Capacity Auction Reforms: Seasonal/Accreditation (CAR-SA)

Proposal Overview

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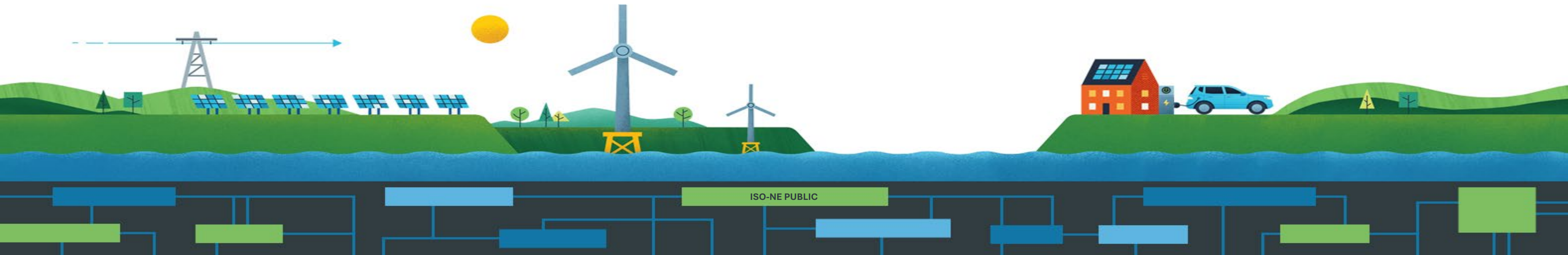


CAR-SA Project Overview

WMPP ID: 185

Proposed Effective Date: Q2 2027

- CAR-SA builds on the earlier reforms to introduce seasonality to capacity procurement, incorporate accreditation reforms, and introduce a winter gas constraint
- These changes seek to procure capacity in a more cost-effective manner that aligns with the region’s resource adequacy criterion by more accurately reflecting resource operational characteristics in the resource adequacy modeling, better aligning capacity accreditation values with expected contributions to resource adequacy, and running more targeted seasonal auctions
- This presentation provides an overview of the changes proposed under CAR-SA

Purpose of Today's Presentation

- Provide a high-level overview of the CAR-SA proposal to date
- Pull together the various design components to illustrate how pieces of the proposal fit together, and build on the earlier CAR- Prompt/Deactivation (CAR-PD) proposal
- Highlight some of the benefits of moving to a seasonal auction with accreditation reforms and a gas constraint, and how they are achieved with the ISO's proposal
- This discussion aims to focus on key themes and changes, rather than focusing on every design detail
  - Design details are covered in presentations and memoranda that are focused on specific design areas and the corresponding Tariff language
  - In the interests of time, not every aspect of the proposal is discussed in this presentation
- Complements CAR Proposal Information Summary, which the ISO has been updating monthly to help summarize the many design components of the project including additional topics of interest from stakeholders

Background: Region's Decision to Pursue CAR

- The ISO began exploring the move to a prompt auction during its earlier efforts in Resource Capacity Accreditation (RCA), which found synergies between the accreditation changes and other capacity market reforms, including prompt and seasonal markets
- In evaluating how to proceed, the ISO asked the Analysis Group (AGI) to assess the merits of moving to a prompt and seasonal auction
- AGI's analysis found numerous benefits to such reforms

AGI's Analysis Supported Move to a Prompt and Seasonal Capacity Market

- AGI's analysis found several benefits associated with moving to a Seasonal Capacity Market (SCM) related to the more targeted procurement of capacity associated with each season, including more targeted:
  - Derivation of capacity demand parameters for each season
  - Resource-level accreditation values reflecting expected resource adequacy contributions for that season
- AGI also found that a seasonal structure will incent more efficient investment in the long-term by providing more accurate price signals about the reliability value of capacity in each season
- More detail is available in AGI's report

Capacity Auction Further Delay and CAR-PD Filings

- Based on the ISO's assessment, AGI's recommendation, and discussions with stakeholders, the ISO has already submitted two filings that received broad stakeholder support and were accepted by FERC
- **Filing 1**: Further delay filing submitted in April 2024, which provided the ISO and stakeholders additional time to develop the CAR proposal
- **Filing 2**: CAR-PD filing was submitted in December 2025 and was accepted by FERC in March 2026, and included the following reforms:
  – Move from a forward to a prompt capacity auction, held roughly 1 month before the start of the commitment period
  – Decouple the deactivation process from the auction to account for this change in timing
  – Modify auction format from a descending clock auction (DCA) to a sealed bid auction

CAR-SA Schedule

- Work began on both CAR-PD and CAR-SA shortly after FERC approval of the further delay filing. The ISO developed the scope of the CAR effort in tandem with stakeholders
- The ISO brought specific CAR-SA design elements in the first half of 2025, and then began discussing the design more thoroughly in the second half of 2025
- Anticipating Technical Committee and Participants Committee votes and a CAR-SA filing with FERC by the end of the year
- Key deadlines and auction activities for the first commitment period begin in the first half of 2027

Key Design Changes Under CAR-SA

- **Modeling improvements** to better reflect expected resource operational characteristics and forecast demand
- **Accreditation** reforms to align how much capacity resources can sell with their modeled resource adequacy contributions
- Move from an annual to **seasonal auctions** targets needs and capabilities in each season
- Introduction of a novel **gas market constraint** and development of firm gas contract requirements
- In addition, the ISO has provided directional design information through the Resource Accreditation Modeling and Market Clearing Impact Analyses
- Numerous other changes to capacity market elements including:
  - Deactivations
  - Buyer and seller-side mitigation
  - Cost allocation
  - Pay-for-Performance
  - Introduction of Internal Bilateral Transactions for capacity
  - Qualification updates
  - Updated capacity market activity schedule
- A **transition mechanism** is planned to provide a glide path from current rules to those that will be in place under the full CAR-SA design

Key Benefit: Resource Adequacy Modeling Improvements Incorporate Enhanced Resource and Load Characteristics

- Resource operational characteristic improvements include:
  - Introduction of generation profiles for intermittent resources
  - Account for resource-specific energy limits for both energy limited and storage resources
- Load modeling enhancements include:
  - Use of a net load forecast (net of Passive Demand Resources)
  - Developing a methodology to include multiple weather years in the demand curve modeling to better reflect the range of potential weather
- These enhancements will allow the region to more accurately reflect capacity demand in a manner that allows the market to meet its long-term 1-in-10 resource adequacy criterion

Key Benefit: Accreditation Reforms Better Align How Much Capacity Resources Can Sell with Relative Reliability Contributions

- In addition to improving the resource-level modeling in the RAA model, CAR-SA modifies resource accreditation to align with resource-specific expected resource adequacy contributions under at-criteria conditions
- This approach reflects key resource performance characteristics including outage rates, generation profiles, limited energy characteristics, etc.
- By ensuring resources are selling a more uniform Marginal Reliability Impact Capacity (MRIC) product, CAR-SA allows the auction to more cost-effectively select the set of resources from which to buy capacity
- This change will also improve investment signals, as resources will be compensated in the capacity market based on their expected resource adequacy contributions
  - Creates incentives to reduce unforced outage rate, increase storage capability, etc.

Key Benefit: Introduction of Summer and Winter Periods Better Aligns Capacity Procurement with Seasonal Needs

- The introduction of summer and winter seasons allows the capacity market to more accurately specify its needs in each season in which the region experiences resource adequacy risk
- This includes the development of seasonal demand curves reflecting capacity's reliability value in each season
- It also allows for the determination of season-specific accreditation values for each resource that correspond with their expected resource adequacy contributions for that season

Key Benefit: Winter Gas Constraint Reflects Potentially Reduced Reliability Value Due to Regional Infrastructure Limitations

- The introduction of a non-firm winter gas constraint reflects the fact that the region's gas infrastructure can become constrained during cold winter spells
- The constraint estimates the marginal reliability value of non-firm gas during the winter as compared to other capacity, and specifies a price that accounts for this reliability impact
- Allows the region to cost-effectively trade off in its procurement of non-firm gas capacity and other capacity
- This will help ensure that all procured capacity will provide reliability value to the region commensurate with its costs
- Since gas resources with firm fuel (gas contracts, dual fuel) are not subject to this constraint, the constraint sends price signals for resources to firm up their fuel, which will improve the region's resource adequacy in the winter

RESOURCE ADEQUACY SUMMARY AND MODELING IMPROVEMENTS

Resource Adequacy Model Overview

- To develop capacity market parameters, the ISO uses the GE Vernova resource adequacy modeling tool (GE MARS), including
  - Net Installed Capacity Requirement (Net ICR)
  - System and zonal capacity demand curves based on the marginal reliability impact
  - Resource accreditation values (under CAR-SA)
- To do so, the model simulates thousands of years using input data on the assumed resource mix (and the operating characteristics of each resource) and the demand forecast
- The ISO has provided a memo on enhancements to the software and three in-depth technical sessions on the software functionality
  - Technical Session 1
  - Technical Session 2
  - Technical Session 3

Resource Adequacy Model – Resource Operating Characteristics

- CAR-SA enhances the modeling of Intermittent Power Resources (IPRs) so that their output is based on profiles simulating expected performance (e.g., using weather data), rather than assuming a flat output equal to their Qualified Capacity (QC)
- CAR-SA improves the modeling of energy limited and storage resources by considering how their energy limitations may impact their availability
- Modeling also includes a number of other improvements to better reflect the expected performance of resource types including:
  - Active Demand Capacity Resources
  - Passive Demand Resources
  - Hybrid Resources

Resource Adequacy Model – Load Modeling

The ISO proposes a number of improvements to the load modeling including:

- Use of a net load forecast (net of Passive Demand Resources)
- Introduction of multiple load shapes to more accurately represent a range of potential future conditions

Each of these changes will allow for a more accurate load forecast (on top of the closer timing of this forecast, as developed under CAR-PD)

ACCREDITATION REFORMS

Calculating rMRI Values for Resources

- Under the proposed methodology, a resource's accreditation value is determined based on the degree to which it helps to reduce Expected Unserved Energy (EUE) in MWh when the system is at criteria. Using EUE captures both the frequency and severity of simulated events
- Mathematically, this is done by increasing ('perturbing') a resource by a small amount in the model and calculating the impact that this has on EUE when the system is at criteria
- This impact is then compared to that of 'perfect capacity' that is always available to calculate the resource's rMRI value
  - Resources for which the perturbation results in a large reduction in EUE will tend to have higher rMRI values and those with a lower reduction in EUE will have a smaller rMRI value

Translating rMRI Values to Capacity Accreditation Values

- To calculate how much capacity a resource can sell in the capacity auction, the design multiplies a resource's rMRI value by its maximum output level (MCap)
  - While not directly used in the accreditation calculation, a resource's DCap, a measure of resource performance, serves as an input parameter in the process, as further described in the appendix
- *Intuition*: The rMRI value represents a resource's reliability contributions per unit of a resource's MCap, while the total accredited capacity reflects the overall reliability contribution of the entire resource
- This value, its Marginal Reliability Impact Capacity (MRIC) quantity, represents the maximum amount of capacity the resource can offer into the SCM

MRIC Values Calculated For Each Season Using Most Up-To-Date System Conditions

- Resource-level MRIC values will be calculated for each season using up-to-date assumptions about:
  - Resource operational characteristics and performance metrics
  - Forecast load
  - The anticipated resource mix
- This will allow resource MRIC values to evolve over time to continue to reflect their resource adequacy contributions as system conditions change
- This will help allow the CAR-SA proposal to provide sound investment signals to the market about the reliability value of various types of capacity
  - Avoids sending market signals that are stale and thereby incent investment decisions that are not cost effective

Key Drivers Behind Accreditation Results: MRI Hours

- Resource accreditation values are generally driven by performance during the most stressed system conditions
- In analyzing model results, the ISO has identified three distinct but related conditions under which resource performance impacts accreditation values:

1. Hours with load shed (MRI Type 1 Hour)
   - During such hours, additional energy would reduce the depth of the load shed
2. Hours where energy limited resources are dispatched to prevent load shed (MRI Type 2 Hour)
   - These hours can occur where the model is drawing down on its limited energy supply in advance of load shed
   - During such hours, the introduction of additional energy may allow the region to save more of its limited energy for later, thereby reducing the severity of the (future) load shed
3. Hours where energy storage resources are charging-constrained (MRI Type 3 Hour)
   - There can be hours where the region's limited energy has been drained and storage resources are recharging, but cannot return to fully charged before the system again becomes stressed and experiences load shed
   - Additional energy here would increase the amount such resources can charge, and thereby reduce future EUE
   - In response to stakeholder feedback, the ISO has proposed a heuristic adjustment to account for model limitations regarding these hours which will tend to increase the accreditation values for energy limited and storage resources

Key Drivers Behind Accreditation Results: MRI Hours (con't)

- While load shed hours (MRI Type 1) are the most intuitive to understand, discharging and charging constrained hours (MRI Type 2 & 3) also represent instances where incremental energy would reduce system EUE, and therefore factor into the rMRI calculations
- Discharging and charging constrained hours are more prominent during extended stressed conditions where the reliability challenge occurs because the region draws down its limited energy over a period that precedes the load shed
- In the modeling, such outcomes are more typical in winter, and we therefore see a higher frequency of such hours during this season

Resource-Level Drivers Behind rMRI Values

- **Forced Outage Rate**: Resources that are on outages more frequently are less likely to be available during stressed system conditions, and will therefore tend to have lower rMRI values
  - Under CAR-SA, outage rates are calculated on a seasonal basis
- **Resource Size**: When a larger resource is on outage, this may increase the likelihood that the model predicts load shed. All else equal, a larger resource will tend to have a lower rMRI value than a smaller resource (though its MRIC will tend to be greater)
  - More information on the impact of outage rates and resource size on rMRI values was included in Appendix IV of the May 2026 Resource Accreditation Modeling IA presentation materials

Resource-Level Drivers Behind rMRI Values (con't)

- **Resource Profiles**: For such resources, their profiled performance during stressed conditions will impact their rMRI
  - Much like with resource size, the model will account for correlations in performance across the fleet of profiled resources
  - Implication: If the resource mix includes lots of wind, reliability events are more likely to occur during periods when wind energy production is limited
- **Energy Limitations**: Energy limited and storage resources may run out of energy to provide during stressed system conditions, which affects their rMRI values
  - While this affects rMRI values for such resources in both summer and winter, the impact appears greater in the winter when events tend to be longer in duration, and the reliability value of limited energy resources is thereby lower (as compared to perfect capacity)

Resource Modeling by Type

- As part of stakeholder discussions, the ISO has provided presentation materials and memoranda providing details on the specific proposed modeling methodologies for a number of resource types
- In the appendix, the ISO includes an overview of the approach for many of these resource types, and also includes hyperlinks to many of the more detailed materials that have been discussed during the stakeholder process

INTRODUCTION OF SEASONALITY

Overview

- Under current rules, capacity is procured for an entire 12-month period via a single annual auction
- The ISO proposes to separately procure capacity for 6-month summer and winter seasons
- More targeted procurement of capacity will provide numerous benefits, including better aligning capacity demand with the region’s needs during that season, and more accurately reflecting resource operational capabilities and accreditation values by season

Seasonal Definitions and At Criteria LOLE Split

- The ISO proposes to use 6-month summer and winter seasons, as explained in a March 2025 presentation
  - Summer: May – October
  - Winter: November – April
- Seasonal definitions align with those used in NYISO
- For each season, set the at criteria case to achieve an LOLE of 0.05; this aligns with satisfying the region's annual 0.1 LOLE criterion
  - Evaluated sensitivities that considered greater summer risk (e.g., 0.08/0.02, 0.09/0.01) which showed similar accreditation values

Derivation of Demand Parameters

- Derive capacity demand by solving for the scaling factor that yields demand curves that pay the annual Net CONE value over the two seasons
- Apply this scaling factor to translate all the MRI-based demand curves into price-based demand curves for the capacity auction
  - This includes the system demand curve, import and export-constrained zone curves, and the gas demand curve applied for the winter
  - As outlined in the July 2026 MC IA presentation materials, these values will be updated each auction to reflect current system conditions
- Helps to ensure that the auction demand curves will help the region to meet its 1-in-10 at criteria objective in a cost-effective manner
- More information on the theory and mechanics of this process is available at:
  - Conceptual approach to deriving seasonal demand curves
  - Derivation of Seasonal Payment Rates

DEVELOPMENT OF A WINTER GAS CONSTRAINT

Gas Constraint Overview

- The proposal includes the development of a gas constraint applied to non-firm gas resources in the winter
- Similar in nature to an export-constrained capacity zone demand curve, which may reflect that zonal capacity provides less reliability value by specifying a lower price for this capacity, especially at higher quantities where the reliability value reduction is more pronounced

Gas Constraint Reflects Regional Infrastructure Limitation

- The gas constraint reflects the fact that the region's infrastructure limits the amount of gas available for electric generation during the winter
- *Implication*: As we buy more non-firm gas capacity, the reliability value each incremental MW provides begins to decrease
- The logic is similar to that applied to export-constrained capacity zones, where as more capacity is procured in the zone, the reliability value it provides as compared to other capacity is reduced
- Gas constraint will be determined ahead of the submission of firm gas contracts and be applied to all non-firm gas capacity offers

Methodology to Derive Gas Constraint

- The gas constraint that is applied to non-firm winter gas capacity is derived using simulated availability profiles based on observed historic gas availability
  - Profiles consider correlation between weather, gas demand for other sources (e.g., home heating), and electric demand
  - More information on the derivation of these profiles is available from the November MC/RC
- These profiles are then used in the resource adequacy platform to estimate the incremental reliability value of another MW of non-firm gas as compared to other capacity
- Much like with an export-constrained capacity zone, this results in an MRI demand curve for non-firm gas capacity representing its incremental reliability value

Allows Auction Clearing to Better Reflect Marginal Reliability of Non-Firm Gas Capacity

- The constraint reflects this reduction in the incremental reliability value of non-firm gas capacity by specifying a lower price for such resources via a negative congestion price
  - This negative congestion price becomes more significant as more non-firm gas capacity is procured, reflecting the estimated (lower) marginal reliability value of such capacity
- Non-firm gas resources will therefore compete to sell the limited non-firm gas capacity that provides reliability value
- As demonstrated in the Market Clearing Impact Analysis, this may result in lower capacity prices and payments for such resources
  - Helps ensure the auction cost-effectively trades off between procuring non-firm gas capacity and other capacity
  - Lower price corresponds with a reduction in consumer payments to reflect lower reliability value such capacity delivers

Creates Incentives to Sign Firm Contracts or Make Other Investments (e.g., Dual Fuel) that Improve Winter Reliability

- Resources with firm fuel are not subject to the winter gas constraint, and therefore are likely to receive higher capacity payments than non-firm gas capacity
  - This includes gas resources with dual fuel capability, and those with firm fuel contracts
- Increases incentives for resources to make such investments when cost effective to do so
- *Observation*: The incremental capacity revenues associated with such investments, as reflected via the higher capacity price paid to firm resources, will generally increase with the incremental reliability value that firm fuel provides

Firm Fuel Contract Requirements

- Worked closely with the Analysis Group to develop firm fuel requirements
  - The development of these requirements also benefited considerably from stakeholder feedback provided at the committee, as well as many conversations with various gas industry experts
- Propose different requirements depending on whether the gas associated with the contract would be delivered via pipeline from the west, or at an LNG terminal to the north/east
- Pipeline gas requirements include primary firm transport from a liquid receipt point outside of New England to the mainline delivery point closest to the relevant resource
- LNG contract requirements include 20 days of gas with no restriction on when this gas can be called

RESOURCE ACCREDITATION MODELING IMPACT ANALYSIS

Overview

- The Impact Analysis (IA) provides information about potential reliability and market outcomes under a specific set of assumptions regarding:
  - The set of resources participating as well as their operational characteristics and offer prices
  - Relevant demand parameters relating to load conditions and gas availability
- The results are not intended to be predictions or forecasts of potential results, but rather seek to provide information about the potential directional impacts of the proposal and the drivers/sensitivities associated with these impacts
  - Provide results under a range of scenarios, where each uses a specific set of assumptions
- Separated IA into two components:
  - Resource Accreditation Modeling IA: Impacts of CAR-SA on capacity demand parameters and resource accreditation values
  - Market Clearing IA: Impacts of CAR-SA on market clearing outcomes including cleared quantities and prices, as well as total market costs/revenues

Resource Accreditation Modeling IA Methodology

- In collaboration with stakeholders, the ISO developed a set of potential resource mixes
  - Near-Term Base Case is based on the set of resources that have qualified for CCP 18, including a considerable quantity of energy storage that is not yet commercial
  - Future cases considered additional renewable/storage resources, and load growth consistent with 2025 CELT forecasts
- Use these inputs to estimate system demand parameters and resource accreditation values under both current QC-based rules and the ISO's proposed CAR-SA framework

Resource Accreditation Modeling IA Key Results

- Capacity demand decreases under CAR-SA, reflecting the fact that we can meet peak load with less MRIC capacity than QC capacity
  – This occurs because on a per-MW basis, a MW of MRIC capacity provides more reliability value than a MW of QC capacity
- The impact on accreditation values varies considerably by season and resource type, where key drivers behind accreditation values include:
  – Resource outage rates
  – Resource performance profiles for intermittent and profiled resources
  – Energy limitations for energy limited and storage resources, especially in the winter when the region experiences longer resource adequacy events
  – Resource size, where non-performance from a larger resource is more likely to cause a resource adequacy event than from a smaller resource

Resource Accreditation Modeling IA Key Results (con't)

- Most resources see a reduction in accreditation values, reflecting that on a per-MW basis, QC capacity provides less reliability value than MRIC capacity
- On a relative basis, resource types that generally see an increase in their accreditation values include:
  - Some thermal resources
  - Hydro resources
  - Passive Demand Capacity Resources (PDRs)
- On a relative basis, resource types that generally see a decrease in their accreditation values include:
  - Active Demand Capacity Resources (ADCRs)
  - Energy limited and storage resources
- *Recall*: Non-firm gas resources do not see an accreditation decrease to reflect the region-wide gas infrastructure limit, as this is instead reflected via the gas constraint (as discussed in the previous module)

Key Drivers Behind Resource Accreditation Modeling IA Accreditation Results

- As part of the IA, the ISO has included numerous sensitivities and additional analysis to help explain the results, as well as what modeling assumptions/inputs had large impacts on accreditation values, and what assumptions/inputs had more modest impacts
- These sensitivities and analysis have included:
  - Different assumed resource mixes (near-term base case, future cases, lower energy storage case)
  - Different seasonal LOLE assumptions for the base case (80/20, 90/10) and 0.001 winter LOLE
  - Multiple load weighting methodologies
  - Various charging and discharging orders for energy limited and storage resources
- **Key finding**: From the cases studied and analysis conducted, the assumed resource mix has a significant impact on accreditation values, whereas the seasonal LOLE assumptions and load weighting have a less material impact on accreditation values, including for energy limited and storage resources in the winter
- *Next*: Discuss these key drivers further

Resource Accreditation Modeling IA Accreditation Results and Assumed Resource Mix

- Accreditation values appear to be sensitive to the assumed resource mix
- Reflects that the modeled reliability events will be highly dependent on this mix
  - If there is more solar energy, events are more likely to occur during periods after the sun has set or when there is cloud cover
  - When there is more energy storage, events are more likely to be driven by energy limitations, rather than high peak demand
- The Near-Term Base Case assumes ~2 GW of energy storage that has qualified for CCP 18, but is not yet commercial
  - In a sensitivity that removed these resources from the assumed mix, the accreditation values for energy storage resources increased considerably; this was discussed in the May IA materials, slides 57 to 61
  - Found similar trends when looking at the Future Cases 1, 2, and 3, as outlined in the April IA presentation, slides 51 to 90

Resource Accreditation Modeling IA Accreditation Results and Seasonal LOLE Split

- In addition to the 50/50 LOLE split case, the ISO ran sensitivities that set the at criteria cases to place more LOLE on the summer and less in the winter (80/20 and 90/10)
- Shifting more LOLE to the summer decreases its seasonal NICR, and the opposite occurs in winter
- However, the impact on resource accreditation values for both sensitivities was modest for each season
- Additional analysis found that the average duration of events during the winter did not materially change, as reducing the number of winter events had two largely offsetting effects:
  - Shorter reliability events from the 50/50 split were no longer reliability events (increases average reliability event duration)
  - Longer reliability events from the 50/50 split that persist become shorter due to lower load scaling (reduces average reliability event duration)
- More information was provided in the April and May IA presentations
  - April: Slides 36 to 50 outline the 80/20 LOLE split results
  - May: Slides 5 to 10 provide further analysis of the 80/20 LOLE split results, slides 43 to 52 outline the 90/10 LOLE split results
- Analysis included in July Resource Accreditation Modeling IA materials continues this trend – with a winter LOLE of 0.001, accreditation values for energy limited and storage resources appear similar to those with an LOLE of 0.05 (or 0.02 or 0.01)

Resource Accreditation Modeling IA Accreditation Results and Load Weighting Methodology

- Stakeholders have raised questions about the ISO's load weighting methodology, and how it assigns weights to historic summers and winters, and how these compare to using the full 70 years of historic weather data to derive load weights and IPR generation profiles
- The ISO conducted analysis comparing the Net ICR and accreditation values using its proposed weighting methodology to the full 70-year sample and found that the values matched very closely
- It has also evaluated alternate weighting schemes and found that while they have limited impact on accreditation values, they may underestimate Net ICR, suggesting that the alternate methodologies raised to date could result in procuring less capacity than is needed to meet the region's 1-in-10 resource adequacy criterion
  - More information on an alternate methodology introduced in May was provided in the June Resource Accreditation Modeling IA material, slides 5 through 23
  - More information on an alternate methodology introduced in June is provided in the July Resource Accreditation Modeling IA materials

Resource Accreditation Modeling IA Accreditation Results and Discharging/Charging Order

- The ISO evaluated various modeling approaches for establishing the order in which energy limited and storage resources charge and discharge
- Analysis showed that approaches that use a longest-to-shortest dispatch order tend to yield a more reliable system and higher accreditation values for energy limited and storage resources
  - Given these results, propose to use this order when determining demand parameters and resource accreditation values
- Found that the charging order had a less material impact on reliability outcomes and accreditation values
- More information was provided in the April Market Clearing IA presentation (slides 19 through 29 and Appendix A)

MARKET CLEARING IMPACT ANALYSIS

Market Clearing IA Methodology

- Start with the demand curves and accreditation values from the Near-Term Base Case under both current rules and CAR-SA
- Derive resource-specific competitive supply offers based on the resource's next best alternative, using a range of data sources on capital costs, energy and ancillary service revenues and costs, and opportunity costs associated with Pay for Performance
  - These offers are derived under a range of assumptions regarding resource costs, though for each, the assumptions are consistent between current rules and CAR-SA
- Simulate market clearing results including capacity awards, clearing prices, total costs and revenues (by resource type), with a focus on how these values change between current rules and CAR-SA
- Additional sensitivities are run to assess impacts of modifying various model and cost assumptions

Market Clearing IA Key Results

- Total cleared capacity under CAR-SA tends to be lower than under current rules, especially in the winter where we observe a lower peak demand
  - Reflects the fact that on a per MW basis, MRIC capacity provides more reliability value than QC capacity
- Clearing prices under CAR-SA tend to be higher than under current rules
- Generally, these two effects largely offset in the cases studied, meaning total market capacity costs are similar between current rules and CAR-SA
- Total revenues by resource type tend to align with the relative accreditation impacts noted in the Resource Accreditation Modeling IA, meaning resources that are expected to provide more reliability value tend to see their capacity revenues increase, and vice versa

Market Clearing IA Key Results (con't)

- The gas constraint tends to bind, indicating a lower clearing price for non-firm gas resources in the winter
  - In the cases evaluated, the reduction in the clearing price paid to non-firm gas increases as winter conditions become more stressed (meaning the premium paid to firm gas becomes greater)
- In aggregate, gas resources that sign a firm contract see their annual capacity revenues increase, whereas those that do not sign a firm contract see their annual capacity revenues decrease
- The gas constraint provides an increased incentive for resources to firm up their fuel, thereby improving the region's winter reliability
  - Incentive increases as market conditions become more stressed, thereby providing the investment signal when its reliability value is greatest

OTHER DESIGN ELEMENTS

Deactivations

- Updated the deactivations framework developed under CAR-PD to accommodate seasonal commitment periods and accreditation reforms
- Notification deadline continues to be 12 months ahead of desired deactivation date, though the possibility of acceleration persists
- Now have two deactivation deadlines per year, consistent with seasonal auctions
- Continue to evaluate deactivating resources for local transmission security and market power using the same framework approved under CAR-PD
  - Includes a number of conforming changes to reflect seasonal auction framework

Capacity Market Seller-Side Mitigation

- Extend current capacity market mitigation frameworks under CAR-SA
- Pivotal supplier test evaluates Market Participant's portfolio as it compares to the region's excess capacity supply
- Conduct test focuses on offers submitted above the Capacity Offer Price Threshold (COPT) and compares the resource's proposed offer price against an IMM-developed reference price, plus ten percent
- Resources that fail both tests have their offers reduced to the greater of the COPT and the IMM's estimate of the resource's competitive offer price, as informed by its next best alternative if it does not sell capacity in New England

Capacity Market Mitigation: COPT

- The ISO proposes to employ the current COPT methodology, which derives a value based on (i) the previous auction's clearing outcome, and (ii) updates to demand parameters
- However, given the step change in rules under CAR-SA, it proposes to instead set this value to 37 percent of the applicable Net CONE value for the first summer and winter seasons
  - Represents the average COPT value over the past three annual auctions

Capacity Market Buyer-Side Mitigation

- Buyer-side mitigation continues to be limited to lane 3 resources that satisfy numerous conditions related to resource size, policy attributes, and load-side commercial relationships
- For such resources, the ISO calculates a floor price reflecting the annual payments such a resource would require to recover its amortized costs without out-of-market revenues
- If it clears in one season, it is no longer subject to a floor price in that season and its floor price in the other season is updated to reflect these capacity payments

Energy Market Must Offer

- A resource’s energy must offer requirement will generally be the lesser of its:
  - Maximum expected performance, and
  - Proportion of its MCap value
- If it sells less than its MRIC in the capacity market, its must offer requirement would decrease proportionally
- *Logic*: A resource’s MRIC value is calculated based on the assumption that its maximum capability is available to the market
  - If it offered less than its maximum capability, its MRIC would be lower than the model-calculated value

Cost Allocation

- Capacity costs will continue to be allocated based on the share of load during the system-wide peak load hour applicable to the relevant commitment period
- Accordingly, there will now be separate peak load hours for each summer and winter season
- Moreover, the CAR-SA changes allow for the elimination of one additional cost component, in addition to the two eliminated under CAR-PD:
  - IPR seasonal variance capacity adjustment charge (eliminated under CAR-SA)
  - Annual Reconfiguration Auction (ARA) charge (eliminated under CAR-PD)
  - Failure to Cover (FTC) adjustment charge (eliminated under CAR-PD)
- Also introduce non-firm gas capacity pricing adjustment credit in winter

Pay for Performance Conforming Changes

- Replaced the current annual stop loss mechanism with a seasonal stop loss that takes a similar form
  - For a six-month seasonal commitment period, would cap a resource's seasonal losses at two times its maximum monthly net loss
- Assessed several options regarding balancing ratio capping, and after further consideration and stakeholder feedback, propose to retain the cap of 1 that was ordered by FERC under the current rules in response to the NEPGA complaint
- Additional information on these items was provided at the June MC, and is also included in the July MC presentation materials

Introduction of Internal Bilateral Transactions for Capacity

- In response to stakeholder feedback during CAR-PD and CAR-SA, the ISO is proposing a new capacity bilateral product that is similar in nature to an energy market internal bilateral transaction (IBT)
- Would give stakeholders more flexibility in how they hedge their capacity market positions, by using ISO systems to settle bilateral transactions that are agreed upon before the auction is run
- Can be used by capacity sellers to improve revenue certainty and capacity buyers to get more cost certainty in advance of the auction

Resource Qualification

- Under CAR-SA, there will be qualification processes for the summer and winter seasons
- CAR-SA resource qualification activities will occur through resource creation, resource maintenance, seasonal auction preparation, and monthly CSO trading activity preparation
  - Resource creation will be a continuous process, rather than a batch process, to facilitate timely market participation
- Resources must have 100 kW of MRIC to participate in a seasonal auction
- Resources that experience a full-capacity forced outage for the entire upcoming season after submitting the IMM cost workbook may request that their seasonal auction MRIC be reduced to zero
- LMPs may continue to offer Ambient Air MWs above the COPT without cost justification by submitting documentation of Ambient Air MWs in their Qualification Data Submission Package

Activity Schedule

- Key auction activities such as qualification, offer construction and review, seasonal auction, and deactivation will occur more frequently and on a shorter schedule under CAR-SA
  - BSMP review deadline 1 year prior to start of season
  - Deactivation notification deadline 1 year prior to start of season
- Ahead of ICR and demand curve development process, data will be pulled to define the set resources to include in the RAA case and finalize the resource specific RAA inputs
- CONE, Net CONE, and the Capacity Auction Offer Price Cap will be calculated and published prior to the ICR and demand curve development process
- A high-level activity schedule was shared at the May MC, with additional detail being provided in July

TRANSITION

Transition Overview

- The ISO proposes to include a transition to provide a glide path from the current QC-based rules to CAR
- ISO has employed transitions for other major capacity market changes, including:
  - Pay for Performance
  - MRI-based capacity demand curves
  - MOPR
- Current thinking is that the transition would be in place for the first two summer and winter auctions, where the 'full' CAR design would then be in place beginning for the auction for summer of 2030

Benefits of a Transition

- Provides a glide path from the current rules to the full CAR-SA proposal
  - This eases the transition for resources that see a more substantial decrease in their accreditation values as compared to current rules
  - While the Market Clearing IA suggests modest changes in total market costs/revenues under the scenarios and assumptions studied, the transition nonetheless helps to ease any such changes that may occur
- Offers a degree of stability and allows market participants and the ISO to gain experience with the CAR design before it is fully in effect
- Allows the region to continue making capacity market enhancements during the transition period that are informed by the continued assessment of key design elements and experience gathered during the initial capacity auctions held during the transition period
- By specifying the final proposal, provides strong investment signals that align with the complete CAR-SA design thereby helping to ensure cost effective outcomes

Transition of Resource Accreditation Values

- Accreditation values would reflect a weighted average of their proxy QC value and MRIC value as calculated under CAR-SA
  – Estimated QC would reflect an estimate of QC based on class average ratios of QC to Mcap to allow for the discontinuation of the QC calculation and administration processes during the transition period
- Accreditation value would shift from current QC value to MRIC value over the course of several auctions, providing a glide path for capacity sellers from current rules to the accreditation reforms proposed under CAR-SA
  – MCap and MRIC values are calculated using up-to-date inputs for each auction, consistent with the full CAR-SA proposal
- For example, a resource with a QC value of 100 MW and an MRIC of 70 MW would see the following accreditation values
  – Year 0 (before transition): 100 MW
  – Year 1 (first transition year): 90 MW
  – Year 2 (second transition year): 80 MW
  – Year 3 (full CAR-SA): 70 MW

Transition of Capacity Demand

- Modify demand so that it is specified in the same units as capacity supply during the transition period
  - Applies to the system demand curve, as well as each zonal curve and the winter gas demand curve
- This will help ensure that capacity demand during the transition will align with the 1-in-10 resource adequacy criterion
- Also helps keep the transition mechanism simple

Stakeholder Feedback is Valued

- Feedback has been appreciated and has been incorporated throughout the CAR-SA process. The following examples are not an exhaustive list of contributions to the design but show the ISO's continued collaboration and openness:
  - Created methodology to account for modeling limitation for energy limited and storage resources
  - Revised IPR historical profile window to 15 years
  - Retained all existing hybrid resource configurations
  - Created sensitivity study mechanism to reevaluate seasonal tie benefits outside of triennial process
  - Addition of Capacity IBT as a price-hedging opportunity
  - Updated the firm contract requirements for gas resources
  - Retained the balancing ratio cap of 1

The ISO has Provided Considerable Analysis in Response to Stakeholder Feedback

- Developed and ran several GE MARS training sessions to help stakeholders better understand the resource adequacy tool
- Run numerous Resource Accreditation Modeling IA sensitivities to help illustrate the impacts of various modeling assumptions and inputs, including:
  - Accreditation results under different resource mixes and demand parameters
  - Deriving accreditation values under 80/20 and 90/10 LOLE split cases and 0.001 winter LOLE
  - Assess impacts of different load weighting schemes on accreditation and Net ICR values
  - Evaluating reliability metrics and accreditation results under different assumed energy limited and storage charging and discharging orders
- Detailed breakdown of resource adequacy events in Resource Accreditation Modeling IA (slides 11 to 28 and Appendix III)
- Competitive offer formulation examples, including for gas resources (slides 14 to 42)
- Conducted detailed examination of the ORCA tool

Design Areas of Continued Stakeholder Interest

While many design elements are at or near completion, we appreciate that there are also some items for which there is continued discussion and/or a diversity of views, including:

- Transition mechanism
- Numerous model inputs and assumptions that may affect the accreditation value for energy limited and storage resources
  - Load weighting methodology
  - Use of 'at criteria' input assumptions to develop accreditation values
- Firm contract requirements for gas-only resources
- The ISO continues to assess these items and for some, has shared its current thinking
  - Welcome continued stakeholder feedback on these items as well as others as we move towards finalizing the proposal

Capacity Market Enhancements Will Continue After CAR-SA is Filed

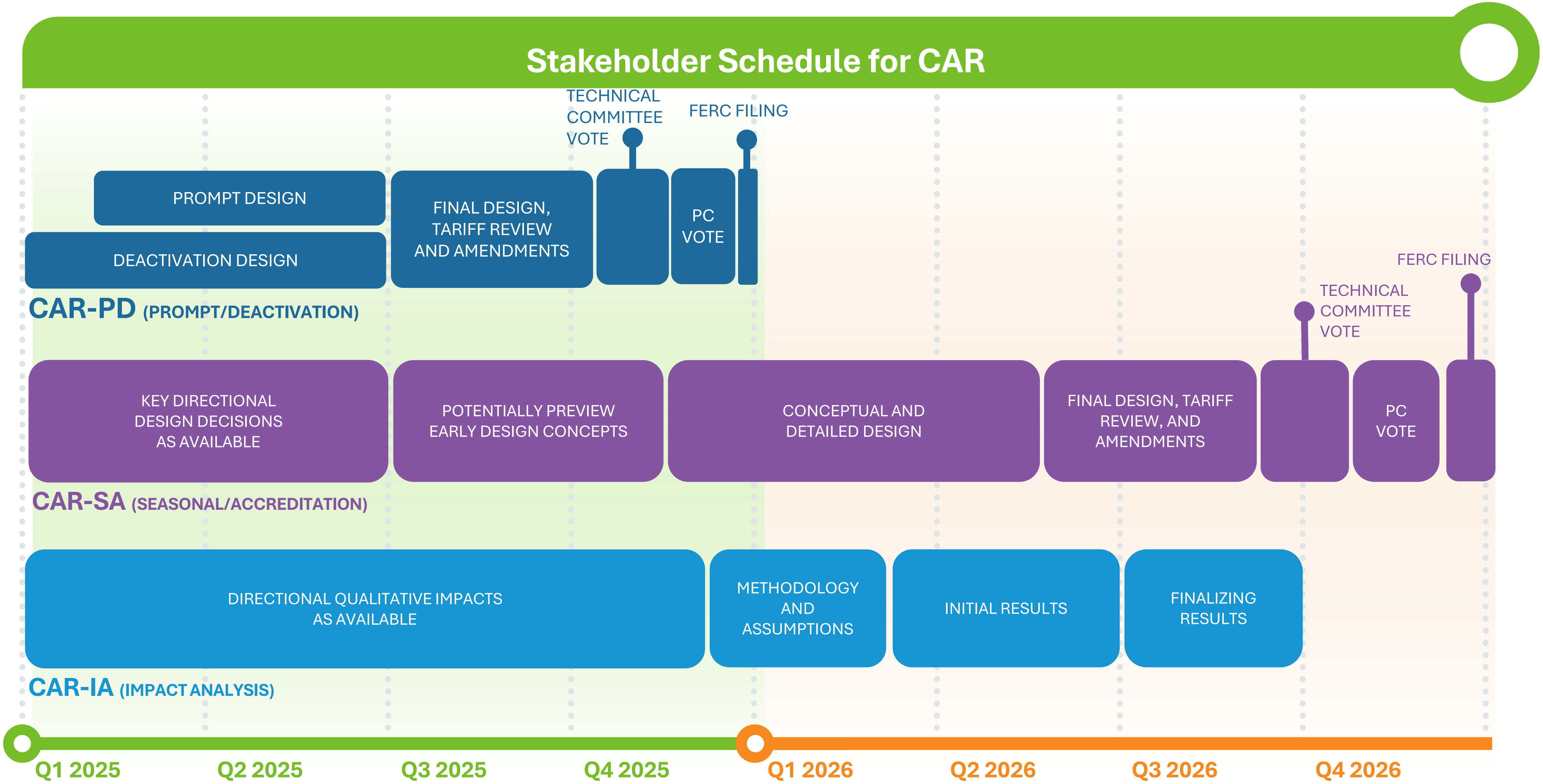
- While the ISO is targeting a CAR-SA filing in Q4 of 2026, we recognize that capacity market work will continue after the filing
- We've heard stakeholder feedback and requests regarding a number of assessment and design areas, and plan to work diligently with stakeholders to seek further enhancements in 2027 and beyond; where topic areas that have come up to date include (but are not limited to):
  - The RAA modeling and accreditation framework and input assumptions
  - Further experience with and potential refinement of the gas constraint and firm contract requirements
  - Bilateral trading opportunities
- Anticipate that as the region gains experience with seasonal auctions with accreditation reforms, this may also inform design enhancements
- The region will need thoughtfully consider how to prioritize between the many items of interest
- Transition would provide some time to begin the work associated with this next phase before the 'full' CAR-SA design is in effect

Conclusion

- The ISO continues to work with stakeholders to finalize its CAR-SA proposal
- The proposal has been discussed across a number of NEPOOL meetings and has benefited greatly from thoughtful stakeholder feedback
- The proposed changes offer many benefits that will allow the capacity market to better achieve its core objectives, including:
  - Improving the resource and load modeling to better reflect system conditions and resource operational characteristics
  - Accreditation reforms create a more uniform capacity product based on resource adequacy contributions, which will lead to more cost effective auction outcomes and long-term investment signals
  - The introduction of seasons leads to more targeted procurements and accurate inputs
  - The gas constraint reflects a region-wide infrastructure constraint in a manner that allows the auction to cost effectively trade off between firm and non-firm winter capacity
- These benefits are expected to facilitate the region's transition to the future grid
- The ISO looks forward to continued stakeholder discussion and feedback

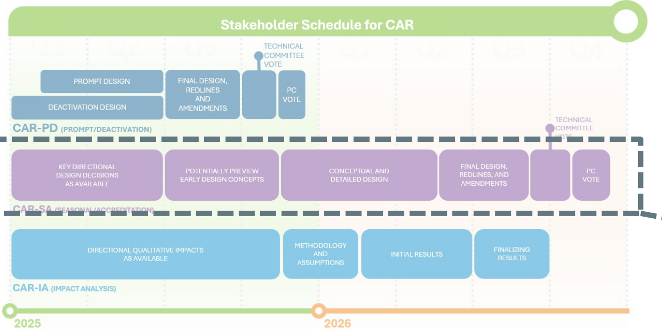
Questions

STAKEHOLDER SCHEDULE



Stakeholder Schedule for CAR
TECHNICAL COMMITTEE VOTE
FERC FILING
PROMPT DESIGN
DEACTIVATION DESIGN
FINAL DESIGN, TARIFF REVIEW AND AMENDMENTS
PC VOTE
CAR-PD (PROMPT/DEACTIVATION)
FERC FILING
TECHNICAL COMMITTEE VOTE
KEY DIRECTIONAL DESIGN DECISIONS AS AVAILABLE
POTENTIALLY PREVIEW EARLY DESIGN CONCEPTS
CONCEPTUAL AND DETAILED DESIGN
FINAL DESIGN, TARIFF REVIEW, AND AMENDMENTS
PC VOTE
CAR-SA (SEASONAL/ACCREDITATION)
DIRECTIONAL QUALITATIVE IMPACTS AS AVAILABLE
METHODOLOGY AND ASSUMPTIONS
INITIAL RESULTS
FINALIZING RESULTS
CAR-IA (IMPACT ANALYSIS)
Q1 2025
Q2 2025
Q3 2025
Q4 2025
Q1 2026
Q2 2026
Q3 2026
Q4 2026

CAR-SA



Stakeholder Schedule for CAR-SA

CAR-SA (SEASONAL/ACCREDITATION)

- CORE MODELING AND ACCREDITATION CONCEPTS
- SEASONAL/ACCREDITATION MODELING AND MARKET DESIGN
- CONFORMING DESIGN DETAILS
- FINAL DESIGN, TARIFF REVIEW AND AMENDMENTS
- TECHNICAL COMMITTEE VOTE
- PC VOTE
- FERC FILING

Stakeholder Activity

- PROVIDE QUESTIONS AND FEEDBACK ON DESIGN
- CONCEPTUAL AMENDMENTS
- PRESENT AMENDMENTS

ISO Activity

- PRESENT DESIGN & RESPOND TO FEEDBACK
- PROVIDE QUESTIONS AND FEEDBACK ON AMENDMENTS

Q4 2025 | Q1 2026 | Q2 2026 | Q3 2026 | Q4 2026

CAR-SA Schedule Projection

- **July**
  - MC Timeframe
    - Updated Activity Schedule
    - Quarterly Follow-up Medley
    - Market Clearing IA, continued discussion
    - Resource Accreditation Modeling, continued discussion
    - Tariff Redline Review, continued discussion
    - Transition Mechanism, continued discussion
    - Energy Storage and Energy Limited modeling adjustment, continued discussion
    - Resource Qualification, continued discussion
    - Winter Gas Constraint, continued discussion
  - RC Timeframe
    - DCap Process Flows for Individual Resource Types
    - Capacity Zone Development Process – Follow-up
  - Budget and Finance Timeframe
    - Financial Assurance, initial concepts

CAR-SA Schedule Projection (Continued)

- **August**
  - MC Timeframe
    - Resource Accreditation Modeling, continued discussion
    - Market Clearing Impact Analysis, continued discussion
    - Tariff Redlines, continued discussion
    - Transition Mechanism, continued discussion
  - Budget and Finance Timeframe
    - Financial Assurance, continued discussion

APPENDIX

Dependable Capacity

- In addition to MCap, the proposal will also calculate a Dependable Capacity (DCap) value for each resource
- DCap is calculated across a number of stressed system hours to provide a measure of expected performance based on observed historical availability during high load hours
- DCap has two primary applications in determining resource accreditation values:
  - Used in the process of assessing resource deliverability, which informs if a resource has established adequate interconnection services that would allow for delivering its capacity to the system under high load conditions
  - For resources that are modeled in aggregate, the accreditation values are allocated among them in proportion to their DCap value

Thermal Resource Modeling

- Non-Energy Limited
  - Non-energy limited thermal resources' MRI values will be primarily determined by their size (MCap) and EFORd (outage rate)
  - Large resources may find some correlation with outage risks
- Energy Limited
  - Energy limited thermal resources' MRI values will be primarily determined by their size (MCap), EFORd (outage rate), and daily energy limit
  - Most oil, jet fuel, kerosene, or dual fuel resources will be modeled and accredited as non-energy limited thermal resources, as they are expected to have more than 24 hours of inventoried fuel. Resources with less than 24 hours of inventory will instead be modeled as energy-limited resources with a daily energy limit. The one exception is for the summer season, during which all dual-fuel resources are modeled as non-energy-limited thermal resources regardless of their on-site fuel inventory
  - For dual-fuel resources that are modeled as energy-limited in the winter, their overall winter accreditation will be determined using the gas-only methodology. The portion of their accredited capacity associated with oil, calculated from the energy-limited model, will be treated as firm, while the remaining portion (the difference between total accredited capacity and accredited oil capacity) will be subject to the gas market constraint
  - Energy limited resources will be dispatched from longest to shortest duration
  - Further refined methodology increases accreditation values for energy limited resources to account for modeling limitation in reflecting their ability to charge other energy storage resources

Energy Storage Resource Modeling

- Energy storage resources' MRI values will be primarily determined by their size (MCap), EFORd (outage rate), maximum stored energy limit, maximum charging capability, and round-trip efficiency
- Energy storage resources will be dispatched from longest to shortest duration and charged from shortest to longest duration
- Some, but not all, simulated hours where energy storage resources are charging constrained can be MRI Hours
- Further refined methodology increases accreditation values for energy storage resources to account for modeling limitation in reflecting their ability to charge other energy storage resources

Intermittent Power Resources (IPR)

- All IPRs will be modeled using hourly profiles
  - Settlement-only IPR solar and hydro resources will be modeled in aggregate by load zone. Other IPRs will be modeled individually
  - Wind and solar will use simulated profiles, while run-of-river hydro and other IPR (landfill gas, certain biogas-fueled resources) will use historical hourly production data for RAA modeling
- In response to stakeholder feedback, historical profile window was revised to 15 years

Hybrid Resources

- Hybrid resources will be accredited primarily by their size (MCap), facility limit, storage duration, and outage rate (EFORd)
- Hybrids typically are comprised of storage with generation
  - The storage and generator components are modeled separately behind a shared constraint
- In response to stakeholder feedback, all existing hybrid participation options will remain

Demand Response Resources

- Active Demand Capacity Resources (ADCR) accredited capacity values will be determined using hourly profiles that reflect their historical offered availability, historical performance during audit and dispatch, and MCap
- Passive Demand Resources (PDR) accredited capacity values for distributed generation (DG) assets will be determined using profiles from the fleet-wide production data of the same technology type from the latest historic year and their DCap values. PDRs' accredited capacity values for energy efficiency (EE) measures will be determined using the representative industrial profiles of underlying end use, and their respective demand reduction value

Distributed Energy Capacity Resources (DECR)

- Distributed Energy Resources (DERs) can aggregate into DER Aggregations (DERAs) to participate in Energy and Ancillary Services markets. An aggregation of one or more DERAs can participate in the Capacity Market as a DECR
- Dispatchable DERAs will be accredited using the same methodology as ADCRs, driven primarily by their historical offered availability, historical performance during audit and dispatch, and size (MCap)
- Non-dispatchable DERAs will be accredited using net meter data
- Resources with limited historical data will use class averages

Imports

- Imports come from capacity suppliers located outside of New England that sell capacity into the region
- Control-area backed imports will be accredited primarily by MCap-equivalent value and historical performance
- Resource-backed imports will be accredited comparably to internal resources, primarily by MCap-equivalent capability and the class-average rMRI value
  - Resource-backed requirements will limit the external resource technologies eligible to provide resource-backed imports