

## Tata Power Delhi Distribution Limited Comments on CERC Discussion paper on ancillary services:

1. As per POSOCO, many plants have a reserve of less than 10MW which is available for despatch under Reserves regulation ancillary services(RRAS). To avoid many generating stations getting very small quantum of despatch instructions they are in the process of setting up a minimum threshold value for RRAS up or down.(pg-11 sec-3.11)

In future, Battery energy storage system will play a vital role in ancillary market due to its fast response. Utilities and other players like industrial customers will install the Battery energy Storage systems in 5-10MW range. On behalf of Distribution Utility we request POSOCO to develop a mechanism to give opportunity for all the generating stations to participate in RRAS to extract the best benefit out those units.

We request the commission to provide special consideration while setting up the cut-off limit to the battery energy storage system to participate in RRAS considering its capacity range and output benefit in terms of fast response.

2. CERC has indicated that Secondary control(AGC) and Fast Tertiary ancillary services would be open to market mode after gaining experience from the pilot studies. (Pg-18 , sec-6.3)

The Commission vide Order dated 07.12.2017 in Petition no 79/RC/2017 approved implementation of the AGC pilot project and POSOCO is in the process of executing a pilot project at Pumped hydro system for Fast tertiary ancillary services. CERC has also issued a Suo-Motu order on pilot project to harness hydro projects under a framework of Fast response ancillary service(FRAS).

We appreciate the commissions efforts in promoting the AGC and Pumped hydro system for Fast tertiary ancillary services and at the same time we request the commission to develop a framework for using battery energy storage system(BESS) for ancillary services in line with Pumped storage as it also falls under fast tertiary services and will be more prevalent where above two are not feasible.

Our submission is that in cities like Delhi and other metropolitan cities Battery Energy storage will play a crucial role as renewable, predominantly solar generation is integrated in network. In Delhi alone we envisage around 400MW of Roof top solar installation and solar energy potential can be well harnessed and integration of renewables would be better by using battery energy storage system.

In addition to the ancillary service market BESS can be used for applications like

- Peak shaving
- DSM loss minimisation
- Power quality management
- Essential services to Metro during exigency
- Preferential services to valued customer

We wish to inform the CERC that Delhi Electricity regulatory commission has already given approval for implementing the first of its kind 10MW BESS at TATA power DDL to explore best utilisation of battery storage in Utility for the above application. The plant is expected to be commissioned by end of Dec-18.

3. This paper describes about the market based ancillary services mechanism for only slow tertiary services. These are the Qualified Generators and Demand side resources which are already synchronised & non synchronised and during requirement they can respond within 15 min and 30 minutes.(Pg-18,sec-6.4)

As mentioned above, we request the commission to consider Battery energy storage for Ancillary services which can respond within a minute as it is a Fast acting tertiary services and can be used for ancillary market and frequency regulation. In the past we have paid a penalty for underdrawal below 38MW as per DSM regulation in 4000 slots (15 minutes) in a year where this could have been managed by using BESS as during those conditions the Batteries can be charged for utilising excess scheduled power.

4. Various international Market designs for ancillary services(pg-39, Annexure -3)

We appreciate the commission efforts in comparing the various international market designs for ancillary services.

In western countries more than 1000 MW of battery energy storage system were installed and used for various services in terms of spinning reserves, ancillary markets etc.

In-line with their market designs, we request the commission to develop an initial framework for using the BESS in ancillary markets. This would wide open the market for Battery energy storage systems and in-turn it would help in reducing the cost of entire system in future. Meanwhile during the course of time the economics and viability of various battery chemistries can be explored for the best fitment of BESS. In-line with the western countries we request the CERC to mandate the 3% spinning reserves from the existing generation and include the same in Indian Electricity Grid code

5. We request the commission to introduce a separate segment for Ramping services based on Ramping time. As Battery energy storage systems has a quick ramp time this service will help to meet the sudden peak in the system.

#### Recommendation:

Currently in India there is no Battery energy storage project at MW level and TATA power DDL is setting up aGrid integrated 10MW battery energy storage system project at Rohini, Delhi.

To wide open the market for ancillary services through BESS, we request the commission to develop a policy guideline based on Internal market designs to participate in the ancillary market and thereafter based on the results from the 10MW BESS pilot project POSOCO/CERC can develop a final framework for Fast acting reserves regulation ancillary services through BESS.

## General Comments:

**Tata Power-DDL Submissions:** To overcome the uncertainty of the quantum of power available in the hands of the system operator in view of the right to recall available with the original beneficiaries, a suitable mechanism may be notified by the appropriate commission wherein, the original beneficiary should be allowed to surrender a part capacity of its allocation from any Generator for a pre-defined tenure with no right to recall associated with such capacity. A suitable compensation may be provided to the original

Beneficiary as deemed fit by the appropriate commission for such surrender of power. By way of such surrender, the concerned RLDC would be able to assess the reserve capacity available with it with a fair degree of accuracy and this reserve power may be scheduled by the RLDC as and when the need of such balancing power arises.

Hon'ble Commission in clause number 3.6 of the discussion paper has also pressed upon the "need to define Adequacy in terms of "flexibility", wherein, commission has highlighted that Ancillary Services procurement and deployment mechanisms need to be technology agnostic. "Adequacy" in balancing resources needs to be defined in terms of ramping requirements (MW/min) along with MW. We welcome the view of the Hon'ble commission in this regard and would like to mention that irrespective of the technology of the resource being used for real time balancing requirement, the reserves available for this purpose should only be quantified in terms of the support it can provide to the Grid in terms of Ramping requirement (in MW/min) along with the output in MW that it can offer. Irrespective of the technology, the same would create a level playing field for all the resources capable of providing the necessary support to the Grid in real time and they should get compensated accordingly. The resources offering faster ramping support may be provided some incentive over the resources who need some time for the same permitted by its inherent technology of generation.

Hon'ble Commission in clause number 3.7 of the discussion paper has mentioned that "Ancillary Services are needed to maintain power system frequency within the limits. It is critical that the market has confidence that the services enabled will actually deliver their response both accurately and in a timely manner. The ability to verify the performance of units enabled to provide Ancillary Services is a key element of the ancillary service specification". It has been also mentioned that "Performance monitoring and verification of Ancillary Service providers needs to clearly specify:

- (a) Tests to ensure compliance with technical minimum, ramp rates, minimum up / down time, and
- (b) Procedures for regular monitoring in terms of compliance with the instruction given by the RLDC

We support the views of the Hon'ble commission in this regard and would like to mention many Generators having high variable costs generally remain un-dispatched during a major time period of the year and they keep on claiming fixed costs from the beneficiaries. As and when power is required from such Generators mainly during peak hours, they face a lot of problems during light up and synchronization. On a number of occasions such plants fail to deliver power during the times of need and beneficiaries are required to explore other options to meet their demand during such period. The moot issue here is not the "availability of the station but the "readiness of its units to deliver the power as per requirement". Such generators who are not capable to generate power as and when required should not be considered for the purpose of calculation of reserve for RRAs. Moreover, stricter norms for performance monitoring of each generator needs to be put in place and guideline should be issued for testing of readiness of such stations on a periodic basis if they are not being scheduled on regular basis. If such stations are not able to deliver as per requirement, suitable penalty should be imposed, and such penalties should be paid by the failing Generators to the original beneficiaries in a time bound manner.

**Proposed Market based Ancillary Services Mechanism:-**

Tata Power-DDL welcomes and supports the above proposed methodology for assessment of available reserves on a seasonal basis. The same would result in the better predictability of surplus power available for the purpose of real time balancing requirements and will lead to optimal utilization of resources on a nationwide basis. We further suggest that a suitable mechanism should be notified and put in place wherein, the reserves available within a particular season should also be scheduled to the participants of other regions also if there is no corridor congestion. However, assessment quantum of such reserve power should be based on the readiness (tested on a periodic basis) of the participating Generators and their past track record in providing the required support as and when required. The generators who have failed to deliver the promised capacity on a certain number of times during recent past should not be considered for calculating the quantum of available reserve.

### **Who can participate?**

#### **Tata Power-DDL Submissions:**

Tata Power-DDL welcomes and supports the above proposed methodology for inclusion of all Generation Resources under the umbrella of ancillary services providers as the same would result into more and more capacity competing to be dispatched under RRAS mechanism thereby resulting into availability of sufficient reserves under ancillary services and lowering down of cost of such balancing power.

**6.12 Therefore, in order to ensure availability of resources on a firm basis and with a view to enlarge the ambit and bringing in greater efficiency, it is proposed that:**

- a) The extant Ancillary Services Mechanism for slow tertiary reserves be replaced with markets for Ancillary Services, where all resources that can provide the defined services can participate.
- b) The markets will operate both on a Day Ahead Basis and Real Time Basis through the Market Clearing Engine of the Power Exchanges.

#### **Tata Power-DDL Submissions:**

Tata Power-DDL welcomes and supports the above proposed methodology for inclusion of all resources under the umbrella of ancillary services providers and procurement of Ancillary services through Day ahead and Real time as the same would result into availability of necessary balancing power requirement in line with the actual operating situations and would enable the buyers in securing the purchase of such services at competitive and transparent prices.

### **How will the services be procured and cleared?**

**6.13 For the slow tertiary, there shall be a Day Ahead Market where generators would bid simultaneously in Day Ahead Energy and Day Ahead Ancillary Services Market and the two shall be cleared together. While the demand curve in Day Ahead Energy Market is an aggregation of demand bid into the market, the demand curve for each type of ancillary service is put forth by the NLDC/RLDCs.**

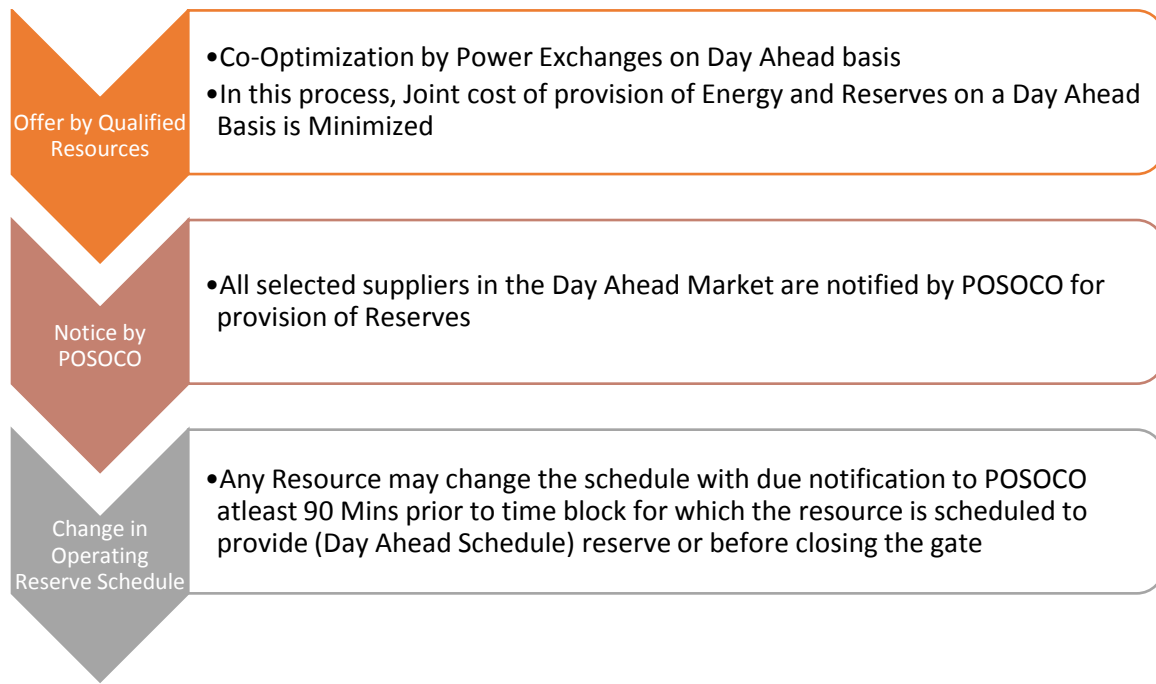
A brief of the process to be followed for procurement and clearing of ancillary services as understood from the draft discussion paper has been appended below:

1. NLDC in coordination with RLDCs and SLDCs shall decide the various types of slow tertiary services. NLDC shall further characterize these services in terms of ramp rates and duration for which continuous energy would be required from these resources.
2. The resources capable of providing tertiary reserves in the Day-Ahead commitment shall be required to submit Availability Bids for each hour of the upcoming day in the Day Ahead Market, where such offers will be co-optimized with the energy bids. Each supplier will be required to mandatorily submit its availability offer for reserves.
3. The tertiary Reserve Suppliers shall be selected for each block of time for the upcoming day through a co-optimized Day-Ahead Unit Commitment process that minimizes the total cost of Energy and tertiary Reserves, using bids submitted to Power Exchanges in the Day Ahead Market.
4. Resources selected to provide tertiary support in the day ahead market may advise NLDC no later than ninety minutes prior to the first hour of their Day-Ahead schedule or before the gate closure that they will not be available to provide tertiary reserves in Real-Time under normal conditions. However once committed in real time, the resources shall supply the support of designated quality.
5. However, there is separate treatment of resources in Real Time basis. In case the requirement changes in real time and the system operator does not require a supplier selected in day ahead market to provide tertiary reserve services, the supplier would be required to buy back the unserved quantum at real time prices.
6. Similarly, a supplier, selected in Day Ahead Market, that is not able to supply reserve services in real time shall also buyback the unserved quantum at real time prices.
7. Suppliers will thus be selected in real time based on their response rates, their applicable operating limit, and their Energy Bid through a co-optimized Real-Time commitment and dispatch process that minimizes the total cost of Energy and tertiary Reserves.

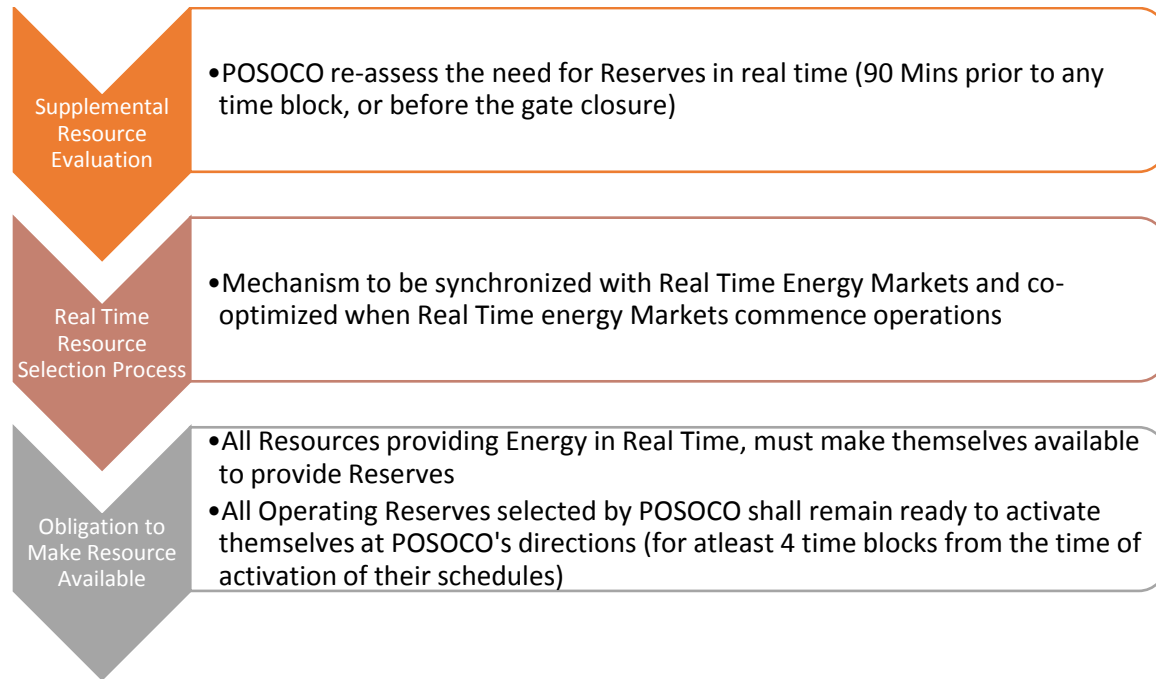
8. As part of the process, the RLDCs shall determine how much of each tertiary reserve product, a particular supplier will be required to provide in light of the reliability rules and other applicable reliability standards, including the locational tertiary reserves requirements.
9. NLDC can initiate resource evaluation at any instant. The resource that is not able to demonstrate the offer parameters shall be barred from participating in these markets for a period of three years after it has failed three successive tests.

Process flow both for Day ahead basis and intra-day basis has been shown below:

**Process flow on a Day Ahead basis**



### Process flow on an intraday basis:



### Pricing of Ancillary Services:-

Pricing of Ancillary Services is typically given by the shadow price of the Ancillary Services i.e. the lost opportunity of the generator forgone in energy market. Therefore, the price would be calculated as the cost of the marginal resource providing the ancillary service. Such opportunity costs are best discovered through markets.

The proposed design of ancillary Services Markets is demand of the time however, the desired outcome of the same can only be achieved through successful implementation of the same which in turn will be based on the deeper understanding of the entire process by all the stakeholders. Our clarifications and submission in this regard are as mentioned below:

### **Tata Power-DDL queries/Submissions:**

1. Pricing of Ancillary Services is typically given by the shadow price of the Ancillary Services i.e. the lost opportunity of the generator forgone in energy market. We request the Hon'ble



commission to arrange a mock session for all the stakeholders where a price discovery algorithm is run and entire process is shared with the stakeholders along with the results.

2. Norms of performance evaluation of the resources along with the results of such performance evaluation tests should be made available in the public domain. Frequency of such performance evaluation tests to be done in case of the generators those are not running on regular basis due to their high variable cost needs to be defined to test their readiness to deliver at the time of the need.
3. As understood from the draft paper initially, the charges for such ancillary services will be recovered from the Deviation Settlement Mechanism pool and Once the AS markets have stabilized, the charges be recovered as a “price adder” to the NLDC/ RLDC service charges and recovered from the grid connected entities on per unit of energy basis or as price adder in UI/DSM charges. We suggest that payment of such services from DSM/UI pool will send a wrong signal to the defaulting entities as they would not be directly liable to pay the charges corresponding to the ancillary services being used due to them and the same will be loaded on all the Grid connected entities. A separate mechanism should be put in place wherein the entity responsible for such charges should pay.
4. Clause number 6.16.2 mentions that *“In case the requirement changes in real time and the system operator does not require a supplier selected in day ahead market to provide tertiary reserve services, the supplier would be required to buy back the unserved quantum at real time prices”*. In this regard it may be clarified that in case on non-requirement of *“tertiary reserve services”* it is not the fault of the supplier then in such case why the supplier is required to *“buy back the unserved quantum at real time prices”*. The same may be illustrated with an example.