

**MINUTES OF SEVENTH MEETING OF STANDING TECHNICAL COMMITTEE
RE-CONSTITUTED BY THE FOR- GROUP-I & II
(Through Video Conference)**

Day and Date: Monday, 7th February 2022

List of Participants: Annexure-1(Enclosed)

The Seventh meeting of the FOR Standing Technical Committee was held on 7th February, 2022 under the Chairmanship of Shri I. S. Jha, Member CERC. At the outset, the Chairperson welcomed all the participants and special invitees. He gave brief background of the agenda items to be deliberated in the meeting. He gave a brief update on the importance of efficiency improvement in view of regular and standardized voltage across States and importance of maintain reserves at regional as well as at State level to enhance stability of the system. Thereafter agenda items were taken up for consideration.

Agenda Item No.1: Confirmation of minutes of the 6th meeting of the Standing Technical Committee held on 17th May, 2021

2. The members of the Standing Technical Committee considered and endorsed the minutes of the 6th meeting of the Standing Technical Committee held on 17th May, 2021.

Agenda Item No. 2: Proposal to bring Uniformity in Nominal Voltage of LT Supply in India

3. Shri Bhanu Bhushan, (Former Member, CERC) with support of the Chairperson of the Committee presented on the subject matter emphasizing the need to bring uniformity in the nominal voltage of LT supply in India (**Annexure II**). It was brought to the attention that some States specify nominal LT voltage as 230/400V while others as 240/415V. According to Shri Bhanu Bhushan, this difference in LT voltage adds into the confusion for stakeholders about standard voltage and hence a county-wide uniformity in this respect is most essential.
4. It was further informed that the L.T. supply voltage has been rated at 240 / 415 V, as per the age-old British practice, and was specified as 'preferred nominal system voltage' in IS-12360:1988. It was also informed that to bring about uniformity, the International Electrotechnical Commission (IEC) decided in 1994 to adopt 230 / 400 V as the international standard, and stipulated the transition completed by 2003 end. Subsequent amendments were also carried out in December 2000 with regards to IS-12360 to align with the above standard. However, in India, as per the presenter, the process of bringing uniformity is in abeyance by concerned competent authority and a recommendation of technical committee may facilitate this transition.

5. Members of the Committee supported the need for standardizing the rating of LT supply voltage and recommended that 230/400 V with a tolerance band of +/- 10% while providing transition time for switchover to 230V should be adopted by states. It was also updated that BIS panel have taken up the matter under consideration and have recommended changing rated voltage level from 240V/415V to 230V/400 V with a tolerance band of $\pm 10\%$ while providing transition time for switchover to 230V. However, it was also suggested that moving to 230 / 400 V would be possible only when CEA sends a strong recommendation for its adoption .

Action Point (s) / Decision(s):

The Committee noted the presentations made by Shri Bhanu Bhushan and emphasized the need of bringing uniformity in the nominal voltage following the best international standards for rating the voltage of LT supply.

Agenda Item No.3: Discussion on the Reserve at the State Level /Ancillary Service Framework at State Level

6. Advisor-RE, CERC made a presentation on salient features of Ancillary Services Regulation notified by the CERC recently at the inter-state level. It was highlighted that with implementation of the said regulations, existing administered mechanism of RRAS for tertiary reserve would be moved to market based mechanism at national level while a volumetry mechanism for secondary reserves would be introduced at inter-state level. With Indian power system characterized by regional and state control area operation, it was emphasized that a uniform and complimentary mechanism also need to be in place at State level to ensure effective and secure grid operation.
7. It was also highlighted that ‘SANTULAN’ report has been endorsed by FOR in its 70th meeting on 30.01.2020 highlighting the need of maintaining reserves at State Level. The reserve requirement is generally a small proportion of the aggregate demand in the system and they have to be ensured all the time. Reserves are normally pressed into service only for a short duration. Therefore, assessment of the optimal quantum of reserves for the randomly varying system conditions becomes key to ensure reliable grid operation. Deterministic and probabilistic method of reserves estimation were highlighted during the presentation while emphasizing dynamic need of reserves in the system to take into account uncertainty and variability into the system like load forecast error, RE forecast error, forced outages, scheduling error etc.
8. Joint Chief Engineering, CERC also presented exercise carried out by the POSOCO for

maintaining secondary reserves at the both Regional and State control areas based on historical data taking into account contribution of each State control area in Area Control Error (ACE). It was highlighted that the probability density function of area control error (ACE) is generally utilised in probabilistic method in which three times of standard deviations of the mean of ACE of individual control areas could be considered as the required power balancing reserve for specified hourly time horizon. The computed reserves may be considered as the total reserves needed for secondary control and tertiary control to be kept inside the control area. Percentage share to secondary control and tertiary control may be varied from time to time or fixed. The requirement of reserves can be set on an annual basis and reviewed periodically.

9. Members of the Committee appreciated the efforts at inter-state level and emphasized the need of adopting similar complimentary mechanism at State level. The members also deliberated on the appropriate commercial mechanism to be evolved discussed the importance of simulation to estimating the quantum of different reserves to be maintained in State control areas with State specific resources including new innovative resources like Demand response and Storage system .

Action Point (s) / Decision(s):

The Committee appreciated the Regulatory Framework formulated by the CERC at inter-State level to provide required Ancillary Service. It was also decided that the Committee may recommend similar complimentary mechanism at State level to ensure that adequate Ancillary service is maintained at all time for reliable grid operation.

Agenda Item No.4: Status of implementation of Regulations on Forecasting, Scheduling and Deviation Settlement.

10. FOR Secretariat apprised the Committee on State-wise current status of Forecasting & Scheduling and DSM Regulations at State level for various State. It was updated that 22 States have come up with either Draft or Final Forecasting & Scheduling Regulations (1 Draft and 21 Final). While 15 States have notified the DSM Regulation and in 1 States, the DSM Regulations are at draft Stage. Member, Himachal Pradesh updated that the State has finalized Forecasting and scheduling mechanism in 2nd amendment of State DSM Regulations.
11. Chairperson emphasized the need of finalizing the Forecasting & Scheduling and DSM Regulations by all States and suggested to have a special session with States which are yet to initiate action on F & S and DSM. It was also suggested that regular update instead of update in every meeting, may be taken for the regular agenda for F&S and DSM.

Action Point (s) / Decision(s):

The Committee noted the status update and suggested to update the same based on the deliberation during the meeting. It was also proposed that a special session with States which have not initiated any action or have operational experience on the subject may be scheduled in subsequent meetings.

Agenda Item No.5: Status of implementation of SAMAST

12. CMD, POSOCO apprised on the status PSDF fund for SAMAST. He informed the committee about delay in execution of some projects by States which results into delay in disbursement of the PSDF fund. He also informed that due to ongoing election process in few States grant of funds have been postponed for approved DPRs. He informed that sufficient leverage is given to the State to execute the projects taking into consideration variation in their institutional structure. Also, in order to monitor the progress of the implementation of the approved projects, the fund is disbursed in five tranches with disbursement of part fund starting with letter of award of the projects.
13. The Committee observed that SAMAST is very crucial especially for smooth integration of RE and expressed concerns over the long process of approval of grants for SAMAST. The Committee also pointed out that the grants disbursed under SAMAST are relatively small and can be prioritized.
14. It was also suggested to have an exclusive meeting with States on best practises on implementation of ABT and SAMAST framework. It was also suggested the Committee may take an exclusive agenda on sharing best practices on ABT, SAMAST, Forecasting and Scheduling , DSM implementation in its subsequent meetings with specific States.
15. The Committee agreed to have a special meeting with PSDF committee to expedite the disbursement for SAMAST.

Action Point (s) / Decision(s):

The Technical Committee noted the status on implementation of SAMAST and emphasized the need to expedite and streamlining the approval process for disbursement of PSDF grant for SAMAST implementation at State Level. It was also decided that the PSDF Committee be requested to expedite disbursement of fund for SAMAST implementation. It was also decided to get an update on SAMAST implementation from the States which are not part of the Standing Technical Committee.

16. The meeting ended with a vote of thanks to the Chair.

ANNEXURE – I

**LIST OF PARTICIPANTS ATTENDED THE SEVENTH MEETING OF
RECONSTITUTED TECHNICAL COMMITTEE HELD ON 07.02.2022.**

Members

S. NO.	NAME & DESIGNATION	ORGANIZATION
01.	Shri I.S. Jha, Member	CERC
02.	Shri Raj Pratap Singh, Chairperson	UPERC
03.	Shri M. Chandrasekar, Chairperson	TNERC
04.	Shri D.K. Sharma, Chairperson	HPERC
05.	Shri Sishir Sinha, Chairperson	BERC
06.	Ms. Anjali Chandra, Member	PSERC
07.	Shri Durgadas Goswami, Member	WBERC
08.	Shri H.M. Manjunatha, Member	KERC
09.	Shri Thakur Rama Singh, Member	APERC
10.	Shri B.N. Sharma, Chairperson	RERC
11.	Shri Kumar Sanjay Krishnan, Chairperson	AERC
12.	Shri S.R. Pandey, Member	GERC
13.	Shri S. R. Narashimhan, Chairman	POSOCO
14.	Dr. S.K. Chatterjee, Chief (RA)	CERC
<u>Special Invitee</u>		
15.	Shri Arvinder Singh Bakshi, Former Member	Special Invitee
16.	Shri Bhanu Bhusan, Former Member	CERC
17.	Ms. Shilpa Agarwal, Joint Chief (Engg)	CERC
<u>Other Participants</u>		
18.	Ms. Rashmi Nair, Dy. Chief (RA)	CERC
19.	Shri Ravindra Kadam, Advisor (RE)	CERC
20.	Shri Kushal Pal, RA	SAFIR

230/400 V or 240/415 V ?

IS 12360 : 1988 'Voltage Bands for Electrical Installations including preferred Voltages and frequency' : 3.1.2 : TABLE 2 - AC SYSTEM VOLTAGES

Preferred nominal AC system voltage: 240 V / 415 V (for voltage band II)

Highest system voltage: 264 V / 457 V

Lowest system voltage: 216 V / 374 V

(The historical development is provided in Appendix A of the above IS)

3.1.3 Tolerance on declared voltage – The voltage at any point in the system under normal conditions shall not depart from the declared voltage by more than +/- 6 percent. (for voltage band II)

Amendment No. 1 - December 2000

Table 2 amended as follows, in line with IEC 38

Preferred nominal AC system voltage: 230 V / 400 V (for voltage band II)

Highest system voltage: 253 V / 440 V

Lowest system voltage: 207 V / 360 V

Note 3 : During the transition period, both the system voltage of 240 / 415 and 230 / 400 will prevail till December 2003.

Amendment No. 2 - December 2006

Note 3 : The system voltage of 230 / 400 V shall be effective from 1 January 2008.

Amendment No. 3 - February 2009

Note 3 : The system voltage of 230 / 400 V shall be effective from 1 January 2010.

Amendment No. 4 - November 2011

Note 3 : The changeover of system voltage from 240 / 415 to 230 / 400 shall be kept in abeyance for the time being.

Present Status : The Panel of ETD 01 of BIS assigned to examine the issue met on 30-09-2021 and recommended (as per MoM issued on 06-12-2021) :

“ Members of the Panel have decided in favor of changing the rated voltage level from 240V/415V to 230V/400V with a tolerance band of +/- 10% while providing transition time for switchover to 230V. In due course of time, the tolerance band shall be reduced to +/- 6%.”

Practical Problems being faced :

- a) Nobody really knows whether our nominal supply voltage is 230 or 240, as is evident from differing supply codes issued by the SERCs. Some electrical appliances available in the market are rated for 230 V, while others are rated for 240 V.
- b) As consumers, we are many times connecting our appliances rated for 230 volts to power supply with a nominal voltage of 240. The appliances sustain it because of their in-built design margins and tolerance limits, but the resulting stress affects their life, causing premature failure.
- c) The appliances have to be designed, tested and got certified for two different voltages: 230/400 V for global market, and 240/415 V for domestic market. They would prefer aligning of IS 12360 with IEC 38.

Status on Regulatory side and Issues for Discussion :

The voltage of L.T. supply in every State has been specified in the 'Supply Code' issued by the SERC of that State.

It is 230/400 V in Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal, J&K, Jharkhand, Karnataka, Madhya Pradesh, Orissa, Punjab, Rajasthan, the U.T.s and Uttar Pradesh.

It is 240/415 V in Andhra, Kerala, Tamil Nadu, Telangana and West Bengal, and is ambiguous in the case of Maharashtra.

(a) Should this diversity in unity be allowed to continue, or should the L.T. voltage be specified uniformly throughout the nation?

(b) If it is to be uniform, should it be 230/400 V or 240/415 V?



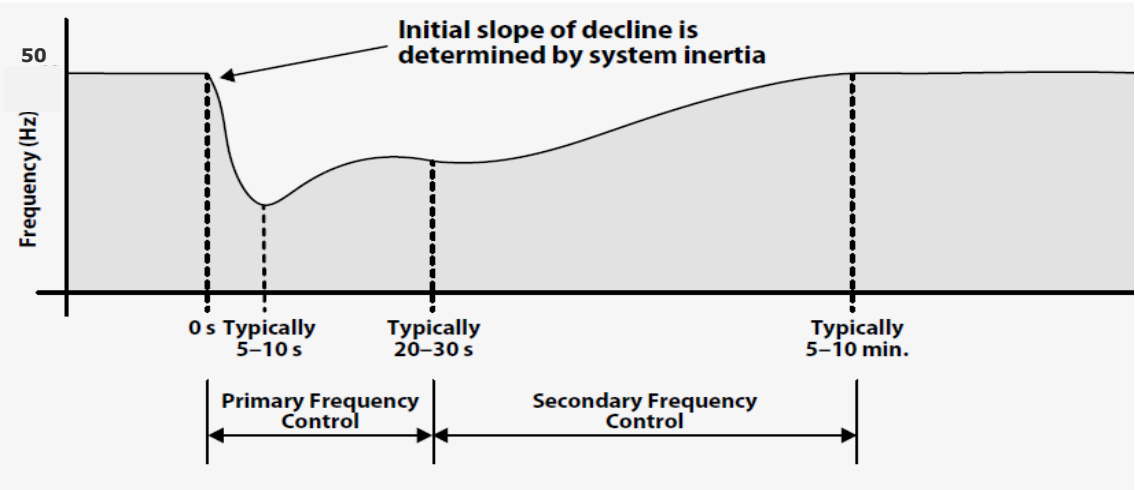
Ancillary Service Framework

CERC

Ancillary Services - Introduction

To restore the grid frequency to desired level and to relieve congestion in the transmission network

Schematic of Reserves, Balancing and Frequency Control Continuum in India



Adapted from NREL Report on "Variable Renewable Generation Can Provide Balancing Control to the Electric Power System", incorporating reference frequency of Indian grid



Response → Attribute	Inertial	Primary	Secondary	Fast Tertiary	Slow Tertiary	Generation Rescheduling/Market	Unit Commitment
Time	First few secs	Few sec - 5 min	30 s – 15 min	5 - 30 min	> 15 – 60 min	> 60 min	Hours/ day-ahead
Quantum	~ 10000 MW/Hz	~ 4000 MW	~ 4000 MW	~ 1000 MW	~ 8000-9000 MW	Load Generation Balance	Load Generation Balance
Local / LDC	Local	Local	NLDC / RLDC	NLDC	NLDC / SLDC	RLDC / SLDC	RLDC / SLDC
Manual / Automatic	Automatic	Automatic	Automatic	Manual	Manual	Manual	Manual
Centralized / Decentralized	Decentralized	Decentralized	Centralized	Centralized	Centralized/ Decentralized	Decentralized	Decentralized
Code / Order	IEGC / CEA Standard (?)	IEGC / CEA Standard	Roadmap on Reserves	Ancillary Regulations	Ancillary Regulations	IEGC	IEGC
Paid / Mandated	Mandated	Mandated	Paid	Paid	Paid	Paid	Paid
Regulated / Market	Regulated	Regulated	Regulated	Regulated	Regulated / Market	Regulated / Market	Regulated / Market
Implementation	Existing	Partly Existing	Yet to start	Yet to start	Existing	Existing	Existing

CERC Roadmap to operationalize reserves

Findings of the Committee (as per CERC order in 11/ SM/ 2015 dt. 13.10.2015)

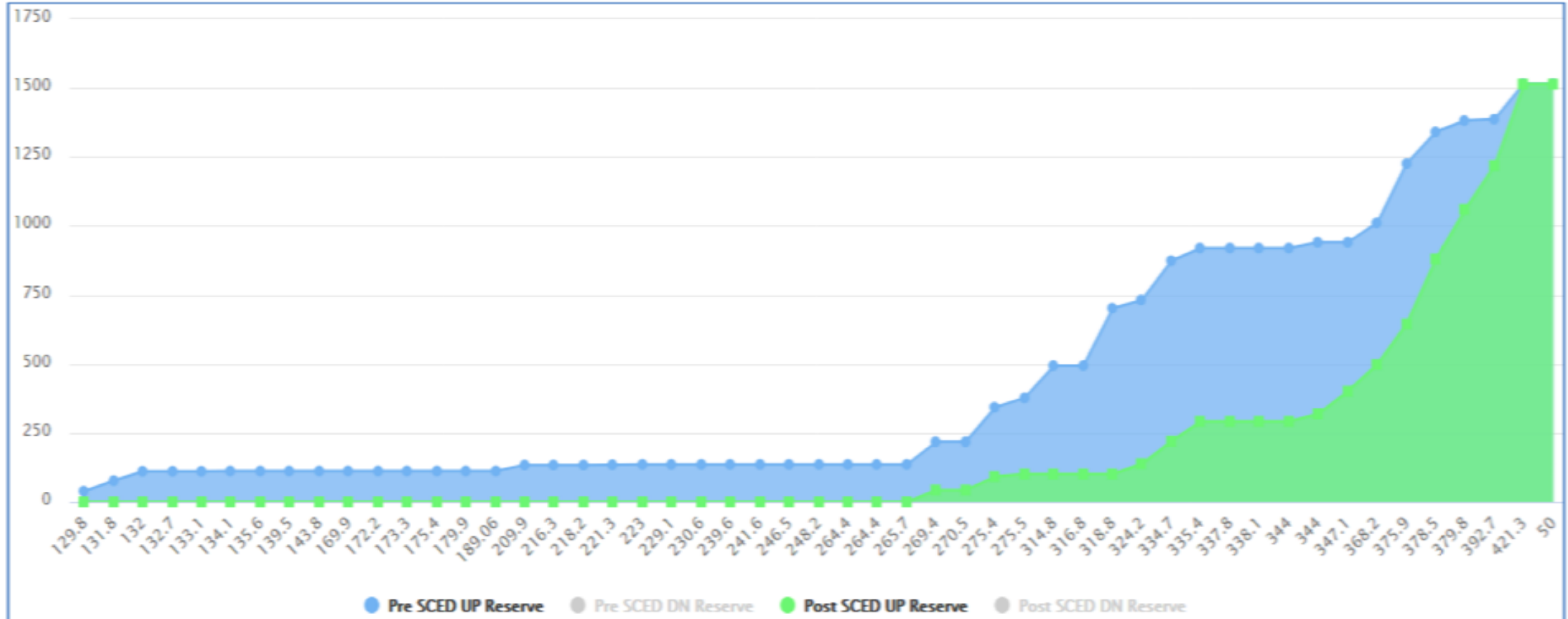
- Spinning reserves to be maintained starting at the regional level with RLDCs being the regional nodal agency and NLDC being the national nodal agency
- **Quantum of reserves:-**
 - Primary reserves of 4000 MW on an All India basis
 - ***Secondary reserves on regional basis*** i.e. 1000 MW in Southern region; 800 MW in Western regions 800 MW in Northern region; 660 MW in Eastern region and 363MW in North-Eastern (total approx. **3600 MW** on an All India basis)
 - Tertiary reserves by each state control area for at least 50% of the largest generating unit available in the state control area
- Reserves may be **estimated by nodal agency** on a day ahead basis along with day-ahead scheduling of all available generating stations
- **Implementation of AGC** is necessary along with reliable telemetry and communication
- Nodal agency should be able to identify the ISGS for providing spinning reserve services
- **Market based framework** for procurement to be put in place in future

Existing framework for Ancillary Services in India

Type of Service	Outline	Response Time	Current Status
Primary response (Frequency Containment)	Automatic response delivering reserve power in negative proportion to grid frequency change	Few sec (able to sustain upto 5 min)	Mandated through IEGC <i>Clause 5.2 (h) of IEGC states :- Coal / lignite stations > 200 MW, Gas stations >50 MW and hydro >25 MW operating at or up to 100% MCR shall normally be capable of picking up to 105/ 105/ 110% respectively of MCR when frequency falls suddenly</i> <i>Generating station / unit not to be scheduled beyond 100% IC</i>
Secondary response (Frequency Restoration)	Supplementary corrective action needed to bring frequency back to 50 Hz.	30 s (able to sustain upto 15 min)	CERC Order on AGC enablement for ISGS 28 th Aug 2019 in Petition No 319/RS/2018
Tertiary response	All ISGS including Ultra Mega Power Plants (UMPPs), operating on part load and having URS availability on day ahead basis, are to be mandated	Within 15 minutes (able to sustain upto 60 min)	Implemented by POSOCO as per RRAS Regulation, CERC under administered mechanism since 2016 CERC Notified AS Regulations

Issues & Challenges in existing Ancillary Services Framework

- Inadequacy of firm reserves available for AS during period of high demand
- Opaqueness due to the option of 'Right to recall'
- Primary reserves under mandate, Secondary reserves in Pilot mode, Tertiary in Administered mode



Issues & Challenges in existing Ancillary Services Framework

- Large scale integration of RE necessitates availability of firm reserves
- Administered AS mechanism is challenging
- Fixed cost recovery distorts the markets
- New resources (BESS, Demand Response) cannot be accommodated under Administered mechanism

Objective of Ancillary Service Regulations

- While it is desirable in the interest of grid security that adequate reserves are maintained locally at the State level for each state control area as per the Grid Code or the State Grid Code as the case may be, these regulations aim to provide mechanisms for procurement, through administered as well as market-based mechanisms, deployment and payment of Ancillary Services at the regional and national level for maintaining the grid frequency close to 50 Hz, and restoring the grid frequency within the allowable band as specified in the Grid Code and for relieving congestion in the transmission network, to ensure smooth operation of the power system, and safety and security of the grid

Ancillary Services Regulations

Estimation of Reserves

Estimation by Nodal Agency in coordination with RLDCs and SLDCs at the regional level after factoring in the reserves for each state control area.

Methodology:

- to be specified in Grid Code
- Interim methodology – by Nodal Agency to stipulate in two months
- Reassessment on day ahead basis and incremental requirement on real time basis
- SRAS estimation on regional basis and TRAS at National basis

Deterministic Method

- Reserves based on the largest possible generation incident
- Static method

Probabilistic Method

- To size the reserves such that a certain, pre defined level of system reliability is met.
- Static or Dynamic
- E.g. Graf-Haubrich Method

Secondary Reserve Ancillary Service (SRAS)

Ancillary Services Regulations

Procurement Mechanism

Eligibility

Secondary Reserve Ancillary Service (SRAS)

voluntary mechanism

SRAS Provider :A generating station or an entity having energy storage resource or an entity capable of providing demand response, on standalone or aggregated basis, connected to inter-State transmission system or intra-State transmission system.

SRAS Provider:

- (a) has bi-directional communication system
- (b) is AGC-enabled
- (c) can provide minimum response of 1 MW
- (d) SCADA telemetry in place
- (e) capable of responding to SRAS signal within 30 seconds and providing the entire SRAS capacity obligation within fifteen (15) minutes and sustaining at least for the next thirty (30) minutes

Secondary Reserves Ancillary Services Regulations

Eligibility

A generating station or an entity having energy storage resource or capable of providing demand response, connected to inter-State or intra-State transmission system shall fulfil following conditions:

Procurement

Selection and Despatch

Payment Mechanism

Accounting and Settlement

- Bi-directional communication system with RLDC as stipulated in the Detailed Procedure
- AGC-enabled
- can provide minimum response of 1 MW
- has SCADA telemetry in place for monitoring and measurement energy delivered
- capable of responding to SRAS signal within 30 seconds and providing the entire SRAS capacity obligation within fifteen (15) minutes and sustaining at least for the next thirty (30) minutes

Secondary Reserves Ancillary Services Regulations

Activation and
Deployment

Procurement

Selection and
Despatch

Payment
Mechanism

Accounting and
Settlement

(2) The Area Control Error (ACE) for each region would be auto-calculated at the control centre of the Nodal Agency based on telemetered values, and the external inputs :

$$ACE = (I_a - I_s) - 10 * B_f * (F_a - F_s) + \text{Offset}$$

Where,

I_a = Actual net interchange in MW (positive value for export)

I_s = Scheduled net interchange in MW (positive value for export)

B_f = Frequency Bias Coefficient in MW/0.1 Hz (negative value)

F_a = Actual system frequency in Hz

F_s = Schedule system frequency in Hz

Offset = Provision for compensating for metering and measurement error

- Frequency Bias Coefficient (B_f) shall normally be based on median Frequency Response Characteristic during previous financial year of each region and refined from time to time

- Offset shall be used to account for metering errors and shall be decided by the Nodal Agency for the respective region

- Nodal Agency may operate SRAS in any of the three control modes viz., tie-line bias, flat frequency or flat tie-line depending on grid requirements

SRAS shall be activated by the Nodal Agency to maintain frequency within the allowable band or replenish primary reserves on account of the following events :

- Considering Region as control area ACE going beyond the minimum threshold limit of +/- 10 MW
- such other event as specified in the Grid Code

Secondary Reserves Ancillary Services Regulations

Eligibility and
Activation

Procurement

Selection and
Despatch

Payment
Mechanism

Accounting and
Settlement

Through a mechanism of voluntary participation

Role of SRAS Provider:

- shall **provide standing consent** for participation, remain valid till it is modified,
- notice of at least forty-eight hours to modify or withdrawn
- shall declare **technical parameters/ requirements as required** by the Nodal Agency.
- shall declare variable charge/ compensation charge upfront on monthly basis

Role of Nodal Agency:

- shall be procured on regional basis
- shall ascertain **availability of adequate reserves on day ahead and real time basis**
- shall **identify ISGS under section 62** for SRAS based on actual availability after RTM results
 1. on day-ahead basis, based on the capacity available after the schedule has been communicated at 2300 hrs for the next day
 2. on real-time basis before the gate closure for incremental SRAS requirement

Secondary Reserves Ancillary Services Regulations

Eligibility and
Activation

Procurement

Selection and
Despatch

Payment
Mechanism

Accounting and
Settlement

SRAS shall be deployed through secondary control signals

- **Extent of participation** of each SRAS provider based on the **Custom participation Factor** subject to the ramp limited resources available with the SRAS Provider as follow:
 - (A) **Rate** Participation Factor (ramping capability in MW/min)
 - (B) **Cost** Factor (variable charge or compensation charge)
- The Custom Participation Factor for SRAS-Up shall be directly proportional to the normalised Rate Participation Factor and inversely proportional to the normalised Cost Factor. The Custom Participation Factor for SRAS-Down shall be directly proportional to the product of the normalised Rate Participation Factor and normalised Cost Factor
 - For SRAS Up : (**Normalized Rate Factor**) / **Normalized Cost Factor** (i.e A / B)
 - For SRAS Down: (**Normalized Rate Factor** x **Normalized Cost Factor**) (i.e. $A \times B$)
- **Signals** shall be sent to the control system of the SRAS Provider **every four second** by the Nodal agency.
- SRAS Provider shall **increase or decrease generation automatically** as per the automatic signal from the Nodal Agency control centre
- Average SRAS Up or SRAS Down MW data for every 15 minutes and every 5 minutes shall be calculated by the Nodal agency.
- The SRAS Provider shall share all real time data with NLDC and the concerned RLDCs as per the stipulations in the Detailed Procedure.

Secondary Reserves Ancillary Services Regulations

Eligibility and
Activation

Procurement

Selection and
Despatch

Payment
Mechanism

Accounting and
Settlement

- All measurements shall be carried out on post-facto basis using SCADA data
- Payment of energy charges and deviation charges shall be on the basis of 15-minute time block for SRAS-Up or SRAS-Down energy in 15 minutes at energy charge or compensation charge
- Payment for performance based on 5-minute time period, integrated for all SRAS signals over this period.
- **Incentive**
- $\text{SRAS (generator)} = \text{Actual Response (MWh)} \times (1 - \text{NAC}) \times \text{Incentive Rate}$
- $\text{SRAS (other than generator)} = \text{Actual Response (MWh)} \times (1 - \text{NAC}) \times \text{Incentive Rate}$
- Performance below 20% for two consecutive days by an SRAS Provider shall make the SRAS Provider liable for disqualification for participation in SRAS for a week by the Nodal Agency

Actual performance vis-à-vis Secondary Control signal for an SRAS Provider	Incentive Rate (+) (paise/ kWh)
95% and above	(+) 50
75% to below 95 %	(+) 40
60% to below 70%	(+) 30
50% to below 60%	(+) 20
20% to below 50%	(+) 10
Below 20%	0

Tertiary Reserve Ancillary Service (TRAS)

Tertiary Reserves Ancillary Services Regulations

Eligibility and
Activation

Procurement

Scheduling and
Despatch

Payment
Mechanism

Accounting and
Settlement

A **Generating Station** or
Energy Storage or
Demand Response

Connected to Inter State or
Intra State Transmission
System

1. capable of varying its active power output or drawl on receipt of instructions from NLDC or RLDC.
2. capable of bringing into service the entire Ancillary Service capacity obligation within 15 minutes and sustaining the service up to 60 minutes

Tertiary Reserves Ancillary Services Regulations

Eligibility and
Activation

TRAS shall be activated by the Nodal Agency on account of following events :

Procurement

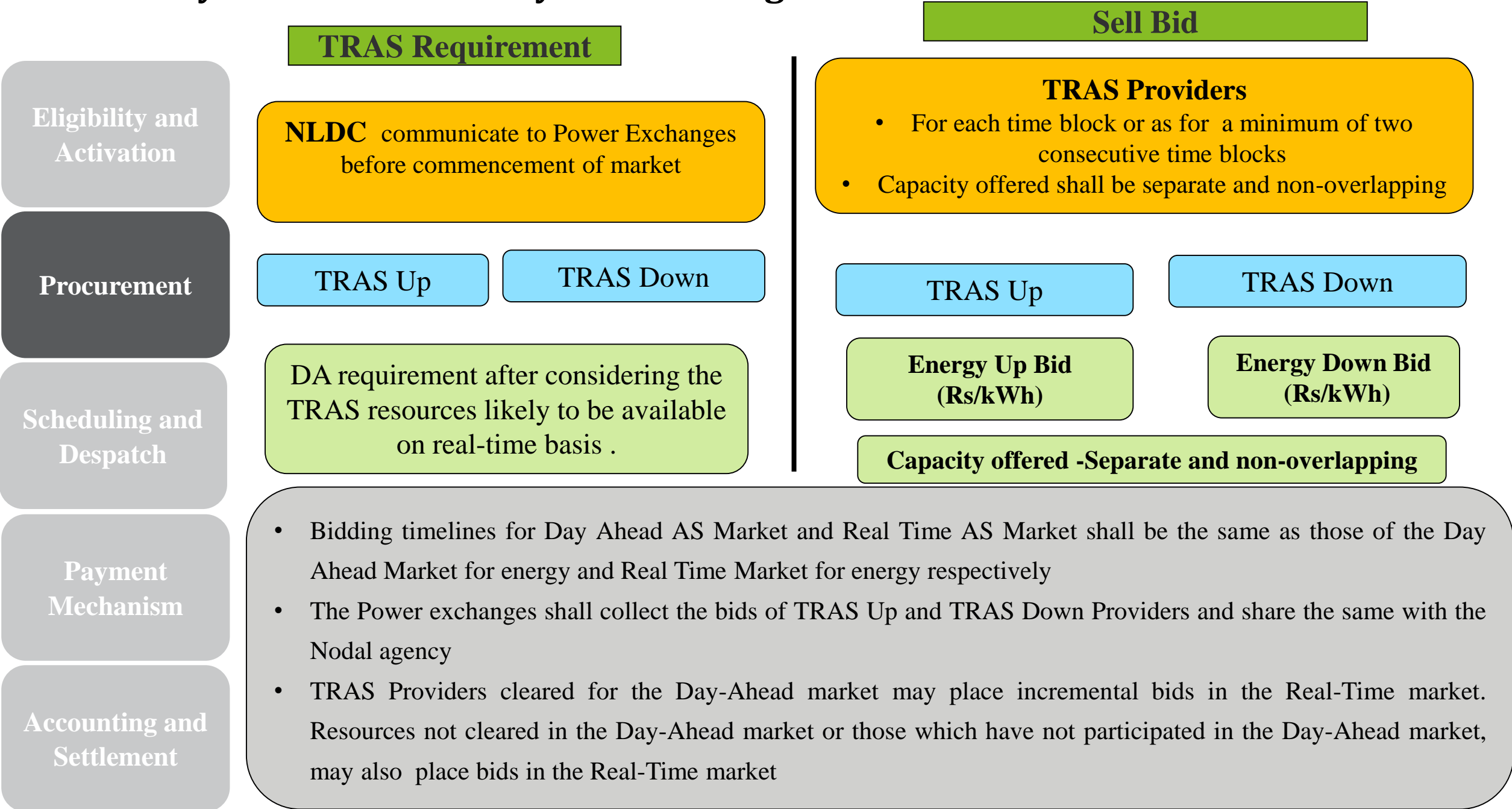
Scheduling and
Despatch

Payment
Mechanism

Accounting and
Settlement

- (i) In the event of loss of generation or loss of load of more than 100 MW in the control area.
- (ii) In case the secondary reserve has been deployed continuously in one direction for fifteen (15) minutes for more than 100 MW, in order to replenish the secondary reserve
- (iii) Such other event as specified in the Grid Code

Tertiary Reserves Ancillary Services Regulations



Tertiary Reserves Ancillary Services Regulations

Eligibility and
Activation

Price Discovery

Scheduling and
Despatch

Payment
Mechanism

Accounting and
Settlement

Price Discovery of TRAS-Up -
Uniform Market Clearing

Step-1: The Power exchanges shall collect the bids and share with the Nodal agency

Step-2: Highest Energy Up bid of TRAS Up provider from the selected TRAS Up providers shall be considered as Market Clearing price for Energy Up (MCP-Energy Up)

Price Discovery of TRAS-Down –
Pay as bid

Step-1: The Power exchanges shall collect the bids and share with the Nodal agency

Step-2: The Energy-Down bids shall be stacked in a descending order from the highest Energy-Down bid to the lowest Energy-Down bid and the Nodal Agency shall select the TRAS-Down Providers to meet the estimated TRAS requirement in that order

- The Commission may, if considered necessary, provide for a price cap for TRAS Ancillary Services

Tertiary Reserves Ancillary Services Regulations

Eligibility and
Activation

Procurement

Scheduling and
Despatch

Payment
Mechanism

Accounting and
Settlement

1. Scheduling and despatch of TRAS shall be **according to the provisions of the Grid Code**
2. Information of **TRAS cleared** for the Day Ahead and Real Time markets **shall be published on the website of the Nodal Agency** and shall be simultaneously communicated to the concerned power exchanges.
3. The Schedule of TRAS providers will become effective earliest from the time block starting 15 minutes after issue of the despatch instruction by the Nodal Agency.
4. Provided that the Nodal Agency may also consider to implement TRAS from any time block after the above-mentioned time block if required, based on the anticipated system conditions .
5. Nodal Agency shall deploy the cleared TRAS Up and TRAS Down in the following order of preference , 1)Merit Order and 2) On pro-rata basis

TRAS
Up Procured

=

TRAS
Up Deployed



Nodal Agency shall deploy Nodal Agency shall dispatch instruction to all TRAS- Up Providers

TRAS
Up Procured



TRAS
Up Deployed



- on pro-rata basis if MCP-Energy-Up-DAM & MCP-Energy-Up-RTM are same for AS
- TRAS with lower MCP-Energy-Up first to despatch, followed by higher MCP-Energy-Up.

Eligibility and
Activation

Procurement

Scheduling and
Despatch

Payment
Mechanism

Accounting and
Settlement

Deployment of TRAS-Up

Case -1

Actual Requirement for
Deployment

=

TRAS Procurement
in DAM-AS

+

TRAS Procurement
in RTM-AS

- Nodal Agency shall dispatch instructions to all such TRAS Up providers

Case -2

Actual Requirement for
Deployment

<

TRAS Procurement
in DAM

+

TRAS Procurement
in RTM

Case -2(i)

If MCP-DAM-AS and
MCP-RTM-AS **are same**

- On pro rata basis

Case -2(ii)

If MCP-DAM-AS and MCP-
RTM-AS **are not same**

- On merit order of MCP
- TRAS Provider with lower MCP shall despatch first and balance on pro-rata basis

Deployment of TRAS-Down

Eligibility and
Activation

Case -1

TRAS-Down
Procurement in
DAM

+

TRAS Down
Procurement in
RTM

=

Actual requirement
for deployment

- Nodal Agency shall dispatch instructions to all such TRAS Down providers

Procurement

Case -2

TRAS Procurement
in DAM

+

TRAS Procurement
in RTM

➤

Actual requirement
for deployment

- despatch instructions to the TRAS-Down Providers in the descending order of their Energy-Down bids,
- the selected TRAS-Down Provider with the highest Energy-Down bid shall be despatched first, followed by the TRAS-Down Provider with the next highest Energy-Down bid and so on

Scheduling and
Despatch

Payment
Mechanism

Accounting and
Settlement

Tertiary Reserves Ancillary Services Regulations

Eligibility and
Activation

Procurement

Scheduling and
Despatch

Payment
Mechanism

Accounting and
Settlement

Payment of TRAS-Up and TRAS-Down

TRAS- UP

Response energy payment

As per MCP-AS

Commitment Charge

*10% of MCP-Energy Up-AS
subject to ceiling of 20
paise/unit*

TRAS- Down

Energy payment

Pay as bid

Energy payment

*TRAS shall pay back to the
Regional Deviation Pool
Account Fund
as per their Energy Down
bid*

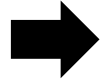
Scheduled in DAM / RTM	Dispatched	Payments	
		Response energy payment	Commitment Charge
✓	✗	✗	✓
✓	✓ (full)	✓	✗
✓	✓ (partial)	✓ for dispatched quantum	✓ non-dispatched quantum

Tertiary Reserves Ancillary Services Regulations

Eligibility and
Activation

For TRAS Up

Regional Deviation
Pool Account Fund



TRAS- Provider

For TRAS Down

Regional Deviation
Pool Account Fund



TRAS- Provider

Procurement

For TRAS Providers **cleared but not deployed** will receive **commitment charge**

For TRAS Provided **cleared but not deployed** will receive no commitment charges

Scheduling and
Despatch

For TRAS Provided **cleared and deployed** will receive uniform price of **MCP Energy –Up as highest Energy-Up bid** among selected TRAS Providers in respective Market DAM-AS or RTM-AS

For TRAS Provided **cleared and deployed** will pay back at their energy down bid in respective Market DAM-AS or RTM-AS

Payment
Mechanism

- In case of forced outage of a generating station or a unit of a TRAS Provider, being a generating station, which has been cleared in the Day Ahead AS Market, the Nodal agency shall procure the corresponding TRAS quantum of power in Real Time AS Market, if required.

Accounting and
Settlement

- Provider shall receive no payment in case of forced outage of a complete station; or receive payments based on the reduced quantum of power in case of forced outage of a unit

Tertiary Reserves Ancillary Services Regulations

In case of shortfall of TRAS through Market Mechanism or under emergency condition

Eligibility and
Activation

Procurement

Scheduling and
Despatch

**Shortfall and
Emergency**

Accounting and
Settlement

Shortfall through Market

1. All generating stations, under section 62 or 63 of the Act, and having URS power, shall be deemed to be available for use by the Nodal Agency for TRAS services, subject to technical constraints
2. For TRAS-Up : Generators shall be paid at the rate of 110% of energy charge
3. For TRAS- Down: Generators shall pay back at the rate of 90% of energy charge

Under Emergency Conditions

In case the Nodal Agency requires any generating station to meet emergency conditions for reasons of grid security as per the provisions of the Grid Code,
- such generating station shall be compensated at the rate of energy charge or compensation charge

Tertiary Reserves Ancillary Services Regulations

Eligibility and Activation

1. Accounting of SRAS shall be done by the Regional Power Committee on a weekly basis, based on SCADA data
2. Accounting of TRAS shall be done by the Regional Power Committee on a weekly basis, based on interface meter data, schedules and State estimation information

Procurement

- Deviation of AS Provider in every 15 minutes time block shall be calculated as under and settled as per the procedure of DSM Regulations

MWh Deviation for AS Provider = (Actual MWh of AS Provider) – (Scheduled MWh of AS Provider) – (SRAS MWh or TRAS MWh or both, as the case may be, of AS Provider)

Scheduling and Despatch

Payment Mechanism

Accounting and Settlement

Regional Deviation Pool Account shall be charged for



- the **full cost of dispatched SRAS services** including the variable charge or the compensation charge for every time-block on a regional basis as well as the incentive, payable to the concerned SRAS
- Compensation if any
- the **full cost towards TRAS-Up** including the cost towards the quantum cleared but not despatched and the quantum cleared and despatched

Tertiary Reserves Ancillary Services Regulations

Eligibility and
Activation

Regional Deviation
Pool Account shall be
charged for



- the **full cost of dispatched SRAS services** including the variable charge or the compensation charge for every time-block on a regional basis as well as the incentive, payable to the concerned SRAS
- Compensation if any
- the **full cost towards TRAS-Up** including the cost towards the quantum cleared but not despatched and the quantum cleared and despatched

Procurement

Scheduling and
Despatch

Regional Deviation
Pool Account shall
receive credit for



- Payment made by SRAS Providers for SRAS Down
- Payment made by TRAS Providers for TRAS Down

Payment
Mechanism

- Accounting of SRAS shall be done by the Regional Power Committee on a weekly basis, based on SCADA data
- net of these charges and credits shall be settled through the existing charges collected under DSM Regulation
- In case of deficit in Deviation and Ancillary Service Pool Account for payment to AS Providers, surplus amount available in other Regional Deviation Pool accounts shall be used for such payment, as per the methodology stipulated in the Detailed Procedure

Accounting and
Settlement

Thank you

Summary status of SAMAST, F&S and DSM Regulations

States	SAMAST DPR			F&S Regulations			DSM Regulations		
Region	Proposal approved	Under examination	WIP or Yet to Prepare	Notified	Draft Published	WIP or Yet to initiate	Notified	Draft Published	WIP or Yet to initiate
North	4 HP, HR, PB, RJ	1 UP	2 UK, DL	4 HP, RJ, UP, HR, PB		3 DL, UK,	6 HP, DL, RJ, UK,HR, PB,UP		
West	1 MP	1 CG	3 Goa, GJ, MH	4 CG, MP, MH, GJ		1 Goa (no major Wind/Solar Potential)	3 GJ, CG, MH		2 Goa, MP (B&S for OA)
South	4 KR, AP, TN, KL	1 TS		4 AP, KR, TS, TN		1 KL	1 TN	1 TS	3 AP, KR, KL (AP and KR ABT for OA)
East	2 BR, WB	2 JH, OR	1 SK	3 JH, SK, BR	1 OR*	1 WB	1 BR	2 WB, OR*	2 SK, JH (B&S for OA)
North-East	7 AS, ML, NL, TR, AR, MN, MZ			5 AS, MN, ML, MZ,TR		2 AR,NL	2 ML, AS		5 AR, MN, MZ,NL, TR
UT			7 CH, PY, DD, DNH, LD, AN, J&K			7 CH, PY, DD, DNH, LD, AN, J&K			7 CH, PY, DD, DNH, LD, AN, J&K
TOTAL	18	5	13	21	1	14	13	3	20

* Draft regulations were notified by OERC in 2015. However, a new set of regulations are presently under preparation