

AEEE's Recommendations and Comments on Draft CERC (Ancillary Services) Regulations, 2021





About AEEE

Alliance for an Energy Efficient Economy (AEEE), is one of the leading organizations in India that works on creating awareness about energy efficiency as a resource. It is a policy advocacy and energy efficiency market enabler with a not-for-profit motive. We advocate for data-driven and evidence-based energy efficiency policies and research.

We foster a culture of energy efficiency in India, working with industry, government and civil society organizations. AEEE advocates for Thermal Comfort for All, and a Lean-Mean-Green philosophy to design and construct net-zero energy-water-waste built environments, Sustainable Transportation and robust Energy Data Framework for better policy-making and implementation, to build a culture of energy efficiency in India. We are committed to achieve India's energy transition for a climate-resilient and energy secure future and meet India's commitments to the 2030 nationally determined goals (NDC) and UN sustainable development goals (SDG).

Introduction

Ancillary services are necessary to ensure the secure and reliable operation of the grid. With the increase in uptake of grid-connected variable renewable energy and increasing volatility on the demand side, the increase in requirements for ancillary services is inevitable. Moving towards procurement of market-based ancillary services is a highly welcoming step by the Central Electricity Regulatory Commission (CERC) as it will facilitate transparency in price discovery for all the participants. Furthermore, the inclusion of energy storage and demand-side resources to participate in the ancillary services (secondary and tertiary) mechanism will encourage new pathways to extend the value proposition from Demand Response (DR) and Demand Flexibility. Accordingly, the Hon'ble Commission has appointed the National Load Dispatch Centre (NLDC) as the Nodal Agency to implement Ancillary Services at the inter-state level through the Regional Load Dispatch Centers (RLDC).

Prior to these regulations, the Reserves Regulation Ancillary Services (RRAS) were procured based on the merit-order principle by using un-requisitioned surplus (URS) of the generators whose tariff for full capacity was determined by CERC. There were approximately 67 generators that were mandated for providing RRAS as on Sep 2018. The current process for RRAS framework is such that ancillary services are predominantly acquired from thermal generators, characterized by ramping limitations. Therefore, in view of this, CERC via its discussion paper on 'Re-designing Ancillary Services Mechanism in India' released in 2018, highlighted the following:

- » Significant inadequacy of available URS from generators providing ancillary services during the periods of high demand.
- » Importance of fast response ancillary service (FRAS) and need of a market-based mechanism for procurement of ancillary services
- » Need of classification between 'Ramp limited resources' like thermal plants and 'Energy limited resources' the energy storage and EVs.

Subsequently, following up on the recommendations of sectoral experts, the CERC draft (Ancillary Services) regulations 2021 tries to address the barriers in the current ancillary mechanism. The highlights from the 2021 draft regulations are:

- » Enabling market-based mechanism for procurement of ancillary services – Nodal Agency will facilitate procurement of tertiary reserve ancillary services (TRAS) through power exchange(s).
- » Secondary reserve ancillary services (SRAS) will be procured directly by Nodal Agency. Both SRAS and TRAS providers need to be connected to the inter-state or intra-state transmission system.
- » Inclusion of energy storage and demand-side resources to provide SRAS and TRAS.

The main objective for the draft regulations as highlighted by the Hon'ble Commission is to provide the mechanisms for procurement of Ancillary Services through administered as well as market-based mechanism, for maintaining the grid frequency near to 50 Hz, and restoring grid frequency within the permissible limits as defined in Indian Electricity Grid

Code (IEGC). In addition, the regulations have also put relieving transmission congestion as one of their objectives. In view of this, AEEE would like to present its comments and suggestions for some of the key highlights:

Procurement of Ancillary Services (TRAS) through market mechanism

The most significant highlight of the draft 2021 regulations is the introduction of a market-based mechanism to procure TRAS. The regulations also hint that for the SRAS, a market-based mechanism is possible. This can be considered a welcome decision from the Hon'ble Commission for ensuring reliable and secure delivery of power for all. Developed electricity markets, including the US and Europe, have implemented market-based mechanisms that facilitate operation with higher levels of renewable generation. The move to a market-based mechanism is the need of the hour for India, which is set to experience a significant increase in renewable energy-based generation.

AEEE feels that to reap the benefits under a market mechanism; there is a need to elaborate and provide more clarity to some of the regulatory provisions. Sections that could be elaborated further are mentioned as follows:

- » **Aggregation:** Both energy storage and demand side resources participation as ancillary services, the modalities for their deployment is yet to evolve. To enable market mechanism the regulatory reform, as observed in developed markets, is enabling participation of aggregators. These aggregators acquire resources including energy storage, distributed generation, electric vehicles, and flexible loads and bid in markets. Without enabling aggregation, the benefits from fast-acting reserves, which can provide multiple grid support functions, will remain underutilized. Thus, norms related to aggregation could widen the participation benefits in both SRAS and TRAS. As the penetration of smart and controllable load increases, flexibility from demand side could offer huge potential in frequency services. Therefore, there is a need to bring in the regulatory guidance to aggregate demand side resources for facilitating different ancillary services, in accordance with the grid requirements. AEEE requests the commission to take adequate steps to ensure the provisions for aggregation are explicitly stated in Regulations.
- » **Role of DISCOMS:** Electricity Distribution Companies (DISCOMs) by virtue of the nature of their operation are placed as ideal candidates for aggregating demand resources and participating in the market. The 2018 discussion paper on 'Re-designing Ancillary Services Mechanism in India', was positive on DISCOMs role to act as aggregators and providers for ancillary services. The role of DISCOMs in the ancillary services mechanism is a missed opportunity in the regulations. Energy storage resources including electric vehicles aggregated at the distribution level by a distribution company (DISCOM) can provide services to SRAS and TRAS.

- » **Unpicked SRAS providers in TRAS market:** Generators and other sources might incur revenue loss if asked to reserve the capacity for ancillary services. However, they can mitigate these losses if participation of such sources in TRAS could be enabled. Therefore, there is a need to highlight the framework for SRAS providers which are not selected by the Nodal Agency for providing ancillary services to participate in the TRAS market. As the regulations have mandated Nodal Agency (NA) to prepare Detailed Procedure to operationalise SRAS and TRAS, this point may be addressed in the same.

Centralization in the procurement of ancillary services

The Hon'ble Commission has entrusted the responsibility for procuring ancillary services (both SRAS and TRAS) centrally to the Nodal Agency. The Nodal Agency responsible for implementation identified under regulation 3.r is NLDC through RLDC. AEEE wishes to highlight that the role of RLDCs could be further emphasized. The regulation 2.3.2 (g) of the Indian Electricity Grid Code (IEGC), 2010 states that "Operation of Ancillary Services are an exclusive function of RLDC."

Further, in an excerpt from the discussion paper from the Hon'ble Commission on "Re-designing Ancillary Service mechanism in India" states that:

CERC vide order in Suo-motu Petition No. 11/SM/2015 dated 13th October 2015 gave a roadmap for implementation of reserves in the country. While primary reserves are to be maintained mandatorily by all generators, secondary reserves are to be maintained at a regional level and tertiary reserves are to be maintained in a distributed manner in the States.

In view of this, AEEE would like to make the following observation:

Instead of procurement of only centralised AS, it is requested that necessary steps are taken to ensure that there is also a decentralised procurement process with the respective RLDCs at each region with assistance from SLDCs. We believe in ensuring locational value to grid support, and both RLDCs and SLDCs will have better visibility of the regional and local network operations. Nodal Agency could continue to serve as the apex body for ensuring the reliable operation of the grid and monitor the procurement of ancillary services both centralised and decentralised procurement.

It is also anticipated that there is a need to bring in power system monitoring and operation at the distribution level in the evolving market situation. Going ahead, as the distribution network is expected to have a system operator, decentralization of ancillary services procurement is critical to ensure the reliability of power delivery. This also enables a chance for local distributed energy resources to participate in the market and offer grid support. Therefore, the role of RLDCs in the procurement of ancillary services needs to be further elaborated.

Monitoring and verification protocols

AEEE believes that adopting proper Monitoring and Verification (M&V) protocols can assist the ancillary services mechanism. The role of M&V protocols is well established in the case of Demand Response, and therefore it could provide the best means for performance evaluation. Without proper M&V protocols, demand and storage cannot be reliable, measurable, and verifiable resources. Both metering and SCADA telemetry requirements for demand side resources might not be an economically viable option. While it is necessary to ensure proper metering and monitoring, the high expenses could limit the number of energy storage or demand-side resources participating in the ancillary services.

With the support of advanced metering and M&V, the economics and effectiveness of the ancillary market could be improved. Applying M&V techniques to the metering data and aggregating load shapes helps in forecasting and determining reductions from DR. It is imperative that M&V be included in the ancillary mechanism design from the planning phase. The Forum of Regulators (FoR) together with CERC may consider introducing a document dedicated to M&V regulations, which will be adopted for M&V of ancillary and other grid related services.

Reconciliation of SRAS and TRAS accounts

It is highlighted in the draft regulations that accounting of SRAS and TRAS shall be carried out by Regional Power Committee on weekly basis. Accounting for SRAS will be based on the SCADA telemetry data while for TRAS, it will be based on meter data and schedules.

Reconciliation of both SRAS and TRAS accounts between the relevant parties is a crucial step and the periodicity in accounting shall be maintained throughout. AEEE would like to suggest that the data from the reconciliation of SRAS and TRAS accounts shall be made available to the public for every accounting period to ensure transparency.

Further, AEEE would like to recommend that for SRAS, RLDC could take the responsibility of publishing the Ancillary Service accounting document. The Hon'ble Commission could appoint power exchange(s) for the accounting of TRAS, vetted by the concerned RLDC.

Other comments

The other comments and suggestions on the draft 2021 regulations are as follows:

Definitions and Interpretations

Section	Comment
Preamble	Inclusion of resiliency Suggested revision: <i>Whereas it is necessary to provide for a regulatory mechanism for ancillary services in the interest of reliability, resiliency, safety and security of the grid.</i>
Definitions Reg. 3	Addition of definition of adequacy of reserves before 1 (c) “Adequacy of reserves” could be defined separately for Energy Reserves (MWh), Capacity Reserves (MW) and Ramping Reserves (MW/min)
Definitions Reg. 3	Addition of definition of aggregator before 1 (c) “Aggregator” means an entity that aggregates one or more demand-side resources or energy storage resources for purposes of participation in the power exchange(s)
Definitions Reg. 3	Adding ‘resiliency’ into the definition of ancillary services: <i>“Ancillary Services” or “AS” in relation to power system operation, means the service necessary to support the grid operation in maintaining power quality, reliability, resiliency and security of the grid and includes Primary Reserve Ancillary Service, Secondary Reserve Ancillary Service, Tertiary Reserve Ancillary Service, active power support for load following or frequency regulation, reactive power support or voltage regulation, black start, and such other services as defined in the Grid Code.</i>
Definitions Reg. 3	Redefining Demand Response in 1(j) “Demand Response” could be expanded to integrate the concept “Demand Flexibility” Suggestive definition: <i>“Demand Flexibility” means the ability of the demand side to vary in accordance with the grid requirements across different timescales during uncertainty</i>
Definitions Reg. 3	Redefining energy storage resource in 1 (o) “Energy Storage Resource” could be redefined to include EVs or EV charging stations as well
Definitions Reg. 3	Separate definitions for SRAS-Up and SRAS-Down in 1 (v) Definition of “SRAS Provider” could be separated into defining “SRAS-Up” and “SRAS-Down” separately

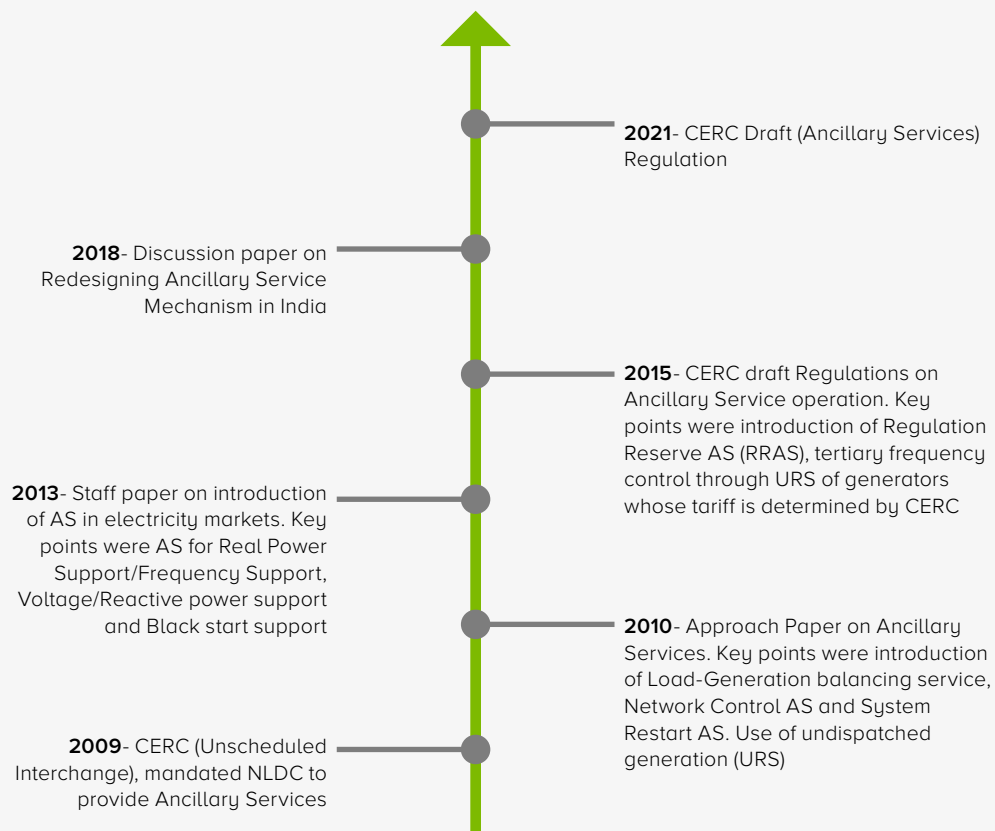
Summary of Ancillary Services

Ancillary Services

Ancillary Services can be broadly classified under frequency (or active power) regulation, voltage (or reactive power) regulation and balancing services. In the context of power system operation, AS are defined as *the service required to support the grid operation in maintaining power quality, reliability and security of the grid and includes Primary Reserve Ancillary Service, Secondary Reserve Ancillary Service, Tertiary Reserve Ancillary Service, active power support for load following, reactive power support, black start and such other services as defined in the Grid Code*. Under the IEGC, operation of ancillary services is an exclusive function of Regional Load Dispatch Centre (regulation 2.3.2 (g)).

The CERC in its draft regulations [1] has categorised AS under:

1. Primary Reserve Ancillary Services (PRAS) – Ancillary services that immediately responds through governor action in event of sudden change in frequency.
2. Secondary Reserve Ancillary Services (SRAS) – Second level of defence against sudden frequency changes, deployed by National Load Dispatch Centre (NLDC) through secondary control signal to replenish the primary reserves.
3. Tertiary Reserve Ancillary Services (TRAS) – TRAS UP/DOWN will be dispatched by the NLDC to replenish the SRAS.



URS – Un-Requisitioned Surplus
NLDC – National Load Dispatch Centre

A brief timeline of evolution of Ancillary Services in India

Secondary Reserve Ancillary Services (SRAS)

SRAS will be procured and deployed by the Nodal Agency to maintain or restore grid frequency within permissible band as specified in the IEGC or with the purpose of replenishing the primary reserves when area control error (ACE) of region deviating from 0, going beyond minimum threshold of ± 10 MW, or such other events as specified in the Grid Code.

As mentioned by the Hon'ble Commission, "any generating station or an entity with energy storage or demand side resource connected to inter-state and intra-state transmission line and is capable of providing a minimum of 1 MW of response is eligible to participate in SRAS."

SRAS will be procured by the Nodal Agency on regional basis. The participant involved in SRAS must have the following requirements:

1. Bi-directional communication system with either National Load Dispatch Centre (NLDC) or State Load Dispatch Centre (SLDC)
2. Response time to SRAS signal within 30 seconds
3. Provide entire capacity obligation within 15 mins and be able to sustain it for 30 mins.

Further, in case of a generating unit, it must be enabled with Automatic Generation Control (AGC). The participant must have metering and SCADA telemetry for measurement and verification of energy delivery under SRAS as given in the Detailed Procedure by Nodal Agency.

A generating station willing to provide SRAS needs to give a standing consent to the Nodal Agency for participation which will be valid unless it is withdrawn or modified. SRAS providers must declare their technical parameters required by the Nodal Agency, that includes but not limited to:

- » Installed Capacity
- » Technical Minimum
- » Ramp Up/Down capabilities
- » Variable charge

SRAS providers other than generating stations, will need to declare the technical requirements and compensation charges on monthly basis in accordance to the manner stipulated in the detailed procedure.

Tertiary Reserve Ancillary Services (TRAS)

CERC in its new draft, has enabled the procurement of tertiary reserves through power exchange(s). Power system experts have viewed this as an important development as they believe that the demand for TRAS from markets could range anywhere between 1500 – 2000 MW which could increase up to 5000 MW in extreme situations. Owing to high penetration of renewable energy sources, the cost of balancing is estimated to be around ₹1.10/unit, according to a study conducted by Central Electricity Authority (CEA). CERC may further enable procurement of SRAS through market mechanism [2].

The entities eligible for TRAS participation includes generating station, energy storage resource and demand side resource connected to inter-state or intra-state transmission system. TRAS are meant primarily for replenishing the secondary reserves that were being deployed for more than 15 minutes in one direction for a quantum greater than 100 MW or such other events specified in the Grid Code.

The procurement (Buy-bids) of TRAS will be carried out by the Nodal Agency through the power exchange(s), wherein the Nodal Agency will communicate the quantum required for both TRAS-Up and TRAS-Down on day-ahead basis before the commencement of Day-Ahead Market. Any incremental requirement of TRAS can be procured on real-time market before the commencement of Real-Time Market. The entities which are eligible to provide such services (Sell-bids) will submit the bids as notified in the regulations. Power exchange(s) will collect the bids for both TRAS-Up and TRAS-Down and share it with the nodal agency for efficient price discovery.

For TRAS-Up, the price discovery will be based on the principle of uniform market clearing price (MCP). The price discovery for TRAS-Down will be based on the principle of pay-as-bid, wherein the bids will be stacked in a descending order and Nodal Agency will select the TRAS-Down providers to meet the requirements. In case the requirements for TRAS-Up or TRAS-Down deviate from the volume cleared in the market, Nodal Agency will issue dispatch instructions as provided in the regulations. The hon'ble commission has also notified instructions on ensuring adequate reserves in the event of shortfall of SRAS and TRAS.



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