



Posoco: Detailed Procedure for Tertiary Reserve Ancillary Service (TRAS)

POSOCO notified a draft on “**Detailed Procedure for Tertiary Reserve Ancillary Service (TRAS)**” on 20th February, 2022. The key highlights of the draft are given below:

Objective: The sole objective of TRAS is to maintain frequency in integrated operation of large power systems. Frequency response of any power system is generally characterized by frequency responses like primary response, secondary response, and tertiary response.

The Procedure for Tertiary Reserve Ancillary Service will cover the following important aspects:-

- a) Eligibility of TRAS Provider
- b) Criteria for Activation
- c) Price Discovery.
- d) Shortfall in Procurement

Objective: Frequency maintenance is a point of concern in integrated operation of large power systems. Frequency response of any power system is generally characterized by frequency responses like primary response, secondary response, and tertiary response. Primary response will be used as first line of defence, backed by secondary response and soon, reserves of which should be greater than one another. NLDC has been appointed as nodal agency which in coordination with RLDC and SLDC would estimate the quantum of requirement of TRAS (Day-Ahead as well as RTM) and communicate the same to power exchange through NOAR. All the generating stations whose tariff is determined according to section 62 can be used for providing TRAS services in case of any shortfall or grid security reasons, settlement for which will be provided from **Regional Deviation and Ancillary Service Pool Account**.

The entities desired to participate in the ancillary services need to get standing clearance from respective SLD's and RLDC's (minimum quantum for which is 1MW) and register on the NOAR portal after which every registered provider will be assigned a unique code . After registration the TRAS providers can submit bids for TRAS Up as well as TRAS down, scheduling details for which can be obtained from NLDC or respective SLDC's and RLDC'S.

Eligibility of TRAS Provider: The generating stations satisfying following conditions is eligible for participating:

- Storage system and capable of providing demand response on standalone basis.
- Vary active power and is able to deliver within 15 minutes and sustain for next 60 minutes.

Criteria for Activation: TRAS will be activated if:

- SRAS is supplying continuously 100 MW for 15 minutes.
- There occurs extreme weather conditions like storms, fog etc.
- In case of outages of generating stations or transmission systems.

TRAS providers have open choice to participate in Day-Ahead AS or Real Time AS through combined bidding both for TRAS UP and TRAS down. The bid for TRAS UP will be **monotonically increasing** and for TRAS down it will be **monotonically decreasing**. The minimum volume for bidding will be 1 MW with a step volume of 0.1 MW. The floor price will be Rs. 100/MWh and the ceiling price will be Rs. 50000/MWh. The bids should be submitted for every time block in case of DAM (AS) and in case of RTM (AS) bids should be submitted for two consecutive blocks.

The bids not cleared in DAM, and who are ready to carry on their bids will be transferred to Day-Ahead AS Market and the bids cleared in Day Ahead AS market will be allowed to place incremental bids in RTM AS Market.

Price Discovery: The price discovery for TRAS-Up shall be based on the principle of Uniform Market Clearing Price subject to market splitting in case of congestion and for TRAS-Down it shall be based on the principle of Pay-as-bid.



Shortfall in Procurement: Any generating station with URS after RTM results and whose tariff is determined u/s 62, shall be used for TRAS by paying them 110% of the energy charges.

Emergency Conditions: The generating stations used to provide ancillary service under emergency conditions shall be compensated the energy charge as determined for them u/s 62 or 63 or as provided by the AS provider (who need to declare their compensation charges on monthly basis by 12th of every month from 16th of the month to 15th of the next month, otherwise last available compensation charges will be taken into consideration).

Settlement: The payment to the TRAS Provider(s) shall be made from the surplus available in Deviation and Ancillary Service Pool Account of the concerned Region where the TRAS Provider(s) is located i.e. from the concerned RLDC's "Regional Deviation and Ancillary Service Pool Account" before transfer of any residual amount to the PSDF.

The document can be accessed [here](#).

EAL Opinion

1. Market Coupling under TRAS: The power exchanges would only collect bids for the TRAS market from the respective power exchanges and communicate the same to the Nodal Agency, which would combine those bids to determine market outcome. This is essentially market coupling and is deemed desirable as the underlying product is to be deployed for the sake of system security.

2. Available Capacity for Despatch under RRAS: Clause 1.3 of the proposed draft states, "...65 power plants with an installed capacity of around 68,000 MW are getting despatched under RRAS on day to day basis."(emphasis added). This may be rephrased as below to provide correct perspective, "...65 power plants with an installed capacity of around 68000 MW are available for despatch under RRAS on day to day basis".

3. Capacity building of SLDCs for Developing Procedure and Accounting for Intra-state participants of TRAS: For intra-state entities participating in TRAS, procedure, metering and accounting mechanism at SLDC level would need to be modified to take into account timely communication of the TRAS triggering and accounting thereof. This would require adequate capacity building of the SLDCs as well as the intra state generators to enable participation of the later.

4. Ancillary Service Market Segment on PXs: Clause 4.5.2 states that "Power Exchange(s) would design a separate market segment namely "Ancillary Services" contracts for TRAS". It is suggested that a separate category of products under a broad market segment of 'Ancillary Services' be created at the PXs. TRAS products would be the first such products to be traded under such a mechanism. More products may likely be added later.

5. Capacity Commitment by TRAS Providers: Clause 5.1.2 describes the eligibility of TRAS provider as "...it is capable of providing TRAS within 15 minutes and sustaining the service for at least next 60 minutes". This means that a resource (especially for TRAS-up) whether deployed or not, once committed under ancillary services will be blocked at least for next 3 time blocks and thus cannot participate in the TRAS offering for the next three 15 minute blocks.

6. Floating Block Bid' for TRAS: In case of TRAS, a capacity and its bid are tied up for up to four time blocks. This kind of bid can thus be called a 'Floating Block Bid'. The MCP of such a bid is to be applicable for the anchor block (the first time block with which the bid is to be recognized) and the subsequent three blocks for the 'cleared capacity'. For example, bid for block 't' would effectively block resources from t to t+3 block. Hence, a generator cleared for a particular capacity for block t would then be excluded for participation for the next three blocks, even if it had submitted bid for TRAS from 't+1', 't+2' and 't+3' blocks. This would

thus differentiate the bidding as well as market clearing procedure for the TRAS market segments. This would also influence the choice of price discovery algorithm as highlighted below.

7. Price Discovery Algorithm: Due to the floating block bid nature of the TRAS bid structure, an interesting paradox would emerge as to the choice of price discovery algorithm. In case a bid can be cleared for two separate time blocks with overlap in the ‘availability of resources for TRAS’, the payoff to the generator would differ under the two alternate algorithms identified here (See Figure 1). The two alternate Price Discovery Algorithms are

- A. Minimise cost of TRAS Procurement
- B. Maximise Social Surplus

The nodal agency may like to minimise cost of procurement of TRAS services. This would likely not lead to maximization of social surplus, and vice versa. This leads to a paradoxical situation as to which of the Price Discovery Algorithms be adopted for market clearing of TRAS. It is also important to mention that the bidding behaviour of generators would be altered as they would take a call on participation based on expectation of their payoff. This is explained through Figures 1 to 4 below in case of market clearing price of second floating bid (MCP1) to be higher than that for the first one (MCP1), and vice versa.

8. Dynamic Commitment Charge for TRAS-Up: The value for TRAS-up services would be higher during the period of expected shortages and is likely to see deployment of the same. Generators would attach different value to the capacity that they may like to offer for the TRAS market. A single commitment charge for TRAS-Up may not be able to incentivize the generators to offer their capacity for the TRAS-Up market. Given the dynamic situation in the market, the commitment charge payable to generators should not be static but dynamic. For example, higher commitment may be offered for peak hours.

9. Deviation Penalty for RE sources: Renewable energy sources, participating in TRAS Down market, would likely benefit from weaker DSM penalty regime at inter-state as well as intra-state level at the cost of the consumers. Participation in TRAS-down (during peak RE generation) would further incentivise overestimation of RE generation and injection. In case deployed for the TRAS-down, participating RE generators, who would have overestimated generation, would get paid 90% of their energy charges while also avoiding DSM penalty if it would have been applicable. The pricing mechanism should thus ensure that such incentives are minimized. This also further strengthens the argument for urgent applicability of DSM structure to RE generators, whose share is on the rise.

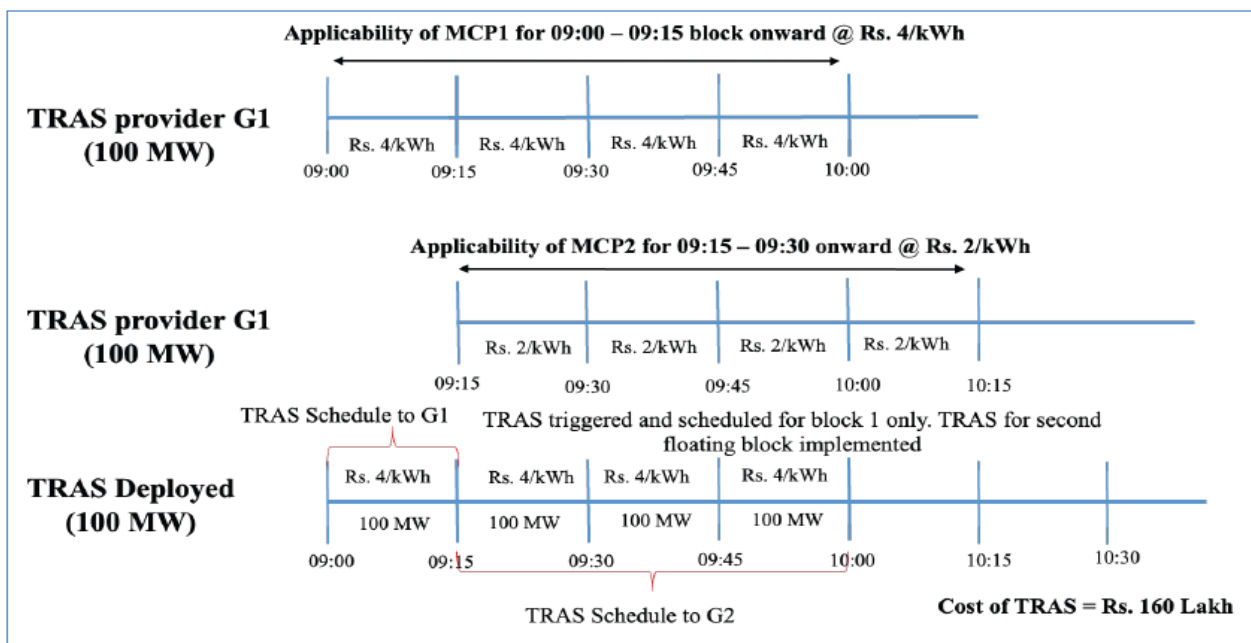


Figure 1: Floating Block Bid – Maximise Social Surplus (MCP 1 > MCP 2)

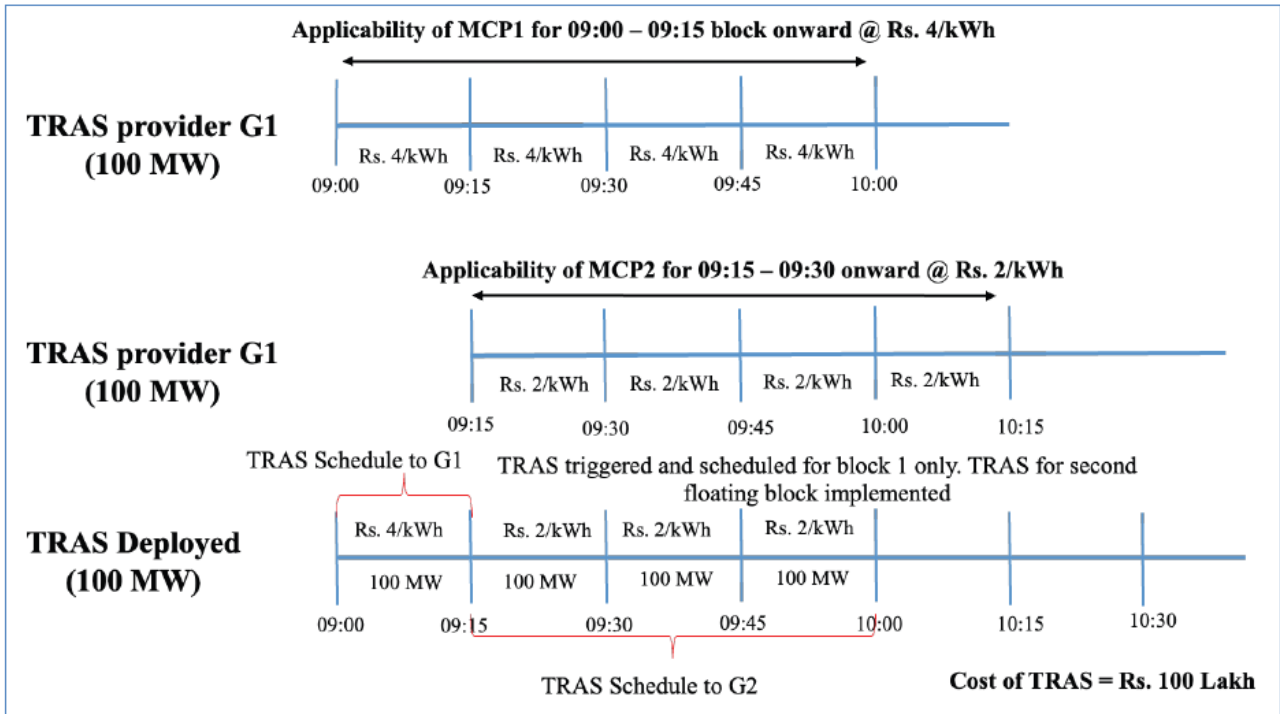


Figure 2: Floating Block Bid – Minimise cost of TRAS Procurement (MCP 1 > MCP 2)

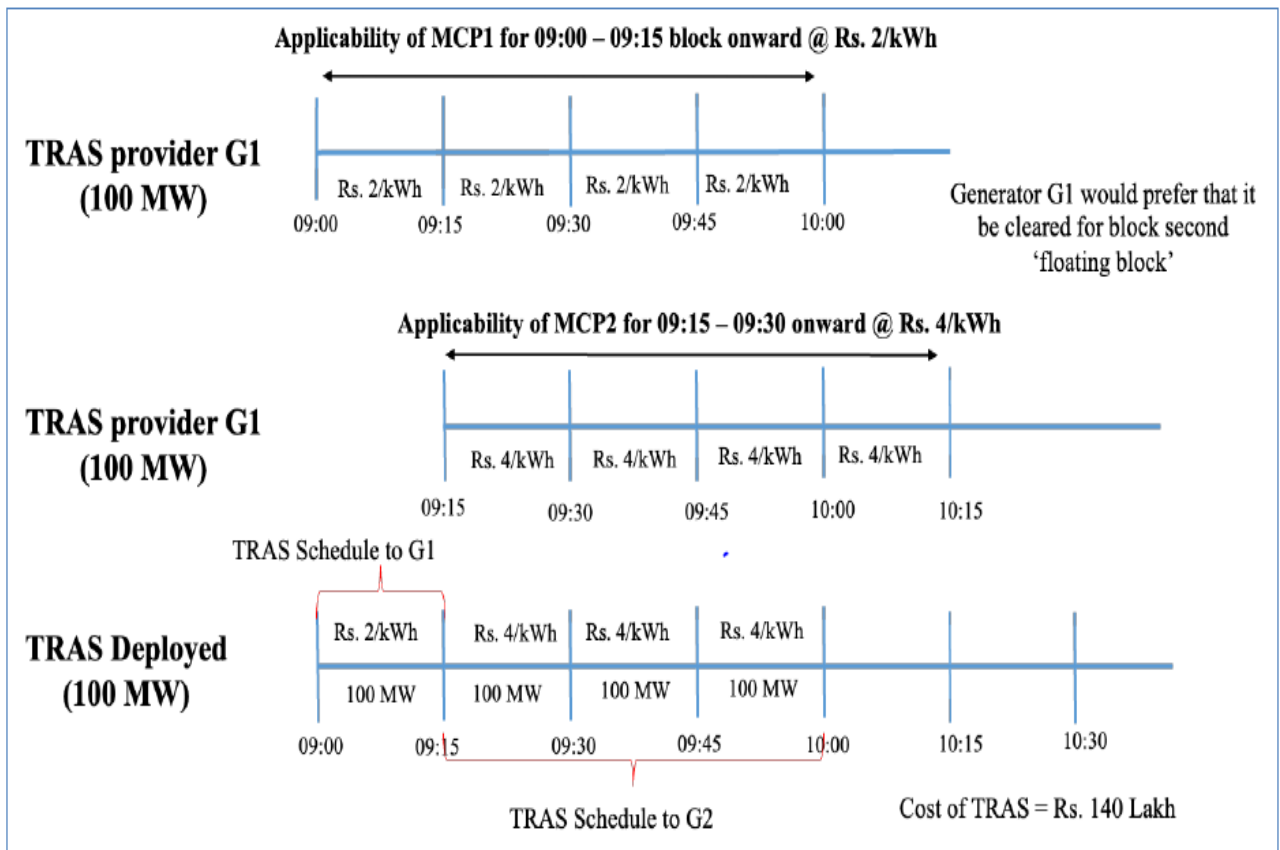


Figure 3: Floating Block Bid – Maximise Social Surplus (MCP 2 > MCP 1)

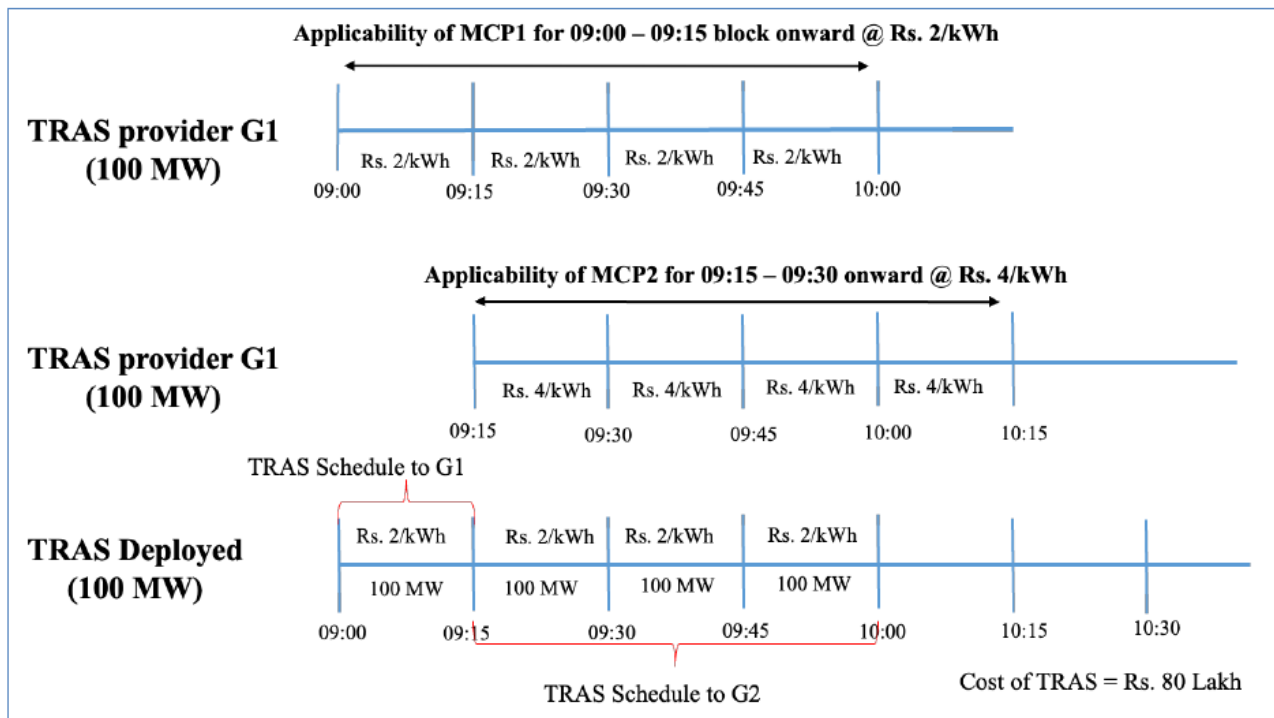


Figure 4: Floating Block Bid – Minimise cost of TRAS Procurement (MCP 2 > MCP 1)

10. Maximum Ceiling for Bidding in TRAS Market Segment: Clause 10.5 States that “The minimum quotation step or price tick would be Rs. 100 per MWh subject to maximum ceiling of Rs 50000 per MWh...”. For clarity this may be modified as “The minimum quotation step or price tick would be Rs. 100 per MWh subject to maximum ceiling of Rs 50000 per MWh for the bid...”

11. ‘MoD’ based Despatch of TRAS Across DAM and RTM: Clause 13.6.2.1 states that “In the event of the MCP-Energy-Up-DAM being equal to the MCP-Energy-Up RTM, TRASUp shall be despatched on pro-rata basis”. Deployment of TRAS-Up/Down should be undertaken on the basis of coupled MCV of the DAM and the RTM segments. If the market segment, say TRAS-Up-DAM, has lower discovered price than the TRAS-Up-RTM, the former should be deployed in full and the rest of the requirement be deployed from the later market segment. In doing so, the principle of ‘economic despatch’ would be followed across the two market segments¹. In case of part deployment to a TRAS market segment, the pro-rata approach be followed for allocating rest of the TRAS-Up requirement amongst the cleared generators in that segment.

12. Transmission Losses: Clause 14.1 states that “No inter-state transmission charges and transmission losses shall be applicable for the TRAS-Up and down delivery. (emphasis added)” The statement should also clarify whether inter-state transmission losses, intrastate transmission losses or both are exempted.

13. Part Load Compensation: In line with other similar provisions associated with ancillary services, part load compensation should be adjusted for TRAS-down (TRAS-up), which would result in lower (higher) plant loading part load operation.

14. Deployment of Generating Stations falling u/s 62: Clause 15 states that “All generating stations, whose tariff is determined by the Commission under Section 62 of the Act including those having Un-Requisitioned Surplus (URS) power after declaration of the Real Time Market (RTM) results, shall be deemed to be available for use by the Nodal Agency for TRAS, subject to technical constraints of such generating stations”. Also “The

¹ It is clarified that the merit order comparison would only be across the aggregated cleared block of DAM and the RTM market segments of TRAS respectively.



above-said generating stations, whose URS is despatched for TRAS-Up, in the event of short-fall in procurement of TRAS-Up through the Market, shall be paid at the rate of 110% of their energy charges for the quantum of TRAS-Up despatched". It is suggested that the generating stations whose tariff is determined under Section 62 of Electricity Act, 2003 and whose URS is being used in case of shortfall of TRAS-UP, should be placed as one of the bidders, so as to displace the market volume (instead of giving them 110% energy charge), at a bid equal to the their energy charge, thus improving overall market efficiency. It is important to highlight that while TRAS is being introduced through a market mechanism, any further adjustment in price to be paid is against the market philosophy and is not fair to other market participants.