EDAM Resource Adequacy Workshop #3: Modeling and Metrics; Resource Qualification Requirements

May 19, 2026

Agenda

- Modeling and Metrics
- Resource Qualification Requirements

Modeling and Metrics

Modeling and Metrics

Defining standardized modeling assumptions and reliability metrics establishes a transparent, consistent foundation for evaluating whether the power system can reliably meet load under stressed conditions. Clear modeling rules ensure that load forecasts, availability assumptions, and risk metrics are applied uniformly across participants, supporting comparability and confidence in compliance outcomes.

Resource qualification criteria are essential to confirm that counted resources have verifiable capabilities and operational characteristics aligned with system needs. Performance requirements further ensure that qualified resources deliver energy or capacity when called upon, particularly during scarcity events, thereby translating planning adequacy into real-time reliability. Together, these elements protect system reliability while promoting fairness and accountability.

Modeling and Metrics

- Planning Reserve Margin (PRM)
- Area Modeling
- Load Modeling for LOLE Study
- Generator Modeling for LOLE Study
- LOLE Study
- PRM Calculation
- PRM Timelines

Planning Reserve Margin (PRM)

Planning Reserve Margin (PRM)

Planning Reserve Margin (PRM):

- Represents the amount of dependable capacity required in excess of the load forecast to maintain the program's reliability objective under conditions of high demand, generator outages, variable energy resource output, and other uncertainties
- Is expressed as a percentage multiplier applied to the load forecast for each participating entity
- Is envisioned to be established using a probabilistic Loss-of-Load Expectation (LOLE) annual analysis with a reliability standard of 1 event-day in 10 years

Questions

- Are there other considerations that need to be taken into account to establish the PRM?

Area Modeling

Area Modeling

- For the initial LOLE study, the RA program footprint would assume perfect deliverability of resources to load (perfect deliverability to be revisited based on results of future analysis)
- Individual participants are envisioned to have individual transmission requirements demonstrating deliverability of resources to load (to be discussed in further detail in the Consideration Design Document for Workshop #4)
- This approach provides a practical baseline but there is a need for additional analysis:
  - Connectivity and transmission constraints study to assess whether transmission limitations within the footprint require the definition of sub-regions or load-resource zones for LOLE studies

Questions

- Other than a transmission constraints and connectivity study, what additional analysis to assess whether transmission limitations within the footprint require the definition of sub-regions or load-resource zones for LOLE studies should be considered?

Load Modeling for LOLE Study

Load Modeling for LOLE Study

- Models would incorporate the effect of weather variability by developing a set of weather informed load shapes for the RA program footprint that reflect the impact of weather on load
- Development of the load shapes would be informed by actual load data, load forecasts, and historical weather data
- The load shapes used would be designed to retain correlation with other weather impacted variables and incorporate reasonable uncertainty in actual consumption patterns

Questions

- How can avoidance of omitting or double counting of load be addressed in load modeling for LOLE?

Generator Modeling for LOLE Study

Generator Modeling for LOLE Study

- **Thermal**: Model at Net Generating Capability with forced outages via Equivalent Forced Outage Rate – demand (EFORd); planned outages not modeled
- **Wind and Solar**: Use operational and/or synthesized profiles tied to load/weather history; model as a single aggregated resource using operational data whenever available and create synthetic data when gaps occur
- **Run-of-River**: Use operational/synthesized flow based profiles; modeled as one aggregated resource using both operational and synthesized data for the analysis
- **Storage Hydro**: use monthly capacity values calculated through the QC methodology
- **Demand Response Programs**: Characteristics of DR programs would be provided by participants; no forced outage rates would be assigned to DR programs
- **External Capacity**: Represents transactions with counterparties that are not participating in the RA program; firm imports and exports would be modeled as hourly generators with no forced outage on imports
- **Behind-the-Meter (dispatchable)**: modeled as generation in the LOLE study with parameters and outage rates based on equivalent resources that are not behind-the-meter
- **Contingency Reserves**: LOLE study approach would shed load to maintain required CR when calculating loss-of-load events; would follow NERC updates to CR requirements to remain consistent with NERC regulations

Questions

- Are there any resource types missing that should be part of the generator modeling?
- What potential refinements (if any) of geographic zones for wind and solar may be needed, even if the resources are modeled with a single generic profile (e.g., Desert Southwest versus Pacific Northwest solar)?
- How should aggregation be defined (by participant, by zone, by footprint)?

LOLE Study

LOLE Study

LOLE Study:

- Would be performed to determine the monthly capacity needed to meet reliability standards after calculating resource stack contributions
- Would use a probabilistic model using load variability (for example, 40+ synthetic load shapes for all hours of the year) and random forced outages for qualifying resources
- The target reliability metric would be no more than one event-day in 10 years
  - An event-day is an event period lasting one day (during which at least one event-hour occurs)
- Once the reliability metric is achieved, the capacity requirement (resource stack and pure requirement) for each month of the RA compliance period would be converted to Unforced Capacity (UCAP) for the PRM

System Critical Hours (SCH)

- SCH Definition:
  - SCHs represent the hours when the system is most likely to experience power shortfalls.
  - SCHs are preliminarily defined as hours when regional capacity need within the program footprint exceeds the 95th percentile of historical gross load, adjusted for VER performance
- Data Provision:
  - Analysis will be needed to quantify the frequency and characteristics of SCH events under historical conditions for the program footprint
  - SCHs inform key modeling assumptions for capacity assessments applicable to eligible resources.

Questions

- Should other factors be taken into consideration when conducting the LOLE Study?

PRM Calculation

PRM Calculation

1. Convert capacity requirement to UCAP:
   a) **Thermal Generation**: The Net Generating Capability would be replaced by Qualifying Capacity (QC) values calculated by the PSP using the thermal QC methodology
   b) **Wind, Solar, Batteries**: Values for wind, solar, and Energy Storage Resources (ESR) resources would be determined by using an Effective Load Carrying Capability (ELCC) analysis. The capacity values attributed to wind and solar resources and ESRs would be consistent with the QC values assigned to such resources in the QC analysis.
   c) **Storage Hydro**: QC values determined by the Storage Hydro QC methodology
   d) **Run of River Hydro (RoR)**: QC values calculated by the PSP using the RoR QC methodology
   e) **Demand Response**: No conversion needed- DR programs submitted by participants would be modeled at maximum capacity
   f) **Pure Capacity Adjustment**: No conversion needed

PRM Calculation

2. Calculate the PRM for each month of the compliance period by using the Coincident Regional P50 Load Forecast for each month

$$PRM\ (\%) = \frac{UCAP_{1-in-10} - Coincident\ Regional\ P50\ Load\ Forecast}{Coincident\ Regional\ P50\ Load\ Forecast} * 100$$

a. **PRM (%):** Planning Reserve Margin for a specific month in the Compliance Period

b. **$UCAP_{1\text{-}in\text{-}10}$:** The Unforced Capacity required to meet the 1 event-day in 10 years reliability metric for a specific month in the Compliance Period

c. **Coincidental Regional P50 Peak Load Forecast**: The Coincident Regional P50 Peak Load Forecast for a specific month in the Compliance Period

- Coincidental Regional P50 Peak Load Forecast would use the same methodology as for individual participants' P50 peak load forecast.

Questions

- Are there any adjustments needed to the proposed PRM calculation?

PRM Timelines

PRM Timelines

- Annual LOLE studies would be conducted to determine monthly PRMs, which would be communicated to participants no later than two years before the start of the relevant Compliance Period
- With each Annual LOLE study, it is envisioned that the PSP would provide PRMs for a rolling 5-year horizon
  - Determination of the rolling period and when a PRM is binding will need additional development and stakeholder feedback
- The program tariff would include the detailed process for PRM determination, reviewing, and approval if there are changes to load, resource, or other assumptions

Questions

- Annual studies meet industry standard approaches, but the Work Group notes that this cadence may increase workload. Would updating the LOLE study every two years to provide greater certainty for contracting and alignment with the two-year notification period be a better fit for the program?
- Should the coincident peak contributions for each entity be fixed at the same time?
- Should all QC values be fixed at the same time?
- What happens if an entity's load forecast (shape or magnitude) changes after the PRM and coincident peak contributions are fixed? What if their resource mix changes meaningfully? How should the program respond to an entity whose actual load and resources differ significantly from what was modeled?
- As drivers of the QC and PRM values, how should resource additions be included in the model?

Resource Qualification and Capacity Assessment

Resource Qualification and Capacity Assessment

- Qualifying Resources
- Resource Capacity Assessment
- Contracts

Qualifying Resources

Qualifying Capacity

- Resources that provide capacity and/or physical energy would be eligible for inclusion in a participant's RA compliance filing, provided they meet all resource qualification requirements (envisioned to be detailed in a future program BPM)
- Resource and operational data from WEIM and/or EDAM participation are intended to support resource registration and validate performance measurement
  - Leveraging market operations data is intended to reduce administrative burden and ensure consistent data collection
- Participants may submit supplemental data if market data does not fully reflect a participant's portfolio's capabilities

Resource Capacity Assessment

Resource Capacity Assessment

- **Thermal Resources**: UCAP Methodology
- **Wind and Solar**: Effective Load Carrying Capability (ELCC)-based accreditation
- **Batteries (Energy Storage Resources)**: ELCC Study
- **Storage Hydro**: QC based on performance during System Critical Hours (SCH)
- **Run-of-River Hydro**: Historical Performance
- **Demand Response Programs**: Accreditation and receipt of QCs based on ability to sustain load reduction for a specified number of hours
- **Customer Resources: Behind-the-Meter**: Meet eligibility criteria
- **Hybrid (wind/battery, solar/battery, wind/solar/battery)**: Accreditation based on sum of ELCC-derived contributions of each underlying component but not to exceed the Point of Interconnection limits

Spring Schedule

May 21: Workshop #4
Contracts/Compliance Submittal Requirements/
Load Forecasting
Consideration Design Document released May 14

May 26: Workshop #5
Transmission/
Compliance Structure/ Reporting & Transparency
Consideration Design Document released May 19

Comment Period Ends June 10th
Summer Workshops Announced in July

Where to find materials

All workshop dates, **zoom links**, and materials are located at:
https://rowesternenergy.org/regional-resource-adequacy/

Reach out with questions or comments by emailing:
resourceadequacy@rowesternenergy.org

The ROWE is not a sponsor of the initiative or the initial stakeholder process, but is lending the use of its website for hosting materials.

Open Forum for Discussion

- Please raise your hand to be unmuted
- Announce your affiliation/entity you represent

Next Steps

Review Consideration Design Document: Compliance Submittal Requirements, Load Forecasting, and Transmission (published May 14) to prepare for Workshop #4 (May 21)