

ASSAM ELECTRICITY REGULATORY COMMISSION

NOTIFICATION

September 6th, 2024

Draft Framework for Resource Adequacy

In exercise of the powers conferred under Section 181 of the Electricity Act, 2003 (36 of 2003), read with section 61, 66, and 86 thereof and all other powers enabling it in this behalf, and after previous publication, the Assam Electricity Regulatory Commission hereby makes the following Regulations, namely – Assam Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations, 2024.

Chapter 1

Preliminary

1. Short Title, Extent, and Commencement

- 1.1. These Regulations shall be called the Assam Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations, 2024.
- 1.2. These Regulations shall extend to the whole State of Assam.
- 1.3. These Regulations shall come into force from the date of their notification in the Official Gazette of the Government of Assam

2. Objective

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

Provided that the planning of transmission resources shall be consistent with “Assam Electricity Regulatory Commission (Electricity Grid Code) Regulations, 2018”, “Central Electricity Regulatory Authority (Indian Electricity Grid Code) Regulations, 2023”, and amendments thereof.

- 2.2. The Resource Adequacy framework shall cover a mechanism for demand assessment and forecasting, generation resource planning, procurement planning, and monitoring and compliance.

3. **Scope and Applicability**

- 3.1. These Regulations shall apply to the generating companies, Distribution Licensee, State Load Despatch Centre, State Transmission Utility, full transmission Open Access participants, and other grid connected entities and stakeholders within Assam.

Provided that Distribution Licensee shall consider demand of -embedded open access consumers (consumers paying demand charges to Distribution Licensee) while forecasting their demand for Resource Adequacy planning.

4. **Definitions**

- 4.1. In these Regulations, unless the context otherwise requires,
 - a. “**Act**” means the Electricity Act, 2003 (36 of 2003) and subsequent amendments thereof.
 - b. “**Assam Electricity Grid Corporation Limited**” or “**AEGCL**” means the state transmission utility or **STU**.
 - c. “**Assam State Load Despatch Centre**” or “**Assam SLDC**” or “**SLDC**” means the state load despatch centre.
 - d. “**Authority**” means Central Electricity Authority referred to in sub-section (1) of Section 70 of the Act.
 - e. “**Capacity Credit**” or “**CC**” means a percentage of a resource’s nameplate capacity that can be counted towards resource adequacy requirements.
 - f. “**CEA RA Guidelines**” means Guidelines for Resource Adequacy planning framework for India notified by Central Electricity Authority in pursuance of Rule 16 of Electricity (Amendment) Rules, 2022 and amendments thereof.
 - g. “**Commission**” or “**State Commission**” means the Assam Electricity Regulatory Commission (AERC) constituted under the Act.
 - h. “**Distribution Licensee**” means a licensee authorised to operate and maintain a distribution system for supplying electricity to the consumers in his area of supply and “**Assam Power Distribution Corporation Ltd**” (APDCL) is the Distribution Licensee in the state of Assam.
 - i. “**Expected Energy Not Served**” or “**EENS**” means the expected amount of load (MWh) that may not be served for each year within the time horizon for Resource Adequacy planning.
 - j. “**Long-Term**” or “**LT**” means duration exceeding five years for development of demand forecasting and generation resource planning.

- k. **“Long-Term Power Procurement”** means procurement of power under any arrangement or agreement with a term or duration exceeding five years.
- l. **“Long-Term Distribution Resource Adequacy Plan”** or **“LT-DRAP”** means plan for assessment and meeting of long-term resource adequacy by Distribution Licensee.
- m. **“Long-Term National Resource Adequacy Plan”** or **“LT-NRAP”** means plan for national level assessment of long-term resource adequacy published by Central Electricity Authority as per CEA RA Guidelines.
- n. **“Loss of Load Probability”** or **“LOLP”** means probability that a system’s load will exceed the generation and firm power contracts available to meet that load in a year.
- o. **“Medium-Term”** or **“MT”** means five years for development of demand forecast, generation resource plan, and procurement plan.
- p. **“Medium-Term Distribution Resource Adequacy Plan”** or **“MT-DRAP”** means plan for assessment of medium-term resource adequacy by the Distribution Licensee.
- q. **“Net Load”** means the load derived upon exclusion of actual generation (MW) from renewable energy generation resources from gross load prevalent on the Grid during any time-block.
- r. **“Normalized Energy Not Served”** or **“NENS”** is normalization of the EENS by dividing it by the total system load.
- s. **“Planning Reserve Margin”** or **“PRM”** means a specified percentage of available capacity above peak demand as may be stipulated by Authority or Commission for the purpose of generation resource planning.
- t. **“Power Exchange”** means any exchange operating as power exchange for electricity in terms of the regulations issued by the Central Electricity Regulatory Commission.
- u. **“Power Purchase Agreement (PPA)”** means the agreement entered into between the Procurer(s) and the Seller(s) pursuant to which the Seller shall supply power to the Procurer(s) as per the terms and conditions specified therein.
- v. **“Power Sale Agreement (PSA)”** shall mean the back-to-back agreement entered into between the Buying Entity(s) and the Intermediary Procurer/trader for onward sale of power purchased under any power purchase agreement.
- w. **“Resource Adequacy”** or **“RA”** means a mechanism to ensure adequate supply of generation to serve expected demand (including peak, off peak and in all operating conditions) reliably in compliance with specified reliability standards for serving the load with an optimum generation mix with a focus on integration of environmentally benign technologies after taking into account the need, inter alia, for flexible resources, storage systems for energy shift, and demand response

measures for managing the intermittency and variability of renewable energy sources.

- x. **“Resource Adequacy Requirement”** or **“RAR”** shall mean the requirement of resource capacity to be contracted to reliably meet the forecasted demand of such obligated entity and in compliance to provisions under these Regulations with appropriate planning reserve margin prescribed by Commission or Authority as the case may be.
 - y. **“Short-Term”** or **“ST”** means duration up to one year for development of demand forecast, generation resource plan, and procurement plan.
 - z. **“Short-Term Distribution Resource Adequacy Plan”** or **“ST-DRAP”** means plan for assessment of short-term resource adequacy by the Distribution Licensee.
 - aa. **“Short-Term National Resource Adequacy Plan”** or **“ST-NRAP”** means plan for national level assessment of short-term resource adequacy published by Grid India/National Load Despatch Centre as per CEA RA Guidelines.
- 4.2. The words and expressions used and not defined in these Regulations but defined in the Act, Rules, and Regulations framed thereunder shall have the meaning assigned to the in the Act, Rules, and Regulations.

Chapter 2

General

5. Resource Adequacy Framework

- 5.1. Resource Adequacy framework entails the planning of generation and transmission resources for reliably meeting the projected demand in compliance with specified reliability standards for serving the load with an optimum generation mix.
- 5.2. Resource Adequacy framework shall cover following important steps:
 - a) Demand assessment and forecasting
 - b) Generation resource planning
 - c) Procurement planning
 - d) Monitoring and compliance
- 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 exceeding five years;
 - 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. 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.
- 5.5. Distribution Licensee, State Transmission Utility (STU) and State Load Despatch Centre (SLDC) shall provide requisite information and data including demand forecasts for period up to 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.

Chapter 3

Demand Assessment and Forecasting

6. Long-term and Medium-term Demand Forecast

- 6.1. Demand assessment and forecasting is an important step for Resource Adequacy assessment. For short-term, it shall entail at least hourly, or sub-hourly assessment and forecasts of demand within the distribution area of Distribution Licensee using comprehensive input data and policies and drivers and scientific mathematical modelling tools. For medium-term, it shall entail hourly load assessment and forecasts, while for long-term, it shall entail monthly peak/off-peak load assessment and forecasts along with category-wise energy forecasts.
- 6.2. Distribution Licensee shall be responsible for the assessment and forecasting of demand (MW) and energy (MWh) for short- and medium-term and peak/off-peak demand (MW) for long-term within its own control area including embedded open access consumers (consumers paying demand charges to Distribution Licensee).
- 6.3. Distribution Licensee shall be responsible for providing the category wise consumption data and assessed consumption data of particular class of consumers such as agricultural, domestic etc. to various agencies such as STU for purpose of state level demand forecasts. Distribution Licensee shall submit the category wise consumption information of previous financial years and any other information as may be required by STU by 21st April of each year as per format to be prescribed by STU.
- 6.4. Distribution Licensee shall determine the load forecast for each consumer category for which the Commission has determined separate retail tariff.
- 6.5. Distribution Licensee shall determine the load forecast for a consumer category by adopting any of the following and/or combination of following methodologies:
 - a) compounded average growth rate (CAGR) on annual basis or long-term average;
 - b) end use or partial end use;
 - c) trend analysis;
 - d) Auto-regressive integrated moving average (ARIMA);
 - e) Artificial Intelligence (AI) including machine learning, artificial neural networks (ANN) techniques;
 - f) econometric (specifying the parameters used, algorithm, and source of data); and
 - g) any other methodology prescribed by the Authority in its “Guidelines for Medium and Long Term Power Demand Forecast” or by the commission.

- 6.6. Distribution Licensee may use Electric Power Survey (EPS) projections as base and/or any other methodologies other than the above-mentioned after recording the merits of the method. Further, Distribution Licensee shall use best fit of various methodologies for the purpose of demand/load forecast taking into consideration probabilistic modelling approach for various scenarios (viz. most probable, business as usual, aggressive) as outlined under Clause 6.14.
- 6.7. For the purposes of deciding the load forecast for a consumer category and the methodology to be used for load forecasting of a consumer category, the Distribution Licensee must conduct statistical analysis and shall select the method for which standard deviation is lowest and R-square is highest.
- 6.8. Distribution Licensee shall utilize state-of-the-art tools, scientific and mathematical methodologies, and comprehensive database such as but not limited to weather data, historical data, demographic and econometric data, consumption profiles, impact of policies and drivers etc. as may be applicable to their control area.
- 6.9. Distribution Licensee shall modify the load obtained on either side, for each consumer category, by considering the impact for each of the but not limited to the following activities. The impact shall be considered by developing trajectories for each of the activities based on the economic parameters, policies, historical data, and projections for the future.
- a) energy efficiency measures;
 - b) energy savings and conservation interventions;
 - c) demand response programs;
 - d) demand-side management measures;
 - e) open access;
 - f) distributed energy resources;
 - g) DSM;
 - h) electric vehicles;
 - i) tariff signals;
 - j) changes in specific energy consumption,
 - k) increase in commercial activities with electrification
 - l) increase in number of agricultural pump sets and its solarization
 - m) changes in consumption pattern from seasonal consumers
 - n) availability of supply; and
 - o) policy influences such as 24X7 supply to all consumers, LED penetration, efficient use of fans/appliances, increased use of appliances for cooking/heating applications, electrification policies, distributive energy resources, storage, and policies, which can impact econometric parameters,

impact of national hydrogen mission. For each policy, a separate trajectory should be developed for each consumer category.

- 6.10. 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, Distribution Licensee shall take into consideration the impact and benefits arising out of the demand side management programmes, energy efficiency measures, and energy conservation interventions in pursuance of AERC (Demand Side Management) Regulations, 2012 and amendments thereof, as well as impact of renewable and distributed generation resources in pursuance of AERC (Renewable Purchase Obligation and its Compliance) Regulations, 2010, (Second Amendment), 2017, and amendments thereof.
- 6.11. The medium-term load profile of the consumer 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.
- 6.12. The summation of energy forecast (MWh) for various consumer categories upon suitably adjusting for captive, prosumer, 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.
- 6.13. Distribution Licensee shall calculate the load forecasts (in MWh) by adding a loss trajectory approved by the Commission in the latest tariff order or as per actual loss of previous year, whichever is lower. In the absence of the loss trajectory as approved by the Commission for the planning horizon, an appropriate loss trajectory stipulated by State or National policies shall be considered with a detailed explanation.
- 6.14. The peak demand (in MW) shall be determined by considering the average load factor, load diversity factor, seasonal variation factors for the last three years and the load forecasts (in MWh) obtained in clause 6.12. If any other appropriate load factor is considered for future years, a detailed explanation shall be provided.
- 6.15. Distribution Licensee shall conduct sensitivity and probability analysis to determine the most probable demand forecast. The Distribution Licensee must also develop long-term and medium-term demand forecasts for possible scenarios, while ensuring that at least three different scenarios (most probable, business as usual, and aggressive scenarios) are developed.

7. Short term (Hourly/Sub-hourly) Demand Forecast and Aggregation at State

- 7.1. Distribution Licensee shall develop a methodology for at least hourly, or sub-hourly, as may be decided by the Commission from time to time, demand forecasts and shall maintain a historical database.

- 7.2. For the purpose of ascertaining hourly load profile and for assessment of contribution of various consumer categories to peak demand, load research analysis shall be conducted and influence of demand response, load shift measures, time of use shall be factored in by Distribution Licensee with inputs from SLDC. A detailed explanation for refinement conducted must be provided.
- 7.3. Distribution Licensee shall utilize state-of-the-art tools, scientific & mathematical methodologies and comprehensive data such as but not limited to weather data, historical data, demographic and econometric data, consumption profiles, policies and drivers etc. as may be applicable to their control area.
- 7.4. Distribution Licensee shall produce at least hourly, 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 SLDC by 30th April of each year for the ensuing year(s).
- 7.5. STU with inputs from SLDC and based on the demand estimates of the Distribution Licensee of the State, shall estimate, in different time horizons, namely long-term, medium term and short term, the demand for the entire State duly considering the diversity of the State.
- 7.6. SLDC shall aggregate demand forecasts by Distribution Licensee, consider the load diversity, congruency, seasonal variation aspects and shall submit state-level aggregate demand forecasts (MW and MWh) in different time horizons, namely long-term, medium-term, and short-term, to the Authority and NLDC and RLDC by 31st May of each year for the ensuing year(s).

Chapter 4

Generation Resource Planning

8. Generation resource assessment and planning is the second step after demand assessment and forecasting and entails assessment of the existing and contracted resources considering their capacity credit and identification of incremental capacity requirement to meet forecasted demand including planning reserve margin.
9. **Key contours and important steps in Generation Resource Planning:**
 - 9.1. Generation resource planning shall entail the following steps namely, (a) capacity crediting of generation resources, (b) assessment of planning reserve margin, and (c) ascertaining resource adequacy requirement and allocation for obligated entities within control area (state/Distribution Licensee).
 - 9.2. Distribution Licensee shall map all its contracted existing resources, upcoming resources, and retiring resources to develop the existing resource map in MW for the long term and medium term.
 - 9.3. The mapping shall include critical characteristics and parameters of the generating machines, such as heat rate, auxiliary consumption, ramp-up rate, ramp-down rate, minimum up and down time including start-up time, shut-down time etc., for thermal machines; hydrology and machine characteristics, etc., for hydro machines; and renewable resources, their capacity utilization factors (CUFs), etc. for renewable resource-based power plants to be considered in the resource plan. All the characteristics and parameters with their values for each generating machine considered shall be provided in the resource plan. Some of the important parameters that would be considered for this resource characteristic assessment shall include but not limited to following:
 - 9.3.1. Name of the plant (with location, district, taluka, geo-coordinates)
 - 9.3.2. Installed Plant Capacity (MW) (existing and planned)
 - 9.3.3. Heat rate of thermal generating stations
 - 9.3.4. Auxiliary consumption (MW)
 - 9.3.5. Maximum and Minimum generation limits (MW)
 - 9.3.6. Ramp up and Ramp down rate (MW/min)
 - 9.3.7. Minimum up and down time including start-up, shut-down time etc.
 - 9.3.8. Plant availability factor (%)
 - 9.3.9. Average capacity utilisation factor for past 3 years (%)
 - 9.3.10. Historical outage rates and planned outage rates
 - 9.3.11. Installed Capacity and generation profile of renewable energy generation resources

- 9.3.12. Under-construction / contracted capacity with likely date of commissioning
- 9.3.13. Planned Retirement of capacity or Renovation of capacity with timelines
- 9.3.14. Transmission expansion plans with timelines
- 9.3.15. Evacuation arrangements with timelines for RE generation resources
- 9.4. Constraints such as penalties for unmet demand, forced outages, spinning reserve requirements, and system emission limits as defined in State and Central electricity grid codes, planning criteria of CEA and emission norms specified by the Ministry of Environment and Forest shall be identified and enlisted.
- 9.5. 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, provided that the PRM adopted by Distribution Licensee shall be at least equal to or greater than the PRM adopted by the Authority. The value of planning reserve margin considered shall be stipulated in the resource plan along with justifications.

10. Capacity Crediting of Generation Resources

- 10.1. Distribution Licensee shall compute Capacity Credit (CC) factors for their contracted generation resources by applying the net load-based approach as outlined under Clause 10.2 of this Regulation. The five-year average of the Capacity Credit (CC) factor for each type of the contracted generation resource for the recent five years on a rolling basis shall be considered as Capacity Credit factor for the purpose of generation resource planning.
- 10.2. The Net Load based approach/methodology for determination of Capacity Credit (CC) factors for wind, solar, and wind-solar hybrid generation resources shall be adopted as under:
 - a) For each year, the hourly recorded Gross Load for 8760 hours (or time-block) shall be arranged in descending order.
 - b) For each hour, the Net Load is calculated by subtracting the actual wind or solar generation corresponding to that load for 8760 hours (or time-block) and then arranged in descending order similar to Step 1.
 - c) The difference between these two load duration curves represents the contribution of capacity factor of wind generation or solar generation, as the case may be.
 - d) Installed capacity of wind or solar generation capacity is summed up corresponding to the top 250 load hours.
 - e) Total generation from wind or solar generation corresponding to these top 250 hours is summed up.

- f) Resultant CC factor is (Total Generation for top load 250 hours)/(Installed RE Capacity for top load 250 hours), as per formula below:

$$\text{CC factor} = \frac{\text{Sum of RE Generation for top } x \text{ hours}}{\text{Sum of RE Capacity for top } x \text{ hours}}$$

- g) The process for CC factor determination shall be undertaken for each year for duration of past five-years and the resultant CC is the average of CC values of past 5 years.
- 10.3. For the purpose of inter-state contracted RE generation or intra-state RE resources, contribution of CC factor for the RE or generation resource where such resource is connected into grid (viz. inter-state or intra-state, as the case may be) as contracted by Distribution Licensee shall be considered. For this purpose, CC factors as specified by Authority or the Commission shall be considered.
- 10.4. 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. CC for thermal resources shall be computed based on coal/gas availability and forced and planned outages.
- 10.5. The computation for CC factor for the storage technology or any other resources shall be determined using Top Net Load Hours approach or such other methodology as may be prescribed by the Authority.
- 10.6. Distribution Licensee shall share CC factors for their contracted resources along with justification for its computations with SLDC along with its 1-year short-term (ST) and 5-year medium-term (MT) forecasts
- 10.7. SLDC 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.

11. Assessment of Planning Reserve Margin (PRM)

- 11.1. Planning Reserve Margin (PRM) as a percentage of peak load represents the excess generation resource or planning reserve required to be considered for the purpose of generation resource planning.
- 11.2. Such Planning Reserve Margin (PRM) factor shall be based on the reliability indices in terms of Loss of Load Probability (LOLP) and Normalized Energy Not Served (NENS) as may be specified by the Authority or computed by the Distribution Licensee and STU/SLDC at the state level, subject to approval of the Commission, , and the same shall be considered by entities in their planning for resource adequacy requirement and generation resource capacity planning. In case the reliability indices are at variance with the Authority, the same need to be

adequately justified and prepare a trajectory to meet the reliability indices as specified by the Authority.

- 11.3. The capacity planning by the Distribution Licensee and State level resource adequacy planning by STU/SLDC shall factor in PRM while developing state-level Integrated Resource Plan.

12. Ascertaining Resource Adequacy Requirement (RAR) 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 basis of RA plan of Distribution Licensee.
- 12.2. Distribution Licensee shall subtract the RA plan developed in clause 12.1 from the demand forecast developed in section 6 (ref. Clause 6.13) to identify the resource gap. The resource gap in terms of RA compliance for the Distribution Licensee for the long term, medium-term, and short-term shall be developed in the manner as specified in these Regulations.
- 12.3. Distribution Licensee shall conduct sensitivity and probability analysis to determine the most probable resource gap. 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.
- 12.4. Based on most probable scenario, the Distribution Licensee shall undertake development of Medium-term Distribution Resource Adequacy Plan (MT-DRAP) and Short-term Distribution Resource Adequacy Plan (ST-DRAP) exercise by 31st August of each year to meet RA target requirement and serve the copy of the same to SLDC.
- 12.5. Long-term National Resource Adequacy Plan (LT-NRAP) and Short-term National Resource Adequacy Plan (ST-NRAP) reports shall act as guidance for the Distribution Licensee for undertaking the Resource Adequacy exercises.
- 12.6. The Central Electricity Authority will publish the Long-term National Resource Adequacy Plan (LT-NRAP) to determine the optimal Planning Reserve Margin (PRM) requirement at the national level for ensuring reliable supply targets. The report will also include the optimal generation mix for the next 10 years thereby ensuring compliance with Resource Adequacy Requirements while meeting national demand at least cost basis. Further, the report will feature capacity credits

for different resource types on a national basis and prescribe the State contribution towards the national peak demand.

- 12.7. NLDC will publish a one-year look-ahead Short-term National Resource Adequacy Plan (ST-NRAP) report which will include parameters such as demand forecasts, resource availability based on under-construction status of new projects, planned maintenance schedules of existing stations, station-wise historic forced outage rates and decommissioning plans.
- 12.8. Based on the allocated share in national peak provided in LT-NRAP for the State, STU/SLDC shall allocate the 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 (CPD) and percentage share in the state non-coincident peak demand (NCPD).
- 12.9. 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.
- 12.10. Distribution Licensee shall keep minimum 70% of RAR through long-term contracts, minimum 20% of RAR through medium-term contracts, and the rest to be met through short-term contracts.
- 12.11. The contracts mix mentioned under Regulation 12.10 of these Regulations may be periodically reviewed by the Commission.
- 12.12. Provided that power procurement through Day-Ahead Market (DAM), shall not be considered towards the contribution for meeting RAR.
- 12.13. RA requirement planning of the state shall be done with reference to national coincident peak and of Distribution Licensee with reference to average of share in state CPD and share in state NCPD, to optimize requirement of incremental capacity addition through annual rolling plan. Mid-term review of state RA requirement planning shall be conducted to check for events of slippages by states, if any.
- 12.14. While planning RA requirement, the Distribution Licensee shall duly factor in the allocation of RA requirement to the Distribution Licensee as may be suggested by the STU/SLDC, as the case may be, based on average of share in state CPD and share in state NCPD for MT-RA and ST-RA.
- 12.15. The Commission shall approve MT-DRAP and ST-DRAP of the Distribution Licensee by 30th September of each year for the ensuing year(s) incl. annual rolling plans, as the case may be, upon taking into consideration various scenarios as well as allocation of Resource Adequacy requirement allocated to the State/Distribution Licensee based on its contribution to the National/state peak respectively as determined by Authority/NLDC/RLDC and STU/SLDC, as the case may be. LT-DRAP shall be for purposes of planning and consistency with national framework.

Chapter 5

Power Procurement Planning

13. Procurement planning shall consist of (a) determining the optimal power procurement resource mix, (b) deciding on the modalities of procurement type and tenure, and (c) engaging in the capacity trading or sharing to minimize risk of resource shortfall and to maximize rewards of avoiding stranded capacity or contracted generation.

14. Procurement Resource Mix

- 14.1. The distribution license in its power procurement strategy shall identify an optimal procurement generation resource mix that shall enable smooth RE integration in its portfolio of power procurement resource options while meeting reliability standards.
- 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. ST-DRAP and MT-DRAP shall be submitted to Commission for approval while LT-DRAP shall be for planning and consistency with national framework.
- 14.3. Procurement by Distribution Licensee shall be consistent with the identified resource mix and considering overall national electricity plan and policies notified by the Appropriate Government from time to time.
- 14.4. The power capacity procurement from renewable energy sources for fulfilling the RPO targets shall be carried out as per Assam Electricity Regulatory Commission (Renewable Energy Purchase Obligation) Regulations, 2023 and amendments thereof.
- 14.5. The power procurement from Wind, Solar PV, Wind Solar Hybrid, Round the Clock (RTC) generations shall be carried out as per the guidelines for tariff based competitive bidding process notified by the Ministry of Power.
- 14.6. 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 storage technology based on the availability of resources as per the guidelines for tariff based competitive bidding process notified by the Ministry of Power.
- 14.7. Distribution Licensee may contract power through State Generating Stations / Central Generating Stations / Independent Power Producers (IPPs) / Captive Power

Plants (CPPs) / Renewable Power Plants including Co-Generation Plants / Central Agencies / State Agencies / Intermediaries / Traders / Aggregators / Power Exchanges or through bilateral agreements / Banking arrangements with other Distribution Licensee, over-the-counter (OTC) or any other platform recognized and approved by the Central Electricity Regulatory Commission and any other sources as may be approved by the Commission under Section 62 or Section 63 of the Act in compliance with competitive bidding guidelines.

- 14.8. Distribution Licensee may procure power on Short-term and Medium-term basis through DEEP and PUSHP portal.

15. Procurement Type and Tenure

- 15.1. Distribution Licensee, while determining the modalities and tenure of procurement of resource mix, shall ensure that at the initial level, available capacity within the state shall be optimized. For further optimization, procurement contract shall be decided first within the state subject to the least cost resource availability considering transmission constraints & cost of transmission for procurement from outside the state and then across states if necessary.
- 15.2. Provided that STU/SLDC shall declare available transmission corridor on web portal, accessible to all stakeholders, to enable Distribution Licensee to plan its power purchase accordingly. Distribution Licensee shall identify the generation resource mix and also procurement strategy in long-term, medium-term, and short-term horizon and seek approval of the Commission as part of its power procurement approval.
- 15.3. 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.
- 15.4. For subsequent three years, the Distribution Licensee shall also furnish a plan to meet estimated requirement of their contribution to meet state peak for the Commission's approval.
- 15.5. The MT-DRAP shall be carried out by the Distribution Licensee on an annual rolling basis considering the contracted capacity as a part of the system and shall optimize for additional capacity required.
- 15.6. Distribution Licensee through MT-DRAP, shall demonstrate to the Commission their plan to meet their RAR with a mix of long-term, medium-term, and short-term contracts.

Provided that the Distribution Licensee shall keep the share of contracts in the range as mentioned under Regulation 12.10 of these Regulations.

- 15.7. Assessment through Annual Rolling Plan shall ascertain incremental capacity addition requirement through MT/ST upon factoring in existing and planned procurement initiatives of the Distribution Licensee.
- 15.8. Distribution Licensee shall contract capacities by 30th November of each year and submit the Annual Rolling Plan to STU/SLDC by 31st December of each year for ensuring year(s).
- 15.9. STU and SLDC shall submit state-level aggregated plan to RLDC/NLDC by 31st January of each year for the ensuing year(s).

16. Sharing of Capacity

- 16.1. Distribution Licensee shall duly factor in the possibility of short-term capacity sharing while preparing the Resource Adequacy plan and optimally utilize the capacity available within the state through competitive sharing arrangements or other mechanisms, and then use the platform for inter-state capacity sharing or trading mechanism if created by the Central Commission or other mechanisms as the case may be, and optimize the capacity costs as far as possible.

Provided that all generators and Distribution Licensee shall declare extra capacity available indicating quantum and period on shared portal, accessible to all stakeholders. All generators and Distribution Licensee shall declare extra capacity available indicating quantum and period on shared portal, accessible to all stakeholders

- 16.2. Distribution Licensee shall submit information about contracted capacity to the SLDC and the STU for compliance verification.
- 16.3. Distribution Licensee shall seek approval of the Commission for the Procurement Plan as well as Annual Rolling Plans i.e. MT-DRAP and ST-DRAP. For approval of such plans, the Commission shall seek inputs from STU/SLDC to ensure consistency with the state-level aggregation carried out by STU/SLDC.

17. Approval of Power Purchase Agreement

- 17.1. Any new Capacity arrangement/tie-up shall be subject to the prior approval of the Commission in view of necessity, reasonableness of cost of power purchase and promotion of working in an efficient, economical and equitable manner.

- 17.2. All procurement of Long/Medium/Short-term power from various sources shall be carried out as per the Guidelines/Rules/Regulations/Policies issued by the Central Government/Appropriate Commission from time to time.
- 17.3. Any new power purchase agreement for Long/Medium-term or amendments to existing Long/Medium-term Power Purchase Agreement (PPA's)/ Power Sale Agreement (PSA) entered into by the Distribution Licensee shall be subject to the prior approval of the Commission.
- 17.4. Distribution Licensee shall submit the list of all existing Power Purchase Agreements executed with different conventional power plants as well as RE Generators along with the Resource Adequacy plan.

18. Variation in Power Purchase

- 18.1. Distribution Licensee may undertake additional power procurement during the year, over and above the approved resource adequacy procurement plan on account of following exemptions:

- 18.1.1. In case, where there has been an unanticipated increase in the demand for electricity or a shortfall or failure in the supply of electricity from any approved source of supply during the year or when the sourcing of power from existing tied-up sources becomes costlier than other available alternative sources, the Distribution Licensee may enter into additional agreement for procurement of power.

- 18.1.2. Distribution Licensee may enter into a short-term arrangement or agreement for procurement of power when faced with emergency conditions that threaten the stability of the grid, or when directed to do so by the SLDC/RLDC to prevent grid failure or during exigency conditions and for banking with other States on short-term basis without prior approval of the Commission.

Provided that the details of such short-term procurement shall be submitted to the Commission within 45 days from date of procurement of power.

Chapter 6

Monitoring and Compliance

19. Monitoring and Compliance

- 19.1. **Monitoring and Reporting:** Based on the MT-DRAP and ST-DRAP, STU and SLDC shall communicate the state-aggregated capacity shortfall to the Commission by 15th September of each year for the ensuring year(s) and advise the Distribution Licensee to commit additional capacities. The Commission shall approve RA plans by 30th September of each year.
- 19.2. **Treatment for shortfall in RA Compliance:** Distribution Licensee 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, SLDC 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 Distribution Licensee under its ARR/Tariff Order for the relevant financial year, unless separately specified by the Commission.
- 19.5. Distribution Licensee shall not be allowed to recover such non-compliance charge as part of its ARR.

Chapter 7

Roles and Responsibilities and Timelines

20. Data Requirement and Sharing Protocol

- 20.1. Distribution Licensee shall maintain and share with STU/SLDC all data related to demand assessment and forecasting such as but not limited to consumer data, historical demand data, weather data, demographic and econometric variables, T&D losses, actual electrical energy requirement and availability including curtailment, peak electricity demand, and peak met along with changes in demand profile (e.g.: agricultural shift, time of use, etc.), historical hourly load shape, etc.
- 20.2. Distribution Licensee shall maintain all statistics and database pertaining to policies and drivers, such as LED penetration, efficient fan penetration, appliance penetration, demand side management and energy efficiency measures, increased usage of electrical appliances for cooking, etc., in households, increase in commercial activities for geographic areas/regions, increase in number of agricultural pumps and solarization within control area, changes in specific energy consumption, consumption pattern from seasonal consumers such as tea plants, DSM and DERs, EVs and OA, National Hydrogen Mission, reduction of AT&C losses, etc. shall also be shared.
- 20.3. Distribution Licensee shall maintain at least past 10 years of statistics in its database pertaining to consumption profiles for each class of consumers, such as domestic, commercial, public lighting, public water works, irrigation, LT industries, HT industries, railway traction, bulk (non-industrial HT consumers), open access, captive power plants, insights from load survey, contribution of consumer category to peak demand, seasonal variation aspects, etc. shall also be shared.
- 20.4. SLDC shall maintain the licensee-specific as well as aggregate for state as whole, the statistics and database pertaining to aggregate demand assessment and forecasting data mentioned above and share state-level assessment with the Authority and the NLDC for national assessment from time to time.
- 20.5. Distribution Licensee shall share information and data pertaining to the existing and contracted capacities with their technical and financial characteristics including hourly generation profiles to with STU and SLDC for computation of state-level capacity credit factors and for preparation of state-level assessment.
- 20.6. SLDC and STU shall aggregate generation data and share state-level assessment with the Authority and NLDC for assessment of RA requirement.
- 20.7. STU shall communicate allocation of national RA requirement to the Distribution Licensee.

21. Timelines

- 21.1. Distribution Licensee shall submit demand forecasts to SLDC by 30th April of each year for the ensuing year(s).
- 21.2. SLDC shall aggregate and submit state-level forecasts to the Authority and the NLDC by 31st May of each year for the ensuing year(s).
- 21.3. Distribution Licensee shall perform MT-DRAP and ST-DRAP exercise by 31st August of each year for the ensuing year(s).
- 21.4. STU and SLDC shall communicate the state-aggregated capacity shortfall to the Commission by 15th September of each year for the ensuing year(s).
- 21.5. The Commission shall approve RA plans by 30th September of each year.
- 21.6. AEGCL and SLDC shall submit state-level aggregated plan to RLDC/NLDC by the 31st of January of each year.

22. Publication of the information on website

- 22.1. The monthly/weekly/day-ahead/intraday power procurements/sale by the Distribution Licensee and generator schedule shall be made available on the websites of the Distribution Licensee and SLDC within 45 days of such procurements/sale with ease of access to the current as well as archived data.
- 22.2. As per the “AERC (Electricity Grid Code) Regulations, 2018” and amendments thereof, SLDC shall also publish the monthly Merit Order Dispatch (MoD) stack along with per unit variable cost of each generating station on its website.

23. Constitution of dedicated cells by Distribution Licensee

- 23.1. Distribution Licensee shall establish a planning cell for Resource Adequacy within three months of the Regulation coming into force. The cell shall have the requisite capability and tools for demand forecast, capacity, RE integration etc.
- 23.2. Another round the clock dedicated cell shall also be constituted by Distribution Licensee for power purchase/sell in real-time, and also undertake intra-day, day-ahead, week ahead power procurement through Power Exchanges or any other means. Distribution Licensee shall frame suitable guidelines for the modus operandi of the dedicated cells in line with the spirit of these Regulation and shall apprise the Commission for the same within 45 days from the date of coming into force of this Regulations.
- 23.3. The Distribution Licensee shall make the Resource Adequacy Plan in consultation with State Sector Generating Companies, other Distribution Licensee, Central

Sector Generating Companies, Transmission Companies, National / Regional /State Load Dispatch Centers, and Central Electricity Authority. It may also make enquiries with the Trading Companies and States with surplus power to estimate the likely availability and price of power across the country for peak, off-peak and normal periods.

Chapter 8

Miscellaneous

24. Power to Give Directions

24.1. The Commission may from time to time issue such directions and orders as considered appropriate for implementation of these regulations.

25. Deviation from the Norms

25.1. The norms and parameters prescribed under these Regulations shall be notified by the Commission in due course of time in a separate schedule.

25.2. The parametric norms considered for approval of the Resource Adequacy Plan and Power procurement plan thereof, may be determined in deviation from the norms specified in these Regulations:

Provided that the reasons for deviation from the norms specified under these Regulations shall be recorded in writing.

26. Power to Relax

26.1. The Commission may by general or special order, for reasons to be recorded in writing, and after giving an opportunity of hearing to the parties likely to be affected, may relax any of the provisions of these Regulations on its own motion or on an application made before it by an interested person.

27. Issue of Orders and Practice directions

27.1. Subject to the provisions of the Act, the Commission may from time to time issue Orders and Practice Directions with regard to the implementation of these Regulations.

28. Interpretation

28.1. If a question arises relating to the interpretation of any provision of these regulations, the decision of the Commission shall be final.

29. Powers to Amend

29.1. The Commission may, at any time, vary, alter, modify or amend any provisions of these Regulations.

30. Power to Remove Difficulties

30.1. If any difficulty arises in giving effect to the provisions of these Regulations, the Commission may, by an order, make such provisions, not inconsistent to the

provision of the Act and these Regulations, as may appear to be necessary for removing the difficulty.

(Secretary)

Assam Electricity Regulatory Commission

Demand Forecast (Summary Statement for State and DL separately) - DL wise (Name of DL: _____)									
Sr. No.	Particulars	Actual of Previous Years			Current Year	YoY growth rate/CAGR - as applicable (%)	Projections		
		Yr-1	Yr-2	Yr-n			Yr-1	Yr-2	...Yr-10
	<i>LT-VI Construction activities and Temporary purposes</i>								
2	Total Energy Sale (MU)- (Cumulative of all consumer categories excluding Open Access Sales)								
3	Total Energy Sale (MU)- (Cumulative of all consumer categories including Open Access Sales)								
4	YoY growth rate for total energy Sales (%) (excluding OA)								
5	YoY growth rate for total energy Sales (%) (including OA)								
6	Distribution losses - in %								
7	Distribution losses - in MU								
8	Supply / Requirement at DISCOM Boundary (MU)								
9	Intra-State Transmission losses - in %								
10	Intra-State Transmission losses - in MU								
11	Supply / Requirement at State Boundary (MU)								
12	Inter-State Transmission losses - in %								
13	Inter-State Transmission losses - in MU								
14	Ex-Bus Requirement of DISCOM (MU) (excluding OACs, Railways) - RESTRICTED								
15	<i>Energy Wheeled for Railways/OA Consumers (as applicable)</i>								
16	Ex-Bus Requirement of DISCOM (MU) (including OA, Railways) -RESTRICTED								
17	Unsupplied energy due to system constraints (MU)								
18	Ex-Bus Requirement of DISCOM (MU) (excluding OA, Railways) - Unrestricted								
19	Ex-Bus Requirement of DISCOM (MU) (including OA, Railways) - Unrestricted								
20	System Load Factor								
21	Peak load of DISCOM (MW) (excluding OA, Railways)								
22	Peak load of DISCOM (MW) (including OA, Railways)								

Data template for historical load, RE installed capacity, and RE generation data in hourly resolution as following:

Year	Month	Day	Hour	Load (MW)	Solar IC (MW)	Solar Gen (MW)	Wind IC (MW)	Wind Gen (MW)	Hydro IC (MW)	Hydro Gen (MW)
2018	4	1	1							

..														
2024	3	31	24														

Data template for technical and financial characteristics of each generating station as following:

Sr. No.	Generating Stations	Resource Type	Installed Capacity (MW)	Allocated Capacity (MW)	Commissioning Year	Expected Retirement Year	Fixed Cost (Rs/kW/yr.)	Variable Cost (Rs/kWh)	Heat Rate (at full load)	Ramp Rate (MW/min)	Start Up Cost (Rs.)	Start Up time (h)	Planned maintenance	Forced Outage	PLF (%)	Date of signing of PPA	Date of expiry of PPA
I	CENTRAL GENERATING STATIONS																
1																	
II	STATE GENERATING STATIONS																
1																	
II	HYDRO																
1																	
III	RENEWABLE																
1																	
IV	IPP																
1																	

Data template for peak demand and energy met & requirement projections of all DLs and SEZs as following:

Source	DL	
Unit	MUs	Peak MWs
2018-19		
2019-20		
2020-21		
2021-22		
2022-23		
2023-24		
2024-25		

Source	DL	
2025-26		
2026-27		
2027-28		
2028-29		
2029-30		
2030-31		
2031-32		
2032-33		
2033-34		
...		
Year-n+10		