term of 25 years and cannot be altered thereafter, the X-factor on Existing Projects would defeat the purpose of regulatory certainty since: -

• The Existing Projects will be impacted by the reduction of X Factor which had not been envisaged at the time of conceptualisation and planning of the Existing Projects.

• However, the future projects would be able to factor in the X-Factor while setting up the projects.

Therefore, the applicability of the X-Factor on the Existing Projects will result in ‘regulatory uncertainty’ and changes</td></tr>
</table>

S No	Draft Order	Suggested Change	Comments/Remarks
			the level playing field between the Existing Projects vis-à-vis the future projects. The concept of 'regulatory certainty' is a statutorily recognized concept under the Clause 5.8.8 of the National Electricity Policy and Clause 4.0 of the Revised Tariff Policy.
3.	24. 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 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. 25. Accordingly, the Commission, apart from inviting comments from the stakeholders on the proposed trajectory for reduction of "X" as outlined in para 22 of	24. 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 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. 25. Accordingly, the Commission, apart from inviting comments from the stakeholders on the proposed trajectory for reduction of "X" as outlined in para 22 of this order, also directs the Staff of the	**The concept of equitable treatment of all grid-connected generators is flawed, as source of generation of general seller and RE generators are different, RE source needs accurate forecasting and is primarily dependent upon forecast accuracy improvement by IMD.** Effective April 2026, the deviation bands for renewable energy generators are set to tighten, with penalties to be calculated based on 'Scheduled Generation' rather than 'Available Capacity' / installed plant capacity. This shift significantly increases the financial and operational risks for renewable energy developers. For supporting compliance with these stricter deviation limits & X-Factor for future projects, it is imperative that weather forecasting capabilities be enhanced. The Improved forecasting from the IMD will be critical in enabling renewable generators to align with the principle of equitable treatment of all grid-connected generators, thereby minimizing deviations and associated penalties. By their very nature, General Sellers and Wind & Solar (WS) Sellers operate under fundamentally different conditions and constraints. Equating them under the same

S No	Draft Order	Suggested Change	Comments/Remarks
	this order, also directs the Staff of the Commission to initiate the process of amendment to the DSM Regulations, 2024, for the following: (a) All existing Wind and Solar (WS) Projects shall be treated at par with General Sellers from 01.04.2031 onwards. (b) All new Wind and Solar (WS) projects, with tendering or bid submission dates on or after 01.04.2026, shall be treated at par with General Sellers. (c) Further, to address the growing concerns regarding grid stability, 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. This measure is necessitated as renewable capacity is being rapidly commissioned into the grid, and challenges in real-time grid operations are becoming more prominent. In this context, there is an urgent need to curb over-injection by the existing WS generators in the interest of grid security, particularly in view of the anticipated large-scale	Commission to initiate the process of amendment to the DSM Regulations,2024, for the following: (a) All existing Wind and Solar (WS) Projects shall be continued to be treated as per the provisions of the 2024 regulation without any change in the formula for calculation of deviation percentage and tightening of bands. ~~treated at par with General Sellers from 01.04.2031 onwards.~~ (b) All new Wind and Solar (WS) projects, with tendering or bid submission dates on or after 01.04.2026, shall be treated at par with General Sellers. ~~(c) Further, to address the growing concerns regarding grid stability, 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. This measure is necessitated as renewable capacity is being rapidly commissioned into the grid, and challenges in real-time grid operations are becoming more prominent. In this context, there is an urgent need to curb over-injection by the existing WS generators in the interest of grid~~	regulatory framework overlooks these inherent differences. This distinction was rightly acknowledged by the Forum of Regulators, which had previously advocated for a differentiated treatment for WS Sellers. Aligning WS Sellers with General Sellers disregards the unique challenges of variability and forecasting that are intrinsic to renewable energy generation. Further, the study conducted by Grid India, already indicates that the solar plants experienced a moderate range of revenue loss, varying from around 3.5% to 11.1%. Hybrid plants showed a slightly wider loss range from 2.4% to 11.8%. However, the highest impact was seen in wind power plants, where the percentage loss is from 2.8% to 48.2%. This is primarily because the thermal plants are based on far more mature technology and variations are quite predictive in nature as the generation is dependent on coal, However Wind-Solar are natural sources dependent on variable parameters. Increasing the DSM burden on WS Sellers, without corresponding improvements in weather forecasting accuracy, risks being punitive rather than corrective. Despite regulatory expectations, forecasting quality has not significantly advanced over the years, leaving WS Sellers vulnerable to deviations beyond their control. Furthermore, linking DSM penalties to grid frequency levels may not yield the intended outcome of enhanced grid stability. Unlike conventional generators, WS Sellers have minimal control over their generation output, which is inherently variable and weather dependent. Instead, alternative mechanisms such as partial

S No	Draft Order	Suggested Change	Comments/Remarks
	penetration of renewable energy in the near future.	~~security, particularly in view of the anticipated large scale penetration of renewable energy in the near future~~	curtailment strategies or dynamic DSM pricing models should be explored to achieve grid stability in a more equitable and effective manner. Also, the existing implementation time of 7th/8th time block should be reduced to 4th time block to improve the forecasting quality. If the Hon'ble Commission decides to retain the clause with no payment for overgeneration in case high grid frequency, then there should not be any DSM charges/penalty payable by the wind and solar generators for under generation in case of high grid frequency,

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सत्यमेव जयते
भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केंद्रीय विद्युत प्राधिकरण
Central Electricity Authority
नवीकरणीय नीति एवं प्रौद्योगिकी प्रभाग
Renewable Policy & Technology Division

CEA/PLG/RT&I/15/11/2024/ दिनांक: September, 2024

To

1. WIPPA manager@wippaindia.in, +919873429205
2. IWPA secretary.general@windpro.org
3. IWTMA iwtma08@gmail.com <iwtma08@gmail.com>; 'Dvgiri Gmail' dvgiri2012@gmail.com
4. spda@solarpda.com
5. NSEFI - pulipaka@nsefi.in, ceooffice@nsefi.in

Sir/Madam

Sub: More precise weather data collection and forecasting

As you are aware, there are issues with the currently practiced forecasting and scheduling methods. 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. In order to address this issue Chairman, CEA has set up a committee consisting of experts from the Ministry of Earth Sciences, Ministry of Power and industry representation. The committee has met five times including a review by the Hon. Chairman CEA on October 4th, 2023. The following recommendations in respect of wind power have been made by the committee to take things forward:

- Getting the Wind farm SCADA based wind speed and direction information to NCMRWF.
- Finalizing economic but effective AWS specs and modalities of deployment.
- Testing the concept in Gujarat & Rajasthan.
- Creating a structure for the complete activity with roles and responsibilities for sustained operation.

The committee has proposed that Automatic Weather Stations (AWS) shall be installed at selected Substations**.** AWS would provide detailed meteorological data (wind speed and direction at 10m height, Temperature at 10m height, Relative Humidity at 10m height and Pressure) from specific areas of interest. These parameters are mandatory for assimilation into the models. This is very essential for global weather modelling to be more accurate. Wind farm SCADA based near real time wind speed and direction

data must also be shared with NCMRWF so that it can be used for validation purposes and if found suitable can be employed as part of input data for assimilation and numerical weather prediction. In case of Solar PV plants, in addition to mandatory meteorological data, Solar Farm SCADA based near real time GHI and cloud cover needs to be shared with NCMRWF for validation purposes. All other sensors should be placed at 1.5-2 m above or near the ground (WMO recommendation) except for the anemometer and wind vane. Developers is to install Pressure sensors on their Solar sites to fulfill the Data Assimilation requirements of NCMRWF.

NCMRWF has already provided ftp access on a sample basis to check out the data quality and communication related issues. This experiment has been going on for several months and found to be useful. The IPPs and generators must come forward to participate in this programme so that forecasting will see considerable improvement in the near future. There are two requirements from the generators/IPPs.

1. Set up GPRS enabled Automatic Weather Stations (AWS) in the identified substations. Annexure I to this letter provides the details of the identified substations. Take care of the data transmission and security aspects. Work with IMD/Other agencies to make this happen at the earliest.
2. Get in touch with NCMRWF & IMD and provide wind speed and direction data at hub height based on wind farm SCADA systems.

The details of the concerned scientists are provided below who will be dealing with the data:

a. Sh. Harmeet Sawhney, Scientist E, IMD, New Delhi harmeet.sawhney@imd.gov.in
b. Dr. Raghavendra Ashrit, Scientist G, NCMRWF ashrit@ncmrwf.gov.in

We do hope that this Industry- IMD/NCMRWF project will get full cooperation from all the stake holders. This pilot exercise is to take place in the states of Gujarat and Rajasthan. It would be extended to other states based on the learning from the proposed trials.

This issues with the approval of Chairperson, CEA.

Enclo: As above.

भवदीय

(किशोर कुमार)
उपनिदेशक (आरपी&टी)

Copy for information to:

1. Secretary (MNRE).
2. Secretary (Min of Earth Sciences).

Table 1: Transformer stations with Latitude & Longitude Possible substations in Gujarat

SR No.	NAME OF WIND FARM &/S OWNER	CONNECTED WIND FARM S/S (SENDING	CONNECTED GET CO S/S (RECEIVING END)	DISTRICT	INS. CAP. IN MW	Latitude	Longitude
1	SUZLON	CHOKADI	66KV CHHAIYA	PORBANDAR	15	21.549999	69.699741
2	KSPL	AMARAPAR	220KV TIMBDI	JATNA	204	23.831217	71.449942
3	SUZLON	BARADIYA	220KV VARSANA	DEVIMURTI DWARKA	200	22.198888	69.076666
4	SUZLON	BHOJAPUR	66KV WANKIA	SURENDRANAGAR	50.4	22.328105	71.134105
5	SUZLON	BHOPALKA	66KV HADALA	JATNA	50.4	23.466944	70.676666
6	SUZLON	CHANDIYA	220KV CHANDIYA	DEVIMURTI DWARKA	50.4	22.466666	69.433333
7	GMEEL	SHEPA	66KV SHUNDA	SURANGSAR	39.7	23.501958	69.998891
8	INOX	MOTISINDHOLI	220KV MOTISINDHOLI	KUTCH	50.4	23.219881	69.639881
9	SUZLON	GOVADA-2 (SANOSARI)	66V MOTI BHADODAR	JAMNAGAR	30.6	22.313206	70.266403
8	MYTRAH ENERGY	JASDAN	66KV JASDAN	RAJKOT	50.4	22.036944	71.211666
11	SUZLON	LAYZA	66KV DHORI	KUTCH	37.8	23.37502	69.245832
12	WWIL	RATALIYA	220KV Motisindholi NA	KUTCH	50.4	23.37793	69.381946
13	INOX	SADLA	220KV SADLA	SURENDRANAGAR	166	22.390238	71.387763
14	SUZLON	PATELKA	66KV SAMLI	JAMNAGAR	29.4	22.503239	70.135555
15	INOX	SUDHPUR	100KV MSDHIYALA	JAVED	368	21.951141	71.51015
16	SUZLON	SHIVLAKHA	220KV NANI KHAKHAR	KUTCH	288.8	23.328611	69.516666
17	SUZLON	UNDALIA	66KV MAMSA	BHAVNAGAR	13.2	21.632823	72.102958
18	POWERICA	RAJPAR	66KV KHABADIA	BHAVNAGAR	51.8	21.866388	71.633888
19	K7 ENERGY	VAGHWAGAR	66KV VADALI	BHAVNAGAR	70.8	21.09385	71.800599
20	INOX	ROJMAL	220KV SAYLA	JAVED	50	22.291667	71.73611
21	SRI MARUTI	VIRPUR	220KV RADILA	MORBI	154.8	22.34411	70.88839
22	VESTAS	VAGHADIA	220KV SAYLA	SURENDRA NAGAR	50.4	22.319792	71.631944
23	POWERICA	KREBALAPUR	66KV GOTIN	DEVIMURTI DWARKA	70	22.37038	68.821388

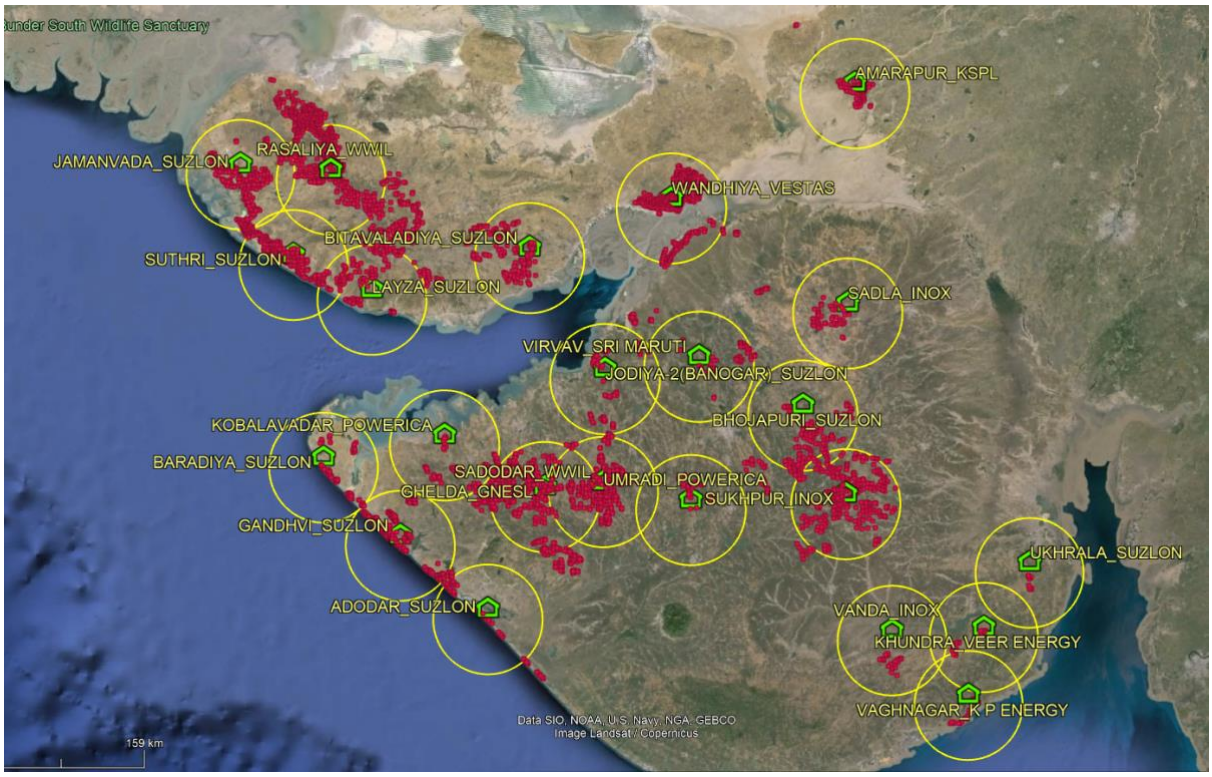
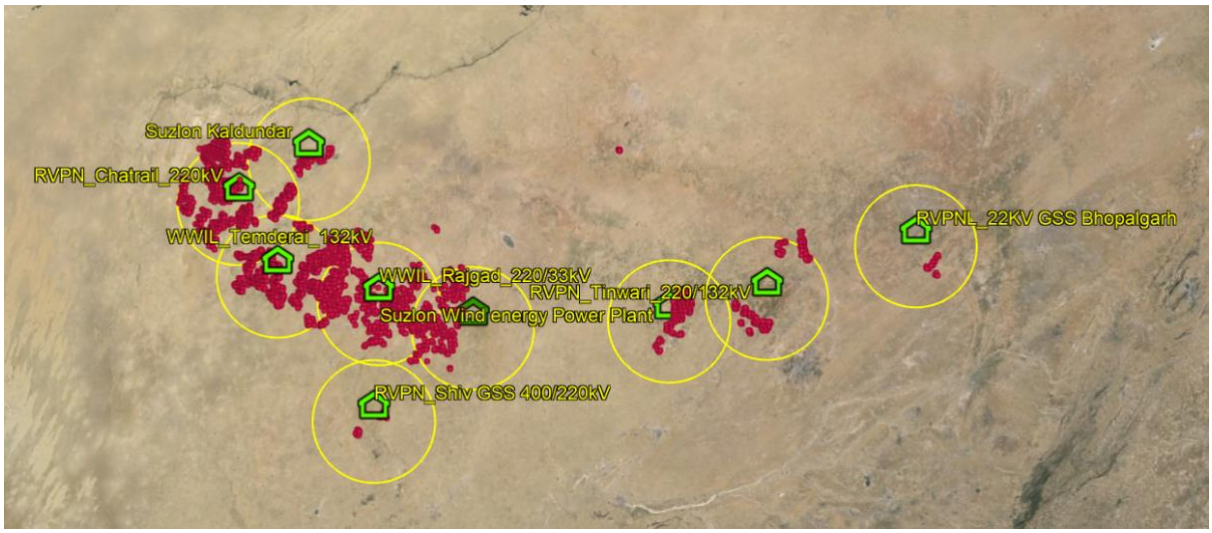


Table 2. Suggested Substations in Rajasthan

Sl No	Substation Name	Latitude	Longitude
1	Chatrail	26.998349°	70.741520°
2	Temderai	26.724423°	70.887396°
3	Rajgad	26.604010°	71.297050°
4	Rajamathai	26.497618°	71.677809°
5	Shiv	26.175669°	71.251907°
6	Tinwari	26.540453°	72.887381°
7	Suzlon Wind energy Power Plant	26.479011°	72.480559°
8	RVPNL_22KV GSS Bhopalgarh	26.694757°	73.512953°
9	Suzlon Kaldundar	27.146658°	71.037986°



A. Weather parameters to be shared for wind power plants

The following weather parameters data shall be shared for **wind power plants**:

1. Barometric Pressure (Pascal)
2. Ambient temperature (degree Celsius)
3. Wind speed (m/s)
4. Wind direction (degrees from true north)
5. Relative humidity (%)

B. Weather parameters to be shared for solar power plants

The following weather parameters data shall be shared for **solar power plants**:
1. Global Horizontal Irradiance (Watts per meter square)
2. Ambient temperature (degree Celsius)
3. Diffuse Irradiance (Watts per meter square)
4. Direct Irradiance (Watts per meter square)
5. Relative humidity (%)
6. Cloud cover (Okta)
7. Precipitation (mm)-

C. Time stamping and telemetry quality flag

The data shall be time stamped (with reference to Indian Standard time) with a resolution of 15-minute and would be accompanied with the telemetry quality flag viz '***Good***', '***Suspect***'

D. Data sharing periodicity

Data shall be shared at an interval of six hours (6 hours) i.e. four times in 24 hours

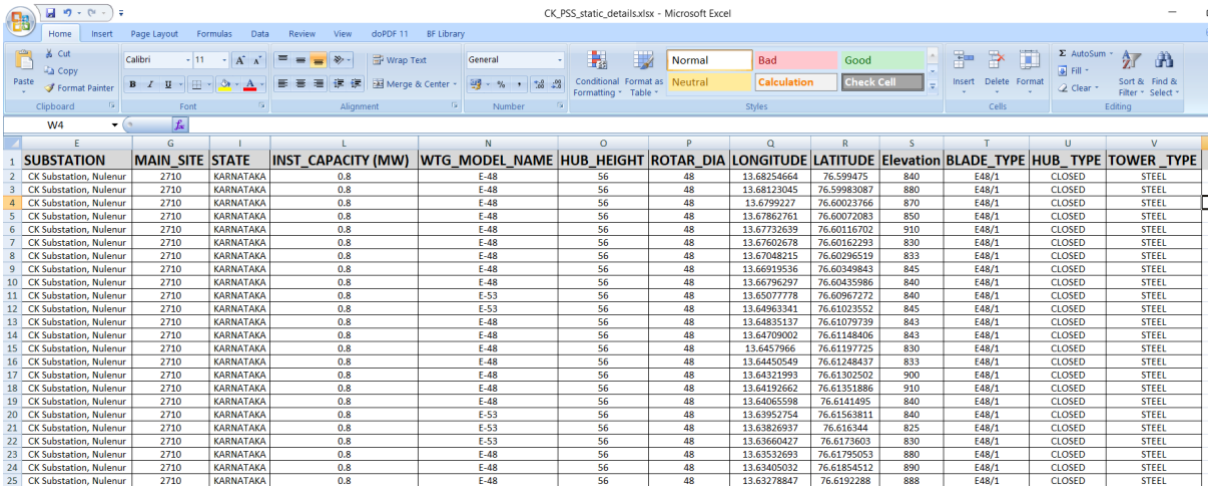
Batch-1: 0015 hrs to 0600 hrs (Need to be received to NCMRWF by 0700 hrs)
Batch-2: 0615 hrs to 1200 hrs (Need to be received to NCMRWF by 1300 hrs)
Batch-3: 1215 hrs to 1800 hrs (Need to be received to NCMRWF by 1900 hrs)
Batch-4: 1815 hrs to 0000 hrs (Need to be received to NCMRWF by 0100 hrs)

E. Static details of the power plants

The latitude and longitude of the power plants / weather station shall be shared one-time in csv/excel sheet on email.

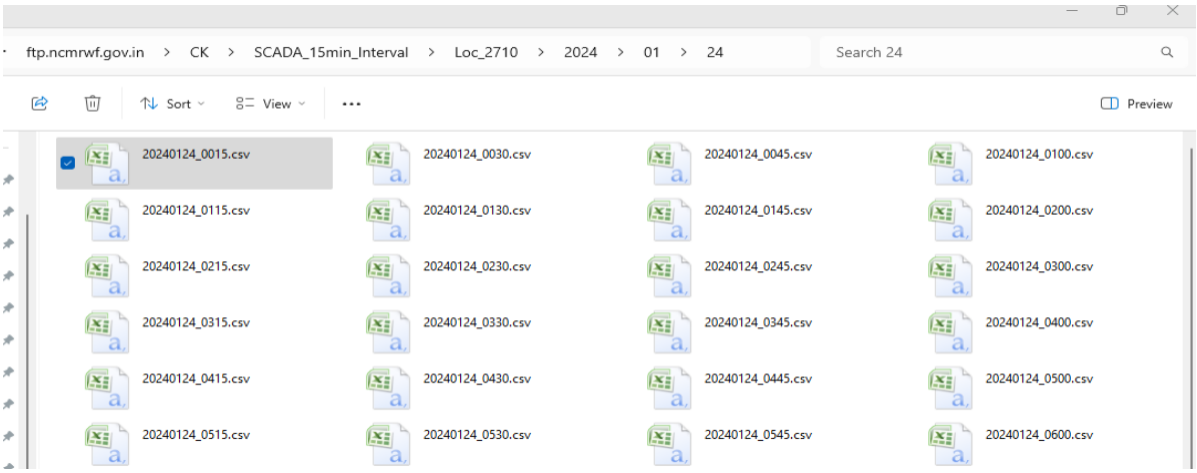
NCMRWF will provide FTP access with user name and password. They will require the static data – the windfarm name, capacity, lat-long, etc. The SCADA data supplied on a sample basis from a wind farm is presented below for guidance.

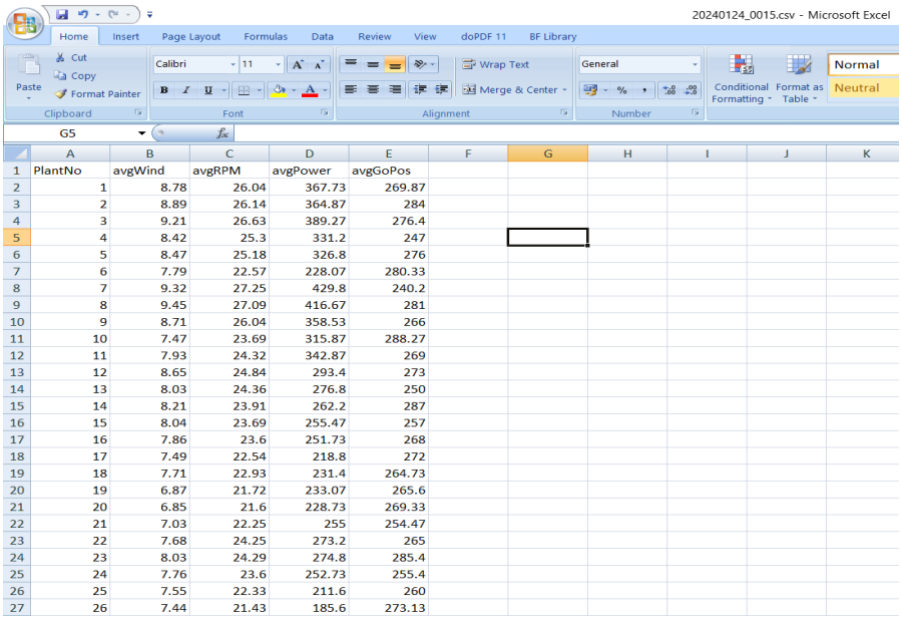
Static data sample:



SUBSTATION	MAIN_SITE	STATE	INST_CAPACITY (MW)	WTG_MODEL_NAME	HUB_HEIGHT	ROTAR_DIA	LONGITUDE	LATITUDE	Elevation	BLADE_TYPE	HUB_TYPE	TOWER _TYPE
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.68254664	76.599475	840	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.68123045	76.59983087	880	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.6799227	76.60023766	870	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.67862761	76.60072083	850	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.67732639	76.60116702	910	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.67602678	76.60162293	830	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.67048215	76.60296519	833	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.66919536	76.60349843	845	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.66796297	76.60435986	840	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-53	56	48	13.65077778	76.60967272	840	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-53	56	48	13.64963341	76.61023552	845	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.64835137	76.61079739	843	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.64709002	76.61148406	843	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.6457966	76.61197725	830	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.64450549	76.61248437	833	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.64321993	76.61302502	900	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.64192662	76.61351886	910	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.64065598	76.6141495	840	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-53	56	48	13.63952754	76.61563811	840	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-53	56	48	13.63826937	76.616344	825	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-53	56	48	13.63660427	76.6173603	830	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.63532693	76.61795053	880	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.63405032	76.61854512	890	E48/1	CLOSED	STEEL
CK Substation, Nulenur	2710	KARNATAKA	0.8	E-48	56	48	13.63278847	76.6192288	888	E48/1	CLOSED	STEEL

SCADA data sample.





20240124_0015.csv - Microsoft Excel

PlantNo	avgWind	avgRPM	avgPower	avgGoPos
1	8.78	26.04	367.73	269.87
2	8.89	26.14	364.87	284
3	9.21	26.63	389.27	276.4
4	8.42	25.3	331.2	247
5	8.47	25.18	326.8	276
6	7.79	22.57	228.07	280.33
7	9.32	27.25	429.8	240.2
8	9.45	27.09	416.67	281
9	8.71	26.04	358.53	266
10	7.47	23.69	315.87	288.27
11	7.93	24.32	342.87	269
12	8.65	24.84	293.4	273
13	8.03	24.36	276.8	250
14	8.21	23.91	262.2	287
15	8.04	23.69	255.47	257
16	7.86	23.6	251.73	268
17	7.49	22.54	218.8	272
18	7.71	22.93	231.4	264.73
19	6.87	21.72	233.07	265.6
20	6.85	21.6	228.73	269.33
21	7.03	22.25	255	254.47
22	7.68	24.25	273.2	265
23	8.03	24.29	274.8	285.4
24	7.76	23.6	252.73	255.4
25	7.55	22.33	211.6	260
26	7.44	21.43	185.6	273.13

The SCADA parameters are to be at 15 minute interval.

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