



Power Chronicle

Power System Overview & Analysis

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Editorial

Emergence of the short-term electricity market, particularly Day-ahead Market speaks about the ability of the generators as well as utilities and consumers in rebalancing their portfolio leading to improved availability of electricity at competitive prices. Short-term market also helped in addressing frequency deviations as short-term changes in demand and supply could be rebalanced on a day-ahead basis.

Growing penetration of renewable energy sources, particularly wind and solar energy, poses challenges for the utilities as well as system operation due to the associated variability and uncertainty. Tightening of frequency band under DSM and linking of UI price to the DAM price, and introduction of RRAS has further helped to address deviations from schedule near to the time block of delivery.

Real Time Market (RTM) paves a new era for the Indian power market that would help to address the uncertainty associated with renewable as well as load forecast. This would also help address deviations, allow near time rebalancing of portfolio and encourage competition.

Covid-19 pandemic has casted its impact on the Indian power sector as it reduced electricity demand since the beginning of lockdown in March 2020. With unlocking of the economy, demand for electricity has begun recovering. DAM volume as well as price has also recovered marginally over the last quarter. However, the pandemic would dent overall growth prospects for the power sector in the near term, necessitating policy push to ensure recovery of the sector.

EAL's opinion in the past has contributed to the evolution of the implementation framework for SCED (see previous issues of this newsletter). The expansion of SCED to include intra-state entities may require necessary amendment to the state-level grid code, allowing for modification of schedule through SCED. Further, capacity building of the SLDCs would also support participation of state-level entities in the SCED.

Anoop Singh

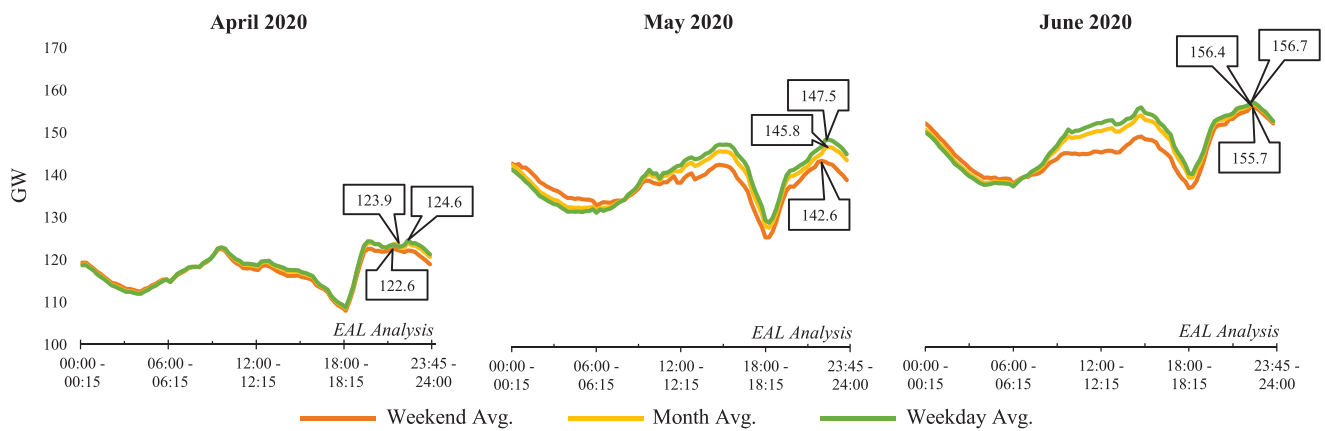
Founder & Coordinator, Energy Analytics Lab



Register at eal.iitk.ac.in to access data and resources

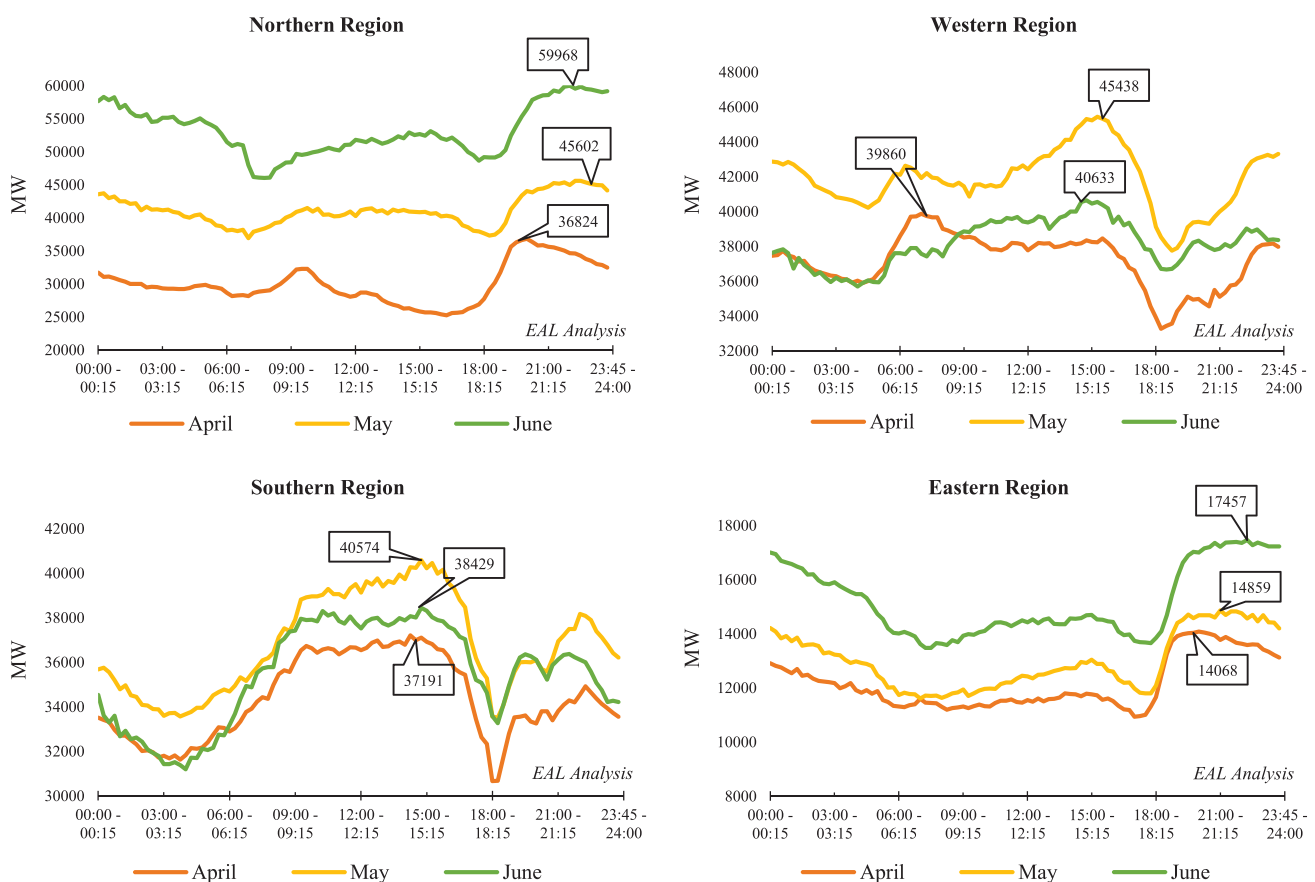
Power System Overview & Analysis

All India Demand Met Profile



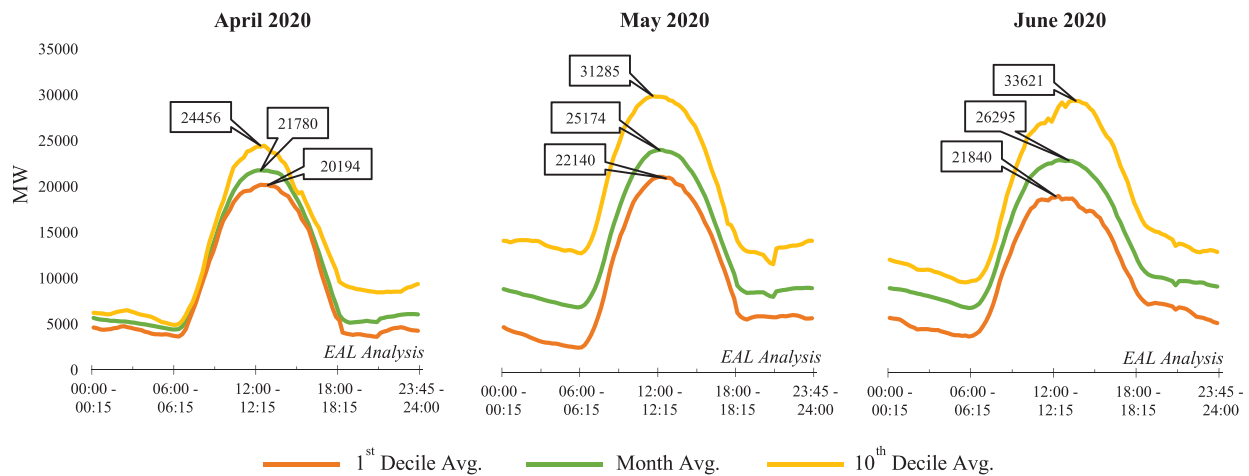
During April to June quarter, all India peak demand reached 164.9 GW (22:15 - 22:30) on 23rd June 2020, about 10 percent lower than the previous year's peak demand recorded at 182.3 GW (14:45 - 15:00) on 30th May 2019 during the same quarter. During COVID-19 lockdown, demand for electricity witnessed significant decline across the regions. Beginning with un-lockdown in June, electricity demand increased in comparison with April and May 2020, however, it remained less than that in June 2019.

Region-wise Demand Met Profile



Demand and generation profiles at India and state-level can be accessed on EAL's web portal.

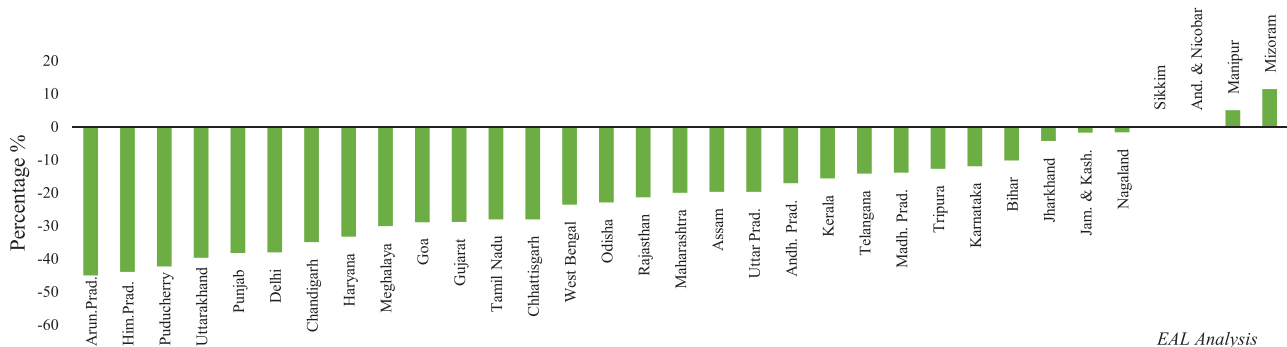
All India Renewable Energy (RE) Generation Profile



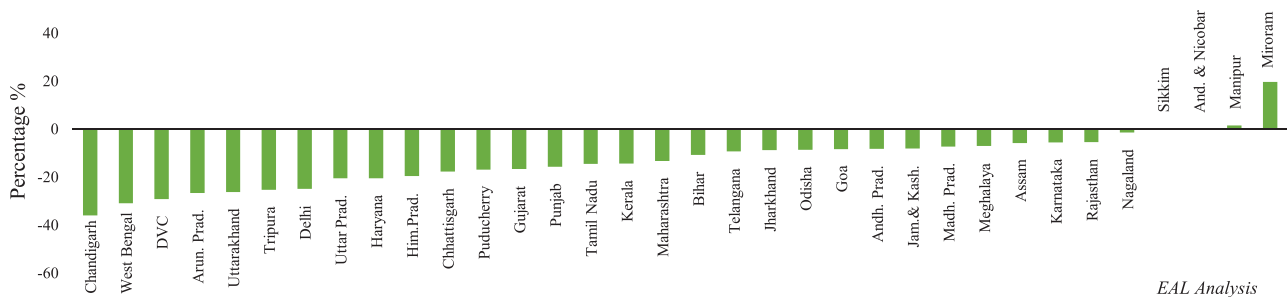
All India peak RE generation reached 34.72 GW (13:45 - 14:00) on 19th June 2020, about 9.4 percent higher than the previous year's high of 31.73 GW (11:15 - 11:30) on 17th June, 2019 during same quarter.

COVID-19: Impact on Monthly Electricity Supply across States/UTs

Decline in Energy Supply in April 2020 w.r.t April 2019

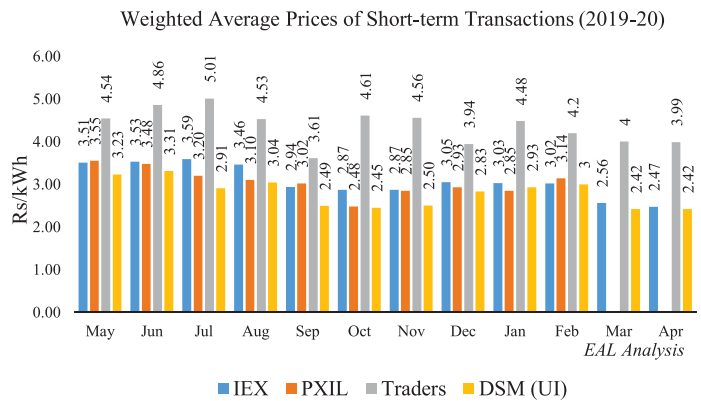
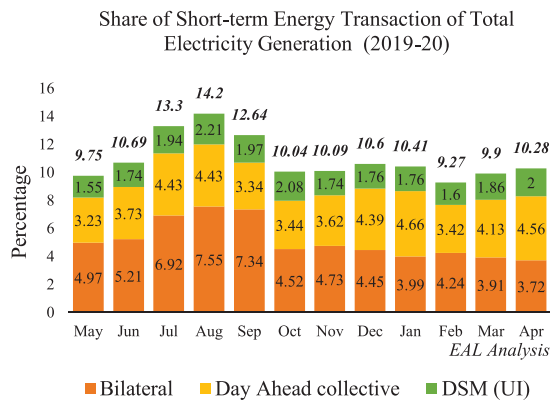


Decline in Energy Supply in May 2020 w.r.t. May 2019

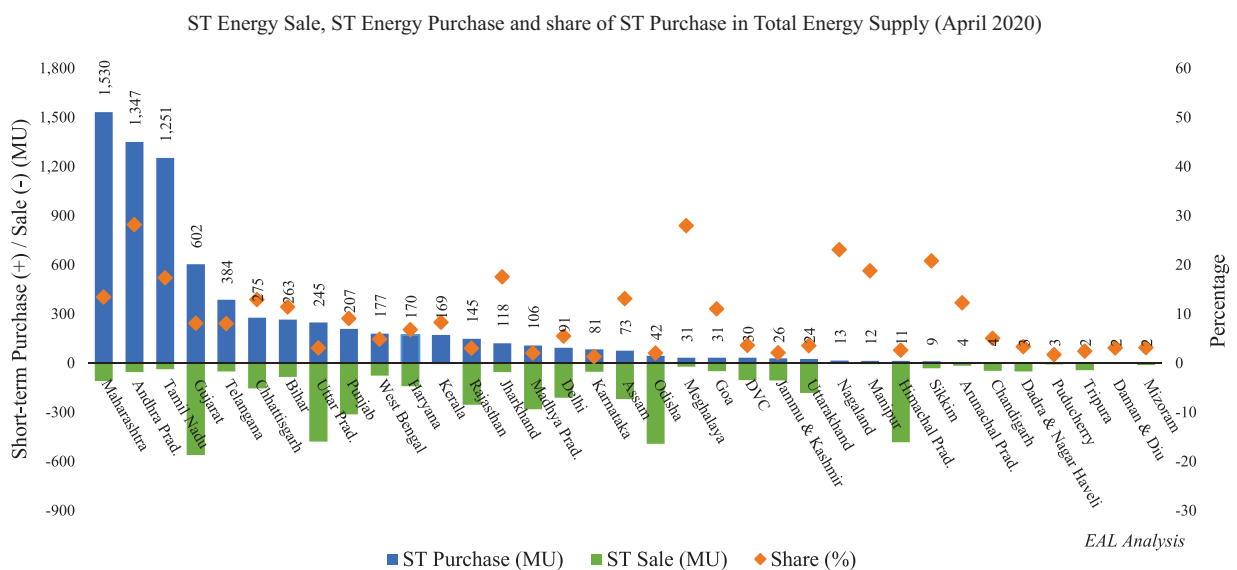
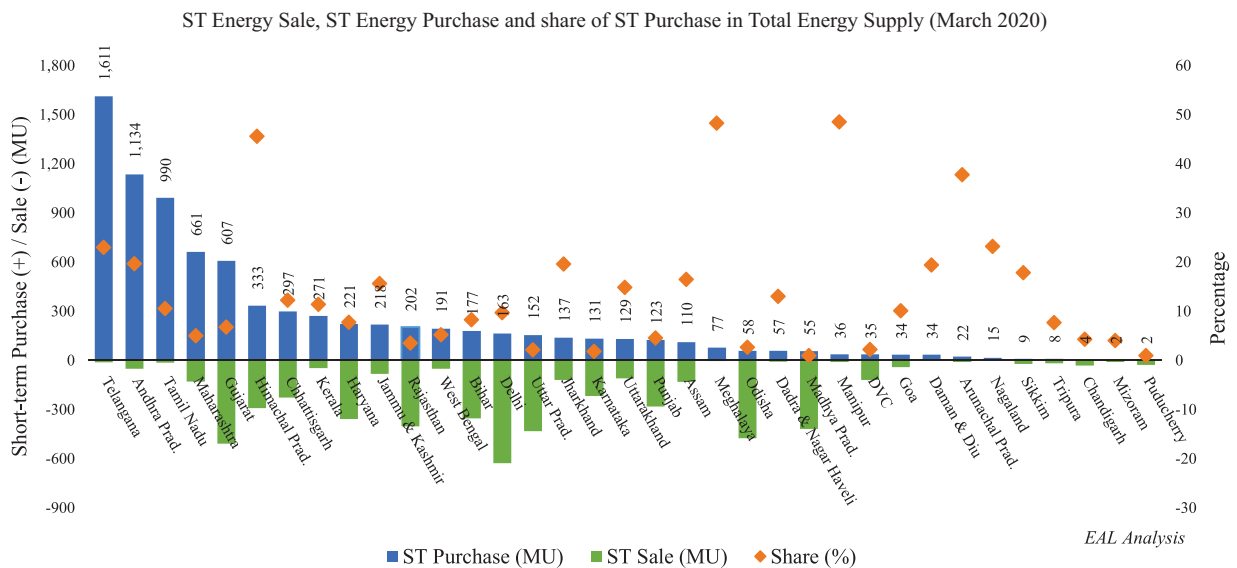


Due to COVID-19, all India decline in energy supply for April, May and June FY-20 were recorded to be 23%, 15% and 11% respectively with respect to the same recorded during the FY-19.

Short-term (ST) Energy Transactions

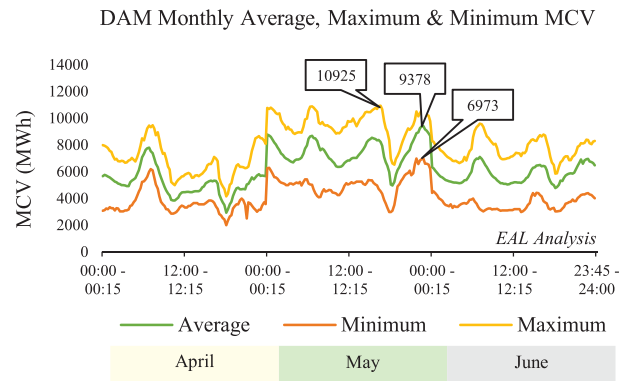
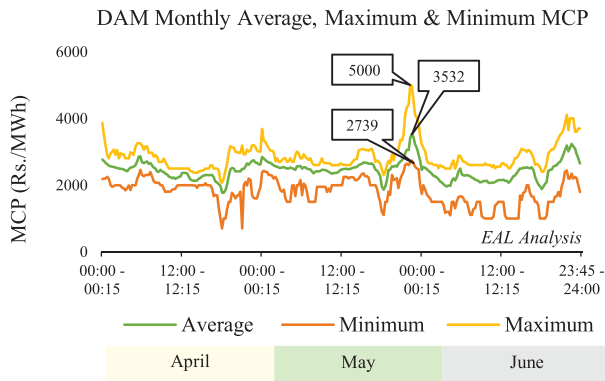


Monthly Short-term Purchase and Sale Quantum across States



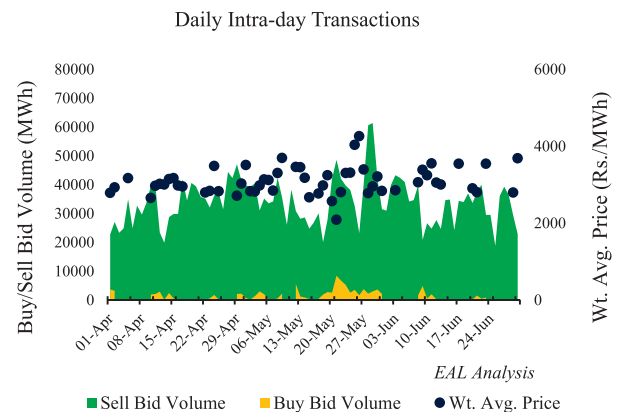
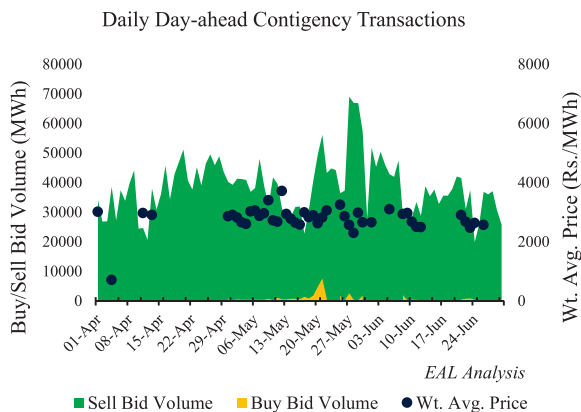
Power Market Overview & Analysis

DAM – Market Clearing Price (MCP) & Market Clearing Volume (MCV)



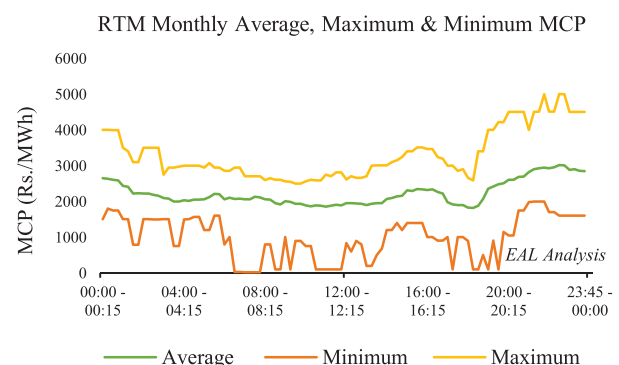
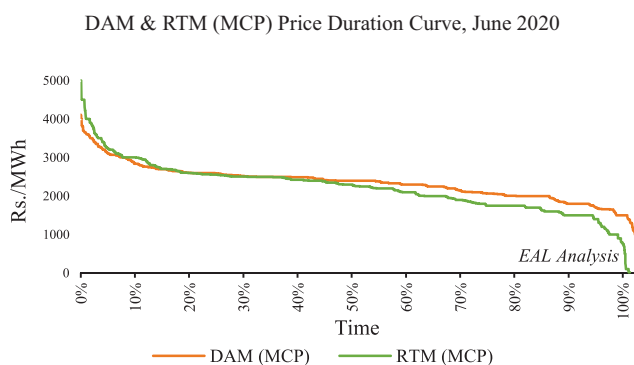
Lowest MCP during the quarter was discovered on 18th April 2020 (Rs. 699.83 per MWh). The highest MCP at Rs. 5000.74 per MWh was recorded on 27th May 2020.

Term-ahead Market (TAM)



The weighted average clearing price observed in Intra-day market during April to June quarter is higher in comparison to the Day-ahead contingency market. Also, the proportion of sale bids in Term-ahead market is much higher when compared to purchase bids placed in the Term-ahead market.

RTM & DAM Price Duration Curve and RTM Market Clearing Price



Regulatory & Policy Perspectives

Revised Procedure for Pilot on SCED for Generating Stations PAN India

The revised procedure released by POSOCO for Pilot on SCED for generating stations PAN India and implemented as "Expanded SCED Pilot" from 1st June 2020.

Overview

- CERC expanded SCED participation to Intra-state generating stations scheduled by SLDCs.
- The multi-fuel ISGS stations are excluded due to operational complexity.
- Expanded SCED Pilot follows the multi-period optimization while revising the schedule for the next time block.*
- Any post-facto revision in rates/charges by participating generators is not permitted.
- The variable charges of the participant generators are computed as follows:

SCED participant Generator	Variable Charges
Full capacity tied in multiple PPAs	Weighted average of the variable charges
Only part capacity tied in PPAs	Weighted average of the variable charges for the contacted portion of the capacity
No tied capacity (merchant generator)	Considered as intimated by such generator to concerned RLDC/NLDC through RPC

- The participating SCED generators also communicate the details of constituent-wise share in generating station, requisition (day-ahead and last revision) from the generating station to respective RLDC and RPCs.
- A SCED generator with no tied capacity (merchant generator) will inform about contracts for power sale entered in LTA/MTOA. It will submit revised information of variable charges at least seven working days in advance before the commencement of scheduling of the same to the concerned RLDC and RPCs.
- The benefits are cleared quarterly to the SCED participant generator.
- The benefit sharing to the generators with untied capacity cleared in proportion to their schedule at first and remaining benefit is equally shared between the generators and DISCOMs.
- A benefit sharing ratio of 60:40 applies to the generators in the expanded pilot on SCED. A cap of Rs. 0.07/kWh is applicable in respect of the 'tied capacity' of generators. Benefit over the cap is transferred to the DISCOMs.

*Note: EAL, based on an in-house developed modelling analysis, had suggested adoption of such multi-period optimisation which leading to additional cost savings.

EAL OPINION

- ✍ In the light of participation of intra-state generators in the SCED, the intra-state grid code needs to be appropriately amended to account for SCED related re-scheduling and processes thereof.
- ✍ In the case of merchant generators participating in SCED, the variable charges should be revised as per LTA/MTOA entered into and its supporting information should be shared with POSOCO.
- ✍ In the case of central sector generators with unallocated capacity share, benefit sharing for such capacity should not be undertaken as 'untied' capacity for such durations.
- ✍ In the absence of up gradation and seamless integration of SLDC software, the respective SLDC may exposed to a counter party risk in case of a communication failure. It highlights the need of adequate capacity building of SLDCs, and enhancing feedback protocols to identify and address such communication failures.

Real Time Market - Transmission Corridor Allocation

CERC launched RTM from 1st June, 2020 and concerning the difficulties in the transmission corridor allocation, certain provisions were implemented.

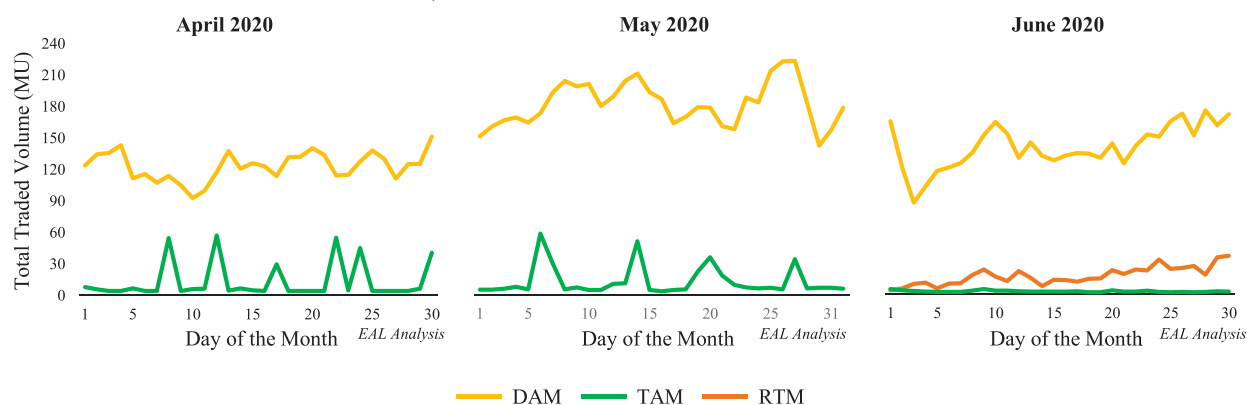
- ❑ Various options for allocation of transmission corridor in events of transmission congestion were based on:
 - A. Cleared volume in DAM
 - B. Previous cleared volume in RTM
 - C. Ratio of initial market clearing volume of RTM
- ❑ Transmission corridor allocation is done on the basis of initial market clearing volume of RTM by each power exchange without any transmission constraint.
- ❑ In order to segregate RTM with the performance of the Power Exchange(s) and the unavailability of pro / reference data, mechanism A & B are not feasible at this stage.
- ❑ The nodal agency, NLDC verifies or re-allocates (in case of transmission congestion) the combined cleared volume of the two Power Exchanges.
- ❑ In case of extreme event of communication failure, the schedules for such RTM session(s) is made zero by NLDC.
- ❑ Synchronization of web based fully automated RTM clearing engine at NLDC and Web Based Energy Scheduling (WBES) Applications in different RLDCs is successful.

Real Time Market – EAL's Analysis

Summary and analysis of trade through RTM is as presented below:

Parameters	IEX	PXIL
Total traded volume in RTM (MU)	515.46	1.86
Total traded volume in DAM (MU)	4174.34	15.03
RTM minimum MCP (Rs./kWh)	0.015	1.877
RTM maximum MCP (Rs./kWh)	5.000	4.000
RTM average MCP (Rs./kWh)	2.22	2.606
DAM average MCP (Rs./kWh)	2.35	2.541

*Source: IEX, PXIL

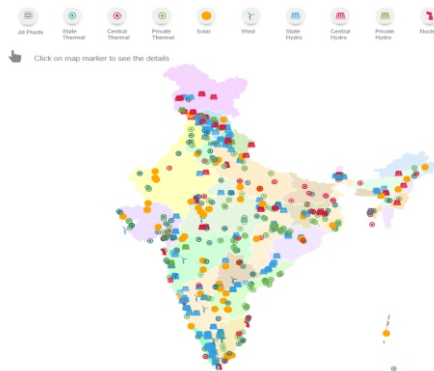


Introduction of RTM seems to have shifted market volume from DAM as well as TAM suggesting that buyers and sellers now prefer to postpone their transaction decision near the time of delivery.

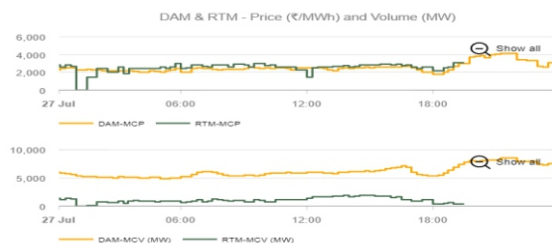
EAL NEWS

EAL has launched an Android App, and new dashboards on Power Map of generating stations, Coal Availability, COVID-19 impact on demand, and RTM, providing users relevant information.

Power Map Dashboard



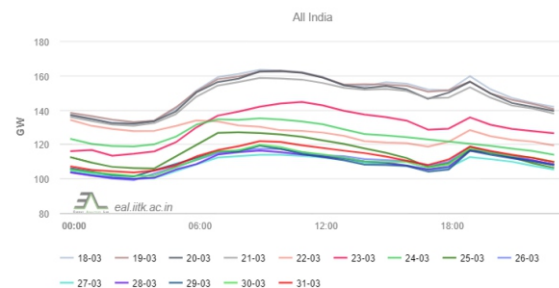
Real Time Market (RTM)



Coal Availability Dashboard



COVID-19 Impact on Demand Profile

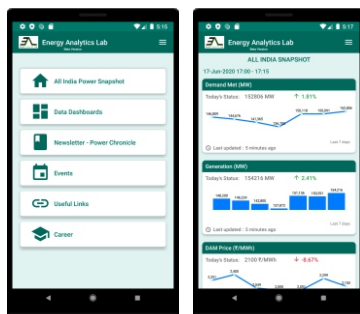


EAL's Android App

EAL has developed an Android App, which is available on the Google Play store, to provide seamless access to EAL's registered users.

It can be downloaded from:

https://play.google.com/store/apps/details?id=e.admin.eal_app



We want to take this opportunity to thank you for being an active member of EAL's web portal. We hope that you find this as a meaningful and insightful initiative.

We request your feedback for making EAL and this newsletter more relevant to the sector. Please write to us at:

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