Capacity Market Reform

This template is being provided in addition to the options matrix to help stakeholders provide their high-level design concepts in context with all Key Work Activities. This may cover all or parts of the RASTF key work activities and seasonal capacity and should focus on design objectives and solution options. We are still in the solution options phase of CBIR. Therefore, this should not be proposals or packages at this time.

Contributor: PJM

Concept Overview

A high-level summary to add context needed to help stakeholders understand your high-level design concept.

At a high-level, the market design concepts provided herein for consideration are focused on reforms to better achieve two fundamental objectives of the capacity market:

- Reliability - procurement of sufficient capacity to meet our resource adequacy targets
- Market Efficiency - embraces competitive principles, and provides transparent price signals for efficient entry and exit of resources; facilitates competitive, least-cost procurement of resources

These reforms are partly driven by known issues or shortcomings in the market design that we've experienced in the past. More broadly, they look to improve upon the current design to better support reliability and market efficiency under the evolving system and shifting risk profiles of the future.

How does your concept address reliability needs?

A number of the proposed reforms focus on addressing reliability needs, including:

- Enhancing our resource adequacy models and tools to better capture reliability risks in the future. Traditionally, resource adequacy analysis has largely focused on meeting summer peak loads, which has aligned with the expected time of reliability risk. Looking forward, evaluation of all hours is becoming more critical as changes in the resource mix and demand patterns will impact when reliability events are expected to occur.
- Looking beyond just loss of load expectation (LOLE) and frequency in assessing load shed events, and moving to a target metric that better captures the severity of the events.
- Improving performance expectations for committed capacity resources to help ensure resources are incentivized to perform when needed.

- Enhancing the modeling and accounting of supply-side risks in the accreditation of capacity resources to better capture a resource's contribution to reliability and meeting our resource adequacy needs.
- Implementing a seasonal capacity market construct, which can provide opportunities to improve market efficiency

How do you frame the definition of a capacity product in your concept?

Generally, capacity is defined as the commitment of a firm, physical resource to perform when needed by PJM in the delivery year, particularly during times of stressed system conditions.

Within the capacity performance construct, the commitment of capacity reflects a forward sale of a resource's expected performance during Performance Assessment Intervals (PAIs) in the delivery year, where those intervals are chosen such that they reflect periods of stressed system conditions. Qualification requirements and accreditation of capacity are components of the definition that help ensure offered capacity is physical and firm, deliverable to load, and are designed to value capacity resources consistent with their relative contributions to system reliability.

One additional aspect of the capacity product definition is it being fungible, or substitutable, such that regardless of the underlying technology, one MW of the qualified product can be exchanged for any other MW of qualified product on the margin while maintaining equivalent reliability outcomes.

Key Work Activity 2 - Reliability Risk and Risk Drivers

Determine the types of reliability risks and risk drivers to be considered by the capacity market and how they should be accounted for.

Option 1	Option 2	Option 3
Enhance our resource adequacy models and tools to better capture future risk profiles, including: • Load Forecast enhancements, including move to hourly forecast • Move to hourly resource adequacy models for RTO and LDA reserve studies, consistent with ELCC analysis • Improved modeling of winter risk These types of enhancements allow us to better capture supply and demand side uncertainties that contribute to resource adequacy risk throughout the year.	Account for all supply side risks (i.e. uncertainty in the availability of resources to perform when needed) in the capacity accreditation of resources, including weather correlated outage risks in the summer (ambient derates) and the winter, planned and maintenance outages of thermal generation, variability risk of random forced outages, availability periods of DR, etc. Moving the accounting of these risks to the supply side and in accreditation can improve the valuation of the relative reliability contribution provided by different resources, allowing for a more efficient market clearing.	
Requirements for Option	Requirements for Option	Requirements for Option
Use this area to describe whether the option has any critical dependencies with other key work activities or is incompatible with another option or concept.	This option is dependent on KWA #5 and changes to capacity accreditation of resources.	

Key Work Activity 3 - Procurement Metric and Level

Determine the desired procurement metric and level to maintain the desired level of reliability.

Option 1	Option 2	Option 3
Use Expected Unserved Energy (EUE), or normalized EUE, as the primary metric for setting our resource adequacy targets to better capture the severity of load shed events in the future. Report out on all loss-of-load metrics (e.g. LOLE, LOLH) in our resource adequacy studies for the beneficial information they provide beyond the EUE metric, such as frequency and duration of load shed events, and for consideration when setting the demand curve in RPM. Set the EUE targets based on the "equivalent" EUE seen in our models today when at a 1 day in 10 years LOLE.		
Requirements for Option	Requirements for Option	Requirements for Option
Use this area to describe whether the option has any critical dependencies with other key work activities or is incompatible with another option or concept.		

Key Work Activity 4 – Performance Assessment

Determine the performance expected from a capacity resource.

Option 1	Option 2	Option 3
Maintain a performance-based assessent that's focused on times of system stress, but modify the trigger of performance assessments to use a nodal, LMP-based trigger that results in assessments for generation when prices reach a certain pre-determined threshold (e.g. $850) that's indicative of scarcity or stressed system conditions. The primary benefit of relying on a LMP-based trigger is (1) improves alignment in LMP and PAI penalty or bonus incentives, as well as (2) providing better transparency in real-time for what units are included in the assessment.	Similar concept as option (1), but use a combined trigger of status quo and LMP, such that PAIs are only triggered for generators when in an Emergency Action and LMP exceeds the $X price threshold.	
Requirements for Option	Requirements for Option	Requirements for Option
Use this area to describe whether the option has any critical dependencies with other key work activities or is incompatible with another option or concept.	Alternative to Options 1 for timing of assessment	

Key Work Activity 5 – Qualification and Accreditation

Determine the qualification and accreditation of capacity resources.

Option 1	Option 2	Option 3
Accreditation Move to a "marginal" capacity accreditation framework for all resource types, including thermal generation and demand response, which accredits resources based on their marginal or incremental contributions to resource adequacy within a single consistent model (e.g. ELCC model). Incorporate all supply-side uncertainty / risk in the model jointly to capture synergistic and antagonistic impacts of different resources in their accreditation, including weather and fuel supply risks of thermals.	**Qualification** Account for winterization standards for generators coming out of NERC that are under review (EOP-12-1) in the qualifications for capacity resources committed in the winter season. Allow single-season resources to qualify and participate in their respective seasons on a standalone basis under a seasonal construct.	
Requirements for Option	Requirements for Option	Requirements for Option
Use this area to describe whether the option has any critical dependencies with other key work activities or is incompatible with another option or concept.	Qualification and participation of single-season resources on a standalone basis dependent on a seasonal construct.	

Key Work Activity 6 – Obligations of Capacity Resources

Determine the desired obligations of capacity resources.

Option 1	Option 2	Option 3
Generation energy market must offer requirement: • Thermal Resources: Generally same concept as today (committed ICAP adj. for outages) with some changes / clarifications • Variable Resources (wind/solar/intermittent hydro): Must offer forecast expectation (median or P50). • Batteries: Require use of PJM central optimizer when it becomes available (with limited exceptions) • Pumped Hydro: Require use of PJM central optimizer now (with limited exceptions) • Hybrids: Net of variable profile expectation and storage profile, within MFO. Battery rules apply to storage profile. • Readily Deployable Hydro (non-pumped): Must be available to PJM for dispatch (within their physical limitations) every hour of every day, unless on forced outage.		
Requirements for Option	Requirements for Option	Requirements for Option
Use this area to describe whether the option has any critical dependencies with other key work activities or is incompatible with another option or concept.		

Key Work Activity 7 – Enhancements to the Capacity Procurement Process

Determine if there are needed enhancements to the capacity procurement process.

Option 1	Option 2	Option 3
Requirements for Option	Requirements for Option	Requirements for Option
Use this area to describe whether the option has any critical dependencies with other key work activities or is incompatible with another option or concept.		

Seasonal Capacity Construct

Items related to a seasonal capacity market construct.

Option 1	Option 2	Option 3

Move to a seasonal capacity market construct with the following key elements:
• Seasonally differentiated demand side, with annual risks allocated across seasons ahead of the auctions, and capacity requirements or procurement targets are set for each season
• Seasonally differentiated supply side, with eligibility requirements (e.g. winterization requirements for winter season; summer-only DR could sell in summer) and accreditation captured for each season
• Seasonal market clearing, with differentiated seasonal clearing prices
  ○ Resources able to offer avoidable costs of both annual and seasonal capacity
  ○ Optimization engine clears the set of seasonal and annual resources to meet the individual seasonal capacity constraints at least cost.
  ○ Single-season resources that clear receive single-season clearing price for their single-season cleared MW
  ○ Annual resources that clear receive the sum, across all seasons, of each season's clearing price for their cleared MW in that season; provides revenue sufficiency to cover offered costs.		

Requirements for Option	Requirements for Option	Requirements for Option
Use this area to describe whether the option has any critical dependencies with other key work activities or is incompatible with another option or concept.		

Key Work Activity 9 – Supply-side Market Power Mitigation Rules

Determine if supply-side market power mitigation rules in the capacity market need to be enhanced.

Option 1	Option 2	Option 3
Enhance the current rules on Market Seller Offer Caps to ensure resources are able to fully reflect their economic costs of taking on a capacity commitment for the delivery year, and improve the review process (consistent with PJM's proposal on this topic here).		
Requirements for Option	Requirements for Option	Requirements for Option
Use this area to describe whether the option has any critical dependencies with other key work activities or is incompatible with another option or concept.		