

BPU Resource Adequacy Investigation

FRR Discussion

November 9, 2020

Agenda

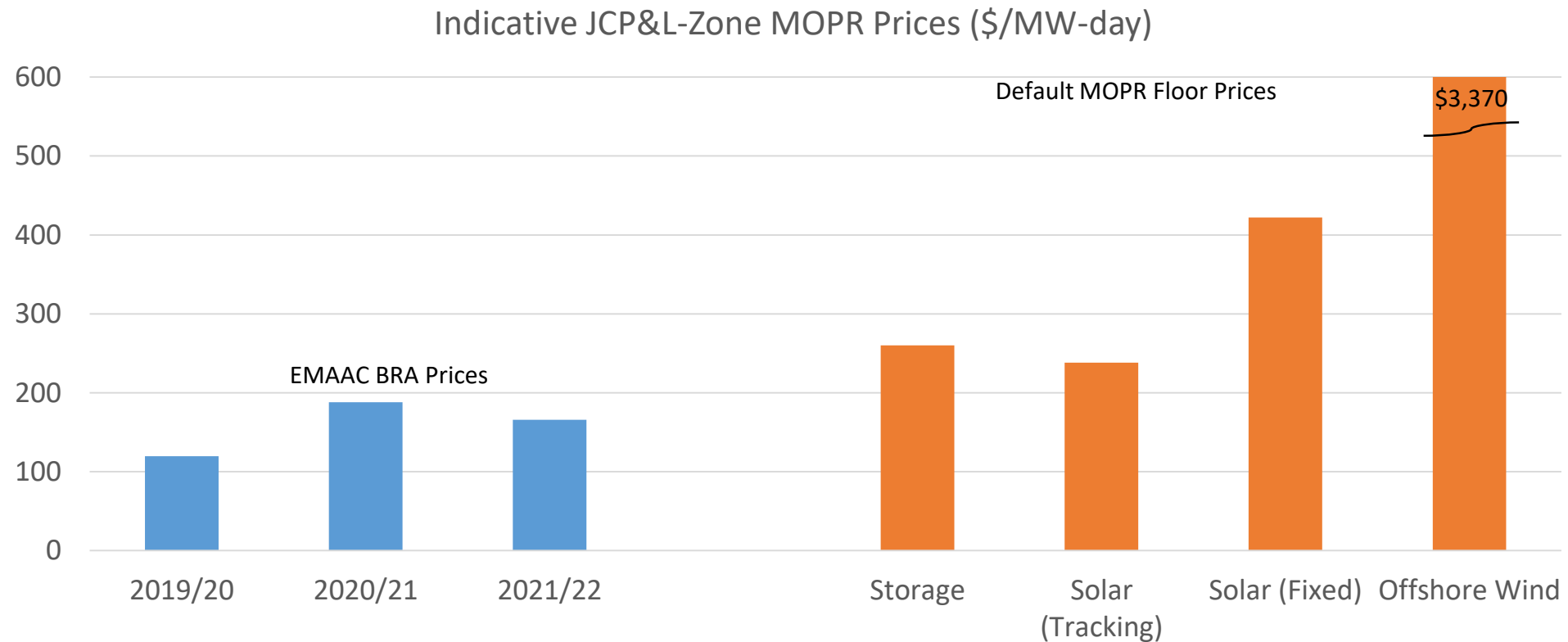
- Impact of FERC Energy Policy Decisions on State's Clean Energy Goals
- FRR Timing and Mechanics
- FRR Pricing Approaches
- BPU's Authority to Utilize FRR
- FRR Structural Considerations
 - Quantity
 - Locational Constraints
 - Tiers
 - Capacity Performance Penalties
 - Price Caps
- Summary
- Questions

New Jersey's Ability to Meet Its Clean Energy Goals

- FERC's December 2019 Order expanded the "Minimum Offer Price Rule" (MOPR)
- The expanded MOPR creates price floors for many clean energy resources receiving state support
- Customers will be forced to bear significant levels of unnecessary costs
- Depending on bid price floor levels, units subject to the MOPR may be unable to clear as PJM capacity resources which would:
 - Increase OREC and SREC costs
 - Eliminate thousands of MWs of capacity provided by clean energy resources mainly serving NJ load, that would then have to be acquired from other sources including carbon-emitting plants
- The Order did retain the current Fixed Resource Requirement Alternative ("FRR") option that permits utilities to opt out of the RPM market

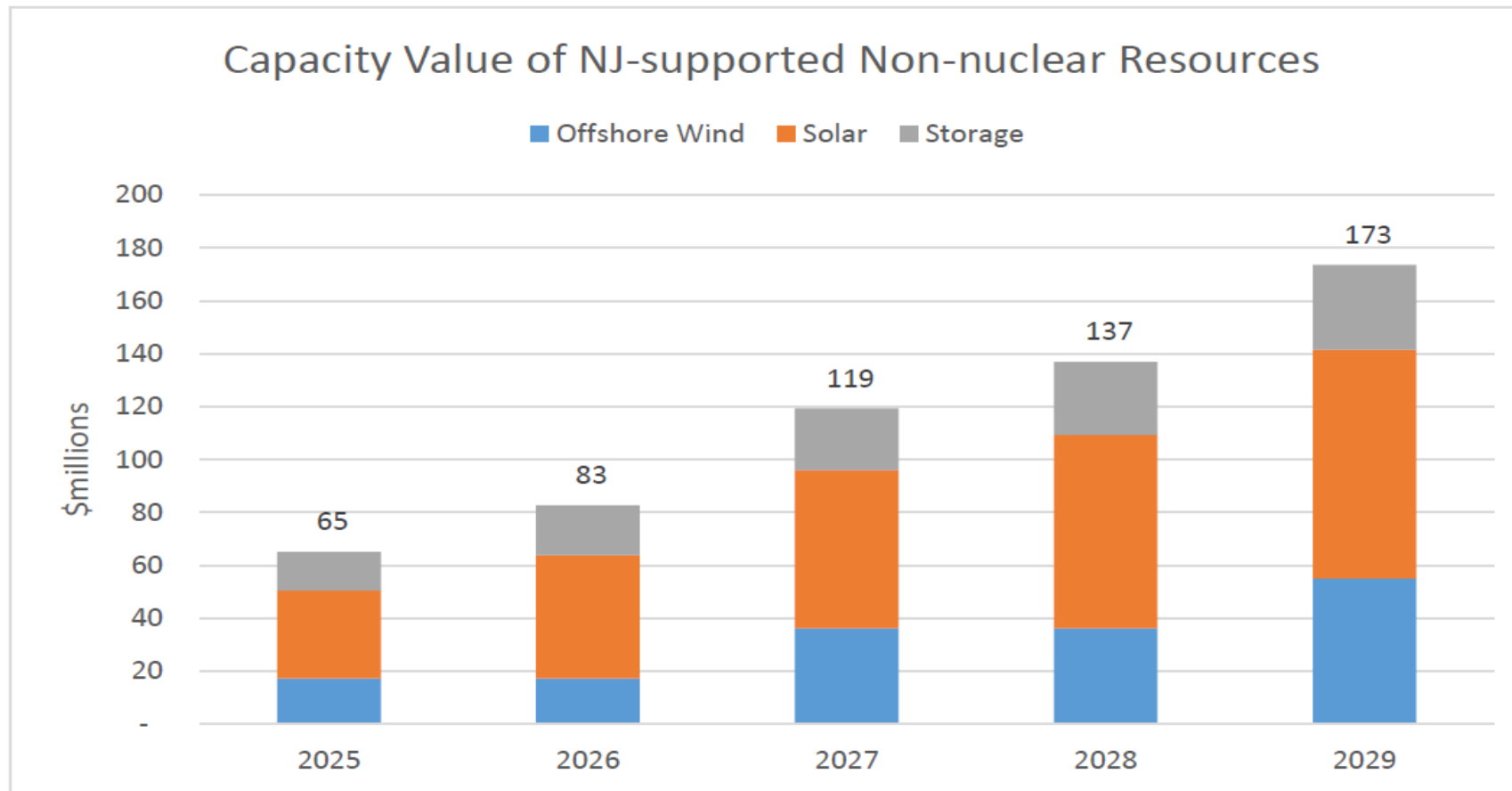
Need for an FRR - MOPR Floor Price Levels

- Default MOPR floor price levels for solar, storage, and offshore wind are well above recent EMAAC capacity clearing prices.

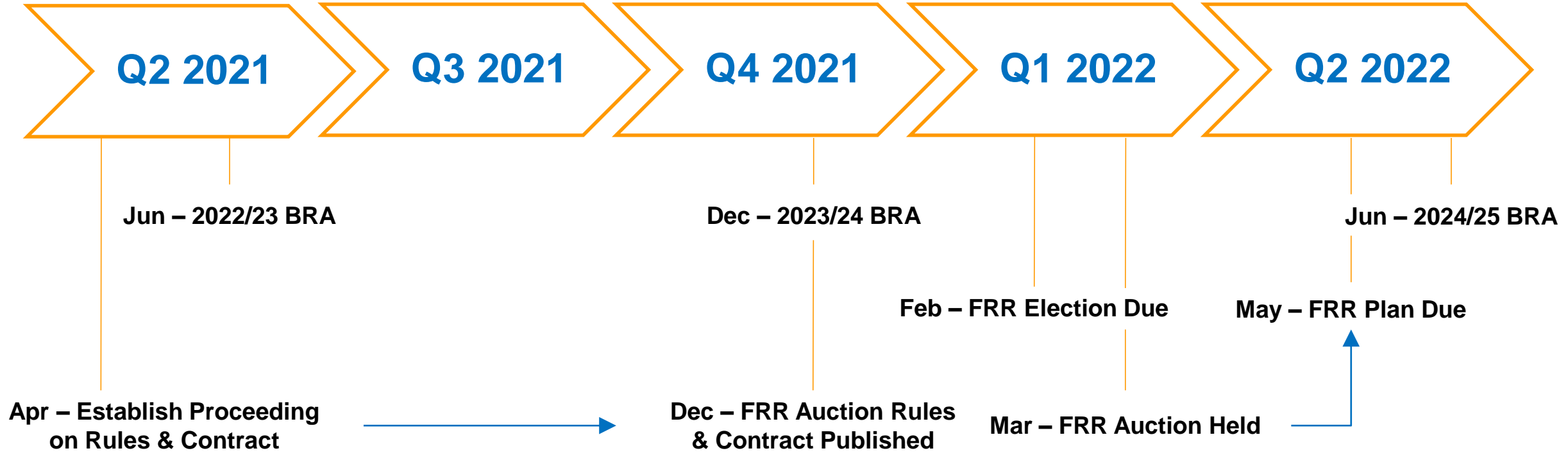


Need for an FRR - Capacity Value at Risk

- The capacity value of New Jersey's supported non-nuclear resources is expected to grow over time and, with the FERC MOPR, customers may have to pay twice for this capacity.



Potential Auction Timing Brings Decisions to the Forefront Quickly



FRR Mechanics

- FRR provides a procurement mechanism to secure capacity resources to meet a service area's resource adequacy requirements in PJM
 - Option in the tariff that has been used in the past to serve multiple purposes
- FRR election can be made for a utility service area (or all utility service areas in the state) for a period of not less than 5 years
 - Resource mix can be procured and modified each year
- FRR entity must provide PJM with an FRR Plan demonstrating that it owns or has acquired sufficient capacity to meet the applicable resource adequacy requirements
- FRR entity and state commission that exercises oversight over the FRR Entity to determine how the necessary capacity resources are procured
- There are multiple ways for an FRR procurement to be constructed

FRR Pricing Approaches: RPM Derivative Pricing

- RPM Derivative Pricing Proposal
 - Pay as bid auction in which suppliers submit bids as a percentage of the clearing prices in the upcoming BRA for the same delivery year
 - Auction would have “tiers” of resources that would be filled sequentially for each locational delivery area eligible to supply the FRR service area
- Characteristics
 - Harnesses competitive forces
 - Incentivizes NJ supported units to participate
 - Capacity pricing outcomes would be close to clearing prices in RPM
 - Incorporates PJM’s market power mitigation regime
 - Procurement would be conducted by an independent auction manager
 - BPU would have the opportunity to review the results and approve the outcome

FRR Pricing Approaches: Sealed Bid Marginal Pricing

- Sealed Bid Marginal Pricing Proposal
 - Single clearing price auction in which eligible suppliers submit bids at the price they are willing to supply capacity
- Characteristics are similar to RPM Derivative Pricing with the following differences:
 - No need for product Tiers
 - Clearing results are more simplified, and known in advance of RPM auction
 - Results could be lower or higher than RPM prices but are likely more divergent from actual RPM settles

BPU's Authority To Order the Formation of FRR Areas Under Existing Law

- BPU has been overseeing procurements to achieve resource adequacy requirements since the 1960s
- BPU has broad statutory authority including the authority to consider environmental impacts:
 - “it is well settled that the Board has been granted expansive jurisdiction, supervision, regulation and control over all public utilities. * * * Moreover, N.J.S.A. 48:2-23 authorizes the Board to require a public utility to provide safe, adequate and proper service, including furnishing and performing service in a manner which tends to conserve and preserve the quality of the environment.” In Re Jersey Cent. Power & Light Co., No. EO02070417 (N.J.B.P.U. Aug. 1, 2003)
- Formation of an FRR is consistent with retail open access under EDECA:
 - FRR construct allows a “third party supplier” (“TSP”) with customers in an FRR service area to procure capacity and energy separately from the EDC
 - TPS’s retain the same flexibility that they have at present to develop and price bundled capacity/energy services
- An FRR can be formed consistent with the provisions of EDECA that govern default service (*i.e.*, BGS)

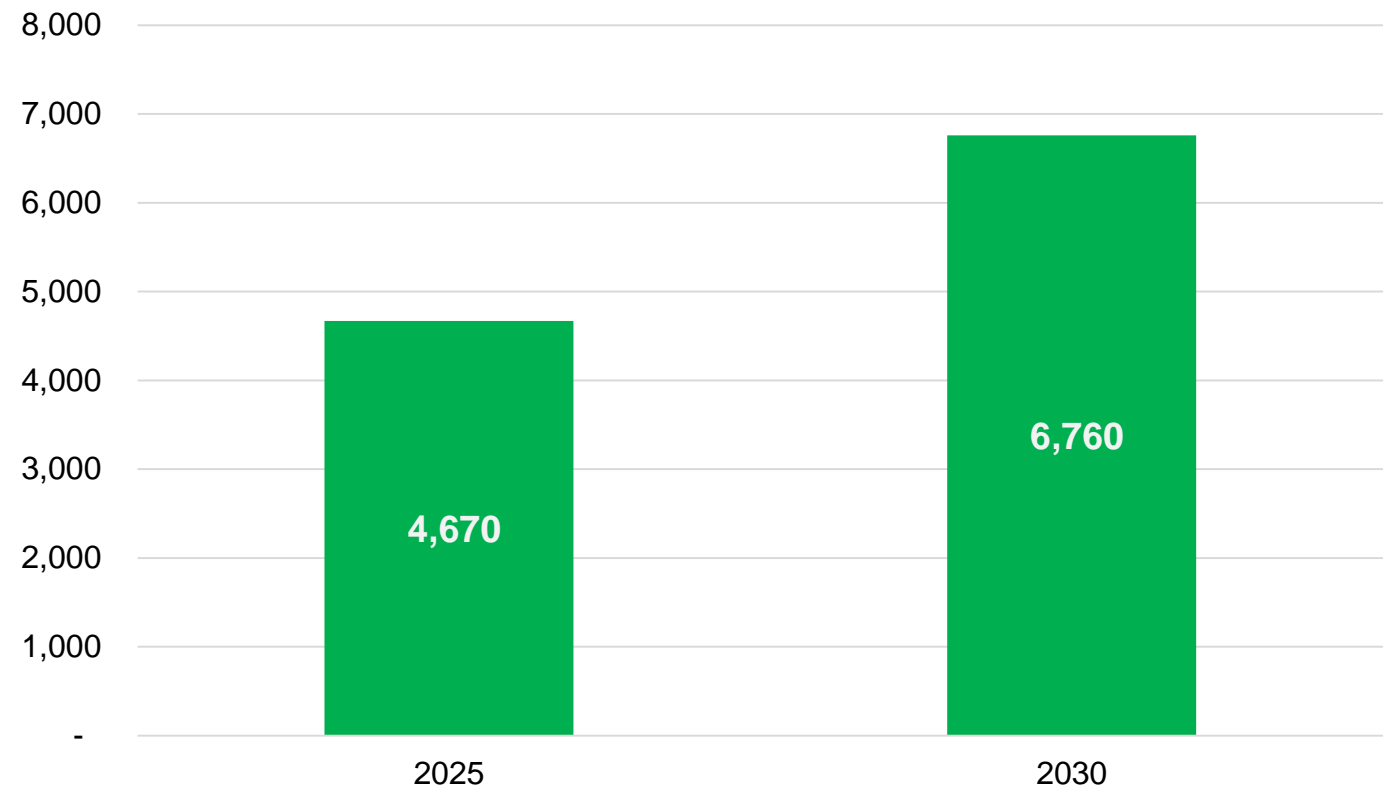
FRR Structural Considerations

- FRR is a capacity procurement tool that can be utilized to avoid the detrimental impacts of the FERC MOPR on clean energy resources
- If New Jersey chooses FRR, it is not choosing regulation over competition – however, before making an FRR decision, it is important that both the structure and objectives are clearly specified:
 - Support achievement of NJ clean energy goals while keeping costs to consumers as low as reasonably achievable
 - Ensure that state supported resources count for capacity
 - Meet all reliability standards and acquire resources through a disciplined procurement mechanism that prices resources fairly

New Jersey Energy Master Plan Goals

- 100% clean energy by 2050
- 50% renewable energy by 2030
- 2030 technology-specific targets:
 - 3,500 MW offshore wind
 - 12,200 MW solar
 - 2,000 MW storage
 - Continued operation of 3,500 MW nuclear

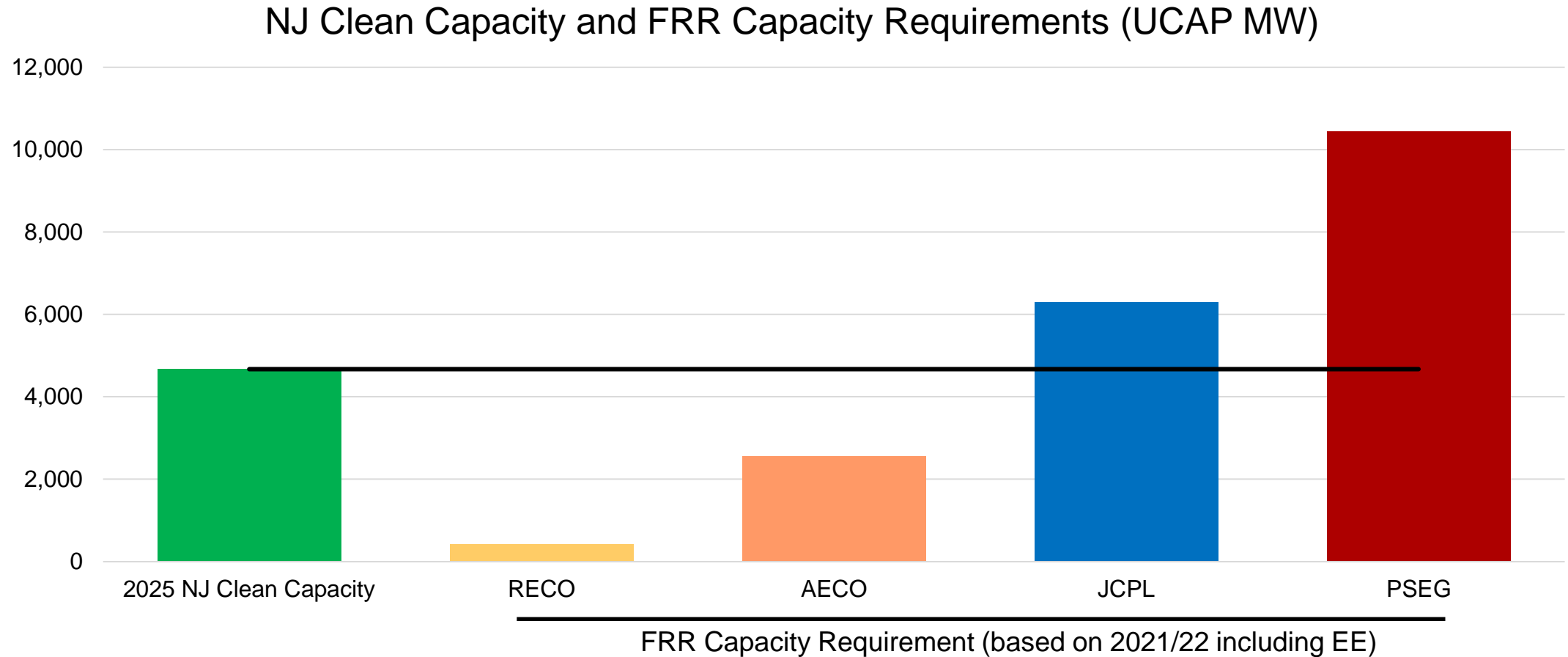
Potential New Jersey Clean Capacity (UCAP MW)



Assumes 100% offshore wind target and 75% of solar and storage target achieved in 2030 and half of new solar is utility-scale. Includes JCPL EE capacity that cleared in 2021/22.

FRR Quantity

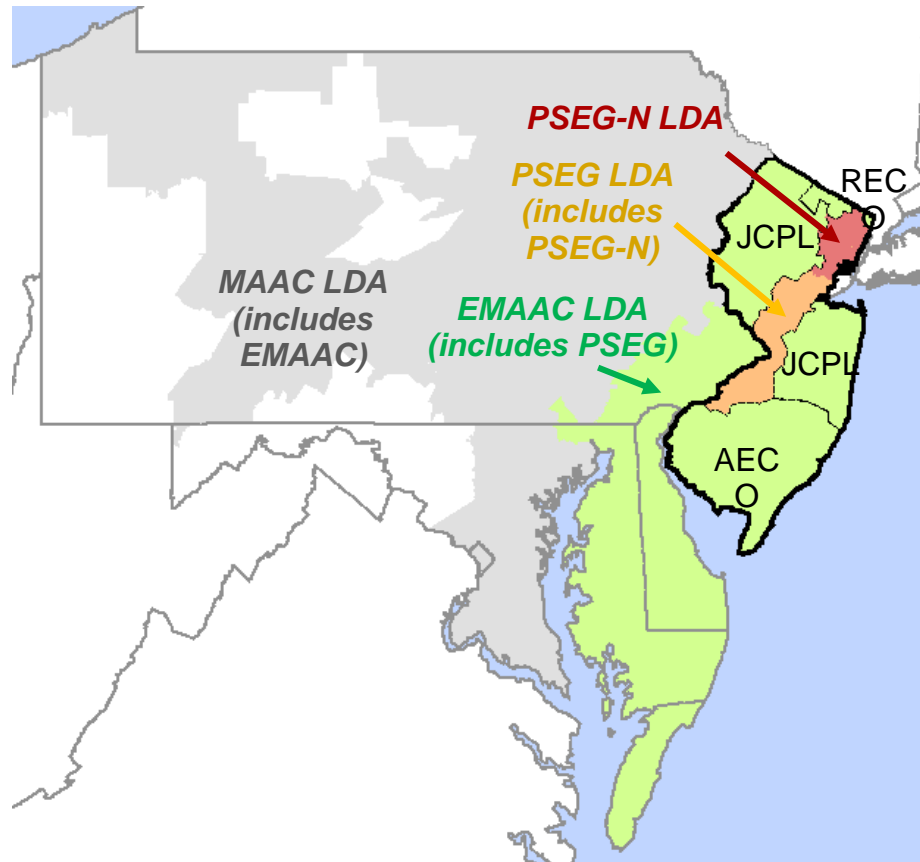
- An FRR for the JCPL service territory would be large enough to support the clean capacity identified in the New Jersey Energy Plan in 2025 with room for planned growth in that capacity



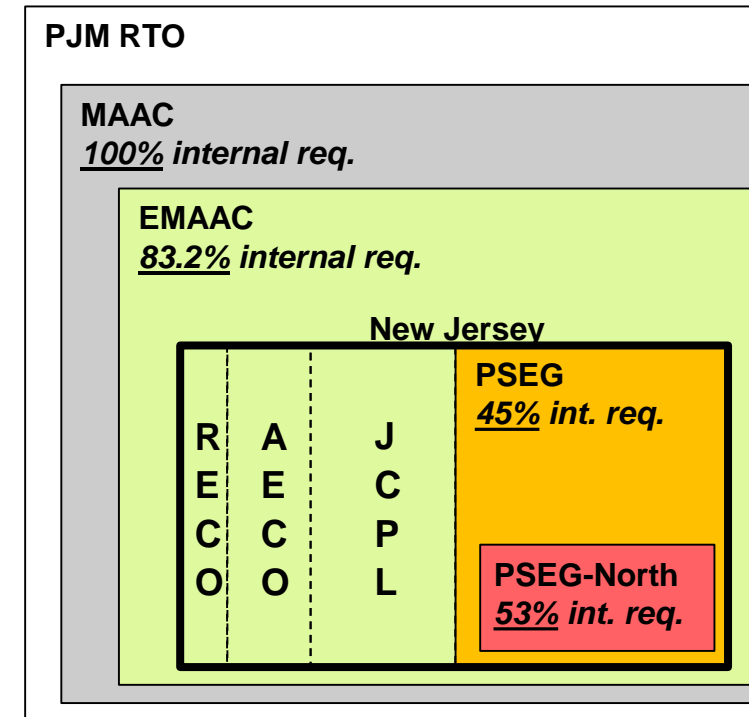
Locational Constraints for New Jersey Utilities

- With an FRR, JCPL can procure about 83% of its resources from EMAAC and the remainder from MAAC.

Map of New Jersey LDAs



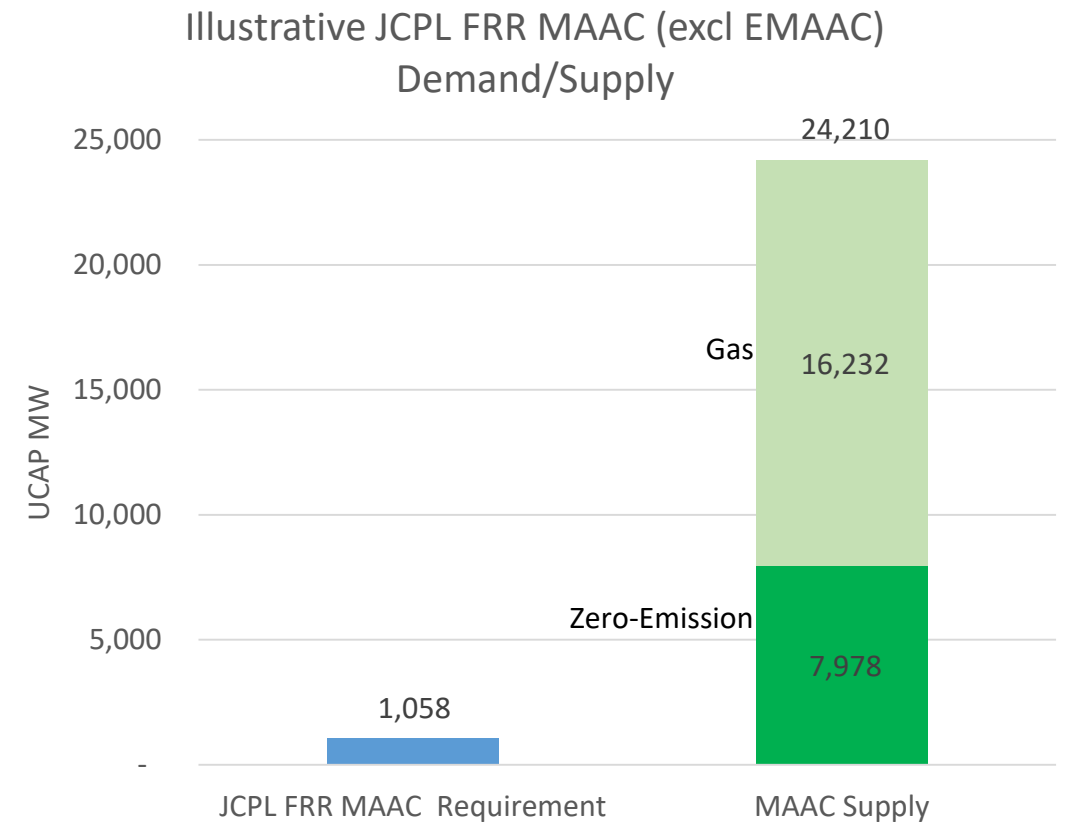
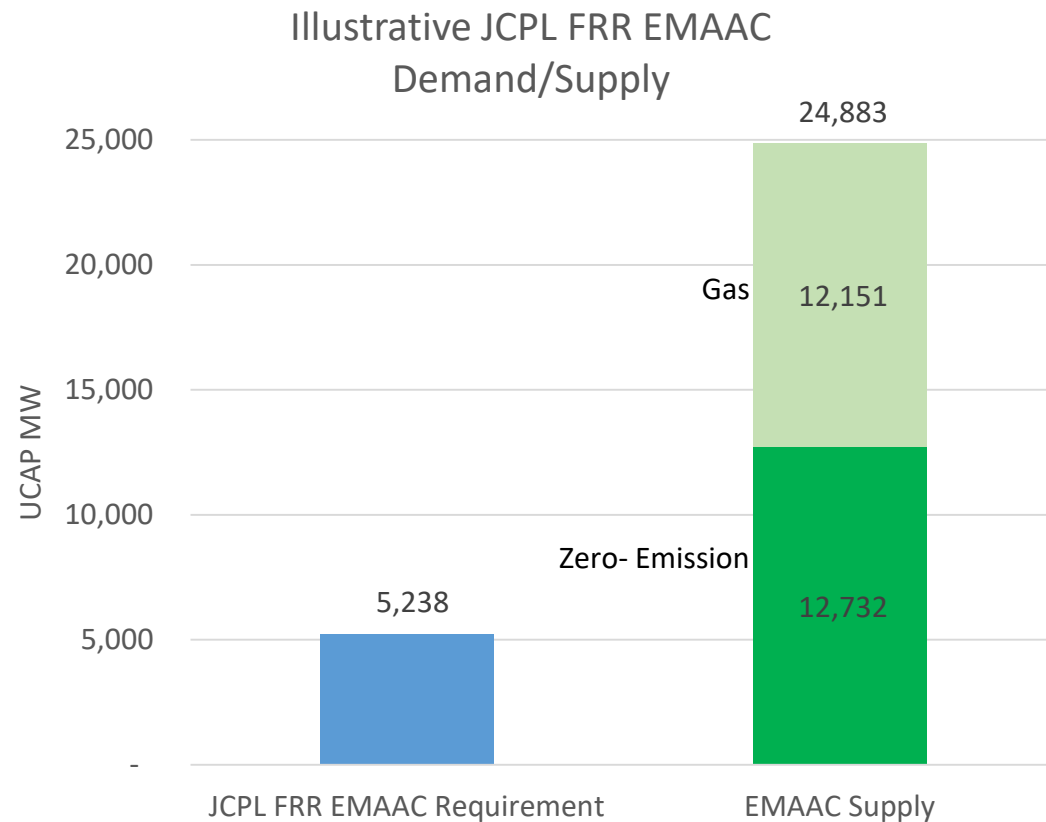
“Simplified” Schematic of New Jersey LDAs



Note: Colored rectangles denote distinct LDAs. Some LDAs are located entirely within another (e.g. PSEG is a subset of EMAAC). Regions shown with dotted lines are load zones that are not modeled as their own LDA.

Locational Constraints and Available Supply

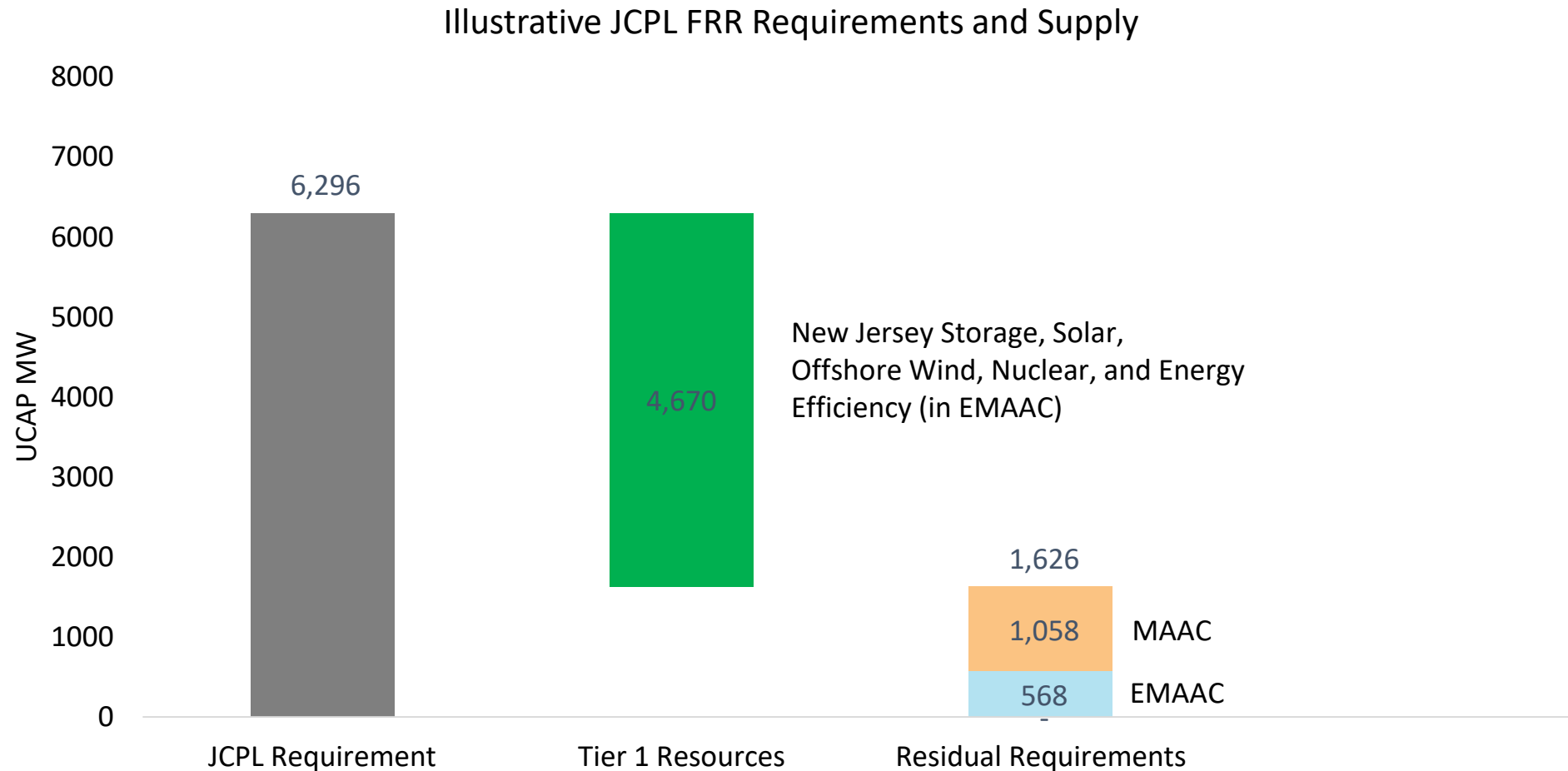
- The pool of available zero-emission and gas resources in EMAAC is roughly 5x the JCPL requirements and the pool of available resources in MAAC is more than 20x requirements.



*Supply based on 2021/22 cleared UCAP plus potential additional New Jersey clean capacity through 2025

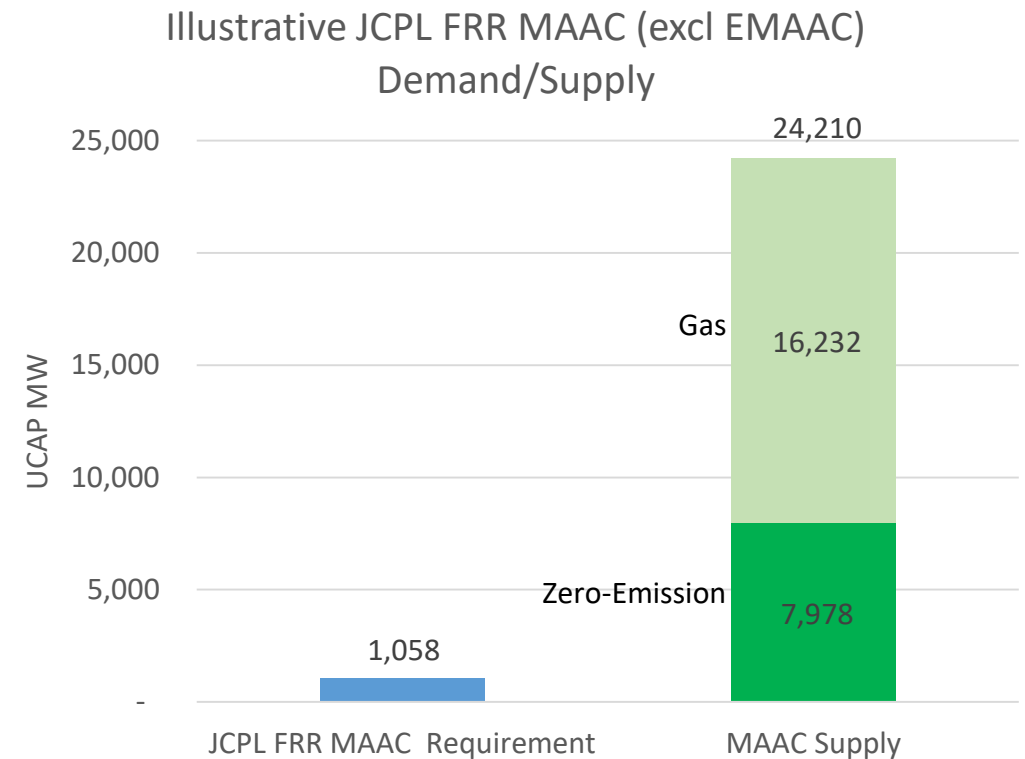
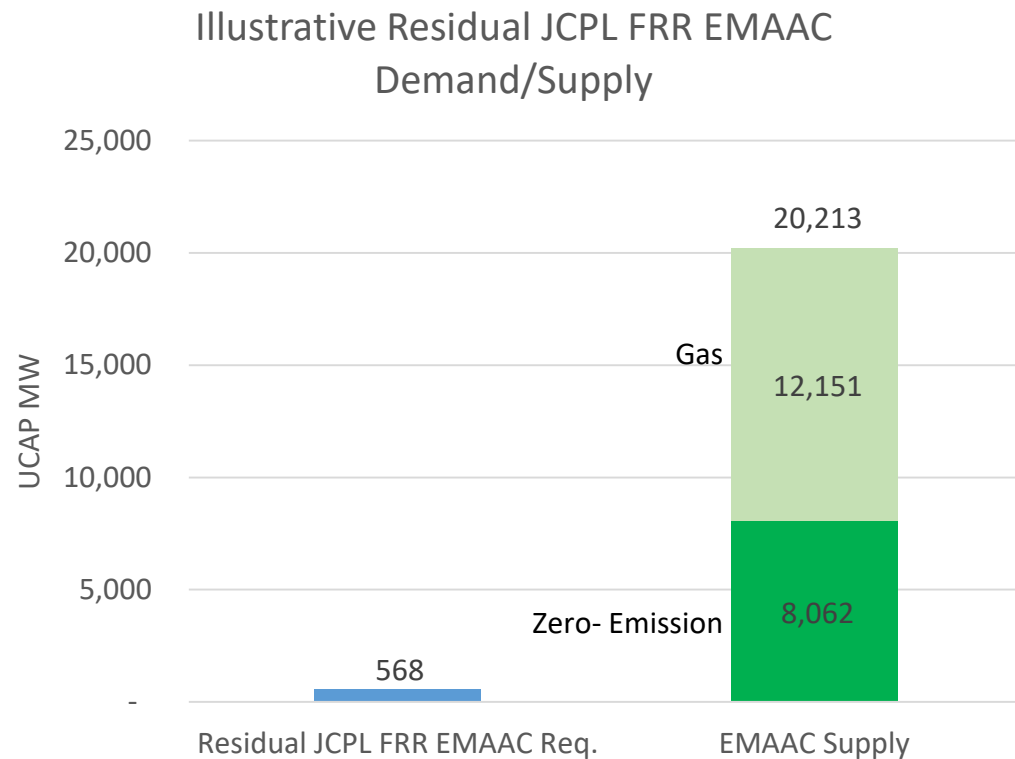
Tier 1

- The first tier of resources in an FRR would be New Jersey's zero emissions capacity – in 2025, these resources could meet roughly 70% of JCPL's FRR needs:



Other Tiers

- Depending on New Jersey’s preferences, JCPL’s remaining capacity needs could be met with zero emissions resources or with a combination of zero emissions and gas resources:
 - In 2025, the pool of available resources is more than 20x residual needs after the first tier in both EMAAC and MAAC
 - Residual needs will decline over time as more Tier 1 resources come on-line



FRR Capacity Performance (CP) Penalty Alternatives

- The PJM tariff allows an FRR entity to choose one of two options for Capacity Performance (CP) penalties:
 - **Financial Non-performance Assessment** – Each resource in the FRR portfolio is evaluated exactly how it would be if it cleared RPM. Each resource would be subject to penalties of \$3,000+/MWH for under-performance and eligible for bonus payments for over-performance during CP events.
 - **Physical Non-performance Assessment** – The entire FRR portfolio is evaluated in total to determine whether the portfolio under-performed during a CP event. Under-performance requires the FRR entity to provide additional incremental capacity to be included in the FRR portfolio for the following delivery year. There are no bonus payments for over-performance.

CP Penalty Examples With and Without FRR

- FRR service territory could choose PJM physical assessment to pool resources and reduce the likelihood that a penalty will need to be paid to PJM.

Performance Assessment Hour Example 1:

Without FRR: No Penalties

Under FRR With Physical Assessment: No Penalties

Resource	Nameplate MW	UCAP MW	MWh during Assessment Hour	(Under)/ Over-performance
Wind	10	2	2	0
Solar	10	4	4	0
Nuclear	100	96	100	+4
Outcome If Aggregated as FRR Portfolio				
		102	106	+4

Performance Assessment Hour Example 2:

Without FRR: Penalties for Wind, Solar

Under FRR With Physical Assessment: No Penalties

Resource	Nameplate MW	UCAP MW	MWh during Assessment Hour	(Under)/ Over-performance
Wind	10	2	0	(2)
Solar	10	4	2	(2)
Nuclear	100	96	100	+4
Outcome If Aggregated as FRR Portfolio				
		102	102	0

CP Penalty Example with FRR and Physical Assessment

- With an FRR and physical assessment, the CP penalty level is about \$1,000/MWH which is roughly 70% lower than the penalty level in the PJM capacity market – for example:
 - Assume FRR portfolio has 1,000 MW shortfall during one CP performance assessment hour
 - FRR entity would need to provide 16.7 MW of additional capacity in the following year*
 - If this capacity is purchased at the 2021/22 EMAAC capacity price, the total cost is \$1.01 million or \$1,010 per MWH
- The reduced likelihood and level of CP penalties with an FRR and physical assessment should make participation in the FRR attractive to renewable resources

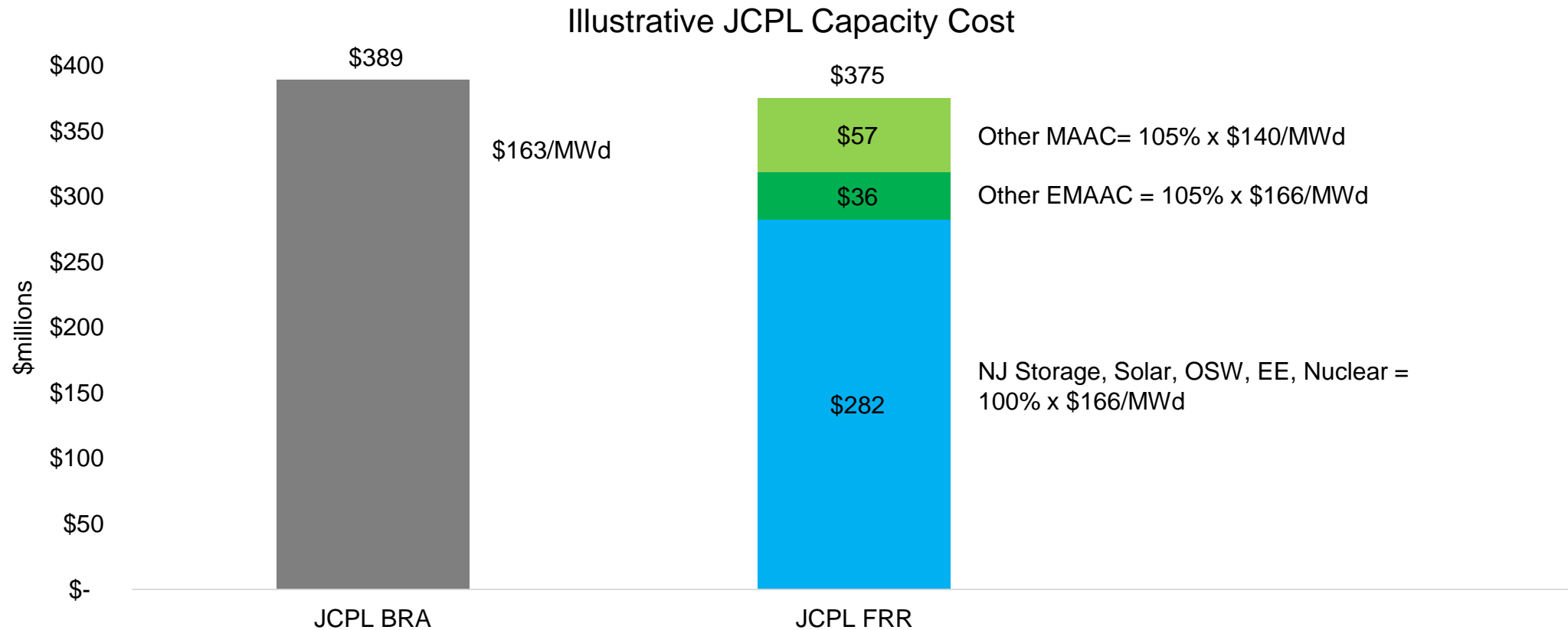
*Note: PJM Manual 18 Section 11.8.7 describes the penalty rate for underperformance in a 5 minute interval as
(0.5 MW / 30 Performance Assessment Hours / 12 intervals per Hour) = 0.00139 MW / interval

Price Caps With RPM-Derivative Pricing

- Pay as bid, with the following bid caps:
 - Tier 1: 100% of EMAAC RPM price for relevant delivery year
 - While bidding in FRR is voluntary, resources that are already supported by New Jersey and may not receive capacity revenues in the PJM market should not need additional incentives to participate in FRR
 - Tier 2 (and Tier 3 if desired): 105% of EMAAC/MAAC price for relevant delivery year
 - FRR capacity commitment will be very similar to PJM capacity commitment
 - If the physical assessment is selected, CP penalty risk will be lower with FRR which will be attractive to renewable and other resources
 - Certain marginal resources that would bid a price in PJM capacity market that is close to clearing price level may prefer to participate in PJM capacity market rather than effectively be a price-taker in FRR
 - Given that pool of resources is 20x residual FRR needs in both EMAAC and MAAC, should be able to attract sufficient supply at 5% premium

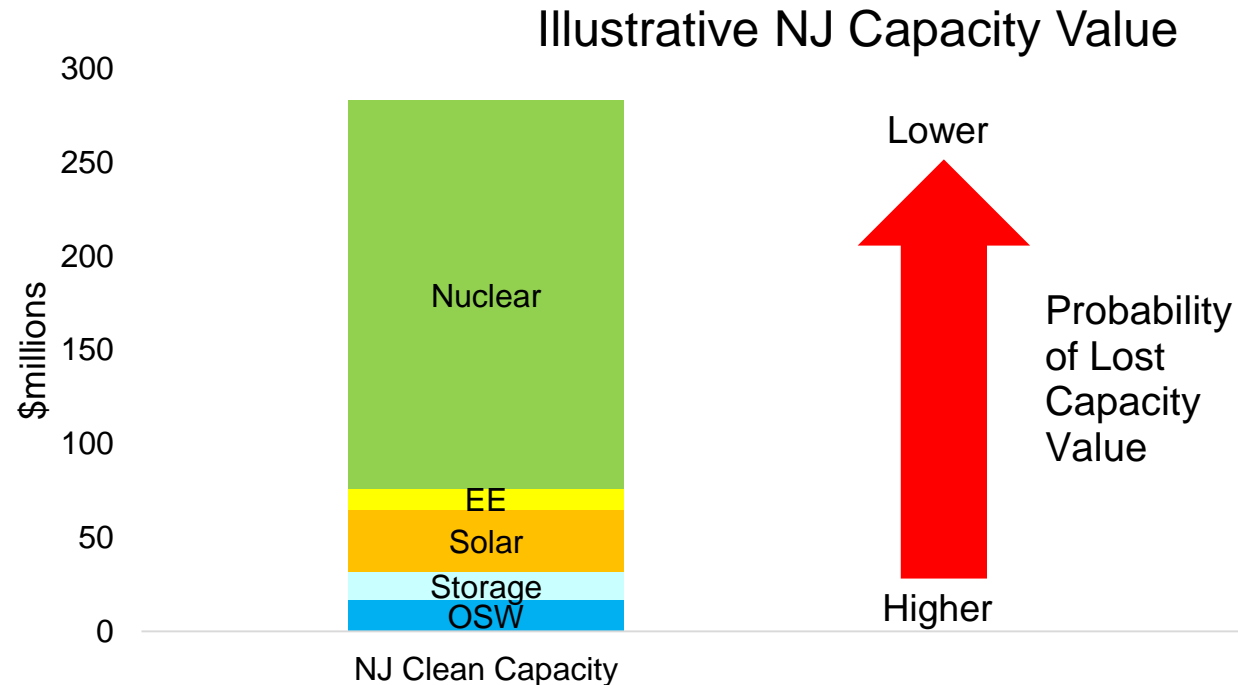
Illustrative Costs With RPM-Derivative Pricing

- Based on these bid caps, the FRR capacity costs are likely to be slightly lower than RPM costs:



FRR Decision

- The primary benefit of the FRR is that it will ensure that New Jersey's zero emissions resources count for capacity and customers don't have to pay twice for that capacity:
 - There is uncertainty about the magnitude of this benefit since it depends on which resources will not clear as the result of the MOPR
 - By further developing an FRR procurement structure, New Jersey will ensure that it preserves the option to utilize FRR in the future



FRR is a Complement to Other Clean Energy Initiatives

- There are other potential approaches for helping New Jersey achieve its clean energy goals
 - Carbon pricing
 - Clean energy standard
 - Emissions standards
- These alternatives alone will not be sufficient to allow New Jersey to meet its goals and implementation will take significant time
- New Jersey should continue to work on these alternatives, but the FRR is the only viable near-term alternative to combat the detrimental impacts of the MOPR

Summary

- The FERC MOPR order presents a challenge to States in meeting their clean energy objectives
- An FRR can help New Jersey meet these objectives and the BPU has the ability to implement an FRR under existing statutory authority
- An FRR can be structured for the JCPL service territory in a manner that:
 - Ensures that New Jersey's supported clean energy resources count for capacity
 - Minimizes costs to customers
- The BPU should continue to develop the details of its preferred FRR structure, so that it preserves the option to utilize FRR in the future