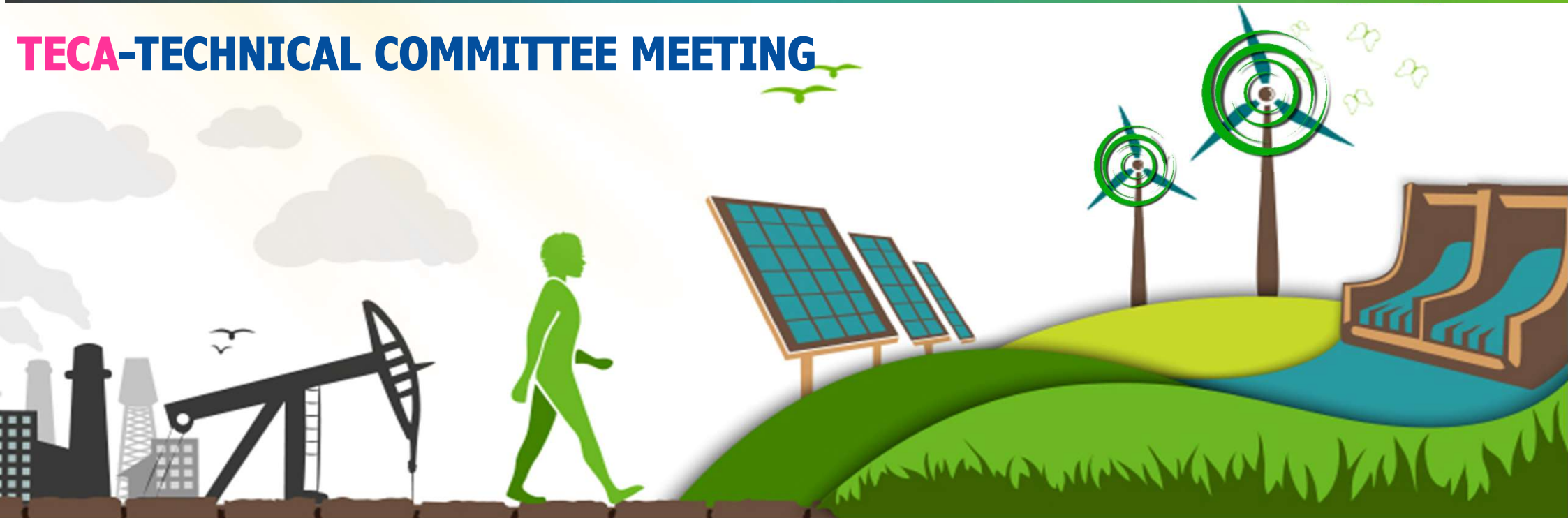


# TNERC (FORECASTING, SCHEDULING AND DEVIATION SETTLEMENT AND RELATED MATTERS FOR WIND AND SOLAR GENERATION) REGULATIONS, 2023

## TECA-TECHNICAL COMMITTEE MEETING



- **TAMIL NADU ELECTRICITY REGULATORY COMMISSION (FORECASTING, SCHEDULING AND DEVIATION SETTLEMENT AND RELATED MATTERS FOR WIND AND SOLAR GENERATION) REGULATIONS, 2023.**
- **TNERC REGULATIONS 2023 - COMMENTS & SUGGESTIONS**
- **AN EXPERIENCE OF STATE LEVEL FORECASTING & COMMERCIAL ARRANGEMENTS**

## **“TAMIL NADU ELECTRICITY REGULATORY COMMISSION (FORECASTING, SCHEDULING AND DEVIATION SETTLEMENT AND RELATED MATTERS FOR WIND AND SOLAR GENERATION) REGULATIONS, 2023 ”.**

**DRAFT ON 11-SEP-2023**

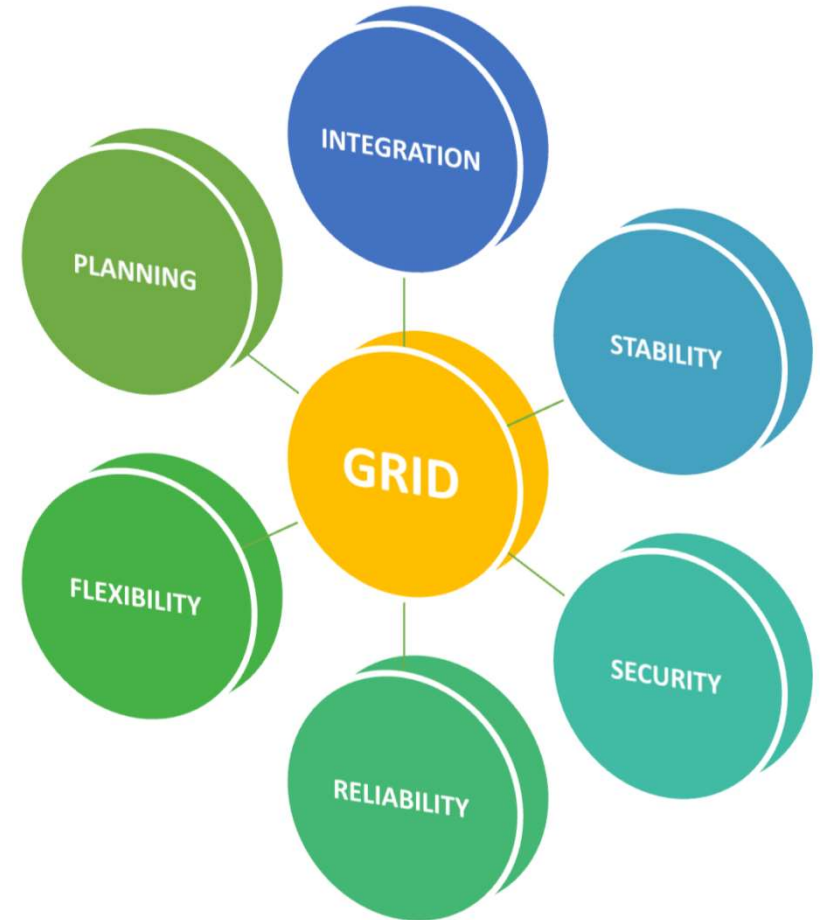
## 3. OBJECTIVE



3.1. These Regulations are intended to facilitate Grid integration of Wind and Solar energy generated in Tamil Nadu while maintaining Grid stability and security as envisaged under the State Grid Code and the Act, through forecasting, scheduling and a mechanism for the settlement of deviations by such Generators.

3.2. In order to maintain system security, stability and reliability, the SLDC shall take into consideration the forecasts of Wind and Solar generation for Week-Ahead, Day-Ahead and Intra-Day operations and scheduling, and longer-term forecasts for its planning.

3.3. The SLDC shall make use of the flexibility provided by conventional Generating Units and the capacity of inter-Grid tie-lines to accommodate Wind and Solar energy generation to the largest extent possible subject to Grid security.



## 4. APPLICABILITY



4.1 These Regulations shall apply to all Wind and Solar Energy Generators (excluding Rooftop PV Solar power projects of capacity less than 1 MW) in Tamil Nadu connected to the Intra-State Transmission System or Distribution System, including those connected through Pooling sub-stations, and using the power generated for self-consumption or sale within or outside the State.

4.2 The Commission shall review these Regulations including formulation for Absolute Error, Accuracy Band and Deviation charge thereof after two years, or earlier if it considers necessary.





## **PART B**

# **TECHNICAL ARRANGEMENTS: FORECASTING AND SCHEDULING CODE**

## 5. FORECASTING AND SCHEDULING CODE



5.1. The Wind / Solar Energy Generators shall appoint a single QCA to represent on their behalf and comply with the requirements of forecasting and scheduling separately.

Provided that the QCA authorized by **the majority of the generators in the State shall be engaged as a single QCA** for all the respective wind/solar generators separately in the State and the terms and conditions for engagement of single QCA shall be governed by the mutual agreement between the respective generators and the QCA.

Provided that the wind/solar generators **who do not wish to avail the services** of the single QCA appointed by the majority of the generators shall have the option to avail the services of the **SLDC for forecasting and scheduling services**.



## 5. FORECASTING AND SCHEDULING CODE



Provided that the service charges for forecasting and scheduling services along with applicable taxes shall be payable to the single QCA / SLDC by the generators as the case may be.

Provided that an **individual Generator connected to a sub-station** that is designated as a Pooling sub-station as defined in 2(q) of this regulation may opt to function as a **QCA on its own or appoint a separate entity** as its QCA. However, multiple QCA(s) for single pooling sub-station will not be permitted.

Provided that the wind/solar generators of the **Pooling sub-station(s) having aggregate capacity upto 25 MW** may aggregate their forecast, schedule with the QCA of the nearest Pooling sub-station.

Provided further that, such wind/solar generators shall obtain concurrence of SLDC. The decision of SLDC in this regard shall be binding on the wind/solar generators.



## 5. FORECASTING AND SCHEDULING CODE



5.2. This Forecasting and Scheduling Code specifies the methodology for **Day-Ahead scheduling** of Wind and Solar Energy Generators connected to the intra-State Transmission Network (Transmission and Distribution system), its **revisions on a one and a half hourly basis**, and the treatment of their deviations from such Schedules. Wind and Solar generators, either by themselves or represented by Qualified Coordinating Agencies shall comply with the requirements of forecasting and scheduling code as stipulated under these Regulations.

5.3. The QCA(s) shall be treated as State Entity.

5.4. Every QCA shall be registered with the SLDC along with the authorization of the majority of wind/solar generators. The fee for registration of the QCA with the SLDC shall be specified in the Detailed Procedure to be issued by them, which will be approved by the Commission separately within the period as specified in the Regulation 5.21.

## 5. FORECASTING AND SCHEDULING CODE



5.5. Notwithstanding the appointment of a QCA, the onus of complying with the relevant provisions of these Regulations shall remain that of the concerned Generators, and the commercial and other terms and conditions between the Generators and their QCA shall be governed by their inter-se agreements or terms of engagement.

5.6. The QCA shall be appointed by the Generators for the purposes specified in these Regulations, including but not limited to the following:

(a) Aggregation of scheduled generation of the generators, meter reading and data collection and its communication, and co-ordination with the Distribution Licensees, the SLDC and other agencies;

## 5. FORECASTING AND SCHEDULING CODE



(b) De-pooling of Deviation Charges within the constituent Generators and intimating the deviation charges to the SLDC and the respective generators.

(c) In case of single QCA chosen by the wind/solar generators, such single QCA is responsible for state level aggregation of scheduled generation for selling out power within Tamil Nadu and outside Tamil Nadu separately.

(d) The minimum term period of **agreement between the QCA and the wind/solar generators** shall be **two years**.

Until new arrangement is put in place, **existing QCA shall continue for further period up to 1 year.**

(e) The SLDC in their detailed procedure shall specify the qualification and other criterions viz. Business Rules/Net worth requirement etc. for the QCA.

## 5. FORECASTING AND SCHEDULING CODE



5.7. The QCA shall be the **Nodal Agency** between the SLDC and its Generators for the purposes of these Regulations.

5.8. The QCA shall furnish the technical specifications of the Generators whom it represents to the SLDC in the prescribed format, at the time of its registration or within such period thereafter as may be stipulated by the SLDC in its Detailed Procedure, and also furnish details whenever there is a change in these specifications.

**5.9. The QCA shall provide real-time data relating to the power generation parameters and weather-related data, as may be required to the SLDC.**

## 5. FORECASTING AND SCHEDULING CODE



5.10. Meters with the AMR facility and uninterrupted data transmission shall be installed for energy accounting in accordance with the relevant provisions of the Central Electricity Authority (CEA) Regulations and its amendments, governing metering for the transfer of information to the SLDC by the Generators.

5.11. **The QCA shall furnish to the SLDC aggregated forecasts relating to its Wind Energy Generators and Solar Energy Generators connected to intra-State system** and contracts undertaken for sale of power through intra-State or inter- State, as the case may be, separately, in the formats specified for each type of source and intra/inter State transaction.

5.12. The SLDC shall also undertake forecasting of the Wind and Solar energy generation expected to be injected into the intra-State Transmission network at each location, by engaging forecasting agencies if required, so as to enable it to better plan for the balancing resources required for secure Grid operation.

## 5. FORECASTING AND SCHEDULING CODE



5.13. The QCA(s) shall aggregate the separate Schedules of all Wind / Solar generators connected to the intra-state network / Pooling sub-station and communicate to the SLDC.

**Provided that in case of single QCA, the QCA shall aggregate the generation of all wind/solar generators separately for the entire State and communicate as single separate schedule for wind and solar respectively to the SLDC for each time block with respect to intra and inter-state transactions.**

5.14. If the QCA has difficulty to aggregate the generation of wind/solar for the entire State, they may provide schedules for each pooling station individually and in such case, the deviation charges will be calculated pooling sub-station wise.

## 5. FORECASTING AND SCHEDULING CODE



5.15. **No Wind or Solar energy generation shall be despatched by the SLDC without schedule** by the QCA on behalf of the Generators in accordance with the provisions of these Regulations. The generation from those generators not participating in the forecasting and scheduling activities shall be treated as inadvertent flow into the grid and no charges for such inadvertent injection of power shall be paid and/or no adjustment on consumption shall be made by the SLDC or distribution licensee.

5.16. The QCA shall provide SLDC with a Schedule based on its own forecast, which shall be the reference Schedule for the purposes of deviation determination and settlement: Provided that, if the Generators/QCA opts to adopt the forecast of the SLDC, the consequences of any error in such forecast which results in **deviations from scheduling shall be borne by the concerned Generators/QCA** only.



## 5. FORECASTING AND SCHEDULING CODE



5.17. In addition to the deviation charges collected by the SLDC from the generators, it shall also **recover the charges** towards the forecasting and scheduling services provided by the QCA to the generators and such charges shall be mutually agreed between the generators and the QCA or as decided by the Commission. **The amount so recovered by the SLDC shall be paid back to the respective QCA nominated by the generators.**

The SLDC shall also recover charges as may be approved by the Commission for providing its forecasting services to the Generators/QCA and the amount so recovered shall be treated as “other income” in the Aggregate Revenue Requirement of the SLDC for the determination of its Fees and Charges.

## 5. FORECASTING AND SCHEDULING CODE



5.18. The QCA shall provide to the SLDC a Day-Ahead and a Week-Ahead Schedule to enable it to assess the Availability of energy and the margin available in the State Grid. In case of state-wide aggregation, the QCA shall provide the forecast considering the generation measured at the metering points provided at the interconnection points / generating stations as the case may be.

Provided that the QCA shall internally maintain the schedule for each pooling sub- station and the same may be furnished to the SLDC as and when required.

5.19. The **Day-Ahead Schedule** shall comprise of the Wind or Solar energy generation to be scheduled in each 15-minute time block starting from 00:00 hours of the following day, and for all 96-time blocks of that day and the **Week-Ahead Schedule** shall contain the same information for the **next seven days**.

## 5. FORECASTING AND SCHEDULING CODE



5.20. (a) The QCA may revise the Schedule of Generators connected to the Intra-State Transmission Network (excluding collective transactions) by giving advance notice to the SLDC.

(b) Such **revisions shall be effective from the 6th time block** following the time block in which notice was given.

(c) There may be **one revision for each time slot of one and half hours** starting from 00.00 hours of a particular day, subject to a **maximum of 16 revisions** during the day.

5.21 The formats of forecast submission and other modalities and requirements shall be stipulated in the Detailed Procedure to be submitted by the SLDC within two month, which the Commission shall endeavor to approve within 15 days thereafter.

Provided that, SLDC shall undertake stakeholder consultation by uploading the Draft procedure on SLDC's website before submission of procedure to the Commission for approval.

## 5. FORECASTING AND SCHEDULING CODE



### **5.22 The Detailed Procedure mentioned in sub – regulation (21) shall contain the following:**

- (a) The procedure and requirements, including the payment of fees and penalties, for the registration and de-registration of QCAs by the SLDC.
- (b) The information and data, and the formats, required by the SLDC from the QCA(s) / Generators and to be provided by the SLDC to them.
- (c) The mode and protocol of communication for exchange of information and data between the QCAs and the SLDC.
- (d) The guidelines for energy and deviation accounting of Wind and Solar energy transactions under the State energy accounting framework, with illustrative examples, in accordance with the principles specified in these Regulations.
- (e) The mechanism for monitoring compliance of the Forecasting and Scheduling by the QCAs.
- (f) The default conditions in the State Pool Settlement by QCAs and their treatment.

5.23 The commercial impact of deviations from Schedules based on the forecasts shall be borne by the Generators through their QCAs.

5.24 The State entities shall operate their equipments and loads in a manner that is consistent with the provisions of the Indian Electricity Grid Code and the Tamil Nadu Electricity Grid Code.

## 6. PRINCIPLES OF APPOINTMENT OF QCA



6.1. The Generators connected to each **Pooling sub-station** shall appoint a person/entity as QCA from among themselves or **any other entity/person as a QCA or majority of the Wind / Solar Energy Generators in the State shall also appoint a single QCA separately for statewide aggregation of solar/wind generation.**

6.2. Single QCA for statewide aggregation shall be appointed by the majority of the wind/solar generators separately in terms of **their combined installed capacity**. The QCA at Pooling sub-station level shall be appointed with the approval of majority of the Generators connected to the polling sub-station in terms of their combined installed capacity, and on appointment with majority, the QCA shall perform all functions assigned in these Regulations for all generators for whom they are representing.

## 6. PRINCIPLES OF APPOINTMENT OF QCA



6.3. The Generators shall satisfy themselves that the QCA is technically and financially competent to undertake on their behalf the functions and discharge the obligations specified in these Regulations.

6.4. The terms of engagement of the QCA shall include provisions on the following aspects:

- (a) The respective roles and responsibilities of the QCA and Generators;
- (b) The metering, billing and energy accounting arrangements;
- (c) The modalities for recovery of Deviation Charges from the Generators and their settlement, including the principles for de-pooling;
- (d) The payment security mechanism and related provisions;
- (e) The events of default and their mitigation.



## **PART C**

# **COMMERCIAL ARRANGEMENTS**



## 7. DEVIATION SETTLEMENT FOR INTRA-STATE TRANSACTIONS



7.1 The sale of power within Tamil Nadu by Wind and Solar Energy Generators connected to the Intra-State Transmission Network shall be settled by the Procurers on the basis of their actual generation, and the Deviation Settlement shall be undertaken as specified in these Regulations.

A Generator who deviates from its given Schedule shall be liable to pay a Deviation Charge under the provisions of these Regulations.

7.2 In respect of sale or self-consumption of power within Tamil Nadu, if the actual injected generation of wind or solar power differs from the scheduled generation, the Deviation Charge for the excess or shortfall shall be payable by the Generator to the “State Deviation Pool Account (Wind and Solar)”, through the SLDC, as specified in the Tables:

# ABSOLUTE ERROR



$$\text{Absolute Error (\%)} = \frac{[\text{Actual Generation} - \text{Scheduled Generation}]}{[\text{Scheduled Generation}]} \times 100$$

Provided that when the **scheduled generation is zero** and if there is actual generation in a particular 15 minutes block by the wind/solar generator(s), only **70% of the actual generation** will be considered as scheduled generation;

## 7. DEVIATION SETTLEMENT FOR INTRA-STATE TRANSACTIONS



**Table 1:** Deviation Charge for under or over injection of **Wind Power**, for sale or self-consumption of power within Tamil Nadu.

Sl. No.	Absolute error in % terms in 15-minute time block	Deviation charge payable to state deviation pool account (wind and solar)
1	$\leq 15\%$	Nil
2	$>15\%$ but $\leq 20\%$	At Rs.0.25 per unit
3	$> 20\%$ but $\leq 30\%$	At Rs.0.25 per unit for the shortfall or excess beyond 15% and upto 20% + Rs. 0.50 per unit for the balance energy beyond 20% and upto 30%
4	$>30\%$	At Rs. 0.25 per unit for the shortfall or excess beyond 15% and upto 20% + Rs. 0.50 per unit for the shortfall or excess beyond 20% and up to 30% + Rs.1.25 per unit for the balance energy beyond 30%

## 7. DEVIATION SETTLEMENT FOR INTRA-STATE TRANSACTIONS



### WORKINGS FOR WIND POWER FORECASTING

DSM Calculations - FY2024			
Month	Gen MU	DSM Rs. (Crore)	DSM Rs. Per KWh
Apr	248.21	4.34	0.17
May	869.36	4.95	0.06
Jun	2389.69	2.51	0.01
Jul	2828.29	1.23	0.00
Aug	2007.76	4.07	0.02
Sep	2237.44	5.18	0.02
Oct	489.41	3.93	0.08
Nov*	99.39	2.69	0.27
Dec			
Jan			
Feb			
Mar			
Total	11169.56	28.90	0.03
			2.59 Paise
*As on Nov 21 <sup>st</sup> , 2023			

DSM Calculations - FY2023			
Month	Gen MU	DSM Rs. (Crore)	DSM Rs. Per KWh
Apr	215.08	6.95	0.32
May	1687.95	6.49	0.04
Jun	2031.31	6.52	0.03
Jul	2215.92	3.04	0.01
Aug	1988.45	3.58	0.02
Sep	1789.98	3.12	0.02
Oct	691.57	4.68	0.07
Nov	142.58	3.88	0.27
Dec	416.50	4.27	0.10
Jan	484.26	2.78	0.06
Feb	381.15	2.39	0.06
Mar	452.20	4.58	0.10
<b>Total</b>	<b>12496.95</b>	<b>52.27</b>	<b>0.04</b>
Annual Avg.			<b>4.18 Paise</b>
For The Period Apr-Nov			<b>3.32 Paise</b>

DSM Calculations - FY2022			
Month	Gen MU	DSM Rs. (Crore)	DSM Rs. Per KWh
Apr	388.68	7.15	0.18
May	1141.99	6.08	0.05
Jun	1881.26	8.75	0.05
Jul	2092.95	6.30	0.03
Aug	2064.19	5.91	0.03
Sep	1674.75	8.09	0.05
Oct	653.31	6.61	0.10
Nov	274.46	6.78	0.25
Dec	274.65	3.31	0.12
Jan	285.89	3.87	0.14
Feb	233.94	3.96	0.17
Mar	364.25	6.93	0.19
<b>Total</b>	<b>11330.32</b>	<b>73.76</b>	<b>0.07</b>
Annual Avg.			<b>6.51 Paise</b>
For The Period Apr-Nov			<b>5.47 Paise</b>

## 7. DEVIATION SETTLEMENT FOR INTRA-STATE TRANSACTIONS



**Table 2:** Deviation Charge for under or over injection of **Solar Power**, for sale or self-consumption of power within Tamil Nadu.

Sl. No.	Absolute error in % terms in 15-minute time block	Deviation charge payable to state deviation pool account (wind and solar)
1	$\leq 10\%$	Nil
2	$>10\%$ but $\leq 20\%$	At Rs.0.25 per unit
3	$> 20\%$ but $\leq 30\%$	At Rs.0.25 per unit for the shortfall or excess beyond 10% and upto 20% + Rs. 0.50 per unit for the balance energy beyond 20% and upto 30%
4	$>30\%$	At Rs. 0.25 per unit for the shortfall or excess beyond 10% and upto 20% + Rs. 0.50 per unit for the shortfall or excess beyond 20% and up to 30% + Rs.1.25 per unit for the balance energy beyond 30%

## 7. DEVIATION SETTLEMENT FOR INTRA-STATE TRANSACTIONS



7.3. The SLDC and the QCA (except for the QCA responsible for the state-wide aggregation) shall maintain records and accounts of the time block-wise Schedules, the actual generation injected and the deviations, for every Pooling sub-station, the individual Generators and state-wide aggregation separately.

7.4. The QCA shall undertake de-pooling of the energy deviations and the Deviation Charges against each Generator as specified in Regulation 14.

7.5. The concerned Generators shall undertake the settlement of the Deviation Charges with the SLDC.

**7.6. The total deviation charges remitted on account of deviations by wind / solar generator(s) into State Deviation Pool Account in a financial year shall be capped at the Ceiling Rate of 5 paise per unit multiplied by the total annual generation at the respective Pooling sub-station(s)/total generated units in state-wide aggregation.**

Provided that the Commission may **refix the ceiling rates every year** based on the true-up petition filed by the SLDC for the preceding year.

## 7. DEVIATION SETTLEMENT FOR INTRA-STATE TRANSACTIONS



**7.7. In addition to the above charges, the forecasting service charges based on the installed capacity of wind/solar generating station along with applicable taxes as agreed between Generators and QCA or as ordered by the Commission is to be remitted with SLDC by the generators and the SLDC will pay the charges towards forecasting services to QCA.**

**7.8 The deviations due to forced backdown or abnormal weather conditions like cyclone, heavy rainfall, flood, gusty wind, if intimated by the QCA to the SLDC well before six hours of occurrence shall be excluded from the scope of deviation charges.**



## 8. DEVIATION SETTLEMENT FOR INTER-STATE TRANSACTIONS



8.1 The sale of power outside Tamil Nadu by Wind and Solar Energy Generators connected to the Intra-State Transmission system or Distribution system shall be settled by the Procurers on the basis of their scheduled generation. The QCA/Generators shall not be allowed to aggregate their inter-state transaction schedule with intra-state transactions.

8.2 Inter-State transactions at a Pooling sub-station shall be permitted only if the concerned Generator is connected through a separate feeder/metering arrangements.

8.3 Generator intending to enter inter-state transaction shall submit, through the QCA, a separate Schedule for its energy generation, in accordance with these Regulations, to the SLDC and the concerned Regional Load Despatch Centre (RLDC).

8.4 The SLDC shall prepare the deviation settlement account for such Generator on the basis of measurement of the deviation in the energy injected.

**8.5 The Deviation Charges for under-injection by Generators connected to the Intra- State Transmission Network and selling power outside Tamil Nadu shall be as per the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2022 and the amendments issued time to time for which, the accounting shall be done by the SLDC separately.**

## 9.DEVIATION SETTLEMENT FOR INTER AND INTRA-STATE TRANSACTIONS: OTHER PROVISIONS



9.1 Deviations in respect of Inter-State and Intra-State transactions for each source of RE i.e. wind and solar Generation shall be accounted for separately at each Pooling Sub-Station or at state level.

9.2 The SLDC shall provide separate energy and Deviation Accounts for Inter-State and Intra-State transactions in respect of wind and solar Generation to the respective QCA, who shall arrange to settle the Deviation Charges by the concerned Generators.



## **PART D**

# **IMPLEMENTATION ARRANGEMENTS**

# 10. METERING



10.1 Every Pooling Sub Station/Generator shall have a energy meter capable of recording the energy in time blocks as specified in the CEA Regulations governing metering. The meters shall be time synchronized through command instruction from the centralized Automated Meter Reading system.

10.2 **The data from existing AMR metering arrangements available with SLDC will be shared to single QCA nominated by generators.** The single QCA shall make their own arrangements to capture, transfer and analyse the respective data shared by SLDC without disturbing the working of their system. QCA shall develop a web portal and provide access to respective stakeholders to monitor real time schedule versus actual generation details.

10.3 The SLDC will provide generation readings for each 15-minutes time block on a monthly basis to QCA. This report shall contain the information related to meters data received from AMR and data downloaded through CMRI.

**10.4 The QCA shall consolidate meter readings provided by SLDC, compare with scheduled generation and report deviations on monthly basis to the SLDC.**

**10.5 The QCA shall consolidate the meter readings provided by the SLDC, compare with the scheduled generation and report deviations on monthly basis to the SLDC on 11th of every month.**

10.6 The deviation charges shall be calculated by the SLDC based on data available with them in 15 minutes block wise.

# 11. COMMUNICATION OF QCA WITH SLDC



11.1 The Detailed Procedure prescribed by the SLDC shall set out the protocol for communication and exchange of information between the QCA and the SLDC, including but not limited to the following aspects:

a) Communication of the Day-Ahead, Week-Ahead Schedule and intra-Day schedule and any revisions to the SLDC.

b) Communication of the time block-wise scheduled and actual generation data.

**c) Communication of Grid constraints and curtailments by the SLDC to the QCA.**

11.2 The SLDC shall equip itself with the necessary Information Technology (IT) enabled communication platform and software for communication between it and the QCA.

# 11. COMMUNICATION OF QCA WITH SLDC



11.3 The QCA shall provide the IT-enabled communication software log-in details to enable the SLDC to access live data of all Schedules and deviations of all the generators.

11.4 The IT-enabled communication platform and software should enable the SLDC and QCA to exchange information, including but not limited to the following:

- i. Generator outages and their reasons;
- ii. Deviation Charges payable/receivable by the QCA;
- iii. Site characteristics and details of the Wind Turbines, Solar Inverters, etc.;
- iv. Schedules and generation handled by the QCA.

## 12. DEVIATION ACCOUNTING



12.1 The methodology for deviation settlement for the State shall be as follows:

- a) The SLDC shall compute the Absolute Error, i.e. the difference between the scheduled and the actual energy injected, in respect of statewide aggregation or each Pooling Sub-Station and shall accordingly determine the amounts payable/receivable on account of the Deviation Charge in accordance with Regulations 7 and 8.
- b) The Deviation Charges payable or receivable for the State as a whole at the State periphery shall be computed by the SLDC.
- c) The SLDC shall also compute the impact of the deviation of the Wind and Solar Energy Generation and its contribution to the Deviation Charge at the State periphery and maintain State Deviation Pool Account (Wind and Solar) for both intra-state and inter-state transactions separately for the same.

12.2 Settlement of Deviation Charges

- a) The SLDC shall compute the deviations from the Schedule, determine the Deviation Charges payable/receivable and bill the Generators accordingly.

12.3 The charges collected in the State Deviation Pool (wind and solar) in respect of both inter-state and intra-state transactions shall be utilized to offset the shortfall in the State Deviation Pool Account (DSM).



## 13. PAYMENT MECHANISM FOR DEVIATION SETTLEMENT AND PAYMENT SECURITY



13.1 Every Generator shall pay the total amount of Deviation Charges on state-wide aggregation to the SLDC as mentioned in the Regulation 7.

13.2 The generators shall pay the amount towards the deviation charges provisionally based on the amount as fixed in the Regulation 7 for each unit of generation on a monthly basis based on the actual generation obtained through AMR /CMRI readings. The generators shall either pay the deviation charges directly to the SLDC through online or through the billing of TANGEDCO's service connections of the captive consumers or third-party consumers. The deviation charges based on the resultant data of the pilot study undergone by the stakeholders for the past 18 months is worked out as follows :

**For Wind: 4.27 paisa/unit of generation**

**For Solar PV: 4.15 paisa/unit of generation.**

## 13. PAYMENT MECHANISM FOR DEVIATION SETTLEMENT AND PAYMENT SECURITY



The SLDC shall prepare the bill for the actual deviation charges for each generator on or before 15th of every month and post the same in their website, which can be viewed by the QCA(s)/Generators and the any excess or shortfall amount to the generator will be reconciled and included in the next billing month. The billing prepared by the SLDC includes deviation charges to be paid to the State Pool account and the forecasting charges to be paid to the QCA.

**13.2 The said charges shall be paid within 10 days from the date of publishing of charges by the SLDC in their website. If payments of the above charges are delayed by more than 2 days i.e. beyond 12 days from the date of issue of statement, a simple interest of 0.06% for each day of delay shall be levied.** This is without prejudice to any action that may be taken under Section 142 of the Act in addition to any action under Section 56 of the Act and other relevant Regulations. Further, **any excess or shortfall in the deviation charges will be reconciled at the end of every financial year and collection from generators or refund to generators shall be done by SLDC within 60 days on completion of every financial year.**

Provided that in case of delay in the Payment of Deviation Charges and interest thereon if any, beyond 12 days from the date of issue of the statement of charges for deviations, the QCAs/ generators who have to receive payments for earliest thereon, shall be paid from the balance available in the State Deviation Pool Account (Wind and Solar). **In case the balance available is not sufficient to meet the payments to the QCAs, the payment shall be made on pro rata basis from the balance available.**

## 14. DE-POOLING OF DEVIATION CHARGES



The QCA shall de-pool the Deviation Charges against each Generator in proportion to their actual generation by the generators and report to SLDC for further action.

## 15. INTIMATION OF CURTAILMENT

15.1 Any curtailment imposed on the energy injection for reliable and secure Grid operation in emergent situations shall be communicated by the SLDC to the QCA through an IT-enabled communication, and no Deviation Charges shall be payable on account of such curtailment.

15.2 In case of any curtailment planned and communicated by the SLDC due to line maintenance or other reasons in certain time blocks of a day, the QCA shall be responsible to intimate the respective generators for curtailing the generation at site and amending the Schedule accordingly, failing which the SLDC shall revise the Schedule as required.

## 16. ENERGY ACCOUNTING



16.1 The energy accounting shall be undertaken on the basis of the data recorded by the SEM referred to in Regulation 10.

16.2 All accounts relating to deviations within pooling sub-station / State-wide aggregation shall be prepared by the respective QCA on a monthly basis based on inputs from the SLDC and be accessible to the SLDC through an IT-enabled system and software.

16.3 The SLDC shall furnish the processed data on a monthly basis to the concerned QCA in the prescribed format for the preparation of monthly accounts of energy from the Pooling Sub-Station/Generators.

**16.4 Any discrepancy communicated by the QCA within 15 days shall be corrected forthwith by the SLDC after verification.**

16.5 The SLDC/Distribution licensee as mutually agreed shall prepare the statement of accounting of energy in each time block for the wind and solar energy generators and the procurers on monthly basis for the purpose of billing. The billing centre of the distribution licensee shall be responsible for energy accounting, raising and settlement of bills with the procurers.

16.6 A detailed energy accounting procedure shall be prepared by SLDC and submitted for approval to the Commission after undertaking stakeholder consultation in accordance to Regulation 5.22.



## **PART E**

# **MISCELLANEOUS**

## 17. POWER TO AMEND

The Commission may, at any time vary, modify or amend any provision of these Regulations.

## 18. REPEAL AND SAVINGS

- (1) Save as otherwise provided in these regulations, the “Tamil Nadu Electricity Regulatory Commission (Forecasting, Scheduling and Deviation Settlement and related matters for Wind and Solar Generation) Regulations, 2019” and Procedures thereof shall stand repealed from the date of coming into force of these regulations.
- (2) Anything done or action taken or purported to have been done in pursuance of the provisions of the earlier “Tamil Nadu Electricity Regulatory Commission (Forecasting, Scheduling and Deviation Settlement and related matters for Wind and Solar Generation) Regulations, 2019” shall be considered to be legal and valid.
- (3) Any rights and liabilities arising out of the earlier “Tamil Nadu Electricity Regulatory Commission (Forecasting, Scheduling and Deviation Settlement and related matters for Wind and Solar Generation) Regulations, 2019” shall be settled within its framework.

## 19. POWER TO REMOVE DIFFICULTIES

If any difficulty arises in giving effect to the provisions of these Regulations, the Commission may, by general or specific order, make such provisions not inconsistent with the provisions of the Act, as may appear to be necessary for removing the difficulty.

## 20. POWER TO RELAX

The Commission may by general or special order, for reasons to be recorded in writing, and after giving an opportunity of hearing to the parties likely to be affected by grant of relaxation, may relax any of the provisions of these Regulations on its own motion or on an application made before it by an interested person.

## 21. POWERS TO ISSUE DIRECTIONS

Subject to the provisions of the Act, 2003 and this Regulation, the Commission may, from time to time, issue orders and directions in regard to the implementation of the Regulation and procedure to be followed and various matters which the Commission has been empowered by this Regulation to specify or direct, as may be considered necessary in furtherance of the objective and purpose of this Regulation.



## COMMENTS & SUGGESTIONS



# COMMENTS & SUGGESTIONS



Ref No.	Draft Regulations 2023	Comments & Suggestions
2. (a)	Provided that when the scheduled generation is zero and if there is actual generation in a particular 15-minute block by the wind/solar generator(s), only 70% of the actual generation will be considered as scheduled generation;	Provided that when the scheduled generation is zero and if there is actual generation in a particular 15-minute block by the wind/solar generator(s), <b>only 85% of the actual generation</b> will be considered as scheduled generation;
4.2	The Commission shall review these Regulations including formulation for Absolute Error, Accuracy Band and Deviation charge thereof after two years, or earlier if it considers necessary	The Commission shall review these Regulations including formulation for Absolute Error, Accuracy Band and Deviation charge thereof <b>after three years</b> , or earlier if it considers necessary
5.1	Provided that the wind/solar generators who do not wish to avail the services of the single QCA appointed by the majority of the generators shall have the option to avail the services of the SLDC for forecasting and scheduling services.	<b>In case of engaging single QCA mandated by majority of the generators in the state connected to the intra state transmission network, the other generators connected in the intra state transmission network of the state have to accept the option to avail these services of SLDC for forecasting &amp; Scheduling services.</b>

# COMMENTS & SUGGESTIONS



Ref No.	Draft Regulations 2023	Comments & Suggestions
5.1	<p>Provided that an individual Generator connected to a sub-station that is designated as a Pooling sub-station as defined in 2(q) of this regulation may opt to function as a QCA on its own or appoint a separate entity as its QCA. However, multiple QCA(s) for single pooling sub-station will not be permitted.</p>	<p><b><i>In case of engaging single QCA at the state level, this proviso may not be required. Hence, the proviso is to be modified as below.</i></b></p> <p><b>Provided that in case of not engaging single QCA at the state level,</b> an individual Generator connected to a sub-station that is designated as a Pooling sub-station as defined in 2(q) of this regulation may opt to function as a QCA on its own or appoint a separate entity as its QCA. However, multiple QCA(s) for single pooling sub-station will not be permitted.</p>
4.2	<p>Provided that the wind/solar generators of the Pooling sub-station(s) having aggregate capacity up to 25 MW may aggregate their forecast, schedule with the QCA of the nearest Pooling sub-station.</p> <p>Provided further that, such wind/solar generators shall obtain concurrence of SLDC. The decision of SLDC in this regard shall be binding on the wind/solar generators.</p>	<p><b>Provided that in case of not engaging single QCA at the state level,</b> the wind/solar generators of the Pooling sub-station(s) having aggregate capacity up to 25 MW may aggregate their forecast, schedule with the QCA of the nearest Pooling sub-station.</p> <p>Provided further that, such wind/solar generators shall obtain concurrence of SLDC. The decision of SLDC in this regard shall be binding on the wind/solar generators.</p>

# COMMENTS & SUGGESTIONS



Ref No.	Draft Regulations 2023	Comments & Suggestions
5.2	This Forecasting and Scheduling Code specifies the methodology for Day-Ahead scheduling of Wind and Solar Energy Generators connected to the intra-State Transmission Network (Transmission and Distribution system), its revisions on a one and a half hourly basis, and the treatment of their deviations from such Schedules. Wind and Solar generators, either by themselves or represented by Qualified Coordinating Agencies shall comply with the requirements of forecasting and scheduling code as stipulated under these Regulations.	This Forecasting and Scheduling Code specifies the methodology for Day-Ahead scheduling of Wind and Solar Energy Generators connected to the intra-State Transmission Network (Transmission and Distribution system), <b>its revisions</b> and the treatment of their deviations from such Schedules. Wind and Solar generators, either by themselves or represented by Qualified Coordinating Agencies shall comply with the requirements of forecasting and scheduling code as stipulated under these Regulations.
5.6(c)	In case of single QCA chosen by the wind/solar generators, such single QCA is responsible for state level aggregation of scheduled generation for selling out power within Tamil Nadu and outside Tamil Nadu separately.	In case of single QCA chosen by the wind/solar generators, such single QCA is responsible for state level aggregation of scheduled generation for selling out power within Tamil Nadu and outside Tamil Nadu separately.  <b>In case of engaging more than one QCA by wind/solar generators, the respective QCA is responsible for providing schedule for their generators to whom they are responsibility and carry out all responsibilities of QCA.</b>

# COMMENTS & SUGGESTIONS



Ref No.	Draft Regulations 2023	Comments & Suggestions
5.6 (d)	The minimum term period of agreement between the QCA and the wind/solar generators shall be two years. Until new arrangement is put in place, existing QCA shall continue for further period up to 1 year.	The minimum term period of agreement between the QCA and the wind/solar generators shall be <b>three years</b> . Until new arrangement is put in place, existing QCA shall continue for further period up to 1 year.
5.6 (e)	The SLDC in their detailed procedure shall specify the qualification and other criterions viz. Business Rules/Net worth requirement etc. for the QCA.	The SLDC in their detailed procedure shall specify the qualification and other criterions viz. <b>Business Rules etc. for the QCA</b> .
5.9	The QCA shall provide real-time data relating to the power generation parameters and weather-related data, as may be required to the SLDC.	The SLDC shall provide real-time data relating to the power generation parameters as may be required to the QCA. (Or) <b>Remove this clause</b>
5.17	In addition to the deviation charges collected by the SLDC from the generators, it shall also recover the charges towards the forecasting and scheduling services provided by the QCA to the generators and such charges shall be mutually agreed between the generators and the QCA or as decided by the Commission. The amount so recovered by the SLDC shall be paid back to the respective QCA nominated by the generators.	In addition to the deviation charges collected by the SLDC from the generators, it shall also recover the charges towards the forecasting and scheduling services provided by the <b>QCA/QCA(s)/SLDC</b> to the generators and such charges shall be mutually agreed between the generators and the <b>QCA/QCA(s)/SLDC</b> or as decided by the Commission. The amount so recovered by the SLDC shall be paid back to the respective <b>QCA/SLDC as</b> nominated by the generators.

# COMMENTS & SUGGESTIONS



Ref No.	Draft Regulations 2023	Comments & Suggestions
5.20 (b)	Such revisions shall be effective from the 6th time block following the time block in which notice was given.	Such revisions shall be effective from the <b>4th time block</b> following the time block in which notice was given.
5.20 (c)	There may be one revision for each time slot of one and half hours starting from 00.00 hours of a particular day, subject to a maximum of 16 revisions during the day.	There may be <b>revisions</b> for each time slots starting from 00.00 hours of a particular day, subject to a maximum of 16 revisions during the day
6.2	Single QCA for state-wide aggregation shall be appointed by the majority of the wind/solar generators separately in terms of their combined installed capacity. The QCA at Pooling sub-station level shall be appointed with the approval of majority of the Generators connected to the polling sub-station in terms of their combined installed capacity, and on appointment with majority, the QCA shall perform all functions assigned in these Regulations for all generators for whom they are representing.	Single QCA for state-wide aggregation shall be appointed by the majority of the wind/solar generators separately in terms of their combined installed <b>capacity in MW</b> . The QCA at Pooling sub-station level shall be appointed with the approval of majority of the Generators connected to the polling sub-station in terms of their combined installed <b>capacity in MW</b> , and on appointment with majority, the QCA shall perform all functions assigned in these Regulations for all generators for whom they are representing. <b>In case of wind/solar generators who wish to avail services of the SLDC, all functions assigned to QCA in these regulations shall be performed by SLDC as QCA.</b>

# COMMENTS & SUGGESTIONS



Ref No.	Draft Regulations 2023			Comments & Suggestions		
7.2	<b>Table 1:</b> Deviation Charge for under or over injection of <u>wind power</u> , for sale or self-consumption of power within Tamil Nadu.			<b>Table 1:</b> Deviation Charge for under or over injection of <u>wind power</u> , for sale or self-consumption of power within Tamil Nadu.		
	Sl. No.	Absolute error in % terms in 15-minute time block	Deviation charges payable to state deviation pool account (wind and solar)	Sl. No.	Absolute error in % terms in 15-minute time block	Deviation charges payable to state deviation pool account (wind and solar)
	1	<= 15%	Nil	1	Up to 250 MW and <= 15%	Nil
	2	>15% but <=20%	At Rs. 0.25 per unit	2	Above 250 MW and >15% but <=20%	For the deviation <b>(i) Up to 250 MW and &lt;=15% is Zero. &amp;</b>
	3	> 20% but <= 30%	At Rs. 0.25 per unit for the shortfall or excess beyond 15% and up to 20%			(ii) At Rs.0.25 per unit for the deviation between 15% to 20%
			+ Rs. 0.50 per unit for the balance energy beyond 20% and up to 30%	3	Above 250 MW and > 20% but <= 30%	<b>(i) Up to 250 MW and &lt;=15% is Zero. &amp;</b>
	4	>30%	At Rs. 0.25 per unit for the shortfall or excess beyond 15% and up to 20%			(ii) At Rs.0.25 per unit for the shortfall or excess beyond 15% and up to 20%
			+ Rs. 0.50 per unit for the shortfall or excess beyond 20% and up to 30%	4	Above 250 MW and >30%	+ Rs. 0.50 per unit for the balance energy beyond 20% and up to 30%
			+ Rs.1.25 per unit for the balance energy beyond 30%			<b>(i) Up to 250 MW and &lt;=15% is Zero. &amp;</b>
						(ii) At Rs. 0.25 per unit for the shortfall or excess beyond 15% and up to 20%
						+ Rs. 0.50 per unit for the shortfall or excess beyond 20% and up to 30%
						<b>+ Rs.1.00 per unit for the balance energy beyond 30%</b>

# COMMENTS & SUGGESTIONS



Ref No.	Draft Regulations 2023			Comments & Suggestions		
7.2	<b>Table 2:</b> Deviation Charge for under or over injection of <u>solar power</u> , for sale or self-consumption of power within Tamil Nadu.			<b>Table 2:</b> Deviation Charge for under or over injection of <u>solar power</u> , for sale or self-consumption of power within Tamil Nadu.		
	Sl. No.	Absolute error in % terms in 15-minute time block	Deviation charges payable to state deviation pool account (wind and solar)	Sl. No.	Absolute error in % terms in 15-minute time block	Deviation charges payable to state deviation pool account (wind and solar)
	1	<= 10%	Nil	1	<b>Up to 250 MW and &lt;= 15%</b>	Nil
	2	>10% but <= 20%	At Rs.0.25 per unit	2	<b>Above 250 MW and &gt;15% but &lt;=20%</b>	<b>For the deviation</b> <b>(i) Up to 250 MW and &lt;=15% is Zero. &amp;</b> <b>(ii) At Rs.0.25 per unit for the deviation between 15% to 20%</b>
	3	> 20% but <= 30%	At Rs.0.25 per unit for the shortfall or excess beyond 10% and up to 20% + Rs. 0.50 per unit for the balance energy beyond 20% and up to 30%	3	<b>Above 250 MW and &gt; 20% but &lt;= 30%</b>	<b>(i) Up to 250 MW and &lt;=15% is Zero. &amp;</b> <b>(ii) At Rs.0.25 per unit for the shortfall or excess beyond 15% and up to 20%</b> + Rs. 0.50 per unit for the balance energy beyond 20% and up to 30%
	4	>30%	At Rs. 0.25 per unit for the shortfall or excess beyond 10% and up to 20% + Rs. 0.50 per unit for the shortfall or excess beyond 20% and up to 30% + Rs.1.25 per unit for the balance energy beyond 30%	4	<b>Above 250 MW and &gt;30%</b>	<b>(i) Up to 250 MW and &lt;=15% is Zero. &amp;</b> <b>(ii) At Rs. 0.25 per unit for the shortfall or excess beyond 15% and up to 20%</b> + Rs. 0.50 per unit for the shortfall or excess beyond 20% and up to 30% <b>+ Rs.1.00 per unit for the balance energy beyond 30%</b>

# COMMENTS & SUGGESTIONS



Ref No.	Draft Regulations 2023	Comments & Suggestions
7.6	The total deviation charges remitted on account of deviations by wind / solar generator(s) into State Deviation Pool Account in a financial year shall be capped at the Ceiling Rate of 5 paise per unit multiplied by the total annual generation at the respective Pooling sub-station(s)/total generated units in state-wide aggregation. Provided that the Commission may refix the ceiling rates every year based on the true- up petition filed by the SLDC for the preceding year.	The total deviation charges remitted on account of deviations by wind / solar generator(s) into State Deviation Pool Account in a financial year shall be capped at the <b>Ceiling Rate of 2 paise per unit</b> multiplied by the total annual generation at the respective Pooling sub-station(s)/total generated units in state-wide aggregation. Provided that the Commission may refix the ceiling rates <b>every three years</b> based on the true- up petition filed by the SLDC for the preceding year.
11. (C)	Communication of Grid constraints and curtailments by the SLDC to the QCA.	Communication of <b>Planned Grid constraints and curtailments</b> shall be intimated a day in advance.  <b>If unplanned Grid curtailments happened due to breakdown shall be intimated within 4 blocks of Grid drop by the SLDC to the QCA.</b>



# COMMENTS & SUGGESTIONS



Ref No.	Draft Regulations 2023	Comments & Suggestions
13.2	<p>The said charges shall be paid within 10 days from the date of publishing of charges by the SLD C in their website. If payments of the above charges are delayed by more than 2 days i.e. beyond 12 days from the date of issue of statement, a simple interest of 0.06% for each day of delay shall be levied. This is without prejudice to any action that may be taken under Section 142 of the Act in addition to any action under Section 56 of the Act and other relevant Regulations. Further, any excess or short fall in the deviation charges will be reconciled at the end of every financial year and collection from generators or refund to generators shall be done by SLDC within 60 days on completion of every financial year.</p>	<p>The said charges shall be paid within 10 days from the date of publishing of charges by the SLDC in their website. If payments of the above charges are delayed by more than 2 days i.e. beyond 12 days from the date of issue of statement, <b>a simple interest of 0.02%</b> for each day of delay shall be levied. This is without prejudice to any action that may be taken under Section 142 of the Act in addition to any action under Section 56 of the Act and other relevant Regulations. Further, any excess or short fall in the deviation charges will be reconciled at the end of every financial year and collection from generators or refund to generators shall be done by SLDC within 60 days on completion of every financial year.</p>

# COMMENTS & SUGGESTIONS



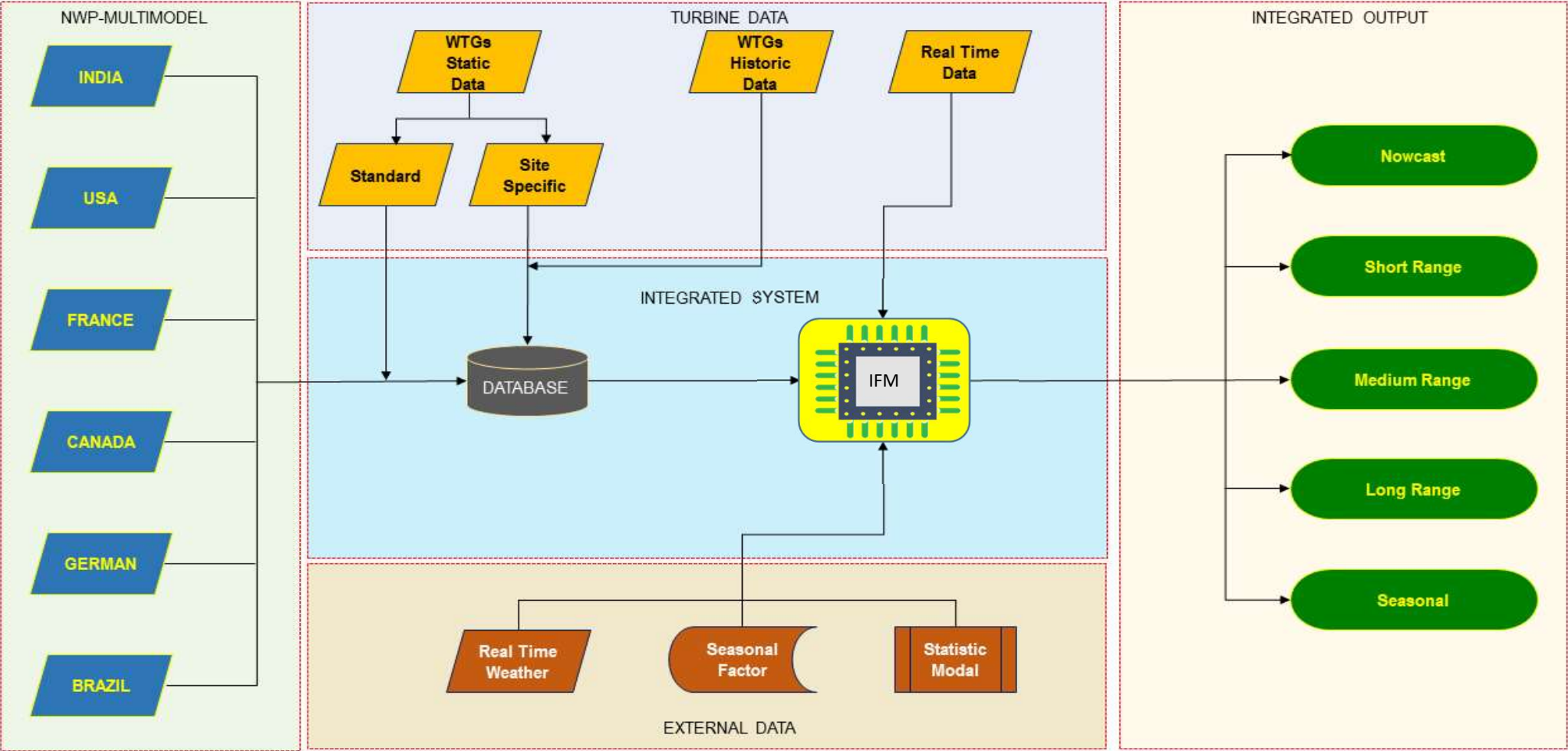
Ref No.	Draft Regulations 2023	Comments & Suggestions
15.2	In case of any curtailment planned and communicated by the SLDC due to line maintenance or other reasons in certain time blocks of a day, the QCA shall be responsible to intimate the respective generators for curtailing the generation at site and amending the Schedule, accordingly, failing which the SLDC shall revise the Schedule as required.	In case of any curtailment or <b>Grid Maintenance planned</b> and communicated by the SLDC due to line maintenance or other reasons in certain time blocks of a day, the QCA shall be responsible to intimate the respective generators for curtailing the generation at site and amending the Schedule, accordingly, failing which the SLDC shall revise the Schedule as required. All <b>Grid scheduled maintenance shall be carried out during lean wind season only.</b>



# **AN EXPERIENCE OF STATE LEVEL FORECASTING & COMMERCIAL ARRANGEMENTS**



# FORECASTING - METHODOLOGY



# DAY AHEAD & MEDIUM RANGE FORECAST

## ONE + 7 DAYS 15 MINS BLOCKS



TN WIND ENERGY FORECAST IN MW as on 24-Jul-2023 at 13:00 Hrs.								
Time	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul
00:00 - 00:15	4222	3459	3491	3058	3050	3145	3071	3513
00:15 - 00:30	4227	3490	3475	3004	2945	3098	2992	3504
00:30 - 00:45	4232	3519	3466	2957	2866	3039	2913	3500
00:45 - 01:00	4239	3525	3458	2917	2788	2967	2843	3513
01:00 - 01:15	4317	3431	3310	2875	2717	2893	2766	3495
01:15 - 01:30	4311	3447	3309	2841	2646	2825	2705	3491
01:30 - 01:45	4329	3438	3300	2804	2581	2748	2644	3503
01:45 - 02:00	4359	3449	3301	2774	2516	2678	2563	3501
02:00 - 02:15	4473	3393	3027	2737	2452	2608	2507	3432
02:15 - 02:30	4510	3396	3022	2698	2382	2555	2440	3434
02:30 - 02:45	4544	3409	3013	2671	2322	2481	2368	3434
02:45 - 03:00	4577	3417	3015	2651	2264	2416	2312	3393
03:00 - 03:15	3735	3307	2916	2533	2205	2348	2259	3361
03:15 - 03:30	3770	3323	2929	2510	2150	2287	2192	3309
03:30 - 03:45	3804	3327	2948	2496	2096	2216	2146	3281
03:45 - 04:00	3841	3315	2973	2473	2045	2157	2102	3258
04:00 - 04:15	3828	3299	2743	2455	1995	2093	2054	3283
04:15 - 04:30	3863	3287	2770	2446	1965	2024	2011	3237
04:30 - 04:45	3891	3272	2801	2434	1930	1978	1978	3207
04:45 - 05:00	3922	3253	2813	2420	1903	1927	1954	3161
05:00 - 05:15	3883	3135	2835	2414	1871	1888	1924	3192
05:15 - 05:30	3913	3119	2850	2403	1852	1858	1912	3168
05:30 - 05:45	3922	3116	2857	2396	1851	1831	1912	3119
05:45 - 06:00	3936	3128	2863	2379	1868	1827	1921	3147
06:00 - 06:15	3985	3105	2839	2371	1892	1836	1942	3161
06:15 - 06:30	3994	3137	2827	2360	1936	1851	1976	3188
06:30 - 06:45	4677	3189	2848	2370	1978	1871	2010	3214
06:45 - 07:00	4686	3260	2877	2398	2027	1895	2073	3232
07:00 - 07:15	4717	3330	2938	2449	1952	1932	2157	3261
07:15 - 07:30	4731	3421	2996	2497	2019	1971	2238	3288
07:30 - 07:45	4774	3510	3065	2550	2094	2006	2325	3310
07:45 - 08:00	4815	3612	3118	2614	2171	2047	2401	3326

TN WIND ENERGY FORECAST IN MW as on 24-Jul-2023 at 13:00 Hrs.								
Time	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul
08:00 - 08:15	4860	3560	3177	2675	2251	2090	2460	3474
08:15 - 08:30	4937	3644	3229	2743	2333	2142	2528	3494
08:30 - 08:45	5012	3716	3284	2809	2409	2192	2586	3519
08:45 - 09:00	5112	3747	3327	2877	2468	2250	2628	3558
09:00 - 09:15	4924	3829	3370	2941	2603	2313	2658	3587
09:15 - 09:30	5000	3816	3408	3009	2657	2368	2699	3615
09:30 - 09:45	5097	3814	3465	3082	2724	2447	2750	3650
09:45 - 10:00	5169	3877	3534	3156	2805	2534	2801	3691
10:00 - 10:15	5020	4130	3624	3239	2890	2642	2869	3719
10:15 - 10:30	5042	4196	3717	3327	2993	2758	2936	3755
10:30 - 10:45	5044	4265	3805	3407	3097	2890	3016	3799
10:45 - 11:00	5108	4340	3898	3514	3201	3013	3097	3841
11:00 - 11:15	5064	4311	3976	3623	3311	3155	3183	3868
11:15 - 11:30	5120	4384	4072	3729	3424	3307	3279	3919
11:30 - 11:45	5152	4456	4152	3831	3541	3452	3382	3958
11:45 - 12:00	5221	4525	4247	3931	3656	3614	3510	4052
12:00 - 12:15	5110	4552	4133	3854	3618	3780	3626	4147
12:15 - 12:30	5187	4607	4213	3956	3748	3954	3767	4235
12:30 - 12:45	5239	4660	4292	4061	3874	4107	3896	4325
12:45 - 13:00	5285	4709	4362	4175	4022	4273	4026	4418
13:00 - 13:15	5207	4666	4428	4281	4166	4417	4172	4372
13:15 - 13:30	5232	4710	4485	4405	4308	4579	4313	4462
13:30 - 13:45	5239	4736	4548	4514	4448	4713	4459	4553
13:45 - 14:00	5226	4753	4598	4637	4586	4840	4588	4645
14:00 - 14:15	5232	4681	4635	4761	4725	4957	4468	4664
14:15 - 14:30	5218	4684	4669	4877	4838	5056	4592	4748
14:30 - 14:45	5424	4687	4711	4968	4950	5158	4721	4826
14:45 - 15:00	5403	4692	4760	5052	5064	5253	4856	4842
15:00 - 15:15	5313	4780	4797	5117	5101	5043	4815	4836
15:15 - 15:30	5276	4783	4832	5174	5207	5123	4944	4840
15:30 - 15:45	5262	4770	4861	5229	5297	5195	5056	4850
15:45 - 16:00	5215	4733	4879	5265	5368	5274	5149	4850

TN WIND ENERGY FORECAST IN MW as on 24-Jul-2023 at 13:00 Hrs.								
Time	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul
16:00 - 16:15	5121	4835	4893	5306	5214	5271	5078	4857
16:15 - 16:30	5111	4792	4904	5330	5270	5328	5147	4865
16:30 - 16:45	5087	4715	4898	5340	5307	5364	5206	4866
16:45 - 17:00	5041	4671	4890	5354	5324	5381	5224	4867
17:00 - 17:15	4805	4689	4879	5357	5336	5386	5239	4871
17:15 - 17:30	4720	4643	4852	5347	5325	5376	5223	4867
17:30 - 17:45	4661	4576	4808	5317	5300	5325	5187	4877
17:45 - 18:00	4552	4530	4752	5270	5232	5260	5126	4794
18:00 - 18:15	4527	4389	4683	5201	5133	5158	5021	4716
18:15 - 18:30	4418	4302	4596	5116	5010	5040	4906	4628
18:30 - 18:45	4294	4219	4502	5027	4891	4907	4767	4549
18:45 - 19:00	4124	4127	4388	4922	4768	4744	4611	4473
19:00 - 19:15	4201	4135	4258	4796	4872	4993	4868	4466
19:15 - 19:30	4026	4034	4126	4672	4714	4813	4685	4389
19:30 - 19:45	3882	3938	4006	4553	4575	4657	4526	4321
19:45 - 20:00	3762	3858	3894	4454	4438	4524	4384	4256
20:00 - 20:15	3903	3729	3793	4356	4375	4385	4419	4312
20:15 - 20:30	3811	3689	3695	4270	4243	4265	4296	4248
20:30 - 20:45	3720	3640	3605	4179	4127	4139	4185	4179
20:45 - 21:00	3631	3599	3520	4094	4016	4011	4053	4165
21:00 - 21:15	3625	3651	3457	3991	3943	3893	3937	4143
21:15 - 21:30	3547	3620	3390	3890	3861	3789	3821	4123
21:30 - 21:45	3475	3587	3328	3793	3784	3684	3712	4112
21:45 - 22:00	3409	3548	3266	3691	3717	3604	3622	4103
22:00 - 22:15	3766	3624	3215	3588	3625	3539	3805	4073
22:15 - 22:30	3713	3589	3164	3486	3561	3471	3726	4064
22:30 - 22:45	3680	3553	3115	3388	3488	3408	3646	4043
22:45 - 23:00	3665	3530	3054	3281	3426	3341	3577	4028
23:00 - 23:15	3750	3564	3003	3167	3364	3277	3603	4009
23:15 - 23:30	3754	3534	2955	3067	3316	3210	3540	3996
23:30 - 23:45	3763	3510	2905	2956	3259	3132	3480	3975
23:45 - 00:00	3780	3488	2852	2872	3202	3059	3435	3926

0 MW	500 MW	1001 MW	1500 MW	2001 MW	2500 MW	3001 MW	4000 MW
501 MW	1000 MW	1501 MW	2000 MW	2501 MW	3000 MW	4001 MW	Above



# REAL TIME MONITORING SCREEN FOR SLDC



Forecasting Block : 64

24-07-2023 16:05:06

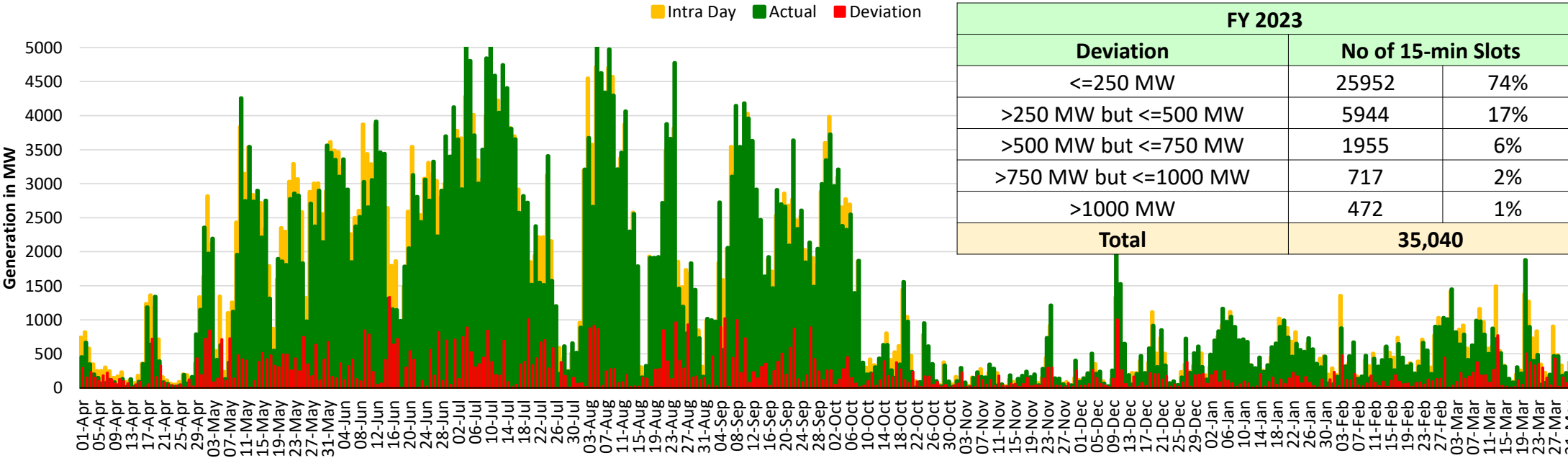
BLOCK No.	TIME BLOCK	TAMIL NADU - 8400.56 MW			ERODE LDC - 2909.675 MW			MADURAI LDC - 5490.885 MW		
		FCST	ACT	MC %	FCST	ACT	MC %	FCST	ACT	MC %
56	14:00-14:15	5232	4767	81.53	1744	1696	82.19	3488	3072	81.18
60	15:00-15:15	5313	4488	80.59	1752	1514	81.54	3561	2973	80.09
61	15:15-15:30	5276	4339	80.91	1752	1427	82.02	3524	2912	80.32
62	15:30-15:45	5262	4169	80.87	1757	1313	82.15	3504	2856	80.19
63	15:45-16:00	5216	3938	80.89	1752	1158	82.04	3464	2780	80.29
64	16:00-16:15	5121	3919	80.87	1764	1144	82.07	3357	2774	80.24
65	16:15-16:30	5111			1777			3335		
66	16:30-16:45	5087			1798			3288		
67	16:45-17:00	5041			1800			3241		
68	17:00-17:15	4806			1747			3059		
72	18:00-18:15	4527			1629			2898		

BLOCK No.	TIME BLOCK	TAMIL NADU - 8400.56 MW												ERODE LDC - 2909.675 MW			MADURAI LDC - 5490.885 MW											
		ARALVAIMOZHI 1800.635 MW			CUMBUM 583.300 MW			PALAKKAD 3308.375 MW			SENGOTTAI 2705.400 MW			PALAKKAD 2909.675 MW			ARALVAIMOZHI 1800.635 MW			CUMBUM 583.300 MW			PALAKKAD 398.700 MW			SENGOTTAI 2705.400 MW		
		FCST	ACT	MC %	FCST	ACT	MC %	FCST	ACT	MC %	FCST	ACT	MC %	FCST	ACT	MC %	FCST	ACT	MC %	FCST	ACT	MC %	FCST	ACT	MC %	FCST	ACT	MC %
56	14:00-14:15	971	738	73.88	388	349	86.68	2138	1978	82.47	1735	1702	84.34	1744	1696	82.19	971	738	73.88	388	349	86.68	395	282	84.52	1735	1702	84.34
60	15:00-15:15	939	603	73.50	365	367	81.24	2146	1808	81.67	1863	1709	83.83	1752	1514	81.54	939	603	73.50	365	367	81.24	394	294	82.68	1863	1709	83.83
61	15:15-15:30	916	584	73.98	362	371	81.24	2145	1718	82.28	1853	1667	83.75	1752	1427	82.02	916	584	73.98	362	371	81.24	393	291	84.16	1853	1667	83.75
62	15:30-15:45	911	557	74.00	359	371	81.60	2149	1579	82.50	1844	1662	83.27	1757	1313	82.15	911	557	74.00	359	371	81.60	392	266	84.99	1844	1662	83.27
63	15:45-16:00	896	505	74.04	354	373	82.09	2142	1408	82.39	1824	1651	83.35	1752	1158	82.04	896	505	74.04	354	373	82.09	390	250	84.99	1824	1651	83.35
64	16:00-16:15	848	499	74.04	360	376	82.09	2153	1395	82.42	1759	1648	83.25	1764	1144	82.07	848	499	74.04	360	376	82.09	390	251	84.99	1759	1648	83.25
65	16:15-16:30	830			378			2165			1737			1777			830			378			389			1737		
66	16:30-16:45	813			374			2185			1714			1798			813			374			387			1714		
67	16:45-17:00	793			370			2186			1693			1800			793			370			386			1693		
68	17:00-17:15	724			346			2131			1604			1747			724			346			385			1604		
72	18:00-18:15	598			349			2008			1572			1629			598			349			379			1572		

TN/ID/2023/Jul/24/04

FCST - FORECAST | ACT - ACTUAL | MC - METER CONNECTIVITY

# INTRA DAY FORECAST VS ACTUAL COMPARISON (FY2023)



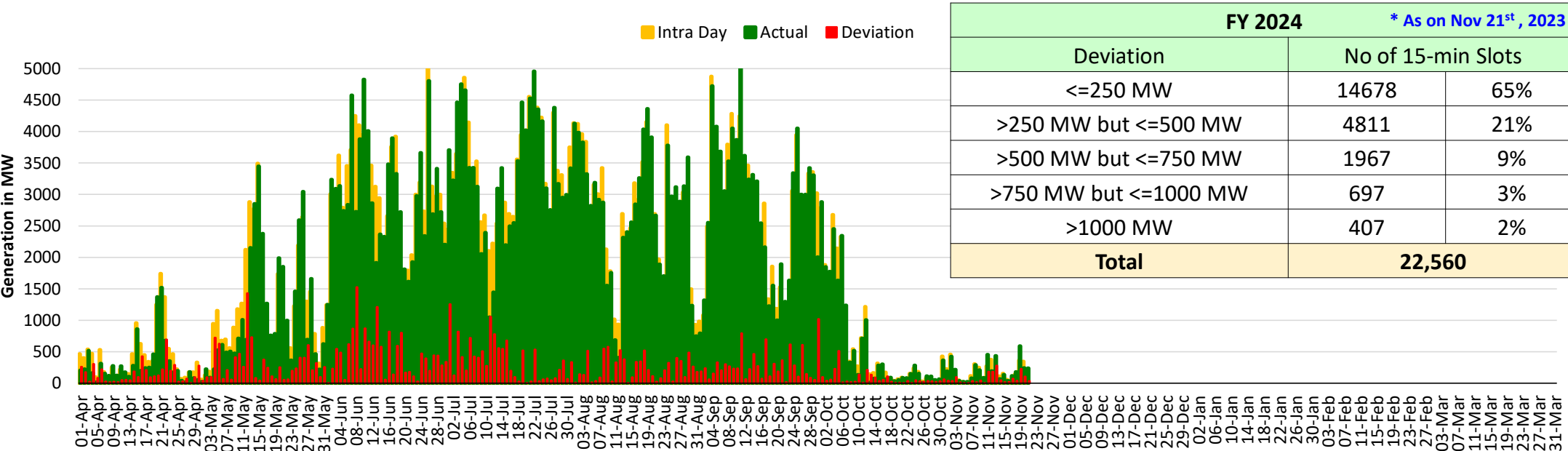
FY 2023		
Deviation		No of 15-min Slots
<=250 MW		25952      74%
>250 MW but <=500 MW		5944      17%
>500 MW but <=750 MW		1955      6%
>750 MW but <=1000 MW		717      2%
>1000 MW		472      1%
Total		35,040

Deviation MW	Deviation in 15 Minutes Slot (Month wise)																							
	Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar	
<=250	2302	80%	1411	47%	1231	43%	1763	59%	1959	66%	1887	63%	2377	80%	2756	93%	2642	89%	2665	90%	2480	83%	2479	83%
>250 but <=500	397	14%	907	30%	861	30%	738	25%	716	24%	690	23%	429	14%	83	3%	258	9%	284	10%	190	6%	391	13%
>500 but <=750	112	4%	404	14%	430	15%	302	10%	190	6%	180	6%	114	4%	37	1%	58	2%	27	1%	17	1%	84	3%
>750 but <=1000	46	2%	143	5%	185	6%	111	4%	77	3%	86	3%	35	1%	4	0%	14	0%	0	0%	1	0%	15	1%
>1000	23	1%	111	4%	173	6%	62	2%	34	1%	37	1%	21	1%	0	0%	4	0%	0	0%	0	0%	7	0%
Total	2880		2976		2880		2976		2976		2880		2976		2880		2976		2976		2688		2976	

90% of the blocks could be managed with 500 MW of balancing generation

Note:- Grid Drop and Machine breakdown not considered

# INTRA DAY FORECAST VS ACTUAL COMPARISON (FY2024)



FY 2024		* As on Nov 21 <sup>st</sup> , 2023	
Deviation		No of 15-min Slots	
<=250 MW		14678	65%
>250 MW but <=500 MW		4811	21%
>500 MW but <=750 MW		1967	9%
>750 MW but <=1000 MW		697	3%
>1000 MW		407	2%
Total		22,560	

Deviation MW	Deviation in 15 Minutes Slot (Month wise)															
	Apr		May		Jun		Jul		Aug		Sep		Oct		Nov*	
<=250	2568	89%	1997	67%	1361	47%	1479	50%	1632	55%	1255	42%	2479	83%	1907	64%
>250 but <=500	217	8%	638	21%	865	30%	985	33%	856	29%	820	28%	326	11%	104	3%
>500 but <=750	66	2%	243	8%	394	14%	368	12%	334	11%	434	15%	125	4%	3	0%
>750 but <=1000	25	1%	62	2%	176	6%	111	4%	79	3%	200	7%	42	1%	2	0%
>1000	4	0%	36	1%	84	3%	33	1%	75	3%	171	6%	4	0%	0	0%
Total	2880		2976		2880		2976		2976		2880		2976		2016	

85% of the blocks could be managed with 500 MW of balancing generation

Note:- Grid Drop and Machine breakdown not considered



# INTRA DAY MONTH-WISE ABSOLUTE ERROR SLOTS FY 2023

BASED ON AVAILABLE CAPACITY



FY 2023																										
Absolute Error	No. of Slots																									
	Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar		Total	%
<=15%	2844	99%	2789	94%	2613	91%	2850	96%	2850	96%	2794	97%	2935	99%	2880	100%	2967	100%	2976	100%	2688	100%	2962	100%	34148	97%
>15% but <=20%	36	1%	167	6%	252	9%	122	4%	122	4%	86	3%	38	1%	0	0%	9	0%	0	0%	0	0%	14	0%	846	2%
>20% but <=30%	0	0%	10	0%	15	1%	4	0%	4	0%	0	0%	3	0%	0	0%	0	0%	0	0%	0	0%	0	0%	36	0%
>30%	0	0%	10	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	10	0%
Total	2880		2976		2880		2976		2976		2880		2976		2880		2976		2976		2688		2976		35040	

$$\text{Abs. Error \%} = ((\text{Scheduled Power} - \text{Actual Power}) / \text{Available Capacity}) * 100$$

\* This Error Estimation Formula is followed in Other States (SS Wise), but under review by TNERC
 

Note:- Grid Drop and Machine breakdown not considered

# INTRA DAY COMMERCIAL ARRANGEMENT

DSM CHARGES BASED ON AVAILABLE CAPACITY (Abs. Error % = ((Sch Power – Act Power)/ AvC ) \* 100



S. No	Absolute Error in % terms in 15-minute time block	Deviation Charge payable to State Deviation Pool Account
1	<=15%	None
2	>15% but <=20%	At Rs. 0.25 per unit
3	>20% but <=30%	At Rs. 0.25 per unit for the shortfall or excess beyond 10% and upto 20% + Rs. 0.50 per unit for the balance energy beyond 20% and upto 30%
4	>30%	At Rs. 0.25 per unit for the shortfall or excess beyond 10% and upto 20% + Rs. 0.50 per unit for the balance energy beyond 20% and upto 30% + Rs. 1.00 per unit for the balance energy beyond 30%

FY 2023			
Month	Gen MU	DSM Rs. (Crore)	DSM Rs. Per KWh
Apr	214.60	0.0	0.00
May	1,687.68	0.3	0.00
Jun	2,031.15	0.1	0.00
Jul	2,216.73	0.0	0.00
Aug	1,988.42	0.0	0.00
Sep	1,789.31	-	0.00
Oct	692.48	0.0	0.00
Nov	142.58	-	0.00
Dec	416.49	-	0.00
Jan	484.28	-	0.00
Feb	380.91	-	0.00
Mar	452.39	0.0	0.00
Total	12,497.00	0.51	0.00
Annual Average			Less than quarter paise 62

Note:- Grid Drop and Machine breakdown not considered

# INTRA DAY MONTH-WISE ABSOLUTE ERROR SLOTS FY 2024

BASED ON AVAILABLE CAPACITY



FY 2024																											* As on Nov 21 <sup>st</sup> , 2023	
Absolute Error	No. of Slots																											
	Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar		Total	%		
<=15%	2866	100%	2918	98%	2705	94%	2888	97%	2861	96%	2598	90%	2950	99%	2015	100%									21801	97%		
>15% but <=20%	14	0%	58	2%	169	6%	88	3%	112	4%	272	9%	26	1%	1	0%									740	3%		
>20% but <=30%	0	0%	0	0%	6	0%	0	0%	3	0%	10	0%	0	0%	0	0%									19	0%		
>30%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%									0	0%		
Total	2880		2976		2880		2976		2976		2880		2976		2016		0		0		0		0		22560			

Abs. Error % = ((Scheduled Power – Actual Power)/ Available Capacity ) \* 100

Note:- Grid Drop and Machine breakdown not considered

# INTRA DAY COMMERCIAL ARRANGEMENT

DSM CHARGES BASED ON AVAILABLE CAPACITY (Abs. Error % = ((Sch Power – Act Power)/ AvC ) \* 100



S. No	Absolute Error in % terms in 15-minute time block	Deviation Charge payable to State Deviation Pool Account
1	<=15%	None
2	>15% but <=20%	At Rs. 0.25 per unit
3	>20% but <=30%	At Rs. 0.25 per unit for the shortfall or excess beyond 10% and upto 20% + Rs. 0.50 per unit for the balance energy beyond 20% and upto 30%
4	>30%	At Rs. 0.25 per unit for the shortfall or excess beyond 10% and upto 20% + Rs. 0.50 per unit for the balance energy beyond 20% and upto 30% + Rs. 1.00 per unit for the balance energy beyond 30%

FY 2024 <span>* As on Nov 21<sup>st</sup>, 2023</span>			
Month	Gen MU	DSM Rs. (Crore)	DSM Rs. Per KWh
Apr	248.21	0.0	0.00
May	869.36	0.0	0.00
Jun	2,389.69	0.1	0.00
Jul	2,828.29	0.0	0.00
Aug	2,007.76	0.0	0.00
Sep	2,237.44	0.1	0.00
Oct	489.41	-	0.00
Nov	99.39	-	0.00
Dec			
Jan			
Feb			
Mar			
Total	11,169.56	0.21	0.000
Annual Average			Less than quarter paise

Note:- Grid Drop and Machine breakdown not considered



# TN - INTRADAY MONTH-WISE ABSOLUTE ERROR SLOTS (AS PER LATEST DRAFT)

## BASED ON SCHEDULED GENERATION

FY 2023																										
Absolute Error	No of Slots																									
	Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar		Total	%
<=15%	349	12.1%	1640	55.1%	1698	59.0%	1963	66.0%	2025	68.0%	1930	67.0%	1002	33.7%	558	33.7%	946	31.8%	1374	46.2%	1156	43.0%	987	33.2%	15628	45%
>15% but <=20%	137	4.8%	353	11.9%	335	11.6%	224	7.5%	203	6.8%	257	8.9%	225	7.6%	176	7.6%	303	10.2%	347	11.7%	307	11.4%	266	8.9%	3133	9%
>20% but <=30%	353	12.3%	425	14.3%	370	12.8%	270	9.1%	228	7.7%	331	11.5%	396	13.3%	332	13.3%	448	15.1%	509	17.1%	502	18.7%	460	15.5%	4624	13%
>30%	2041	70.9%	558	18.8%	477	16.6%	519	17.4%	520	17.5%	362	12.6%	1353	45.5%	1814	45.5%	1279	43.0%	746	25.1%	723	26.9%	1263	42.4%	11655	33%
Total	2880		2976		2880		2976		2976		2880		2976		2880		2976		2976		2688		2976		35040	

Abs. Error % = ((Scheduled Power – Actual Power)/ Scheduled Power ) \* 100

Note:- Grid Drop and Machine breakdown not considered



# PROPOSED FORMULA INTRA DAY COMMERCIAL ARRANGEMENT

**DSM CHARGES BASED ON SCHEDULED POWER** (Abs. Error % = ((Sch. Power – Act Power)/ Sch. Power ) \* 100

S. No.	Absolute error in % terms in 15-minute time block	Deviation charge payable to state deviation pool account (wind and solar)
1	<= 15%	Nil
2	>15% but <=20%	At Rs.0.25 per unit
3	> 20% but <= 30%	At Rs.0.25 per unit for the shortfall or excess beyond 15% and upto 20% + Rs. 0.50 per unit for the balance energy beyond 20% and upto 30%
4	>30%	At Rs. 0.25 per unit for the shortfall or excess beyond 15% and upto 20% + Rs. 0.50 per unit for the shortfall or excess beyond 20% and up to 30% + Rs.1.25 per unit for the balance energy beyond 30%

DSM Calculations - FY2023			
Month	Gen MU	DSM Rs. (Crore)	DSM Rs. Per Kwh
Apr	215.08	6.95	0.32
May	1687.95	6.49	0.04
Jun	2031.31	6.52	0.03
Jul	2215.92	3.04	0.01
Aug	1988.45	3.58	0.02
Sep	1789.98	3.12	0.02
Oct	691.57	4.68	0.07
Nov	142.58	3.88	0.27
Dec	416.50	4.27	0.10
Jan	484.26	2.78	0.06
Feb	381.15	2.39	0.06
Mar	452.20	4.58	0.10
<b>Total</b>	<b>12496.95</b>	<b>52.27</b>	<b>0.04</b>
<b>Annual Avg.</b>			<b>4.18 Paise</b>

**Note:-** Grid Drop and Machine breakdown not considered



# TN - INTRADAY MONTH-WISE ABSOLUTE ERROR SLOTS (AS PER LATEST DRAFT)

## BASED ON SCHEDULED GENERATION

FY 2024																											* As on Nov 21 <sup>st</sup> , 2023			
Absolute Error	No of Slots																													
	Apr		May		Jun		Jul		Aug		Sep		Oct		Nov*		Dec		Jan		Feb		Mar		Total	%				
<=15%	738	25.6%	1176	39.5%	2118	73.5%	2517	84.6%	1995	67.0%	1852	64.3%	860	28.9%	430	28.9%									11686	52%				
>15% but <=20%	218	7.6%	339	11.4%	306	10.6%	212	7.1%	267	9.0%	281	9.8%	224	7.5%	146	7.5%									1993	9%				
>20% but <=30%	404	14.0%	498	16.7%	302	10.5%	163	5.5%	331	11.1%	354	12.3%	438	14.7%	288	14.7%									2778	12%				
>30%	1520	52.8%	963	32.4%	154	5.3%	84	2.8%	383	12.9%	393	13.6%	1454	48.9%	1152	48.9%									6103	27%				
Total	2880		2976		2880		2976		2976		2880		2976		2016										22,560					

Abs. Error % = ((Scheduled Power – Actual Power)/ Scheduled Power ) \* 100

Note:- Grid Drop and Machine breakdown not considered



# PROPOSED FORMULA INTRA DAY COMMERCIAL ARRANGEMENT

**DSM CHARGES BASED ON SCHEDULED POWER** (Abs. Error % = ((Sch. Power – Act Power)/ Sch. Power ) \* 100

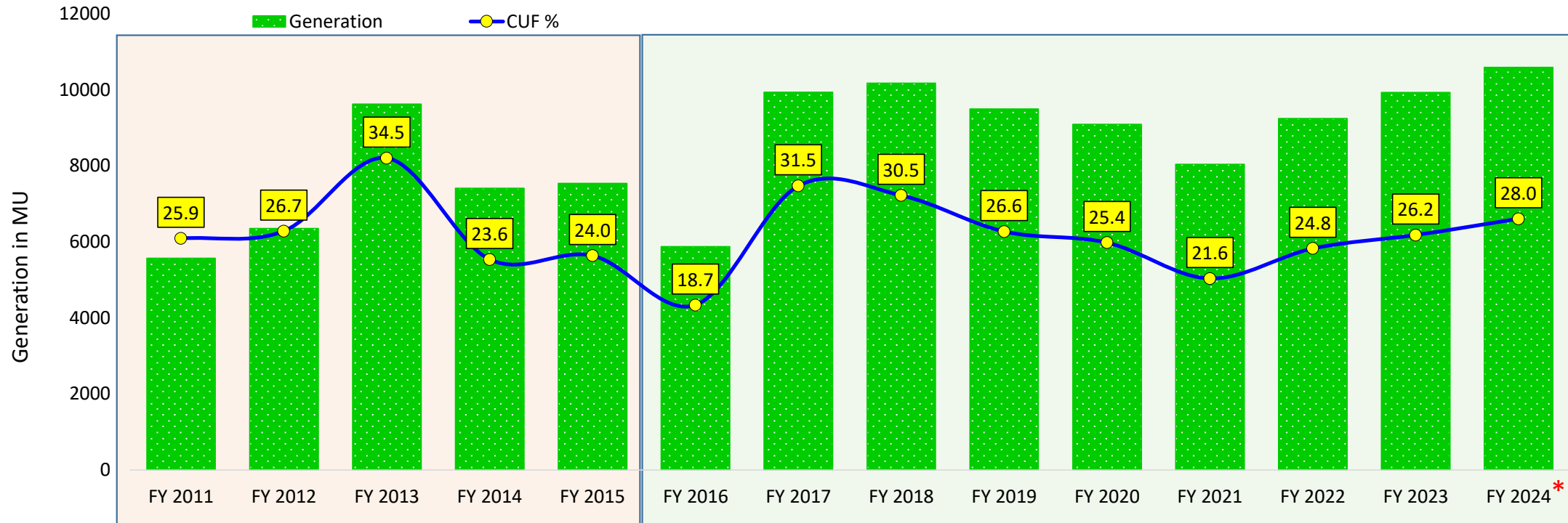
S. No.	Absolute error in % terms in 15-minute time block	Deviation charge payable to state deviation pool account (wind and solar)
1	<= 15%	Nil
2	>15% but <=20%	At Rs.0.25 per unit
3	> 20% but <= 30%	At Rs.0.25 per unit for the shortfall or excess beyond 15% and upto 20% + Rs. 0.50 per unit for the balance energy beyond 20% and upto 30%
4	>30%	At Rs. 0.25 per unit for the shortfall or excess beyond 15% and upto 20% + Rs. 0.50 per unit for the shortfall or excess beyond 20% and up to 30% + Rs.1.25 per unit for the balance energy beyond 30%

FY2024 <span>* As on Nov 21<sup>st</sup>, 2023</span>			
Month	Gen MU	DSM Rs. (Crore)	DSM Rs. Per Kwh
Apr	248.21	4.34	0.17
May	869.36	4.95	0.06
Jun	2389.69	2.51	0.01
Jul	2828.29	1.23	0.00
Aug	2007.76	4.07	0.02
Sep	2237.44	5.18	0.02
Oct	489.41	3.93	0.08
Nov	99.39	2.69	0.27
Dec			
Jan			
Feb			
Mar			
<b>Total</b>	<b>11169.56</b>	<b>28.90</b>	<b>0.03</b>
<b>Annual Avg.</b>			<b>2.59 Paise</b>

**Note:-** Grid Drop and Machine breakdown not considered



# GRID AVAILABILITY COMPARISONS



Avg. Capacity (MW)	5034	5427	6701	7149	7149	7149	7386	7624	8308	8488	8488	8507	8618	8621
Generation (MU)	7222.0	7802.4	11311.9	9208.4	8655.4	6905.5	12312.9	12499.9	10999.7	10849.3	10628.2	11332.8	12499.1	10596.4
Grid Availability (%)	95.2	91.13	95.2	79.65	80.4	74.4	93.04	95.15	95.38	93.51	92.11	93.2	96.6	97.1
Grid % Increase		-4.5%	4.3%	-19.5%	0.9%	-8.1%	20.0%	2.2%	0.2%	-2.0%	-1.5%	1.2%	3.5%	0.5%

Grid Availability as per Leap Green windmills SW Wind : Day Max 117 MU on 04-Jul-2023, Hourly max 5901 MW 10-Sep-2023 15:00 Hrs. Min. Wind 7.23 MU on 29-May-2023 \* FY 2024 as on H1

# WIND GRID BACKDOWN RECORDING & REPORTING



1

Leap Green Energy

This device Rating New

Wind Forecast  
Leap Green Energy Pvt Ltd • Weather  
16 MB 1T+

Green Energy  
Green Energy Saving Comp... • Productivity  
16 MB 1T+

Green Energy 101  
Shaffer and Sons • Education  
6.2 MB 100+

Download Application from Play Store

2

Sign Up

USER REGISTER

Company Name

UserName

Password

Mobile Number

GENERATE OTP

VERIFY OTP

Already Registered / Sign In

USER LOGIN

UserName

leap

Password

LOGIN

New User / Sign Up

Sign In

4

Leap Green

INTRA DAY DAY AHEAD WEEK AHEAD WEATHER TREND

Forecasting Block : 68 Jun 03 2021 17:04:53

Tamil Nadu Summary

Tamil Nadu Capacity - 8272 MW		
Block #	Time	Wind Power Forecast
64	16:00	1974
68	17:00	2177
69	17:15	2207
70	17:30	2200

Home Page

5

Tamil Nadu Substation Wise Backdown

Backdown Entry Screen

SS Selection

6

-Select Substation-

ACHANPUDUR

ALAGAPURI\_GAMESA 10(1)

ALAMARATHUR

AL

AMUTHAPURAM(WF)

ANAIKADAVU

ANDIPATTY

ANGALAKURCHI

ANNANAGAR(WF)

7

-Select-

Asian

Balu

Feeder Selection

Best-2

Dollar

Gangotri

Back down as per LD messages

SS-Maintenance

SS-Breakdown

Feeder Maintenance

Feeder Breakdown

Line Trip/Breakdown

LC Stoppages (LC for Other

Nature Calamities

Select Backdown Type

8

Set date and time

03 Apr 2021

04 May 2022

Select Date & Time

17 01

18 02

CLEAR CANCEL SET

LGE Forecast

ANTHIYUR(WF) Back Down Detail\*\*

+ Add Back Down

Feeder Name\*

LMW

Connected Capacity in MW\*

11.55

Back Down in MW\*

11.55

Start Time\*

04/05/2022, 5:00 pm

End Time\*

04/05/2022, 6:00 pm

Remarks

Back down as per LD messages

Save Cancel

9

Submit


10

Consolidated Backdown Reports

70

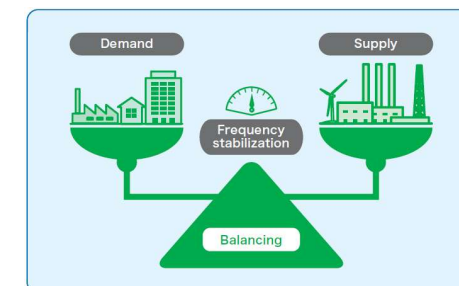
# DEVELOPMENTS-DEMAND FORECASTING



 <b>Leap Green Energy</b> <i>We Partner Your Tomorrow</i>			
Tamilnadu Energy Demand Forecast in MW as on 21-Nov-2023 18:00 Hrs			
TIME	22-Nov	23-Nov	24-Nov
00:00	11592	11974	12117
01:00	11066	11463	11661
02:00	10733	11057	11455
03:00	10528	10916	11413
04:00	10524	10897	11589
05:00	10800	11151	11777
06:00	11486	11933	12575
07:00	13110	13551	13849
08:00	13491	13966	14269
09:00	13594	14327	14369
10:00	13891	14439	14445
11:00	13864	14411	14494
12:00	13791	14148	13966
13:00	13463	13498	13701
14:00	13277	13404	13482
15:00	13677	13629	13553
16:00	13788	13650	13666
17:00	14074	13939	14145
18:00	14135	14634	14867
19:00	14143	14660	14804
20:00	13588	14034	14636
21:00	13174	13742	14283
22:00	13013	13445	14063
23:00	12425	12753	13487
<b>Total MU</b>	<b>307.23</b>	<b>315.62</b>	<b>322.67</b>

LEGEND	
From	To
<=10000 MW	
>10000 MW && <=12000 MW	
>12000 MW && <=14000 MW	
>14000 MW && <=16000 MW	
>16000 MW && <=18000 MW	
>18000 MW	

- Day Ahead Demand Forecast
- Hourly and 15 mins interval
- Short Range Forecast (3 days)
- Daily Bulletin Time 18:00 hrs .
- Fuzzy logic based Statistical Model integrated with weather Model.
- Started on 14<sup>th</sup> March 2023



# DEVELOPMENTS-SOLAR FORECASTING



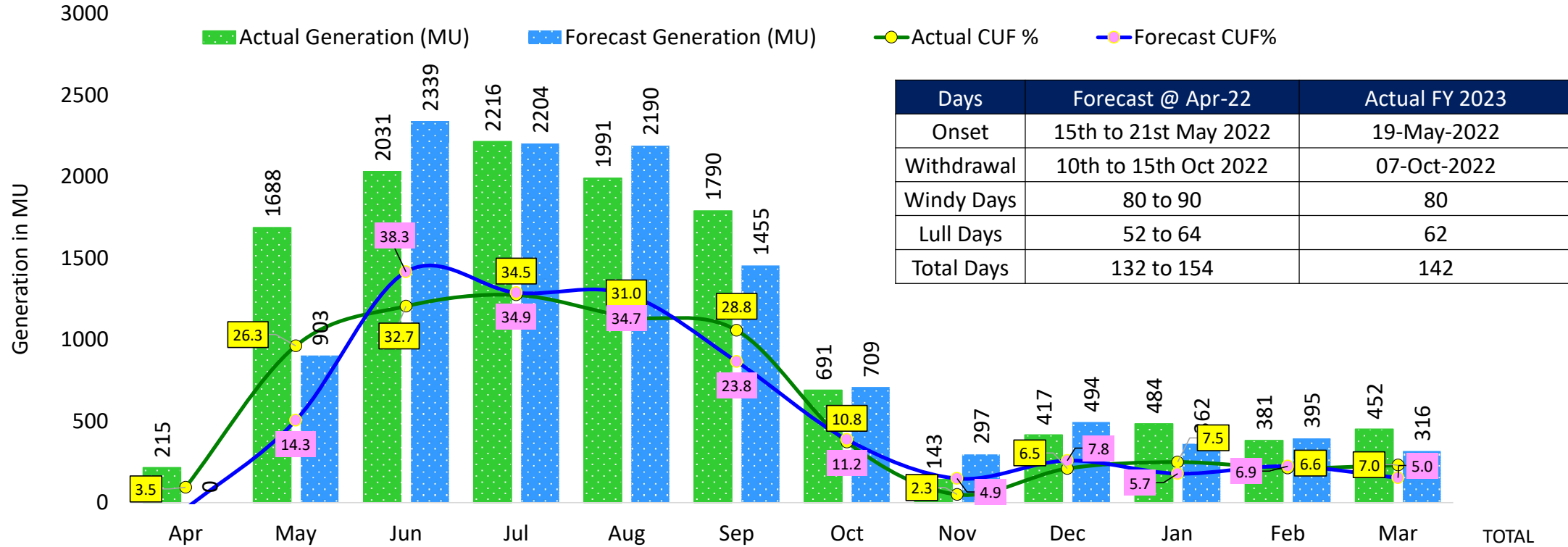
 <b>Leap Green Energy</b> <i>We Partner Your Tomorrow</i>			
Solar Power Forecast 956 MW as on 21-Nov-2023 06:30 Hrs			
TIME	21-Nov	22-Nov	23-Nov
00:00	-	-	-
01:00	-	-	-
02:00	-	-	-
03:00	-	-	-
04:00	-	-	-
05:00	-	-	-
06:00	10.04	10.03	10.04
07:00	61.78	56.18	48.86
08:00	190.79	190.71	164.20
09:00	325.03	340.71	306.57
10:00	401.82	454.93	409.91
11:00	424.01	514.89	470.81
12:00	444.77	509.00	493.60
13:00	458.29	450.89	469.23
14:00	430.48	366.27	412.13
15:00	340.89	271.82	336.42
16:00	225.43	179.84	243.09
17:00	112.71	90.67	128.91
18:00	31.11	23.81	30.41
19:00	-	-	-
20:00	-	-	-
21:00	-	-	-
22:00	-	-	-
23:00	-	-	-
<b>Total LU</b>	<b>34.57</b>	<b>34.60</b>	<b>35.24</b>

LEGEND	
From	To
>= 500 MW	
>=400 MW && <500 MW	
>=300 MW && <400 MW	
>=200 MW && <300 MW	
>=100 MW && <200 MW	
<100 MW	

- State Level Forecast 956 MW
- Day Ahead Solar Forecast
- Hourly and 15 mins interval
- Short Range Forecast (3 days)
- Daily Bulletin Time 18:00 hrs.
- Solar Time-based forecast
- Started on 29<sup>th</sup> May 2023
- Different types of Cloud based Forecast



# LONG RANGE FORECAST & WIND GENERATION OVERVIEW FY 2023



Forecast Gen.(MU)	215*	903	2339	2204	2190	1455	709	297	494	362	395	316	11879
Actual Gen. (MU)	215	1688	2031	2216	1991	1790	691	143	417	484	381	452	12499
Forecast CUF%	3.5*	14.3	38.3	34.9	34.7	23.8	11.2	4.9	7.8	5.7	6.9	5.0	15.7
Actual CUF %	3.5	26.3	32.7	34.5	31.0	28.8	10.8	2.3	6.5	7.5	6.6	7.0	16.6

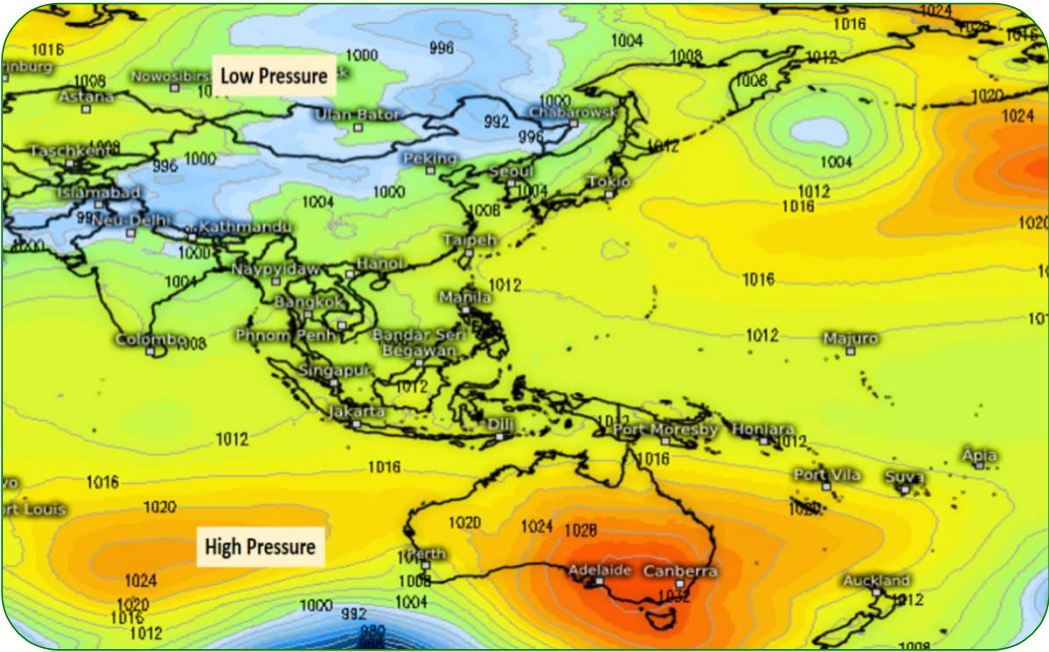
\* Long Range Forecast not given

TN Windmill Capacity 8621 MW

73  
<30% PLF is LULL day



# WIND GENERATION FORECAST FOR SW MONSOON FY 2024



El-Nino Southern Oscillation (ENSO) – El Niña



Indian Ocean Dipole - Positive



Rainfall – Abnormal



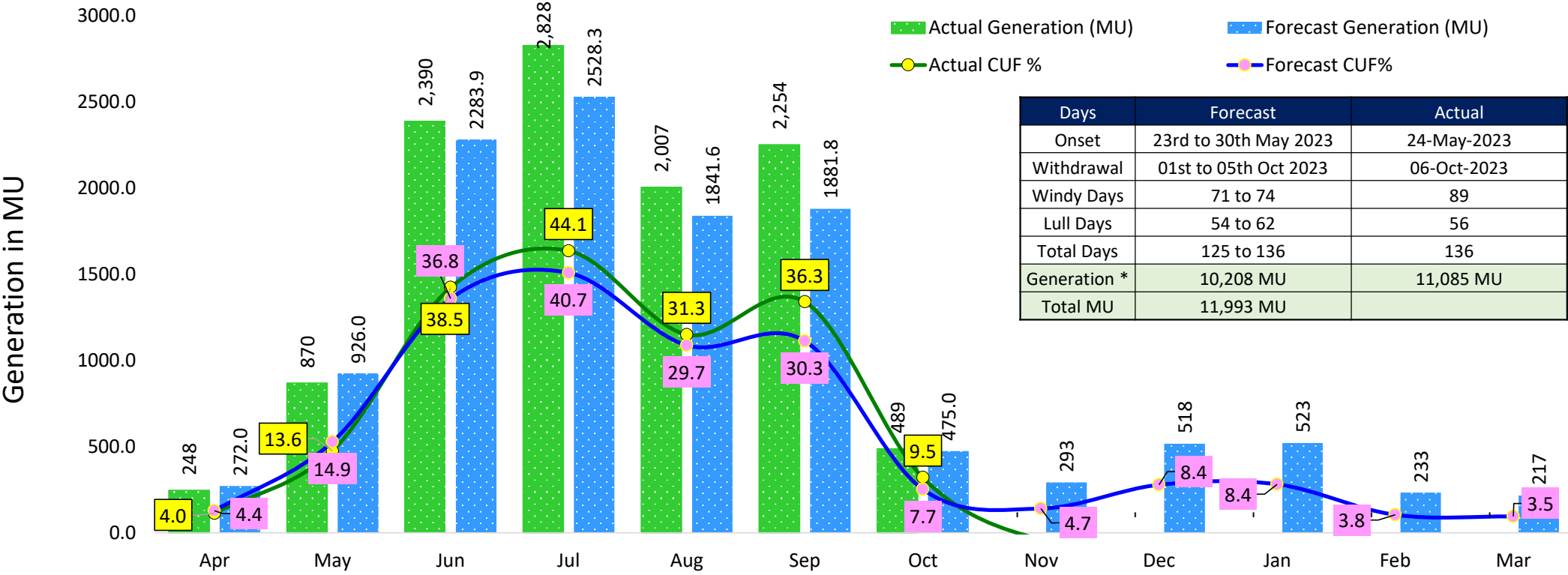
Wind - Below Normal

As per the latest analysis, wind direction is getting transition from East and South. ENSO and IOD conditions are neutral during the month of June and July resulting prevailing normal wind pattern, the Southern Ocean Pressure is not favourable for monsoon wind season during August and September due to El-nino and Positive IOD. Rainfall likely to be increasing drastically in second half of the season resulting many wind dips.

On overall basis, the Southwest monsoon wind season (May to Sep 2023) is expected to have a decrease in average wind speed and about 10-15% decrease in generation when compared to last year due to pertaining El-nino conditions.

# LONG RANGE FORECAST & WIND GENERATION OVERVIEW

## FY 2024



Days	Forecast	Actual
Onset	23rd to 30th May 2023	24-May-2023
Withdrawal	01st to 05th Oct 2023	06-Oct-2023
Windy Days	71 to 74	89
Lull Days	54 to 62	56
Total Days	125 to 136	136
Generation *	10,208 MU	11,085 MU
Total MU	11,993 MU	

Actual Generation (MU)	247.6	869.5	2390.0	2828.3	2007.4	2253.6	489.1	-	-	-	-	-
Actual CUF %	4.0	13.6	38.5	44.1	31.3	36.3	9.5	-	-	-	-	-
Forecast Generation (MU)	272.0	926.0	2283.9	2528.3	1841.6	1881.8	475.0	293	518	523	233	217
Forecast CUF%	4.4	14.9	36.8	40.7	29.7	30.3	7.7	4.8	8.5	8.6	3.8	3.6



## BENEFITS OF STATE LEVEL FORECASTING FOR SLDC

1. Deviations from scheduled generations is measured which helps SLDC for better planning of generation
2. Single QCA – Coordination between QCA and SLDC will be simple and easy
3. Single Schedule – Easy for scheduling and energy balancing by SLDC
4. Single DSM account – Easy to maintain DSM account, billing and collection
5. Single Communication – Easy to communicate on grid maintenance, load shedding and also machine available capacity
6. Weather abnormalities – weather abnormalities affecting the state tertiary shall be monitored and updated at regular intervals





## BENEFITS OF STATE LEVEL FORECASTING FOR GENERATORS

1. Better evacuation of wind generations due to improved forecasting at state level
2. Better Grid Availability for wind generators due to better communication between SLDC and wind generators through single QCA
3. Maintenance Planning – Wind generators shall plan their scheduled maintenance activities based on the forecast so as to minimise generation loss
4. Avoid losses on assets due to extreme weather conditions with weather prediction provided by QCA

# THANK YOU



**REDUCED CARBON EMISSION**

**103,39,985 Tonnes**



**REDUCED WATER CONSUMPTION**

**7253 Million Litres**



FY 2024 as on OCT