

# **Consideration Design Document: RA Modeling and Metrics; Resource Qualification Requirements**

## **Stakeholder Workshop #3: May 19, 2026**

### **I. Introduction**

The RA Sponsors and Work Group have created a series of Consideration Design documents to provide a starting point for conversations with stakeholders on key design elements for a Resource Adequacy program. The content offered in these documents is intended to give stakeholders enough specificity to provide constructive feedback and frame a discussion but should not be construed as a firm proposal. The concepts in this document represent possible design options that the RA Sponsors and Work Group have been able to coalesce around to present to stakeholders for input as an initial starting point. Written comments and discussion during the spring workshops are meant to draw out areas of stakeholder support, identify questions that need to be answered, flag issues that may require continued refinement through the initial stakeholder process and determine areas that will need a different approach. It is intended that stakeholders will review this document in preparation for the Workshop #3 held on May 19. All documents and workshop information including the Zoom link are posted publicly at: <https://rowesternenergy.org/regional-resource-adequacy/>

### **II. Background**

Defining standardized resource adequacy (RA) 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 align 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.

### **III. Proposed Draft Policy Language – RA Modeling and Metrics**

This section details potential draft policy language related to modeling and metrics for the RA program. Notwithstanding the level of detail in this section, much of this material resembles other regional RA programs. The RA Work Group anticipates that it may, therefore, be largely familiar to stakeholders.

#### **A. Planning Reserve Margin**

The Planning Reserve Margin (PRM) for the regional RA program is envisioned to be established using a probabilistic Loss-of-Load Expectation (LOLE) annual analysis. The 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. The PRM is expressed as a percentage multiplier applied to the load forecast for each participating entity.

The PRM would be calculated through probabilistic LOLE analysis with a reliability standard of 1 event-day in 10 years.

#### **B. Area Modeling**

For the initial LOLE study, the regional RA program footprint would assume perfect deliverability of resources to load. This approach provides a practical baseline for the initial design document. At the same time, the program footprint has a need for additional analysis, including a 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. The assumption of perfect deliverability is expected to be revisited based on the results of future analysis. Despite this modeling assumption, individual participants are envisioned to have individual transmission requirements demonstrating deliverability of resources to load, as will be further detailed in the Consideration Design Document for Workshop #4.

The deliverability analysis is an area that will require additional development in defining the interplay with the transmission requirement. Questions around the need for analysis if a resource has firm transmission and how a deliverability analysis might aid in defining the level of firmness in future program iterations are examples of detail that will need to be developed with stakeholders.

#### **C. Load Modeling for LOLE Study**

Models would incorporate the effect of weather variability by developing a set of weather informed load shapes for the regional RA program footprint that reflects 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. Avoidance of omitting or double counting of load will need to be further developed with stakeholders.

#### **D. 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.

Thermal generators would be modeled at Net Generating Capability based on Capability Test results and would be adjusted using EFORd to reflect forced outage performance. EFORd values would be sourced from NERC GADS or equivalent systems (possibly CAISO's OMS), with proxy averages applied where unit-specific data is unavailable; at least five years of outage history would be considered and updated annually. Planned outages would not be modeled in the LOLE study, and units would be assumed to be available unless on forced outage. EFORd would support LOLE reliability metrics during critical conditions, while Equivalent Forced Outage Factors (EFOF) would be used to determine the Qualifying Capacity (QC) during System Critical Hours (SCH).

**Wind and Solar:** These resources would use operational and/or synthesized profiles tied to load/weather history. Generation profiles for these resources would be informed by operational data, weather data (such as irradiance, temperature, wind speeds, and precipitation patterns), and plant characteristics where feasible and useful. Generation shapes would be designed to retain correlation with other weather impacted variables and incorporate reasonable uncertainty in actual generation output.

Wind and solar resources would be modeled as a single aggregated resource using operational data whenever available and create synthetic data when gaps occur. For wind, synthetic wind shapes would be developed by correlating recent performance with historical peak load profiles, while actual output would be used whenever possible to maintain accuracy. For solar, synthetic solar profiles would be developed using irradiance and weather data. The Program Service Provider (PSP) would determine when new synthetic shapes are required for years lacking sufficient data.

The RA Work Group anticipates a need for further discussion about potential refinements (if any) of geographic zones for wind and solar, even if the resources are modeled with a single generic profile (e.g., Desert Southwest versus Pacific Northwest solar). Additionally, how aggregation is defined (by participant, by zone, by footprint?) will also need further work.

**Run-of-River:** These resources would use operational/synthesized flow based profiles.

Run-of-River (RoR) resources would be modeled as one aggregated resource using both operational and synthesized data for the analysis. Synthetic profiles would be created by correlating recent historical RoR performance with corresponding peak load profiles. The PSP would determine whether new synthesized RoR profiles are needed for years that are lacking

sufficient historical data. Resources without synthesized profiles would use previous operational or synthesized river flow data from similar resources (e.g., same river system).

**Storage Hydro:** Modeling in the LOLE would use monthly capacity values calculated through the QC methodology for storage hydro, which is not currently defined.

**Demand Response (DR) Programs:** Characteristics of DR programs would be provided by participants. These resources would generally be modeled as flexible high-cost resources and ensure that these resources are dispatched last in program modelling, to reflect real operating scenarios. Properties and values provided by participants may determine certain programs are curtailed with a different priority. No forced outage rates would be assigned to DR programs.

**External Capacity:** External capacity represents transactions with counterparties that are not participating in the regional RA program. Firm imports and exports would be modeled as hourly generators with no forced outage on imports.

**Behind-the-Meter (dispatchable):** These are capacity resources reported by participants that are controllable and dispatchable. They would be modeled as generation in the LOLE study with parameters and outage rates based on equivalent resources that are not behind-the-meter.

**Contingency Reserves (CR):** The LOLE study approach would shed load to maintain required CR when calculating loss-of-load events. The LOLE study would follow NERC updates to CR requirements to remain consistent with NERC regulations.

## **E. LOLE Study**

The LOLE study would be performed to determine the monthly capacity needed to meet reliability standards after calculating resource stack contributions. The LOLE study 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.

**F. Potential PRM calculation:**

- i. Convert capacity requirement to UCAP as follows:
  - 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:** 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.
  
- ii. Calculate the PRM for each month of the compliance period by using the Coincident Regional P50 Load Forecast for each month:

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

- a. **PRM (%):** Planning Reserve Margin for a specific month in the Compliance Period
- b. **UCAP<sub>1-in-10</sub>:** 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.

## **G. 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. However, 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.

Below are questions for stakeholders and further considerations to be explored:

- 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?
- Are the coincident peak contributions for each entity fixed at the same time?
- Are all QC values 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? What if an entity delays releasing an update for one of these elements to obtain favorable treatment in the study?
- As drivers of the QC and PRM values, how should resource additions be included in the model?

## **IV. Rationale and Policy Considerations – RA Modeling and Metrics**

The proposed language above largely reflects existing regional RA program constructs. A notable area of divergence is the concept of basing an individual participant's requirement on its contribution to the coincident system peak load, which is intended to better align obligations with cost causation and ensure that entities driving system stress bear a commensurate share of reliability responsibility. This approach also strengthens incentives for load management and resource development that reduce peak system risk rather than non-coincident local peaks.

With respect to Planning Reserve Margin (PRM) timing, the RA Work Group sought to balance the need for forward stability, providing participants sufficient lead time to plan and contract against the objective of using values that reasonably reflect the true reliability requirement.

Finally, while rolling advisory PRM values may offer improved accuracy, participants do not yet have full visibility into the associated implementation costs, both in financial terms and

administrative burden. The RA Work Group recognizes that stakeholder support for this approach may evolve as these costs become better understood and quantified.

The RA Work Group welcomes any specific stakeholder input on the potential modeling and metrics approach and calculations above, recognizing that a variety of stakeholders have expertise and commercial exposure depending on the approach selected.

## **V. Proposed Draft Policy – Resource Qualification and Capacity Assessment**

### **A. Qualifying Resources**

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.

Resource qualification requirements are 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.

### **B. Resource Capacity Assessment**

The Capacity Assessment framework establishes consistent methods for determining the accredited capacity, or Qualifying Capacity (QC), of each resource type included in a compliance submittal. These methods aim to reflect the actual ability of resources to contribute during periods of highest system stress, especially during SCHs. While there is broad alignment with the methodologies used in other regional RA programs (e.g., the Western Resource Adequacy Program and CAISO tariff default RA rules), several areas in particular still require further refinement, discussion, and stakeholder input.

#### **Thermal Resources: UCAP Methodology**

Thermal generating units would receive capacity accreditation using the UCAP approach, which adjusts each unit's net generating capability by its EFOF. The EFOF is calculated using NERC GADS performance data (or possibly CAISO's OMS) and outage reports, ensuring that QC reflects each plant's demonstrated reliability rather than its nameplate rating. By incorporating historical outage behavior, the UCAP method produces a more accurate estimate of the resource's expected availability during peak demand periods and helps ensure the forward showing portfolio adequately accounts for forced outage risk across the fleet.

### **Wind and Solar: Effective Load Carrying Capability (ELCC)-Based Accreditation**

Wind and solar resources would be accredited using ELCC studies, which measure their ability to contribute to system reliability during times of highest need. Because these resources are variable and weather-dependent, ELCC analysis evaluates both historical performance and correlated output patterns across the broader footprint to quantify their true contribution during SCHs. This probabilistic approach ensures that the QC assigned to variable energy resources reflects system conditions, fleet diversity, and the shape of net load peaks rather than relying on static or simplistic factors. Geographic factors (e.g., Desert Southwest versus Pacific Northwest solar) may need to be factored in these studies—further stakeholder input on this topic is needed.

### **Batteries (Energy Storage Resources): ELCC Study**

Energy Storage Resources (ESRs) would also receive QC values through ELCC analysis to reflect their ability to discharge during the periods of greatest system stress. The ELCC study incorporates key operational constraints such as duration, state of charge, daily cycling limitations, and interactions with net load ramps. By using ELCC rather than a fixed duration-based method, the program ensures battery accreditation aligns with how these resources support reliability both during short, high-risk events and multi-hour peak periods. Further discussion is expected around potential alignment with CAISO's ESR methodology and whether refinements are needed for multi-use storage assets.

### **Storage Hydro: QC Based on Performance During SCHs**

Storage hydro resources would be assigned QC based on their demonstrated ability to maximize output across each SCH in the historical dataset, subject to operational, environmental, and non-power constraints. This performance-based approach ensures accreditation reflects the real-world availability of hydro resources, including reservoir levels, inflows, and water management obligations. Because storage hydro can provide significant multi-hour and multi-day reliability value, accurately capturing its operational capability during SCHs is essential.

### **Run-of-River Hydro: Historical Performance**

Run-of-river hydro facilities would receive QC values based on their historical generation during SCHs over the last ten years. Because these facilities have limited dispatch flexibility and depend on natural river flows, evaluating their past performance during peak-risk periods provides a realistic estimate of their reliable contribution. This method also accounts for hydrological variability over time, including drought and high-flow years.

### **Demand Response Programs**

DR programs would be accredited and receive QCs based on their ability to sustain load reduction for a specified number of hours. The number of hours would be determined by performing a study to assess the number of SCHs (e.g., 4 hours).

DR programs capable of longer durations may be dispatched accordingly, but the QC would be capped at the specified number of hours specified in the SCH study. DR programs with fewer hours of deliverability would receive prorated QC values based on demonstrated duration.

Participants may model DR programs either as a supply-side resource in the compliance submittals or leave the effects embedded in their historical load, allowing the load forecast to reflect the DR program's contribution.

Using four hours as an example, the QC calculation for DR would use the formula:

$$QC = (\text{Max Load Reduction MW} \times \text{Dispatch Hours} (\leq 4)) \div 4$$

Additionally, DR programs are envisioned align with how the EDAM treats these products for RSE purposes, ensuring consistent recognition across both forward and operational frameworks. Seasonal QC values would be assigned for each binding period to reflect performance differences across the year.

### **Customer Resources – Behind-the-Meter**

Behind-the-meter resources, such as demand-side generation (DSG) or distributed energy resources (DERs), may qualify for participation if they meet eligibility criteria. To receive a QC value, the resource must be dispatchable and controllable either by the participant or by the host BAA or transmission operator. Once eligible, the resource would be accredited based on the QC methodology applicable to its underlying technology—e.g., thermal Distributed Energy Resources (DERs) would follow the EFOF-adjusted UCAP method, while DER ESRs would follow ELCC-based accreditation. This ensures consistent treatment regardless of whether a resource is located in front of or behind the meter.

### **Hybrid (wind/battery, solar/battery, wind/solar/battery)**

Hybrid resources, such as solar-plus-storage, wind-plus-storage, or multi-resource combinations, would be accredited based on the sum of the ELCC-derived contributions of each underlying component but not to exceed the Point of Interconnection limits. By crediting each element individually, the program ensures that the hybrid's total QC fairly reflects its combined capability to support system needs during SCHs while preventing double-counting. This approach also preserves modeling transparency and ensures hybrids are evaluated consistently with their standalone counterparts.

## **C. Contracts**

Participants may include contracted resources and other contract structures to achieve compliance with the program.

### **Treatment of WSPP Schedule C Contracts**

WSPP Schedule C contracts would be acceptable without additional elements for purposes of meeting program capacity requirements if the seller is part of the RA program.

To help refine this area, the Work Group seeks feedback on the following questions:

- How would participation be defined for sellers not otherwise participating as LSE's in the RA program? This could be an important source of resource diversification in the program.
- For sellers who participate in a different RA program, would their Schedule C contracts without additional elements be sufficient?

All WSPP Schedule C or any other firm power sale contracts with counterparties outside of the program footprint (i.e., export contracts) would need to be included and accounted for in the participants' capacity demonstration.

Above an accepted percentage of participants' compliance submittal, WSPP Schedule C contracts may be subject to additional review or supporting documentation to qualify for a capacity contribution in a participant's RA compliance filing. The requirements for additional review or supporting documentation will be developed in the BPM but could include: limitations on CAISO unspecified supply resources, requiring that specified CAISO sources are exported on high-priority transmission out of the CAISO BAA and not committed to CAISO RA, or other requirements.

Participants may temporarily include an increased amount of WSPP Schedule C contracts if evidence and / or attestation can be provided that an event occurred warranting such action, such as an outage of a significant generator or other event reasonably outside the control of the participant which resulted in reduced availability of resources.

### **Contracted Resources**

Resources of which a participant is an off-taker may be counted in program compliance filings.

Specific data requirements for contracted resources (as opposed to owned resources) would be further developed and detailed in the program BPM.

### **Contract Verification**

The program is intended to leverage a participant's CAISO master file information for contract verification.

If the capacity/energy contract is included in the CAISO master file for the EDAM and/or EIM then no further attestation would be needed.

If a capacity/energy contract is NOT included in the CAISO master file for the EDAM and/or WEIM then participants would need to submit a redacted contract or an attestation. Further details would be expected to be provided in a future BPM.

## **VI. Rationale and Policy Considerations – Resource Qualification and Capacity Assessment**

The proposed design choices largely reflect existing regional resource adequacy constructs and as such reduce implementation complexity. While exact resource performance requirements are not stated in this document, the RA Work Group intend for the program to use existing market operations data to validate participant’s resource QC values.

The inclusion of various forms of WSPP Schedule C contracts is intended to recognize current operational reality, where short and medium-term bilateral arrangements play an active role in maintaining system balance and reliability. At the same time, reliance on these contracts is envisioned as a closely monitored aspect of the program, serving as a discreet policy ‘lever’ that can be adjusted over time to influence procurement behavior and encourage longer-term investment if these products fail to result in the program’s desired reliability outcome. Allowing increased use of short-term contracts in response to temporary but significant setbacks, such as catastrophic generator failures, largely reflects actions that participants already take under stress conditions. Formalizing this flexibility provides regulatory and programmatic clarity around those actions. Importantly, it also incentivizes timely mitigation efforts that help keep the system adequate, even when the available solution is a lower-quality or shorter-duration product.

## **VII. Next Steps**

The concepts introduced in this document will be discussed during the May 19 public stakeholder meeting. A written comment period for additional feedback will be open through June 10. Stakeholders are greatly encouraged to submit written comments using the comment template to [resourceadequacy@rowesternenergy.org](mailto:resourceadequacy@rowesternenergy.org). The comment template, details on upcoming workshops, and all materials pertaining to the initial stakeholder process can be found by visiting <https://rowesternenergy.org/regional-resource-adequacy/>