Prayas (Energy Group)'s comments on draft
MERC (Framework for Resource Adequacy) Regulations, 2024

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Prayas (Energy Group)

Maharashtra Electricity Regulatory Commission issued Draft MERC (Framework for Resource Adequacy) Regulations, 2024 in March 2024 and invited comments from the public by 15th April 2024.
We commend MERC for taking the initiative on this important topic to be only the third Commission (after MPERC and PSERC) in the country to publish draft regulations for Resource Adequacy (RA). These regulations provide a framework for Maharashtra DISCOMs to plan their power procurement in a cost-optimal manner taking cognizance of available technologies as well as changes in demand. Hence, this is a much needed and welcome step.

MERC notified the Renewable Purchase Obligation, its Compliance and Implementation of Renewable Energy Certificate Framework (First Amendment) Regulations, 2024 in February which not only stipulates a long term RPO trajectory of having 43.3% of energy from renewables by 2030, but it also mandates a 4% storage obligation by the same time period.
As per the 20th EPS, Maharashtra's demand could grow to 250-290 BU by FY 2030. This would entail a cumulative procurement of 107-125 TWh/BU of RE and 27-32 GWh/day of storage by FY 2030. See Table 1 below for DISCOM wise breakup of these requirements. Thus, a very significant RE and storage capacity would need to be contracted over the coming years to fulfill the RPO and growing demand in a reliable manner.

Table 1: Likely energy demand by FY 30 and RE/Storage requirements as per RPO regulations.

Parameter	Adani	BEST	MSEDCL	Tata Power	Maharashtra	Maharashtra incl. CPP and Rooftop Solar
Energy Requirement in FY 29-30 in MU incl. losses	16,225	5,532	2,10,874	6,376	2,49,002	2,89,272
RE requirement in MU in FY 29-30 with 43.3% RPO	7,025	2,395	91,308	2,761	1,07,818	1,25,255
Storage requirement in MU in FY 29-30 with 4% ESO	649	221	8,435	255	9,960	11,571
Daily Storage requirement in in FY 29-30 in GWh	1.8	0.6	23.1	0.7	27.3	31.7

Source: Prayas analysis based on CEA's 20th EPS data for Maharashtra DISCOMs.

With this context in mind, Prayas (Energy Group)'s comments on the regulations focus on process related aspects and increasing clarity regarding some specific proposals, as detailed below.

1. Strengthening effective demand forecasting for multiple time horizons.

The EM has captured the importance of effective demand forecasting and further *'elaborates the reasoning and justification for* ***fundamentally shifting the present demand assessment and forecasting to a scientific and mathematically driven one****. Demand assessment and forecasting is the* ***first and most crucial step*** *of any RA planning analysis.'*
One cannot over-emphasize the important of effective demand forecasting, since results of the IRP and RA studies based on capacity expansion and unit commitment/production cost simulations can only be

as good as the accuracy of the forecasted demand. In this regard we have some specific suggestions to further improve on this section. Based on the above discussion, we propose some modifications in specific sections in the proposed draft.

1.1. Preferable to have 15-min block wise forecasts in line with the energy accounting and DSM/F&S practices rather than hourly.

6.1. Demand assessment and forecasting is an important step for Resource Adequacy assessment. It shall entail at least hourly, ***but preferably 15 min time block wise*** ~~*or sub-hourly, as may be decided by the Commission from time to time,*~~ *assessment and forecasts of demand within the distribution area of distribution licensee for multiple horizons (short/medium/long-term) using comprehensive input data and policies and drivers and scientific mathematical modelling tools.*

7.1. The distribution licensee shall develop a methodology for at least hourly, ***but preferably 15 min time block wise*** ~~*or sub-hourly, as may be decided by the Commission from time to time,*~~ *demand forecasts and shall maintain a historical database.*

7.4. The distribution licensee shall produce at least hourly, ***but preferably 15 min time block wise*** ~~*or sub-hourly as may be decided by the Commission from time to time,*~~ *1-year short-term (ST) and 5-year medium-term (MT) forecasts on a rolling basis and submit to MSLDC by 30th April of each year for the ensuing year(s).*

1.2. Specifically refer to some more relevant existing regulations in section 6.10

6.10. The distribution licensee shall take into consideration any other factor not mentioned in clause 6.8 after recording the merits of its consideration. Further, while undertaking demand forecasts, the distribution licensee shall take into consideration the impact and benefits arising out of the demand side management programmes and DSM plans, energy efficiency measures, energy conservation interventions in pursuance of MERC (Demand Side Management Implementation Framework) Regulations, 2010 and amendments thereof ***and distributed generation resources in pursuance of MERC (Renewable Purchase Obligation, its Compliance and implementation of Renewable Energy Certificate Framework) (First Amendment) Regulations, 2024, MERC (Grid Interactive Rooftop Renewable Energy Generating System) (First Amendment) Regulations, 2023 and GoM policies such as Mukhyamantri Saur Krushi Vahini Yojana 2.0 (MSKVY 2.0).***

1.3. Importance of comprehensive disaggregated input data.

Further, no matter how good the forecasting tool and approach, the output will only be as good as the inputs, especially for MT and LT forecasts given the changing nature of demand profiles. In this regard, **section 6.9** should specifically include potential future ToD tariffs, which could significantly change the load profile and which may not be as aligned to past data. In addition, DISCOMs should give a detailed documentation on the reasoning for the use of specific tools **(Section 6.8)** and modifications (as per **Section 6.9**).

This is even more important in the context of **multiple licensees and the increasing scale of contested consumers** due to Green OA/CPP. Having transparent assumptions and disaggregated inputs (in the public domain) to create a range of realistic scenarios is a good approach.

6.11. The medium-term ***and long-term*** *load profile of the customer categories for which load research*

has been conducted may be refined on the basis of load research analysis. A detailed explanation for refinement conducted must be provided.

Further, the importance of circle-wise demand assessment has also been recognized in **CEA's Network Planning Criteria**. To quote from *Section 3.2 (emphasis added): Spatial Granularity - The forecasts initially should be prepared at the Discom/State level. In addition, forecast at more granular levels i.e., Zonal level, Circle level, District level, Sub-Station Level, Feeder/Transformer level should also be carried out in case of availability of adequate granular data.* Recording spatially granular input data will further help in better overall demand forecasting.

1.4. Account separately for full and partial Open Access and Captive demand.

*6.12. The summation of energy forecast (MWh) for various consumer categories upon suitably adjusting for prosumers, **partial and full** captive and open access load forecast, ~~if necessary~~, as obtained as per clauses 6.4 to clause 6.10, as the case may be, shall be the load forecast for the licensee.*

1.5. Use of same detailed scientific demand forecast as done under RA in the MYT process.

The **draft MYT regulations** as per section 100. **Sales forecast,** note that
*'100.2 The sales forecast shall be consistent with the load forecast prepared **as part of the power procurement plan under Part C of these Regulations** and shall be based on past data and reasonable assumptions regarding the future.'*
To avoid any confusion, it would be better to explicitly state that the demand forecast prepared under the RA regulations should be used in the MYT process as well and the assumptions should be consistent across both processes.

1.6. Abundantly clarifying Annexure-I: Data Requirement Template.

The Annexure-1 clearly notes that it is a '**Data template** for demand forecasts for state and its distribution licensees.' However, it **should be made clear that the template is not to be merely used for forecasting demand for the terminal year simplistically (as done in the past) based on a single CAGR**, but rather only as an input for the various potential methods and techniques elaborated in section 6. Further the Annexure is not referred to in the main text of the draft. It would certainly be better to have hourly/ToD slot-wise consumer wise forecasts wherever possible as part of the Annexure as well.

2. Consider mandating 10 year (LT) Distribution Resource Adequacy Plan (LT-DRAP)

As per section 5.5,
*'The distribution licensees, State Transmission Utility and State Load Despatch Centre shall provide requisite information and data including demand forecasts for period upto **10 years** to various Agencies to enable Central Electricity Authority and Grid India/NLDC to undertake LT-NRAP and ST-NRAP studies, respectively, as per CEA RA Guidelines.'*

Thus, for the national studies, State entities will have to create 10 year demand forecasts. However as per sections 5.3 and 5.4, only medium and short term RA plans are to be made. We suggest that even long term (10 year) RA plans be made mandatory as part of the RA framework. Both MPERC and PSERC have also mandated a 10 year RA study alone with MT and ST studies.

The MERC may consider revising section 5.3, 5.4 and 9.5 as follows.

5.3. The long, medium and short term for the purpose of these Regulations shall be considered as:
a) Long term procurement plan for a period up to ten years; and
b) Medium term procurement plan for a period up to five years; and
c) Short-term procurement plan for a period up to one year.

5.4. The distribution licensee shall develop and prepare ***Long-Term Distribution Resource Adequacy Plan (LT-DRAP)****, Medium-Term Distribution Resource Adequacy Plan (MT-DRAP) and Short-Term Distribution Resource Adequacy Plan (ST-DRAP) in accordance with the conditions outlined under these Regulations.*

9.5. The distribution licensee shall map all its existing resources, upcoming resources, and retiring resources to develop the existing resource map in MW for the ***long-term*** *and medium term power procurement planning purposes.*

3. Need for capacity building and a trial period (1-2 years) without penalties/non-compliance charges for non-compliance of RA.

The draft has proposed a specific non-compliance charge as noted in section 19.4 below.

"19.2. ***Treatment for shortfall in RA Compliance****: Distribution licensees shall comply with the RA requirement and in case of non-compliance, appropriate non-compliance charge shall be applicable for the shortfall for RA compliance.*

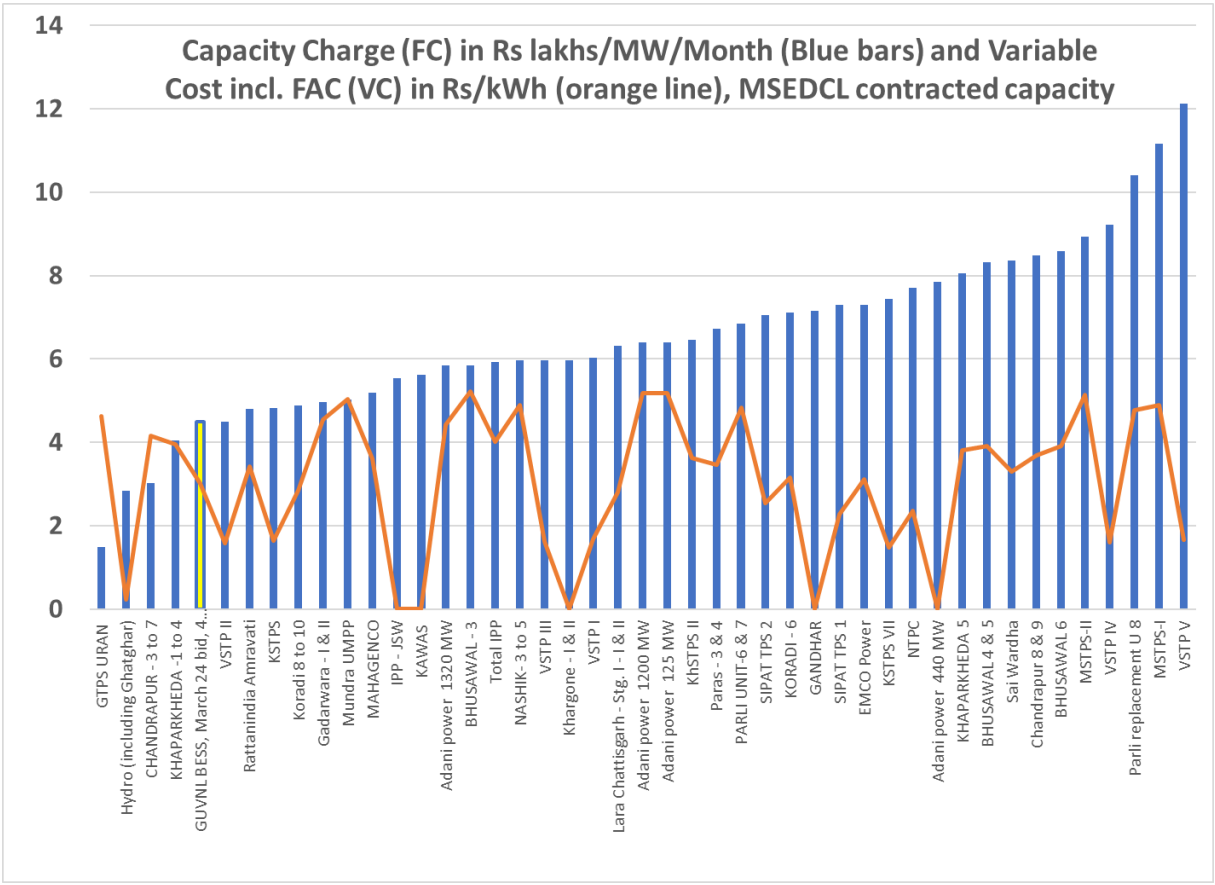
19.3. For shortfall in RA compliance, MSLDC shall levy and collect non-compliance charge from the concerned Distribution Licensee.

19.4. The rate of Non-compliance charges ***shall be equivalent to 1.1 times the Marginal Capacity Charge (Rs/kW/month) or 1.25 times the Average Capacity Charge (Rs/kW/month) whichever is higher****, as approved by the Commission for the power procurement by concerned distribution licensee under its ARR/Tariff Order for the relevant financial year, unless separately specified by the Commission.*

19.5. The distribution licensee shall not be allowed to recover such non-compliance charge as part of its ARR."

To put this non-compliance charge in context, if one were to look at the capacity charge of MSEDCL's contracted capacity for FY 24-25 (arranged in increasing charges as shown in the Figure 1 below), the Marginal Capacity Charge is **Rs 1,224/kW/month (or Rs 12.24 lakh/MW/month)** and the **Average Capacity Charge is Rs 596/kW/month (or Rs 5.96 lakh/MW/month)**. 1.1 times the marginal charge is Rs 1,346/kW/month and 1.25 times the average charge is Rs 744/kW/month. Thus, the non-compliance charge would be the higher of the two, **at Rs 1,346/kW/month**.
If one were to compare this to a very recent winning bid from a BESS tender by GUVNL (5th bar from the left in yellow colour) for 250 MW and 500 MWh (2 cycles/day, so 1000 MWh or 4 hours/day), **the penalty would be 3X the BESS winning bid of Rs 449/kW/month (Rs 4.49 lakh/MW/month)**.

Figure 1: FC and VC of MSEDCL Contracted Capacity for FY 24-25



Source: Prayas analysis based on MSEDCLs petition submissions as part of MTR -- format 2.

RA is new concept for the Indian power sector and RA studies are rather complex and time consuming to undertake. Thus, there needs to be an initial period during which these methods are fine-tuned and capacity building of the various institutions involved is undertaken. In this context, it is imperative that there be a trial period of a few years (1-2) for the RA framework specified by CEA guidelines, IEGC and the MERC and that RA targets are not binding during this trial period[1]. Specifically, penalties should not be imposed for non-compliance with specified RA targets during this period. Without such a cautious approach followed by serious public deliberations on the results of the various studies, RA requirements may not result in cost-optimal investments, and instead may result in long term, base-load contracting with associated inefficient resource lock-ins.

However, it is also true that with some penal clauses, there would be strong pressure on DISCOMs to adhere to the RA framework timelines. Hence, for the first 1-2 years, the **MERC could instead propose penalties for not adhering to various processes and timelines as proposed in the draft regulations**.

[1] This is also highlighted in a 2021 paper assessing IRP processes and RA frameworks in the North Western Power Pool of the United States. The paper titled, "Implications of a regional resource adequacy program forutility integrated resource planning" states that:
"Ultimately, interviewees from public utility commission staff from SPP states indicated that LSEs have an incentive to develop IRP assumptions that are consistent with SPP's in order to fulfill their membership duties. IRPguidelines in these states are generally much broader and more flexible than the IRP rules in Western U.S. states. This flexibility makes it easier for LSEs to adapt their IRP analyses to align with SPP requirements. LSEs should be able to develop NWPP-aligned forecasts as part of their IRP processes and benefit from the public stakeholder engagement as long as IRP regulations in the NWPP states are based on a broad and flexible set of principles." More details here: https://www.sciencedirect.com/science/article/pii/S1040619021000518

These would include:

A. Timely collation, sharing and publishing of various input data sets (incl. data as suggested in all Annexure data formats) and projections.
B. Scientific demand assessment for ST, MT and LT specifically with bottom up analyses for several scenarios for LT.
C. Conducting capacity expansion and production cost simulations for ST, MT and LT and publishing the studies along with the input data for consultation and public comments.
D. Setting up of dedicated RA cells with adequate and appropriately skilled staff.

4. Need for synergy in practice across different regulations.

The draft MYT regulations rightly refer to the RA regulations several times in the section on power procurement as noted in sections 6.4, 18.1 and 19.

6.4 The Distribution Licensees shall project the realistic power purchase requirement from all Generating Stations including Energy Storage system(s) ***considering the provisions of the Maharashtra Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations, 2024*** *and the amendments thereof. Distribution Licensees while submitting the MYT Petitions, shall submit the details of approved power procurement plan by the Commission and variation in the actual power procurement vis-à-vis approved power procurement plan* ***in compliance to the provisions of the MERC (Framework for Resource Adequacy) Regulations, 2024****.*

18.1 The Distribution Licensee shall undertake its power procurement during the year in accordance with the power procurement plan for the Control Period, which may include long-term, medium-term and short-term power procurement, approved by the Commission ***in accordance with Maharashtra Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations, 2024.***

19 Power procurement plan
19.1 The Distribution Licensee shall prepare a plan for procurement of power to serve the demand for electricity in its area of supply ***considering the provisions of the MERC (Framework for Resource Adequacy) Regulations, 2024*** *and submit such plan to the Commission for approval:*
Provided that such power procurement plan ***approved under MERC (Framework for Resource Adequacy) Regulations, 2024*** *for the Control Period commencing on April 1, 2025, shall be filed along with the Petition for determination of Tariff for the Control Period from April 1, 2025 to March 31, 2030, in accordance with* ***Part A*** *of these Regulations.*

Thus, for the purpose of determining consumer tariffs and approving ARRs, only the power procurement plan as approved by the MERC as part of the RA framework shall be considered.

5. Methodology to determine capacity credits, experimenting with few methods

The proposed method for calculating capacity credits may not reflect the dynamics that affect the value of certain technologies. Two aspects merit attention. One, certain resources have diminishing capacity credit as their penetration increases. For example, solar capacity may have a certain value in a system where there is a day-time peak. However, each additional megawatt of solar added to the system may have diminishing value. This may be particularly relevant when making decisions for a longer period like ten years. The second aspect is the impact of one resource on the capacity credit of

other resources. For example, in a solar heavy system, additional solar capacity is likely to have a low-capacity value. However, addition of storage resources can result in a higher capacity value for solar. Thus, capacity values need to be calculated with different combinations of capacities of different technologies. Methodologies such as those based on the Effective Load Carrying Capability (ELCC) metric can be effective in determining capacity credits for combinations of different technologies[2]. While it might be better to start off the RA studies with the relatively easier 'top net-load hours CC methodology', it would be necessary to start experimenting with other methods as noted above in the year 2 or 3 of the RA exercise. The MERC could specify this as a trial for MSLDC as part of section 10.6

Capacity credit for hydro resources: In clause 10.4, it is stated that *"CC factors for hydro generation resources shall be computed based on water availability with different CC factors for run-of-the-river hydro power projects and dam-based/storage-based hydro power projects".* Can it be elaborated how capacity credit is to be calculated for hydro power projects given that past data for storage-based hydro power projects would reflect dispatch decisions made by the MSLDC? On the other hand, should capacity credit for run-of-the-river hydro power projects be calculated in a manner similar to variable renewable resources giventhat they are usually not dispatchable?

6. Explicitly state Planning Reserve Margin (PRM)

With regard to the PRM, the draft notes that,

9.6. The distribution licensee shall also include a planning reserve ***as specified by the Authority or Commission, as the case may be****. In the absence of any guidelines from the Commission, the distribution licensee can consider* ***suitable planning reserve with proper justification, which will be subject to approval by the Commission****. The value of planning reserve margin considered shall be stipulated in the resource plan along with justifications.*
Further in 11.2,
11.2. Such Planning Reserve Margin (PRM) factor (for example, 10%) shall be based on the reliability indices in terms of Loss of Load Probability (LOLP, for example, 0.2%) and Normalized Energy Not Served (NENS, for example, 0.05%) as may be specified by the Authority or separately computed by the distribution licensee and STU/SLDC at state level, subject to approval of by Commission, and the same shall be considered by entities in their planning for resource adequacy requirement and generation resource capacity planning.
11.3. The capacity planning by the distribution licensee and State level resource adequacy planning by STU/MSLDC shall factor in PRM while developing state-level Integrated Resource Plan.

The EM clearly notes that,
As part of Clause 11 of the Draft RA Regulations, DLs and STU/SLDC should either adopt the PRM as notified by CEA or compute their own such that it is at least equal to or greater than the PRM notified by CEA. The PRM should be such that load generation profile is duly factored and LOLP and ENS parameters are met.
However, the same (*it is at least equal to or greater than the PRM notified by CEA*) is not reflected in the

[2] Application of ELCC in RA studies is explained in the paper titled "Capacity and Reliability Planning in the Era ofDecarbonization - Practical Application of Effective Load Carrying Capability in Resource Adequacy", available athttps://www.ethree.com/wp-content/uploads/2020/08/E3-Practical-Application-of-ELCC.pdf

draft regulations.

Thus, the Commission may consider a new proviso to section 9.6 or 11.2 as described below.
Provided, the PRM adopted by the distribution licensee and STU/SLDC at state level shall be own such that it is at least equal to or greater than the PRM notified by CEA.

7. Good innovation in allocation formula of share in National Peak

Section 12.8 and 12.9 notes that,
12.8. Based on the allocated share in national peak provided in LT-NRAP for the State, STU/MSLDC shall allocate each distribution licensee's share in the state peak within 15 days of the publication of LT-NRAP based on ***average of the percentage share in the state coincident peak demand and percentage share in the state non-coincident peak demand.***

This averaging is a good innovation proposed by the draft as the EM rightly notes that this, ***'method ensures appropriate and optimal requirement and allocation of resources while also ensuring that the DL is able to meet its own peak plus PRM i.e. NCPD.'***

Section 12.9. states that, *'The distribution licensee based on the above allocation shall accordingly plan to contract the capacities to meet their Resource Adequacy Requirement (RAR) while ensuring that their own peak demand plus PRM is met'.*
It would be good if the Commission clarifies whether this only for one instance when the peak demand occurs or for all hours of the year?

8. Who is responsible for the resource adequacy for OA & CPP demand?

Another aspect to consider here is the OA and CPP demand embedded within the State's share in national peak. Conceptually, DISCOMs should not be responsible for procuring/contracting adequate capacity to ensure RA for OA and CPP demand.
One argument, especially for partial OA/CPP consumers who continue to maintain contract demand with the DISCOM (and pay fixed charges for that CD) is that DISCOMs should be responsible for their RA given these fixed cost payments. However practically, given the way consumer tariffs are designed, energy charges are much higher than actual variable energy costs for the DISCOMs (more so considering ToD and seasonal variations) with the result that actual fixed charges are much lower than fixed costs. Thus, though these partial OA/CPP consumers are maintaining CD and paying some fixed charges, these are nowhere close to compensating DISCOMs for contracting and maintaining adequate capacity for OA/CPP. **Thus, this argument would not hold much water unless tariff design is fundamentally changed with an effective seasonal and ToD pricing (with energy being priced as per realistic variable costs) and compensation for banking services at least at actuals.**
Further, there is the issue of full/long-term OA/CPP consumers which do not maintain CD with the DISCOM and hence have no basis to expect the DISCOM contracting adequate capacity on their behalf. **Thus, it is unclear as to who is finally responsible for procuring and contracting capacity for full and partial OA/CPP consumers. The Commission should clarify this aspect in their regulations.**

9. Further clarifying nature of contracts and allowable contracts

Section 12.10 notes the time durations of the contracts while 12.12 mentions that DAM transactions will

not be considered for RA. To bring in more clarity and relax the minimum requirement for MT contracts, we propose a slightly modification to 12.10.

12.10. The distribution licensee shall keep minimum 70% Long-term contracts, minimum 20% Medium–term contracts ***(unless long term contracts exceed 80%),*** *and the rest to be met through Short-term contracts.*

Further, the Power Exchanges are likely to come up with up to 11-month contracts under Term Ahead Market (TAM). The regulations should clarify how procurement under TAM segment (week, month and 11 month ahead) would be treated. We propose a new section 12.13.

12.13. Provided that power procurement through Term-Ahead Market (TAM), shall be considered towards the contribution for meeting RAR.

10. Procurement

Some minor edits in these sections for further clarity are suggested below.
We propose adding a proviso to section 14.2 as described below. This would mandate DISCOMs to do 10 year (LT) studies but given the uncertainty over this time period, the Commission could only approve power procurement for ST and MT.

14.2. For identification of the optimal generation procurement resource mix, optimization techniques and least-cost modelling shall be employed in order to avoid stranding of assets. The distribution licensee shall engage in adoption of least cost modelling and optimization techniques and demonstrate the same in its overall power procurement planning exercise to be submitted to Commission for approval.

Provided these planning exercises are done for MT and LT with the approval being given only for ST and MT.

Some minor edits proposed in 14.5 and 14.8 shown in bold below.

14.5. The power procurement from Wind, Solar PV, Wind Solar Hybrid, Round the Clock (RTC), ***Peak, Firm and Dispatchable RE (FDRE)*** *generations shall be carried out as per the guidelines for tariff based competitive bidding process notified by the Ministry of Power.*

14.8. The distribution licensee may procure power on Short-term and Medium-term basis through DEEP and PUShP portal ***or TAM in Power Exchanges****.*

11. Finer resolution (preferably 15-min) of the RA studies

It is important to note that hourly resolution will not be sufficient to capture the impact on the system due to variability in demand and variable RE generation. For example, a coal generator with a ramp rate of 1%/min can ramp up or down by up to 60% of its installed capacity in an hour which is its entire capacity above technical minimum. Thus, an hourly simulation cannot capture the ramp constraints that are seen in areal system. A resolution of 15 min or higher should be considered in studies where operational constraints such as ramp rates are being considered, such as dispatch simulations. Section 12.1 can be modified as follows.

12. Ascertaining Resource Adequacy Requirement and its Allocation for Control Area
*12.1. Upon applying CC factors as determined under Regulation 10 of these regulations and determining adjusted capacity for contracted generation resources (existing and planned), the sum of such adjusted contracted generation capacity (existing and planned) over a time axis of at least one hour**, but preferably 15 minutes interval** as may be decided by the Commission from time to time, but not more than one hour, shall form the resource map of the distribution licensee.*

12. Leveraging wider sector expertise in the country and mandatory public hearings prior to finalizing & approving RA studies and the procurement plans.

There is significant expertise on demand forecasting and capacity expansion & unit commitment/production cost simulations of the Indian/State power system within some Indian research groups and civil society organisations. These groups engage in various policy and regulatory processes and share their inputs andexpertise in many forums. Hence, the various processes under the resource adequacy regulations (given the complexity of the studies) should ideally include this set of stakeholders to bring in their expertise and experience. For example, **the consultation specified in clause 23.3 should be a public consultation and not be restricted to official sector stakeholders**.

Section 23.3 could be re-drafted as
*23.3 The distribution licensee shall make the Resource Adequacy Plan in consultation with State Sector Generating Companies, other Distribution Licensees, Central Sector Generating Companies, Transmission Companies, National / Regional /State Load Dispatch Centers, **research agencies and civil society organisations with relevant experience** and Central Electricity Authority. It may also make enquiries with the Trading Companies and States with surplus **or deficit** power to estimate the likely availability and price of power across the country for peak, off-peak and normal periods. **Further, Distribution Licensees shall publish their draft RA Plan (incl. all scenarios) along with relevant data used in the modelling study for public consultation and finalise it only after taking public comments into consideration. The period for public consultation should be for a minimum of 1 month given the complex nature of the exercise.***

13. Need for enhanced transparency

The data that is mandated to be shared as per the four formats specified in Annexure I (as listed below) should also be made public in downloadable spreadsheet formats since unless the input data used for RA studies is known, it is hard to interpret the results, reducing the possibility of critically engaging with the whole exercise to further improve it.

- Data template for demand forecasts for state and its distribution licensees
- Data template for historical load, RE installed capacity, and RE generation data in hourly resolution
- Data template for technical and financial characteristics of each generating station
- Data template for peak demand and energy requirement projections of all DLs and SEZs

Further, each entity (DISCOMs, GENCOs, Tx licensees, STU, SLDC etc.) should have a separate section on their website for RA and store/update data in downloadable spreadsheet formats since these decisions, esp. on power procurement affect the public at large.
Such transparency also enables various stakeholders to provide informed inputs and contribute constructively to the resource planning process. Without access to the relevant data, the results of the any study will only appear as a black box model which cannot be critically examined or replicated.

Prayas (Energy Group) has been conducting power sector modelling and our entire MSEDCL model along with public data is available in the public domain here (https://github.com/prayas-energy/gridpath-mh).

Wherever, specific data/inputs are noted in the RA regulations and which are to be shared with relevant Central or State agencies for further analysis, the same should also be shared in the public domain. These would include but not be limited to.

a) Inputs to demand forecasting which are shared with MSLDC and STU
b) Actual demand forecasts for each consumer category as per section 6.1
c) The distribution licensee shall share CC factors for their contracted resources along with justification for its computations with MSLDC.
d) MSLDC shall calculate state-specific CC factors considering the aggregate State Demand and State Net Load and contracted RE generation resources available in the State and shall submit such CC factor information to the Authority and NLDC and RLDC from time to time.

14. Treatment of demand-side resources

Demand side resources have been considered in the demand forecasting (6.9 & 6.10) and hence are baked into the demand. However, some demand side resources such as demand response are available for balancing the system, and hence could be considered similar to generation resources in resource adequacy studies. CEA's resource adequacy guidelines also state that methodologies similar to determination of capacity credits for renewable resources should be employed to determine the value of demand response resources. Hence section 2.1 could be re-drafted as

The objective of these Regulations is to enable the implementation of Resource Adequacy framework by outlining a mechanism for planning of generation, ***demand*** *and transmission resources for reliably meeting the projected demand in compliance with specified reliability standards for serving the load with an optimum generation mix.*

15. Broadening scope of Energy Storage

Section 14.6. notes that, *'The distribution licensee shall contract storage capacity corresponding to the results of MT- DRAP capacity addition requirement for future years from Battery Energy Storage System (BESS) and Pump Storage Projects (PSP) as per the guidelines for tariff based competitive bidding process notified by the Ministry of Power.'*

This is understandable since these are the only two scalable & cost-effective energy storage technologies at present. However, given the 10-year time scale of the regulations, it might be prudent to make this more general and re-draft it as,

'The distribution licensee shall contract storage capacity corresponding to the results of MT- DRAP capacity addition requirement for future years from Battery Energy Storage System (BESS) ***and/or*** *Pump Storage Projects (PSP)* ***or any other cost-effective energy storage technology depending on the gestation periods and other techno-economic parameters*** *as per the guidelines for tariff based competitive bidding process notified by the Ministry of Power'.*

Further, it is appropriate that such storage procurement shall only be done through a competitive bidding process in line with MoP guidelines. Therefore, it is unclear why the draft MYT regulations have a detailed section on tariff principles for Energy storage based on cost plus (section 62) projects. This

section should be deleted from the draft MYT regulations.

16. Sections where the Commission could provide further clarity to improve stakeholder understanding of some of the steps in the RA framework.

a. Whether the State model will be run as an independent node or connected to the larger India model with longer term interactions with other States/regions?

b. The EM notes that,

RA Requirement and Allocation
As part of the Clause 12 of the Draft RA Regulations, the following steps should be taken to arrive at RA requirement for state and allocation down to DLs:
1. Discount state installed capacity by CC to arrive at actual available capacity for state.
2. Subtract that from the ***state demand plus PRM*** *to arrive at resource gap for the state.*
3. Allocate this resource gap to DLs based on average of percentage share of DL in state CPD plus PRM and percentage share of DL in state NCPD plus PRM.

Is the 'State demand plus PRM' referred above the State CPD or NCPD peak demand or net-load peak demand? Or this is an incorrect question since this will be done for 8760 hours and not for one instance.

c. 12. Ascertaining Resource Adequacy Requirement and its Allocation for Control Area
12.1. Upon applying CC factors as determined under Regulation 10 of these regulations and determining adjusted capacity for contracted generation resources (existing and planned), the sum of such adjusted contracted generation capacity (existing and planned) over a time axis of at least one hour, or 15 minutes interval as may be decided by the Commission from time to time, but not more than one hour, shall form the resource map of the distribution licensee.

Does this mean that this is done for each hourly or 15 min block for the entire year. I.e. the resource map will have 8760 or 35040 values?

12.2. The distribution licensee shall subtract the resource map developed in clause 12.1 from the demand forecast developed in section 6 (ref. Clause 6.13) to identify the resource gap (Does this mean for every hour or 15 min block?). The resource gap in terms of RA compliance for the distribution licensee for the long term and medium term shall be developed in the manner as specified in these Regulations.

12.3. The distribution licensee shall conduct sensitivity and probability analysis to determine the most probable resource gap (Does this mean for every hour or 15 min block?). The distribution licensee shall also develop long-term and medium-term resource gap plans for possible scenarios, while ensuring that at least three different scenarios (most probable, business as usual, and aggressive) are developed.

d. 15.3. The distribution licensee shall demonstrate to the Commission 100% tie-up for the first year and a minimum 90% tie-up for the second year to meet the requirement of their contribution towards meeting state peak. Only resources with long / medium / short-term contracts shall be considered to contribute to the RAR. (What about contribution to NCP?, or since that is covered by CEA guidelines and hence not covered by MERC?)

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