सत्यमेव जयते

भारत सरकार/ Government of India
विद्युत मंत्रालय/ Ministry of Power
केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority
आर. ए. प्रभाग / Regulatory Affairs Division

To,

सचिव (सी.ई.आर.सी.),
केंद्रीय विद्युत विनियामक आयोग,
6वीं, 7वीं और 8वीं मंजिल, टावर बी, वर्ल्ड ट्रेड सेंटर,
नौरोजी नगर, नई दिल्ली-110029

Subject: CERC Staff Paper on "Shortening the scheduling Timeline for Real Time Markets in India" - regarding.

Sir,

Reference is invited to CERC public notice dated 06.05.2026 vide which CERC has circulated a **Staff Paper on "Shortening the scheduling Timeline for Real Time Markets in India"** for inviting comments/suggestions/objections from stakeholders.

In this regard, comments of CEA on the **Staff Paper on "Shortening the scheduling Timeline for Real Time Markets in India"** is attached at **Annexure**.

This issues with the approval of Chairperson, CEA.

भवदीय/ Yours faithfully,

Digitally signed by
Sharad Chandra Bhupesh
Date: 04-06-2026
19:53:11

(शरद चंद्र भूपेश / Sharad Chandra Bhupesh)
उप निदेशक (आर.ए.)/ Deputy Director (RA)

Copy to:

I. **मुख्य अभियंता (R&R), विद्युत मंत्रालय, श्रम शक्ति भवन, नई दिल्ली**

Annexure

Comments/observations of CEA Staff Paper on "Shortening the scheduling Timeline for Real Time Markets in India"

The staff paper proposes to reduce the timeline between commencement of RTM bidding and commencement of delivery of power from the existing 75 minutes to 50 minutes for the first delivery block of each RTM session. The proposed reduction of 25 minutes is to be achieved though the following measures:

- The Bidding window for RTM is currently 15 minutes which is proposed to be reduced to 5 minutes thereby shortening the scheduling time by 10 minutes.
- The rest 15 minutes shortening is proposed to be achieved through clubbing the activities currently earmarked for SCUC & SCED optimization and TRAS dispatch requiring two (2) time blocks currently to one (1) time block.

It is opined that the above shortening of scheduling would help in better RE integration and system reliability. However, it is felt that there is further scope for optimizing the scheduling timeline and improvement in RTM.

1) Optimizing the RTM clearing window

a) The timelines for the Real Time Markets as specified in the IEGC, 2023 are as follows:

Regulation 49

(q) Procedure for scheduling of transaction in Real-time market (RTM):

(i) All the entities participating in the real-time market including TRAS may place their bids and offers on the Power Exchange(s) for purchase and sale of power

(ii) The window for trade in real-time market for day (D) shall open from 22.45 hrs to 23.00 hrs of (D-1) for the delivery of power for the first two time-blocks of 1st hour of day (D) i.e., 00.00 hrs to 00.30 hrs, and will be repeated every half an hour thereafter.

(iii) NLDC shall indicate to the Power Exchange(s) the available margin on each of the transmission corridors before the gate closure.

(iv) The power exchanges shall clear the real-time bids from 23.00 hrs till 23.15 hrs of 'D-1' day based on the available transmission corridor and the buy and sell bids for the real time market (RTM) for the specified duration and intimate the cleared bids to NLDC by 23.15 hrs, for scheduling.

(r) NLDC shall finalise schedules under RTM, SCED and Ancillary Services by 23.30 hrs. of 'D-1' day and RLDC shall publish the final schedules for dispatch by 23.35 hrs. of 'D-1'day.

As such, the IEGC mandates NLDC to provide available margin on each transmission corridor to the power exchange(s) **before the gate closure**.

b) As per the current practice, which is also mentioned in the staff paper, after the gate closure time of RTM, the following activities are performed in the next time block:

RTM clearing

- Matching of buy/sell bids by power exchanges to obtain provisional/unconstrained solution and its transmission to NLDC.
- Verification of combined trade volumes against corridor-wise ATC margins and exchange-wise margin allocation.
- Fetching of ATC margins by power exchanges, running constrained solution and transmission of final results to NLDC.
- Verification of traded volumes against margins and trade acceptance.

c) From the above, it is understood that while the IEGC, 2023 mandates NLDC to provide available margin before gate closure of RTM based on which power exchange(s) clears the bids post gate closure. However, in practice, after gate closure, the power exchange(s) first obtain an unconstrained solution which is sent to NLDC wherein corridor-wise ATC margins and exchange-wise margin allocation is done. Thereafter, ATC margins are fetched by power exchanges, based on which a constrained solution is obtained and sent to NLDC as final results.

It may be explored whether corridor-wise and exchange-wise transmission margins can be pre-computed and provisionally allocated before gate closure so that power exchanges may directly run constrained clearing algorithms after gate closure, thereby reducing iterative processing time and further shortening of RTM timeline by 5-10 minutes.

2) Moving towards a 15-minute Real Time Market

a) In the Real time market, the bidding is done for two (2) time blocks at a time i.e. Buyers and sellers can place buy/sell bids for each 15-minute time block in the half-hourly real-time market. Under the Real Time Market, Power exchanges conduct 48 RTM sessions per day and the scheduling process takes about 75 minutes from the commencement of RTM bidding to the start of the delivery time block. However, this 75-minute timeline is for the first delivery block of the RTM session whereas, the timeline for the second delivery block is 90 minutes.

b) The staff paper proposes to reduce time between the Bidding commencement of RTM session and the commencement of delivery of power from the current 75 minutes to 50 minutes. However, this is applicable for the first time block. For the second time block, the timeline would implicitly reduce from the current 90 minutes to 65 minutes.

c) Considering the above, it is mentioned that Real Time Market (RTM) was introduced in India in June 2020 as a half-hourly market for collective transactions of real-time contracts through Power Exchange(s). Given the technological advancement, experience gained in operation of RTM and future plan of moving towards 5-minute scheduling, it may be explored whether RTM sessions can be transitioned from the current half-hourly structure to a 15-minute market structure. This would help in making the proposed timeline of 50 minutes consistent across all time blocks and better RE integration. A transition to 15-minute RTM structure may also serve as an intermediate step towards eventual implementation of 5-minute scheduling, dispatch and balancing framework in the Indian power system. However, such transition may require detailed assessment of computational, communication, and operational readiness of power exchanges, Grid-India, SLDCs, and market participants.

d) Moreover, as per IEGC 2023, for revision of schedule, any revision in the schedule made in odd time blocks becomes effective from the 7th time block onwards, and any revision in the schedule made in even time blocks becomes effective from the 8th time block onwards, counting the time block in which the request for revision has been received to be the first one. These different timelines for revision of schedule based on odd/even time blocks are primarily linked with the existing half-hourly RTM structure and associated scheduling cycle. As such, moving towards a 15-minute RTM market structure would facilitate uniform schedule revision timelines irrespective of the time block in which the revision request is made.

e) International experience in electricity market design indicates a progressive movement towards shorter gate closure timelines and closer-to-real-time balancing mechanisms. Several mature electricity markets such as PJM, ERCOT and Australia operate with 5-minute dispatch intervals, while European markets are progressively moving towards shorter intraday gate closure timelines from 60 minutes to 30 minutes ahead of delivery. Similarly, CAISO operates a 15-minute market followed by 5-minute real-time dispatch. These reforms have largely been driven by increasing renewable energy penetration and the need for improved balancing efficiency, forecasting accuracy and operational flexibility.

3) Exploring RTM as market-based balancing mechanism

a) Regulation 48 of the IEGC, 2023 provides for scheduling from alternate sources of power by a generating station under specified conditions such as Unit Shut Down (USD), forced outage of unit(s), or replacement of scheduled generation by Renewable Energy Generating Stations (REGS). Under these provisions, a generating station may procure power through bilateral transactions or collective transactions, and the scheduled quantum from alternate sources is adjusted against the schedule of the generating station.

Further, as per IEGC, 2023, revision of Declared Capacity (DC) and schedule on account of forced outage of a generating unit or ESS (as an injecting entity) is presently permitted primarily in the context of bilateral transactions and not in case of collective transactions. Similarly, in case of requirement of revision of schedule due to forecasting error, a WS seller can revise its schedule only in case of bilateral transactions and not in case of collective transactions. Such revision of schedule becomes effective from the time block and in the manner as discussed in the previous paras.

b) In this regard, it is observed that the existing alternate source framework under Regulation 48 already incorporates certain elements of portfolio-based obligation fulfilment within the existing market framework, wherein scheduled obligations may be met through alternate sources under specified conditions. Similar concepts are observed in several mature electricity markets where market participants manage portfolio positions and balancing obligations through intraday and balancing market mechanisms.

It is further observed that there exists an important distinction between revision of schedule and procurement of replacement power through collective market segments such as RTM. In case of revision of schedule, the drawal schedule of the beneficiary may also undergo corresponding revision. However, in case a generator procures replacement power through RTM or other collective market mechanisms

to meet its scheduled obligation, the drawal schedule of the beneficiary may remain unchanged and only the source of supply undergoes change. Such framework may potentially facilitate market-based balancing while preserving firmness of schedules for buyers.

c) Considering the increasing penetration of renewable energy and progressive convergence of DSM framework applicable to conventional generators and WS sellers, it may be explored whether limited market-based balancing mechanisms may be permitted for generators through collective market segments such as RTM for management of residual deviations arising due to real-time operational uncertainties and forecasting errors. However, any such provision would require careful examination of associated issues relating to market gaming, intentional under-scheduling, speculative trading and grid balancing implications. To minimize the risk associated with such provision, the generators may be allowed to buy power only upto a certain percentage say 5-10% of their installed capacity/scheduled generation.

d) Under the present framework, RE generators participating through bilateral transactions have relatively greater flexibility for schedule revision on account of forecasting errors as compared to collective market-cleared schedules such as DAM transactions, where post-clearing revision flexibility is not available. Consequently, RE generators participating through collective market segments may face relatively higher residual DSM exposure arising from forecast deviations. As such, an RTM based balancing mechanism may also potentially facilitate balancing of obligations arising from collective market-cleared transactions, including DAM-cleared schedules of renewable energy generators, while preserving the firmness of beneficiary schedules and avoiding reopening of market-cleared positions. This would also help in enhancing participation in collective market segments.

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