

## Modified Sustainable Capacity Market (SCM)

Sponsors: AMP and JPower USA

### Executive Summary

For the October Filing, a phased implementation approach for market reform is needed to ensure stable market-based structures that can meet the reliability needs of the evolving resource mix.

Phase I (DY 2025/2026 and DY 2026/2027) – Market Reforms in the current construct to address lessons learned from WSE.

- Modified Pay for Performance structure (CP)
  - Align CP Penalties and Stop Loss to LDA Clearing Price.
  - Maintain Status Quo Trigger Definition as approved by FERC on July 28, 2023, at the Primary Reserve Requirement
  - Include Net Exports in Balancing Ratio such that when PJM is exporting energy the Balancing Ratio declines to reflect PJM is not serving only load paying for CP resources.
  - Modify triggers for curtailing non-firm exports that are not used for resource adequacy.
  - Possible additions of export triggers to include curtailment of all non-capacity backed exports, or consistent with the tariff curtailment of exports to ensure not going short the primary reserve requirement.
- Maintain Status Quo Capacity Must Offer rules into the RPM Capacity Market including categorical exemptions.
- Institute that all committed capacity (including DR) has a must offer requirement on a daily basis into the energy market.
- Required transparency of operational decisions by PJM.
  - Capacity Resources are obliged to follow PJM dispatch instructions.
  - As system operator and in its role at Balancing Authority and Reliability Coordinator, PJM is required to schedule, commit, and dispatch the resources needed to reliably meet load in all hours. PJM should not expect Capacity Resources to self-schedule to meet any regional reliability needs.
  - The portfolio of resources that PJM draws from are the Capacity Resources that it procures through the RPM Capacity Market and the assigned/committed FRR resources.
  - All qualified Capacity Resources offering into the market have limits on the way they can be used in operations, reflecting the physical attributes of each technology. PJM is responsible for scheduling, committing, and dispatching Capacity Resources.
  - Those schedules, commitments, and dispatch must reflect the physical limits on the qualified and cleared Capacity Resources, including non-contract-related fuel access issues, start-times, and production profiles (for intermittent resources).
  - Consequently, should a Capacity Resource not be picked up in economics, but PJM operations determine additional resources are needed to address a likely reliability condition, posturing Capacity Resources, up to and including committing resources that need to secure multi-day fuel packages or with long notification and start times, is appropriate.
- Continue to address winterization and fuel supply issues as they pertain to energy and reserve market performance to other PJM stakeholder committees.
- FRR Entities and their committed FRR Capacity Resources will face financial penalties on par with RPM resources and no longer have the option for “physical” penalty commitments to be made in subsequent years.
- For the transition Delivery Years, retain the status quo accreditation for all resource types rather than making a change for a single year and then another change in the subsequent year.

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- Modeling enhancements to model CETO/CETL hourly and continue evaluation of Capacity Benefit of Ties (CBOT).

Phase II (DY 2027/2028) – Implement Modified Version of Sustainable Capacity Market (SCM) to improve capacity market for future needs of evolving resource mix.

- SCM Framework includes ([link here](#) IMM to proposal):
  - Elimination of Capacity Performance paradigm (CP).
    - No more PAIs and triggers
    - No more penalties during PAIs.
    - No More CPQR.
  - Implementation of “Pay-As-You-Go compensation” (PAYG) based on hourly availability.
    - Availability accounts for forced, planned, and maintenance outages as outlined in SCM.
    - Incentives to be available and not just minimize forced outages but also minimize maintenance and the length of planned outages.
    - In the Delivery Year, a resource will receive at least its annual net ACR if it performs consistent with its expected annual availability.
  - Risk Modeling on a locational and seasonal basis that is automatically incorporated into the model and market clearing mechanism, as this looks at hourly availability based on season, weather, and other conditions.
    - It is not just winter issues; it is also shoulder maintenance periods that can be of concern as PJM has observed in the past.
  - Improved Accreditation based on Modified Equivalent Availability Factor (MEAF).
    - More granular hourly valuation (availability) which automatically [captures?] locational and seasonal factors.
- Proposed Enhancements to SCM
  - Implement 2-year auction procurement horizon. Two Incremental Auctions.
    - Reduces the upward bias in load forecast error that has been present for decades.
    - Should work well with new PJM cluster study process in the queue.
  - Modified Energy Must Offer Obligations.
    - No more categorical exemptions for existing resources. As the CP construct is eliminated, the risk for variable and intermittent resources is eliminated and the availability metric rewards these resources for what they do provide to the system.
  - Maintain the scheduling, commitment, and dispatch requirements of Phase I transition.
  - Maintain Demand Resources that are Capacity Resources energy market must offer requirement.
  - Frequent Testing Requirements.

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### Implementation Timeline

Below is an illustration of the implementation timeline with a 2 Year Auction Horizon and elimination of one Incremental Auction.

If the SCM is implemented for 2027/2028 Delivery Year, then the Auction Schedule will be back on track sooner.

		Order on 12/1/2023		
Delivery Year	Auction	Auction Open Date	Order -> Auction (Months)	Auction Results (Months)
2025/2026	BRA	Jun-24	6	12
	3rd IA	Feb-25		4
2026/2027	BRA	Dec-24	12	18
	3rd IA	Feb-26		4
2027/2028	BRA	Jun-25	18	24
	3rd IA	Feb-27		4
2028/2029	BRA	Jun-26	30	24
	3rd IA	Feb-28		4
*** Back on Track for 27/28 DY				

### Resource Senior Task Force (RASTF) Tasks

After receiving a FERC order from the October 2023 filing, initiate a stakeholder process to finalize the details on the SCM design with a filing by (set date) and potentially explore:

- Sub-annual procurement with Time-of-Day Pricing and Assessments.
- Any further long-term reforms to ensure comparability between RPM and FRR.

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### Introduction

AMP and JPower strongly believe in holistic discussions as the best way to achieve consensus on contentious items as it allows for the greatest opportunity for mutual gains. Nevertheless, the PJM Board has generally limited the scope of the items open for discussion, at this time, per its [letter](#) initiating the CIFP-RA process.

AMP and JPower still believes that any reform, both near-term and long-term, needs to adhere to long-standing guiding principles of capacity market design:

- A sustainable market design to procure all required capacity to maintain a formulaic reliability standard on behalf of all loads regardless of the season.
- Reduce the administrative burden that restricts flexibility.
- Market signals that account for risk and supply choice preferences to minimize out of market costs.
- Recognize reliability attributes and delivery capability of the evolving generation mix of new and retiring resources.
- Recognize that exogenous events are a reality.
- Maintain inter-relationship with energy and ancillary service markets.
- Recognize that states have different, if any, renewable targets that require LSEs to procure certain types of capacity.

### Why the IMM's Sustainable Capacity Market (SCM) design

***PJM Markets need reliability to survive.*** In the near-term, Capacity Market reforms need to be simple not complex, but energy market reforms need to be significant in critical areas like Reserve Markets, Gas Electric Coordination, Circuit Breaker, and DER Integration.

- Reliability starts with real-time market and system operations. Good and accurate load forecasts along with commitment and dispatch of resources based on realities of fuel and unit operations. Generators have the incentive to operate so as to not leave money on the table and so long as prices are consistent with reliability and operational needs.
  - Gas electric coordination is at its core a system operations issue to be managed.
  - Realistic operating parameters that reflect physical realities are essential for efficient system operations.
  - Proper accounting of reserves to ensure contingencies can be met is essential for reliability.
  - Visibility of DERs to know the true energy balance needs by location is required.
  - PJM's capacity market reforms do nothing to address the issues listed above.
- The RAC (after DA Market and before RT operations) commits additional resources to ensure they will be available to meet forecast demand.
  - Again, short-term demand forecasting is needed so that accurate and efficient RAC commitments are made.
- PJM must be willing to make such RAC commitment (again, with realistic operating parameters as part of this decision) and we (market participants) must be willing to incur some small amount of uplift as "insurance" against larger real-time problems that cost everybody more money.
  - PJM's proposed capacity market reforms do nothing to address these operational planning issues.

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- The Day-ahead Market commits resources to meet bid in demand. Load has the incentive to accurately bid in demand to avoid high RT prices and/or emergency condition because not enough demand was offered.
  - PJM's proposed capacity market reforms do nothing to address the load bidding accurately into the DA market.
- The PJM Capacity Market ensures sufficient resources will be available to provide energy at all times under all forecast conditions, accounting for load forecast deviations and resource performance. Financially, the capacity market ensures an opportunity (not guarantee) to cover any needed going forward (avoidable) costs of resources to ensure they remain in service.
  - In this sense, the IMM's view that the capacity market exists to make the energy market work is the economic side of the reliability coin that says the energy market is working when we have enough resources to ensure energy balance and maintain sufficient reserves to meet contingencies and not overload transmission.
- The capacity market is only a sufficient condition, not the only sufficient condition to make energy markets work and ensure reliability.

***The IMM's Sustainable Capacity Market (SCM) design is a stable market-based structure for long term reform.***

- The IMM proposal:
  - Places the burden of performance in each and every hour rather than in some unknown period in which there are other factors beyond the control of resources such as blown load forecast, poor situational awareness, and ignoring gas pipeline operating realities.
  - Commits needed resources to meet energy in each and every hour including during shoulder and maintenance periods as well as those periods with correlated outages rather than a single peak hour.
  - Provides a conceptually well-defined demand in every hour.
  - The Board directed the stakeholders to improve accreditation. This means modifying the current method for determining the availability measurement for all resource types. Changing the methodology will have impacts throughout all areas of the capacity construct and new methods have been introduced by both PJM and the IMM:
    - PJM is introducing a Marginal ELCC methodology to replace the existing Average ELCC.
    - The IMM is introducing a new method, Modified Equivalent Availability Factor (MEAF).
  - The IMM's proposed method, the MEAF, obviates the need for ELCC which is a great vertically integrated utility planning tool, with what really matters in real-time operations: availability during that hour. One resource's availability does not affect another resource's availability. There are no interactive effects like ELCC where the level of, and order of entry of resources affects the ELCC value. This makes the availability measure a better market tool.
  - Can determine availability by location unlike PJM's use of ELCC.
  - Is much easier to implement than the PJM proposal as it requires no seasonal components per se, but rather accounts for hourly load and availability variation to determine which resources are the last needed. This market clearing is simpler as well.

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### Proposed Modifications to Design Components to current Construct (Status Quo)

#### KWA 2 – Reliability Risks and Drivers

##### Design Component 9. Emergency Imports

- Focused Study on the calculation of the Capacity Benefit of Ties (CBOT).

##### Design Component 10. Internal Transmission Risks / Locational Constraints

- Model Hourly CETO/CETL. This can currently be modeled based upon transmission topology and based on economic energy dispatch of all resources including energy only resources.

#### KWA 4 – Performance Assessments

##### Design Component 21. Performance Shortfall Calculation

- Maintain Status Quo.
- Assess resource performance during an Emergency Action as defined in the FERC-approved revisions to the PAI triggers in FERC Docket ER23-1996, as approved by FERC on July 28, 2023, at the Primary Reserve Requirement.
- “Emergency Action” shall mean (1) any megawatt shortage of the Primary Reserve Requirement (as specified in the PJM Manuals) in a Reserve Zone or Sub-Zone, inclusive of any adjustments to such requirement to account for system conditions, as determined by the dispatch run from the security constrained economic dispatch and where there is also a Voltage Reduction Warning and reduction of critical plant load, Manual Load Dump Warning, Maximum Emergency Generation Action, or the curtailment of non-essential business loads and voltage reduction that encompasses such Reserve Zone or Reserve Sub-zone or (2) anytime the Office of Interconnection identifies an emergency and issues a load shed directive, Manual Load Dump Action, Voltage Reduction Action, or deploy all resources action for an entire Reserve Zone or Reserve Sub-zone.”

##### Design Component 23. Expected Performance level of Assessed Resources

- This is for the transition only.
- Include Net Exports in Balancing Ratio such that when PJM is exporting energy the Balancing Ratio declines to reflect PJM is not serving only load paying for CP resources.
  - OATT Attachment 10A (c). *Also refer to PJM Manual 18, Section 8, page 156*
- For Delivery Year 2025/2026 and Delivery Year 2026/2027, the Balancing Ratio = (All Actual Generation Performance, Storage Resource Performance, Net Energy Imports, Net Energy Exports, Price Responsive Demand Bonus Performance effective with the 2026/2027 Delivery Year, and Demand Response Bonus Performance) / (All Committed Generation and Storage Capacity); provided, however, that Net Energy Imports shall be included in the calculation of the Balancing Ratio only for any Performance Assessment Interval for which performance by any external Generation Capacity Resource would have helped resolve the Emergency Action that was the subject to the Performance Assessment Hour; include Net Energy Exports by any internal Generation Capacity Resource would have helped resolve the Emergency Action that was the subject to the Performance Assessment Hour; and provided further that for any Delivery Year up to and including the 2019/2020 Delivery Year, Net Energy Imports shall be included in the calculation of the Balancing Ratio only for any Performance Assessment Hour for which the

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Emergency Action was declared for the entire PJM Region; and provided further that the Balancing Ratio shall not exceed a value of 1.0.

### Design Component 25. Performance Shortfall Calculation

- Capacity resources are obliged to follow PJM dispatch instructions. As system operator, PJM is required to schedule the resources needed to reliably meet load in all hours. The portfolio of resources that PJM draws from are the capacity resources that it procures through the market and the assigned FRR resources. All qualified capacity resources offered into the market have limits on the way they can be used in operations, reflecting the physical attributes of each technology. PJM is responsible for scheduling resources. Those schedules must reflect the physical limits on the qualified and cleared resources, including non-contract-related fuel access issues, start-times, and production profiles (for intermittent resources). Consequently, should a capacity resource not be picked up in economics, but PJM operations determine additional resources are needed to address a likely reliability condition, posturing capacity resources, up to and including committing resources that need to secure multi-day fuel packages or with long notification and start times, is appropriate.

### Design Component 28. Non-Performance Charge Rate

- This is for the transition only.
- For Delivery Year 2025/2026 and Delivery Year 2026/2027, For Capacity Performance Resources and Seasonal Capacity Performance Resources, the Non-Performance Charge Rate = (Base Residual Auction clearing price for the LDA and Delivery Year for which such calculation is performed \* (the number of days in the Delivery Year / 30) / (the number of Real-Time Settlement Intervals in an hour).

### Design Component 29. Stop-Loss for Non-Performance Charges

- This is for the transition only.
- For Delivery Year 2025/2026 and Delivery Year 2026/2027, the Non-Performance Charges for each Capacity Performance Resource (including Locational UCAP from such a resource) and each PRD Provider for a Delivery Year shall not exceed a Non-Performance Charge Limit equal to 1.5 times the Base Residual Auction clearing price for the applicable LDA and Delivery Year times the megawatts of Unforced Capacity committed by such resource or such PRD Provider times the number of days in the Delivery Year. The Non-Performance Charges for each Seasonal Capacity Performance Resource for a Delivery Year shall not exceed a Non-Performance Charge Limit equal to 1.5 times the Base Residual Auction clearing price for the applicable LDA and Delivery Year times the megawatts of Unforced Capacity committed by such resource times the number of days in the season applicable to such resource.

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### KWA 9 – Supply-side Market Power Mitigation Rules

#### Design Component 57. Capacity Market Must Offer Requirement

- Planned Resources must notify PJM of intent to submit a sell offer in the BRA prior to the posting of planning parameters. Otherwise, express intent to be in-service as an energy-only resource for Delivery Year.
- Maintain Status Quo.

### KWA 10 – Modifications to FRR Rules

#### Design Component 80. Synchronization between the RPM and FRR rules

- FRR Entities and their committed FRR Capacity Resources will face financial penalties on par with RPM resources and no longer have the option for “physical” penalty commitments to be made in subsequent years.

### Additional Modifications to Energy & Capacity Market Rules

- Any costs for gas pipeline services such as FT, and shorter-notice FT, storage, and other services must be allowed to be reflected in capacity offers or energy offers, whichever is appropriate.
- Change the parameter limits for gas-fired resources to match the gas pipeline nomination and flow schedules as the default especially regarding start/notification/min run times. Allow gas resources to put start/notification/min run times in shorter to the extent gas pipeline conditions allow it.
  - Rationale: This is a real-time operations adjustment that needs to be made to match up with the realities of the gas pipeline system and reliability needs.
  - Rationale: Gas resources have incentives to be as available as possible still and to run for energy as much as possible when they can do profitably.
- Modify triggers for curtailing non-firm exports that are not used for resource adequacy.
- Possible additions of export triggers to include curtailment of all non-capacity backed exports, or consistent with the tariff curtailment of exports to ensure not going short the primary reserve requirement.

## Proposed Modifications to Design Components in the SCM

### KWA 2 - Reliability Risks and Drivers

#### Design Component 7. Outages / Limitations of Demand Resources

- IMM: “Availability based on history and offers and outages modeled on supply side by unit, class, and fleet wide outage patterns correlated with historical temperatures. DR should be mapped to specific nodes. DR availability based on physical reality.”
- Modification to IMM Proposal: Define availability for Supply-side DR vs Demand Side DR differently; GLD for Supply side; pick your PLC for Demand side. Both need to bid/offer into market. Both need to be telemetered in aggregate by bus or zone.



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### KWA 3 - Procurement Level and Metric

Design Component 21. Timing of Performance Assessment(s)

- IMM Proposal: Payments hourly based on availability. No hourly capacity payment if not available. Performance assessment hourly based on availability. No PAI.
- Additional detail to IMM Proposal: Just because a Capacity Resources has a long notification and start time due to physical operating characteristics, or due to nomination and flow timelines in FERC-approved Gas Tariffs does not make a Capacity Resource unavailable. PJM is responsible for scheduling, committing and dispatching resources based on these operating characteristics.

### KWA 4 - Performance Assessments

Design Component 36. Generator Summer / Winter Rating Tests

- IMM: Weekly testing/actual performance.
- IMM's Modified Proposal: Align with PJM's Seasonal Testing
- Modification to IMM Proposal: Different frequency than weekly. Use actual performance can meet the test that would include the results of economic operations. Test at least once per season, perhaps monthly. Best manages those resources with limited run hours by air permit or legislative mandate.

Design Component 38. Other Assessments for Performance Testing

- IMM Proposal: Weekly testing/actual performance.
- IMM's Modified Proposal: Align with PJM's Seasonal Testing
- Modification to IMM Proposal: Different frequency than weekly. Use actual performance can meet the test that would include the results of economic operations. Test at least once per season, perhaps monthly. Best manages those resources with limited run hours by air permit or legislative mandate.

### KWA 5 - Qualification and Accreditation

Design Component 45. Energy Efficiency Resource

- IMM Proposal: EE should be removed from capacity market. If retained, status quo.
- Modification to IMM Proposal: Maintain status quo.

### KWA 7 – Enhancements to the Capacity Procurement Process

Design Component 46: RPM Auction Timing

- IMM Proposal: BRA conducted 3 years in advance of the Delivery Year. Incremental Auctions are conducted 20 months, 10 months, and 3 months ahead of the Delivery Year. Consider only two IAs.
- Modification to IMM Proposal: BRA conducted 2 years in advance of the Delivery Year. Two IAs.

### KWA 6 - Obligations of Capacity Resources

Design Component 46. Energy Market Must Offer

- IMM Proposal: All capacity resources must submit compliant offers into the DA and RT markets.
- Modification to IMM Proposal:
  - All Capacity Resources, including Demand Resources, have a must offer obligation in the energy market.
  - All Capacity Resources with non-zero offers must have an approved Fuel Cost Policy
  - All Capacity Resources must provide hourly operating parameters that match their physical capability and not unrealistic parameter expectations.
  - DR hourly availability based on Guaranteed Load Drop.

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### KWA 9 - Supply-side Market Power Mitigation Rules

#### Design Component 57. Capacity Market Must Offer Requirement

- IMM Proposal: All Capacity Resources have a must offer obligation in the capacity markets based on CIR/ICAP.
- Modification to IMM Proposal: Planned Resources must notify PJM of intent to submit a sell offer in the BRA prior to the posting of planning parameters. Otherwise, express intent to be in-service as an energy-only resource for Delivery Year.

#### Modifications to FRR Rules

- No other mechanisms needed for performance assessments. Given there are no PAIs and penalties, per se, FRR entities have the obligation to ensure their contracted or owned resources make their stated MEAF or better.
- After the last Incremental Auction, FRR entities must true up their portfolios to match the RPM level of capacity. Otherwise, the FRR entities are procuring less, and if effect leaning on the system relative to other LSEs.