memo

To: NEPOOL Markets Committee

From: David Naughton, Executive Director, Internal Market Monitor (IMM)

Date: January 31, 2024

Subject: IMM Thoughts on a Prompt and Seasonal Capacity Market

The IMM supports the development of a prompt and seasonal capacity market construct as a more cost-effective and efficient means of procuring capacity compared to the current forward market framework. A prompt market will help address the impacts of observed and emerging issues with the forward market construct, particularly inaccuracies due to the uncertainty of auction inputs four plus years ahead of the delivery time — on both the demand and supply side — such as peak load forecasting, supply side deliverability and capacity value accreditation. The benefits of a prompt and seasonal market will only become more pronounced as the grid evolves. In this regard, the shorter re-timing of the capacity auction better aligns with the disparate and uncertain development timelines for new supply, an aging generation fleet that includes potential retiring resources, the uncertain pace of peak load growth, and a reliability risk profile that varies by season.

In its assessment, the Analysis Group identified and discussed a comprehensive list of benefits, costs and tradeoffs between forward, prompt and seasonal capacity auctions.[1] Rather than address all aspects of this evaluation, we focus on the key issues that we find make a compelling case to develop a prompt and seasonal market. Further, while there are still significant design elements to be scoped and much detailed design work to be undertaken, we offer initial high-level input on important design aspects such as price formation, market power mitigation and auction design.

Background: Capacity Market Goals, Forward Procurement and Pricing

A resource will participate in the suite of wholesale markets (energy, ancillary services and capacity) if it expects to recover its going forward costs, including its operating and maintenance costs and a return on capital, over its economic life. Together, these markets are intended to compensate resources for providing system services while also providing efficient entry and exit price signals.

The capacity market is designed to procure sufficient capacity to meet the region's 1-in-10 reliability standard over time in a cost-effective manner. It is the mechanism through which resources can expect to

[1] Analysis Group, "Capacity Market Alternatives for a Decarbonized Grid: Prompt and Seasonal Markets" (January 2024), available at https://www.iso-ne.com/static-assets/documents/100007/a08b_mc_2024_01_09_11_agi_updated_report.pdf

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recover the portion of their going forward costs that are not covered by energy and ancillary services (EAS) revenues. This net going forward cost component, the so-called "missing money", along with a resource's qualified capacity (QC) value, determines capacity offer prices in the forward auction.[2] Resource exit and entry decisions should depend on expectations of revenue sufficiency through market clearing prices, and the decision between a forward or prompt procurement construct should not impact this revenue sufficiency principle.

The current forward capacity process, from qualification to the actual auction, runs roughly 4½ to 3½ years in advance of delivery. A key benefit of the forward design was to provide a price signal and revenue certainty sufficiently in advance to allow prospective developers to contract at a price, deploy capital and develop new projects before the delivery period. The forward price can also provide value to owners of existing resources, particularly to underpin significant maintenance or upgrade expenditures before delivery. Historically, the forward price worked in conjunction with the multi-year rate lock (up to 7 years), which was eliminated beginning with the sixteenth Forward Capacity Auction (FCA 16). This policy provided an administrative mechanism to support capital intensive investment in new projects with long economic lives (e.g. 20 years). Indeed, since FCA 7, 13 new projects with a total capacity of over 4,600 MW cleared with a multi-year rate lock.[3] The elimination of the rate-lock mechanism has likely significantly diminished the importance of the forward price signal for new investment, since now its year-one capacity revenue (compared to up to 7 years) represents a small proportion of overall capacity revenue needs.

Any lost forward price value from moving to a prompt market could be addressed through outside forward contracting arrangements. It may also be important to ensure sufficient forward-looking information is available to inform participant expectations of future prices (e.g. retirements, Net Installed Capacity Requirement (NICR) projections) or assessments regarding capacity adequacy under a range of scenarios. However, retaining this forward price value through an auction construct entails significant market costs due to the uncertain nature of supply and demand side auction inputs and their impact on marginal clearing prices. We provide some observations of recent experience on this issue in the next section.

Uncertainty of Capacity Market Demand and Supply Inputs in a Forward Market

Differences in the NICR values used in each FCA through to the third Annual Reconfiguration Auction (ARA 3) reveal the challenges of forecasting system conditions impacting NICR (peak loads, supply mix) years in advance of the Capacity Commitment Period (CCP). Figure 1 below shows, for six CCPs, the NICR value used for the sloped demand curve in each FCA and the change in NICR in each ARA relative to the FCA. The final ARA (3) runs approximately three months prior to the beginning of the CCP.

[2] Throughout this memo the term "supply offer" is used generally to describe any offer or bid to supply capacity and does not differentiate between new capacity supply offers and de-list bids.
[3] The total only includes generation projects greater than 100 MW.

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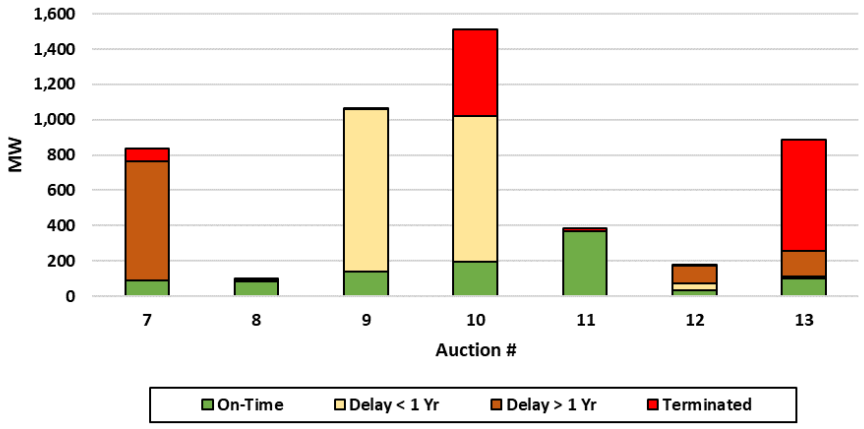
Figure 1: Level and Changes in Net Installed Capacity Requirement for each Capacity Commitment Period

CCP (FCA #)	FCA	ARA1		ARA2		ARA3	
2018-19 (9)	34,189	(306)	-1%	(768)	-2%	(942)	-3%
2019-20 (10)	34,151	(396)	-1%	(744)	-2%	(761)	-2%
2020-21 (11)	34,075	(415)	-1%	(555)	-2%	(1,870)	-5%
2021-22 (12)	33,725	(175)	-1%	(1,495)	-4%	(800)	-2%
2022-23 (13)	33,750	(1,285)	-4%	(985)	-3%	(2,160)	-6%
2023-24 (14)	32,490	490	2%	(1,010)	-3%	(800)	-2%

In all but one of the 18 ARAs, NICR was lower than in the primary forward auction. The differences range from - 2,160 MW to + 490 MW. All else equal, the over-forecasted NICR in the primary auctions results in higher clearing prices and consumer costs.[4]

Delays in new project development impose significant costs and risks, not only for project sponsors, but also for capacity market performance and price formation. After initially clearing in a FCA, a cleared new supply resource is included in the supply stack in subsequent FCAs even if project delays push its operation outside the CCP. These so-called "phantom megawatts" can have the effect of suppressing capacity prices. Figure 2 below provides a breakdown of new generation capacity that cleared in each FCA by the timeframe when it achieved commercial operation.

Figure 2: New Generation Delivery Timing by FCA



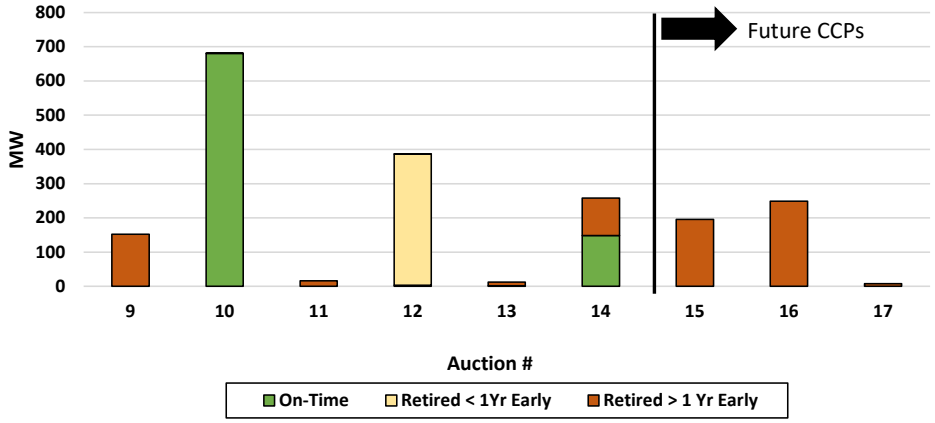
Between June 2016 to May 2023, over a half of all new generation capacity reached commercial operation either on time or within one year (~2,815 MW of a total of 4,650 MW); 20% (1,010 MW), achieved commercial operation on time, while 36% (1,805 MW) were late by less than one year. The

[4] The key point here is the challenge in forecasting NICR years in advance as demonstrated by the forecast error. Updates to NICR can move in either direction due to changes in assumptions and methodological enhancements.

remaining 43% (2,140 MW) experienced significant delays (more than one year), of which 1,220 MW (25%) was ultimately terminated.[5]

Existing generation capacity nearing retirement also has evidenced delivery challenges, in terms of their ability to operate until the FCA delivery period in which the capacity is to be retired. Early exits from the market similarly illustrate the delivery risk for existing resource owners and potential issues with phantom megawatts and price formation, albeit with historically lower volumes than delayed new entry. Figure 3 below provides a breakdown of retired generation capacity in each FCA by the timeframe when it actually retired.

Figure 3: Resource Retirement Timing by FCA



Of approximately 2,000 MW of retired generation capacity, about 40% (830 MW) retired within close proximity (within one month as captured in the "On-Time" series) of the start of the capacity commitment period (CCP) associated with their retirement. The remaining ~60% (1,170 MW) retired more than one month before the CCP; 20% (390 MW) of the total retired between one month and one year sooner ("Retired < 1 Yr Early" series), while 38% (740 MW) retired a year or more sooner than the CCP associated with their retirement ("Retired > 1Yr Early" series).

A Prompt and Seasonal Construct Better Reflects Resource Contributions, Costs and System Needs

In a cost-effective capacity market, forward prices reflect expected spot conditions; auction parameters and supply offers would align with future system conditions upon capacity delivery. In both regards, the FCM has been complicated by late resource entry, early resource retirement, and auction parameters with significant forecast errors.

The ability to accurately capture demand and supply auction inputs will likely become increasingly challenging in the context of an evolving supply mix. New resources have disparate, and sometimes uncertain, development timelines that do not align with the forward procurement timeframe. The development timelines of technologies such as demand response, solar and batteries, which comprise

[5] Megawatt values are rounded to the nearest 10.

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most recent new entry, are generally shorter than the current forward timeline, while offshore wind projects face potential delays beyond the forward period.

The pace and timing of new supply entry will impact the economics and potential exit timing of existing resources. If new entry is delayed, resources who made retirement decisions years in advance may regret having done so should market and system conditions become more favorable for them. Further, by taking on a forward obligation those resources are exposed to delivery risks due to possible equipment failure. The prompt market provides a more effective market mechanism for coordinating resource entry and exit given uncertainty in development timelines.[6]

A prompt market, along with a seasonal component, will also be important to maximizing the benefits of the proposed Resource Capacity Accreditation (RCA) project. First, the determination of the marginal reliability contribution by technology, and each resource's qualified capacity value, will depend on assumptions regarding the supply mix. Second, updates to the planning model approach will quantify reliability risks and resource contributions that differ across the year, particularly during summer and winter peak conditions. A seasonal auction should reflect these variations, and provides a number of efficiency improvements. Resource costs (e.g. winter vs. summer firm gas transportation) and qualified capacity that differ by season will be reflected in capacity offers, while seasonal reliability needs will be captured in NICR values. This should improve price signals and also avoid the over-procurement of capacity in seasons with a lower requirement.

A Prompt Market Construct Should Not Negatively Impact Price Formation

As discussed previously, a resource will participate in the EAS and capacity markets if it expects to recover its going forward costs, including a return on capital, variable and fixed operating and maintenance costs over its lifetime. With expectations regarding EAS market offsets, there should be confidence that the capacity auction has the ability (but cannot guarantee) to generate clearing prices that are sufficient to recover a resource's net going forward costs over time. This revenue sufficiency principle applies in both a forward and a prompt auction construct.

The auction clears at the point where the marginal cost of capacity (aggregated supply curve) equals the marginal reliability benefit (demand curve). The demand curve reflects long-term equilibrium prices needed to incent new entry generation; it is anchored at the 1-in-10 criterion to reflect consumers' willingness to pay a price reflecting the net going forward costs of a proxy new entrant resource (Net CONE). Specifically, Net CONE reflects the year one capacity revenue needed to earn a return on capital employed and recover other going forward costs after EAS offset assumptions. This framework should not fundamentally change in a prompt auction construct.

On the supply side, by virtue of timing, there will be differences in how supply offers are formulated in a prompt auction compared to a 3½ year forward auction. In a prompt timeframe, resources are already operational (or perhaps close to being operational) and a greater portion of their going forward costs, particularly capital, has already been committed (or sunk). Under competitive conditions, participants will

[6] Any requirements to provide advanced retirement notifications will need to be weighed against the benefits of flexible retirement timing should conditions change after notification.

face strong incentives to offer capacity based on their avoidable, or incremental, costs of holding a capacity supply obligation. To what extent this will drive lower supply offer prices and impact clearing prices is difficult to predict, but a number of factors tend to suggest the impact will not be material over time, and that capacity supply offers will more accurately capture net avoidable costs expected during the delivery period:

- We would expect that the amortized cost of capital will be reflected in the year-one offer in a forward auction for both new and existing resources. However, the capital cost is generally not an avoidable cost for subsequent years. Therefore, even under the current forward construct, capital expenditures may not factor into competitive offers for 80% to 95% of a resource's economic life.[7] Year-one capacity market revenues typically comprise a small proportion of overall expected capacity market needs for the economic life of a resource.

- In a prompt/seasonal market, offer prices are likely to more accurately reflect the incremental costs of a CSO, accounting for prevailing energy and ancillary services conditions and expected resource performance.

- The marginal reliability impact accreditation approach to qualifying capacity should also incent resources to make forward fuel arrangements, the net costs of which should be reflected in capacity offer prices. In the forward market, these costs are difficult to predict as fuel procurement typically occurs much closer to delivery. In our experience, the net costs of firm natural gas contracting have not been a major component of supply offers, which should change with a prompt and seasonal auction, combined with marginal accreditation.[8]

- There may be costs in addition to direct avoidable net going forward costs that participants could legitimately reflect in offer prices, and which may vary between a forward and prompt construct. Specifically, the current market rules recognize that offers may reflect risk premiums and opportunity costs, which would need to be supported for supply offer values subject to IMM review.[9]

The Role of Market Power Mitigation in Price Formation

A prompt and seasonal market design is likely to require some significant changes to existing seller-side and buyer-side market power mitigation rules and processes. While it is difficult to scope all necessary changes at this time, we offer some guiding principles and high level considerations to inform any future design work:

- The mitigation measures should minimize interference with open and competitive markets and allow prices to be set by competitive forces to the maximum extent practicable.[10] The mitigation rules therefore should not undermine the market's ability to deliver capacity in a cost-effective

[7] For illustration, the percentage range is based on an economic life range of between 5 years and 20 years.
[8] This observation is based on supply offers subject to the IMM cost review process and potential mitigation.
[9] See Section III.13.1.2.3.2.1. of the ISO-NE Tariff.
[10] Paraphrased from Section III.A.2.4.1 of the ISO-NE Tariff on the purpose of the mitigation functions.

manner, consistent with the goals of the capacity market. The rules and screening thresholds should be proportionate to the ability and incentives of participants to exercise market power.

- When market power is a concern, the mitigation rules should help ensure that offer prices reflect levels that would otherwise be expected in a competitive market and therefore should positively impact price formation and market confidence for both producers and consumers.

- The mitigation process will likely need to be more condensed and efficient in order to ensure that offer prices are current, and don't become stale between the time of the IMM review process and the auction, which could otherwise undermine the benefits of a prompt market.

- The mitigation process should be as transparent as possible. This should include rules and/or guidance on resource costs that would be allowed by the IMM in capacity market offers, and costs that would not be permitted (sunk costs). Guidance will also be important on the allocation of annual and seasonal costs in resource offers.[11]

- The market power mitigation rules regarding resource retirements will also require assessment and will depend on a number of important design considerations, including on whether the retirement process will reside outside the auction process, whether participants will continue to have the ability to price retirements (conditional retirements), and whether a resource can return to the capacity market after it has retired.

Other major design considerations

A prompt market should not increase the possibility and market risk of out-of-market capacity retentions that would distort market outcomes. Under a prompt procurement timeframe, the solution space for addressing reliability issues becomes constrained; there may be limited time and scope for transmission solutions or a market response to capacity exits. Therefore, it is likely beneficial for the retirement process to commence well in advance of the prompt timeframe, with details to be developed regarding notification timing, irrevocability of the notification, market power assessments, and auction treatment.

Lastly, while the design scope of a prompt and seasonal auction will include consideration of serially or simultaneously run auctions, it also presents an opportunity to review the current hybrid auction design, which comprises features of both a descending clock and sealed bid auction. In particular, in a prompt construct the investment decision in a new capital project has already been made, and the theoretical benefits of a descending-clock auction for new capacity resources may no longer be applicable. Therefore, it is worth exploring a single auction format and how this will work in the context of serially or simultaneously-run auctions.

[11] The cost allocation issue is somewhat similar to the allocation of common (or shared) avoidable costs across multiple resources in the stations. See Section III.13.1.2.3.1.6. of the ISO-NE Tariff.

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