Executive Summary: PJM Seasonal and Annual Proposals

Objective of PJM Proposals

PJM's proposals at the Critical Issue Fast Path – Resource Adequacy (CIFP-RA) are motivated by the need to ensure the Reliability Pricing Model (RPM) sends appropriate incentives for the entry and exit of resources needed to maintain resource adequacy, incentivize the performance of those resources during capacity emergencies and ensure continued alignment between the RPM and Fixed Resource Requirement (FRR) alternative.

The proposals include enhancements that directly address the "key capacity market areas" identified in the Feb. 24, 2023 Board letter initiating the CIFP.[1] At the top of each section heading PJM has identified which focus area identified by the Board is being addressed with that set of proposed enhancements. Below is an excerpt from the Feb. 24 Board letter identifying the areas of focus that the Board identified.

> *As part of the initiation of the CIFP, the Board is required to identify the scope of the initiative. While the scope and complexity of the issues in the RASTF are significant, the Board's primary focus in this effort is to resolve key issues that we believe would have a direct benefit to reliability. The Board is certainly open to considering holistic proposals containing any items of scope in the RASTF on which stakeholders are able to reach consensus within the time frame of this CIFP process, but requests that stakeholder proposals include improvements in the following key capacity market areas:*
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> *1.* ***Enhanced risk modeling.*** *In particular, the Board would like to improve the way PJM accounts for winter risk and correlated outages in its reliability planning.*
>
> *2.* ***Evaluation of potential modifications to the Capacity Performance construct and alignment of permitted offers to the risk taken by suppliers.*** *The Board believes that it is appropriate to evaluate whether changes are needed to the Capacity Performance construct and to ensure that market sellers are able to reflect the risk of taking on a capacity obligation in their capacity market offers.*
>
> *3.* ***Improved accreditation.*** *The Board believes that it is necessary to enhance PJM's accreditation approach to ensure that the reliability contribution of each resource is accurately determined and aligned with compensation.*
>
> *4.* ***Synchronization between the RPM and Fixed Resource Requirement (FRR) rules.*** *The Board would like any changes in RPM rules to also be mapped to FRR rules to ensure that supply resources and consumers are held to comparable standards.*
>
> *The Board believes enhancements in these areas are necessary to improve the operation of the capacity market; however, in recognition of the interrelated nature of many topics within the RASTF's scope, the Board recognizes that topics such as the reliability metric, winterization or firm fuel requirements for capacity resources and rules regarding performance assessments, and others, could be related to the listed scope above and therefore may be a part of a solution.*

[1] https://www.pjm.com/-/media/about-pjm/who-we-are/public-disclosures/20230224-board-letter-re-initiation-of-the-critical-issue-fast-path-process-to-address-resource-adequacy-issues.ashx

PJM Proposals

The foundation of the PJM proposals are enhancements to the underlying reliability analyses that identify resource adequacy risks, define procurement targets and result in accredited capacity levels. The changes to these reliability analyses necessitate changes to the capacity market to align the resource adequacy contribution of a resource in the reliability analysis to its value in the capacity market. In addition to the changes needed to support the reliability analysis, PJM has proposed enhancements in other areas of the market design to either address deficiencies with the current design or make targeted enhancements to improve on the existing elements of the market.

Prior to the CIFP-RA meeting on Aug. 7, 2023, PJM had one proposal focusing on implementing a seasonal capacity market for the 2025/2026 Base Residual Auction (BRA). In response to stakeholder feedback, PJM proposed a second, annual capacity market design proposal that contains the vast majority of elements of the seasonal proposal but simplifies the proposal to maintain an annual structure to allow for further stakeholder discussion on transition to a more granular capacity market design.

Seasonal Proposal	Annual Proposal
This proposal includes a number of reforms to improve the reliability and efficiency of the capacity market by moving to a seasonal (summer/winter) capacity market construct for the 2025/2026 Base Residual Auction.	This proposal contains a number of the core reforms contained in the seasonal proposal but retains an annual market structure.

The annual proposal does not contain a formal transition element to move to a seasonal or other more granular market design on a specific timeline, however, PJM continues to believe a seasonal market, at minimum, has near- and long-term reliability and economic benefits and will look to prioritize discussion on this topic with stakeholders following the CIFP-RA.

Throughout the CIFP-RA PJM has highlighted the key elements of its proposal to be:

1. Enhance reliability risk modeling in resource adequacy studies and move to Expected Unserved Energy (EUE) as the primary reliability metric.
2. Improve capacity accreditation to better reflect resources' contribution during risk periods.
3. Maintain the capacity performance framework but enhance the rules and testing requirements.
4. Align FRR rules and improve other areas of the market construct, including balanced market power mitigation rules.
5. Implement a seasonal capacity market design (summer and winter) for the next BRA.

The first four of those elements apply to both PJM proposals while the fifth only applies to the seasonal proposal. Each of those key elements is explained further in the context of each proposal in the following sections.

Enhancements to Reliability Risk Modeling (Board Letter Item #1)

The nature and kind of reliability risks facing the PJM system is evolving. PJM proposes to make significant improvements to its existing analysis to better identify the weather and system conditions under which we face resource adequacy risks. Changes proposed in this area will better model winter and correlated outage risks relative to today's modeling. This improved reliability risk modeling is also the basis for the changes to resource accreditation

which will be discussed further in the following section. The enhancements to the resource adequacy risk modeling apply identically to both PJM proposals.

Design Component	Seasonal Proposal	Annual Proposal
Reliability Risk Modeling *(applies to both proposals)*	• Move to hourly modeling in resource adequacy studies: RTO/LDA reserve requirement studies and capacity accreditation. • Use extended weather history back to 1993 and explicitly model load patterns as a function of weather in the resource adequacy studies. • Explicitly model how forced outages and other de-rates vary with temperature and are further correlated across the fleet even after accounting of unit-specific performance dependence on temperature.	

PJM has shared various versions of this analysis. The most recent version that demonstrates improvements in winter risk modeling is contained on slides 56-68 in PJM's posted materials for the Jul. 27, 2023 CIFP meeting.[2]

Resource Adequacy Metric and Targets (Board Letter Item #1)

The PJM proposal changes the resource adequacy metric from Loss-of-Load Expectation (LOLE) to Expected Unserved Energy (EUE). Using EUE will capture the total amount of unserved energy in the resource adequacy risk studies rather than just the occurrence of a load shed event like LOLE does.

The target levels are intended to be consistent with current loss-of-load criteria, but expressed in EUE terms.

- For the RTO, PJM will continue to use the one-day-in-ten-years standard but convert that into an equivalent level of EUE MWh.

In Locational Deliverability Areas (LDA), PJM proposes to maintain the same relative level of additional risk modeled today for LDAs, representing an additional normalized EUE of 40% relative to the RTO. Based on these target levels of resource adequacy, and the new resource adequacy risk modeling, a Forecast Pool Requirement (FPR) would be produced, annually or seasonally, that would define the amount of UCAP necessary to meet the target requirements.

[2] https://www.pjm.com/-/media/committees-groups/cifp-ra/2023/20230727/20230727-item-02a---cifp---pjm-proposal-update---july-27.ashx

Design Component	Seasonal Proposal	Annual Proposal
Procurement Metric and Target *(applies to both proposals)*	Switch to Expected Unserved Energy ("EUE") as the primary reliability metric in reserve studies and capacity accreditation, but report out on all metrics. • RTO EUE criteria based on equivalent EUE observed at 0.1 days per year LOLE standard • LDA EUE criteria based on same relative level of additional risk accepted today for LDAs	
Reliability Requirements	FPRs determined for summer and winter	Single annual FPR
Capacity Emergency Transfer Limit (CETL)	CETLs determined summer and winter	Single annual CETL

Qualification and Accreditation (Board Letter Item #3)

PJM proposes to implement marginal Effective Load Carrying Capability (ELCC) for all capacity resources except Energy Efficiency. This method of accreditation aligns the amount of capacity a resource is able to sell with its marginal improvement in EUE as calculated in the enhanced resource adequacy risk modeling. This method naturally aligns accredited capacity with expected performance during resource adequacy risk periods and aligns compensation with the resource's contribution to resource adequacy. This accreditation framework is also being pursued by other ISO/RTOs as they seek to enhance their capacity accreditation methodologies.

PJM has proposed additional changes to accreditation to include supply-side risk drivers in accreditation (rather than on the demand side as today). These include:

- Temperature-related forced outages
- Fuel availability outages and other common-mode failures
- Ambient derates
- Planned and maintenance outages

Design Component	Seasonal	Annual
Resource Qualification	• Remove existing commercial and facilitated aggregation approaches. • Allow resources to participate in only one season on a standalone basis.	Status quo. Existing aggregation rules remain in place.
Capacity Accreditation *(applies to both proposals)*	• Move accounting of supply-side availability risks to accreditation for all resource types (correlated outage effects, ambient de-rates, etc.) • Accredit generation and DR based on marginal reliability improvement in EUE using enhanced risk modeling (consistent with expected contribution during periods of reliability risk) – Allows for substitution of UCAP MW across resource types while maintaining equivalent reliability. – Aligns capacity compensation with a resources' contribution to reliability.	
Capacity Accreditation *(differences)*	Accreditation is determined separately for summer and winter.	Single annual accreditation level.

The results of PJM's most recent analysis showing indicative seasonal and annual accreditation levels across resource classes can be found on slide 61 of PJM's posted materials for the Jul. 27, 2023.[3]

Auction Structure (Board Letter Items #1 and #3)

The granularity of input data and market clearing processes are the primary differences between the seasonal and annual market design. In the annual proposal, the mechanics are relatively unchanged from the status quo, whereas in the seasonal approach PJM proposes conforming changes to the demand curves and offer structures, and to enable resources clearing in the auction to recover offered costs across one season or both at different price levels that reflect the marginal cost of capacity in each season.

[3] https://www.pjm.com/-/media/committees-groups/cifp-ra/2023/20230727/20230727-item-02a---cifp---pjm-proposal-update---july-27.ashx

Design Component	Seasonal Proposal	Annual Proposal
Demand Curves	• Fixed seasonal demand curves based on approved VRR curve shapes but parameterized to enable the full annual EUE criteria to show up in a single season, and allow for full (annual) cost recovery of the reference technology in a single season. • Net CONE (in UCAP) updated to use ELCC factor of reference technology.	• Use currently approved VRR curve shape anchored around the Reliability Requirement and Net CONE. • Net CONE (in UCAP) updated to use ELCC factor of reference technology.
Supply	Three-part offer structure: • Annual offer component • Summer offer component (incremental summer capacity costs (e.g. seasonal CPQR) • Winter offer component: parallel to summer.	Status quo. Single-part offer structure.
Market Clearing and Prices	• Least-cost selection among resources given offered (summer, winter, annual) costs. • Two clearing prices (summer and winter)	• Status quo market clearing. • Status quo. Single annual clearing price.

Scenario analysis of the 2024/2025 BRA showing the impacts of PJM's proposed rule changes can be found in PJM's posted materials for the Aug.14, 2023 CIFP-RA meeting.[4]

Specific examples demonstrating the proposed seasonal market design and clearing can be found in Item 05B and 05C of the posted materials for the Aug. 14, 2023 meeting[5] as well as slides 4-24 of the posted meeting materials for the Jul. 27, 2023 meeting.[6]

Performance Assessments and Testing (Board letter Item #2)

The PJM proposals are identical regarding performance assessments and testing enhancements. The objective for the changes in this portion of the proposal are intended to increase the performance of the fleet of resources that have cleared in the capacity market. The primary changes in this area focus on clarifying performance obligations, increasing bonus revenues and enhancing testing of resources with capacity commitments.

An important component in this area is enhanced testing requirements for capacity resources including the introduction of Generator Operational Testing. This new testing process will allow PJM to test units up to two times in each season to help identify any operational issues with the resource prior to extreme conditions.

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[4] https://www.pjm.com/-/media/committees-groups/cifp-ra/2023/20230814/20230814-item-05d---2023-08-14-market-simulation-analysis.ashx
[5] https://www.pjm.com/forms/registration/Meeting%20Registration.aspx?ID={3656E1C8-656B-4BDD-A023-76C80482E596}
[6] https://www.pjm.com/-/media/committees-groups/cifp-ra/2023/20230727/20230727-item-02a---cifp---pjm-proposal-update---july-27.ashx

Design Component	Seasonal Proposal	Annual Proposal
Performance Assessment Intervals (PAI) *(applies to both proposals)*	• Adopts PAI triggers consistent with the recently approved triggers (ER23-1996): focuses assessments on times of greatest reliability risk • Limits pool of resources that get assessed during PAIs to only resources with capacity commitments up to the committed Installed Capacity (ICAP) level. • Balancing ratio updated to account for proposed reforms to assessed resources and excusals to better balance PAI penalty and bonus rates • Approved planned/maintenance outages excused, plus manual dispatch instructions. Online units excused if LMP-desired MW (based on dispatched schedule) is below commitment. • Removal of retroactive replacements and FRR "physical" assessments (apply the same financial assessment to all committed capacity) • Allow for a new PAI obligation transfer for market sellers to exchange the financial PAI obligation associated with committed UCAP on a more granular basis (i.e. hourly): enables sellers to more effectively manage CP risk.	
Daily Commitment Compliance *(applies to both proposals)*	• Status quo assessment regarding if a resource has sufficient accredited capacity to satisfy its daily capacity commitment. Daily deficiency rate set at the applicable clearing price ($/MW-day) for the resource plus the greater of ($20/MW-day, or 20% of clearing price) • Based on seasonal clearing price in seasonal proposal; annual price in annual proposal	
Generator Seasonal Capability Testing *(applies to both proposals)*	• Assesses if a resource can demonstrate it's capable of operating at its committed ICAP in both summer and winter seasons. Proposed reforms to status quo applicable to both PJM packages (e.g. requiring a physical test in each season and assessing if the seasonal capability test value meets the committed ICAP for each day in the season). • Daily deficiency rate for testing shortfalls equal to the commitment compliance deficiency rate	
Generator Operational Testing *(applies to both proposals)*	• Allows PJM initiated testing of a generator's availability status to better ensure they are capable of operating if/when needed for reliability • Up to twice in each season (summer and winter), excluding re-tests following a failed test.	

Market Power Mitigation (Board letter Item #2)

PJM's proposed changes to the Market Seller Offer Cap (MSOC) focus on allowing capacity market sellers to fully reflect the cost, including risk, of taking on a capacity market commitment. The changes proposed here generally

align with the MSOC proposal PJM put together in the Fall 2022 which was voted at the Member's Committee with the exception that the component regarding opportunity cost has been removed to align with the other portion of the PJM proposal that limits bonus payment eligibility to resources that have taken on a capacity commitment up to the cleared ICAP level.

Design Component	Seasonal Proposal	Annual Proposal
MSOC Reforms (applies to both proposals)	• Ability for sellers to reflect incremental cost of taking on a capacity obligation, including risks. Do not use forward revenues to offset Capacity Performance Quantifiable Risk (CPQR). • A standard CPQR calculation as a default option • Use of forward E&AS offsets, administrative reforms, etc.	
MSOC Components	• Annual offer component (annual Net Avoidable Cost Rate (ACR), excludes CPQR) • Summer offer component (incremental summer capacity costs including summer risk) • Winter offer component; parallel to summer	• Single-part offer structure including Net ACR and CPQR. • Net ACR component is floored at zero to not allow forward anticipated revenues to offset risk.

Fixed Resource Requirement Changes (Board letter Item #4)

Changes in the FRR section of the proposal are largely intended to propagate the proposed changes in RPM including the resource adequacy risk modeling and accreditation into the FRR rules. Further proposed rule changes in the FRR section include a transition option for the seasonal market proposal and changes to the FRR Insufficiency and Deficiency Charges. The proposed changes to the Insufficiency and Deficiency Charges are intended to strengthen consequences associated with those shortfalls to ensure that an FRR entity is appropriately incentivized to cure any shortfalls in their plan.

Design Component	Seasonal Proposal	Annual Proposal
Seasonal Construct Alignment	FRR obligations, resource accreditation, commitments, etc., are determined separately for each season pursuant to the reliability risk modeling and accreditation enhancements.	FRR obligations, resource accreditation, commitments, etc., are determined annually pursuant to the reliability risk modeling and accreditation enhancements.
Seasonal Transition	• Allow FRR Entities to opt back into RPM ahead of 5-year minimum period ahead of next BRA. • Do not assess seasonal FRR Insufficiency Charges during the 25/26 and 26/27 Delivery Years. Insufficiency Charge will only be assessed for those Delivery Years if the FRR Plan is short of the equivalent annual requirement. FRR Deficiency charges will still be assessed for any shortfalls during the Delivery Year.	Not Applicable.
Insufficiency and Deficiency Charges (applies to both proposals)	Update the penalty rate for both insufficiency charges (assessed on shortfalls of preliminary FRR plans) and daily deficiency charges (assessed on final plans during the Delivery Year) to the greater of annual {CONE, or 1.75x Net CONE} (i.e. annual price cap in RPM).	

Transition to Seasonal Cost Allocation

This portion of the proposal only applies to the seasonal proposal and reflects a transition from the currently existing annual cost allocation to a seasonal approach. PJM received stakeholder feedback on the need for additional time to resolve additional rules regarding EDC cost allocation processes and other contractual issues.

Design Component	Seasonal Proposal	Annual Proposal
Seasonal Cost Allocation Transition	Maintain current cost allocation rules (based on summer peak load) for the 25/26 and 26/27 Delivery Years. Implement seasonal cost allocation (considering summer and winter peak loads) with the 27/28 Delivery Year.	Not applicable.