October 2, 2020

VIA ELECTRONIC MAIL

Ms. Aida Camacho-Welch
Secretary of the Board
New Jersey Board of Public Utilities
44 South Clinton Avenue
Trenton, NJ 08625
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Re: Post-Technical Conference Comments of PSEG

Investigation of Resource Adequacy Alternatives
BPU Docket No. EO20030203

Dear Secretary Camacho-Welch,

PSEG respectfully submits these post-technical conference comments regarding the presentations made at the New Jersey Board of Public Utilities' ("Board") technical conference held on September 18, 2020 in this matter. These comments expand upon PSEG's presentation and address comments made by other panelists during the technical conference.

I. Background and Introduction

New Jersey is facing a significant roadblock to the achievement of its clean energy goals due to recent federal energy policy decisions. In particular, the Federal Energy Regulatory Commission's ("FERC") expansion of the minimum offer price rule ("MOPR") imposing price floors in PJM Interconnection, L.L.C.'s ("PJM") Reliability Pricing Model ("RPM") capacity auctions on many clean energy resources receiving state support will force customers in those states to bear significant levels of unnecessary costs. Customers will, effectively, be compelled to "double pay" for capacity for those clean energy resources unable to clear in RPM because of the price floors. In addition, overall market prices will be higher. As shown in our previously submitted comments and as expanded upon below, the low end of the range of impacts just from the double payments is estimated to be in the neighborhood of $65 million per year in 2025 and to increase steadily from there.

The only means available to New Jersey permitted under the PJM Open Access Transmission Tariff ("Tariff") for addressing the impacts of the expanded MOPR is to form a "Fixed Resource Requirement Alternative" ("FRR") service area within the State – a service area that procures its capacity needs outside of RPM. This requires an election by the state regulatory

agency for the entire state or by a load serving entity for a smaller area metered by PJM– such as the service territory of an Electric Distribution Company ("EDC") – for a period of five years. The FRR Entity is required to provide PJM with an FRR Plan demonstrating that it owns or has acquired sufficient capacity, consistent with PJM reliability standards, to meet the applicable resource adequacy requirements. However, it is up to the FRR Entity (and the state commission that exercises oversight over the FRR Entity) to determine how the necessary capacity resources are procured.[1]

In earlier comments, PSEG suggested an approach for integrating existing New Jersey clean energy programs with an FRR procurement. This was the only comprehensive FRR capacity procurement approach provided by any party in this proceeding. As shown in those comments, an integration of the clean energy programs with the FRR procurement could provide a way of addressing the double payment issue and assuring that supported clean energy resources receive the correct level of funding. But as those comments acknowledged, this approach would require changes to existing New Jersey law. Thus, in the interest of time, we have chosen to focus instead on approaches that are within the Board's existing authority to address.

As numerous parties, including PSEG, stated during the technical conference and in comments filed previously, there are a number of FRR procurement approaches available to the State.[2] PSEG's representative outlined a FRR procurement mechanism, designated as "RPM Derivative Pricing," that could be adopted by the Board under its existing statutory authority. We showed that utilizing RPM Derivative Pricing for an FRR service area consisting of the Jersey Central Power & Light ("JCP&L") service area would be highly competitive and would be expected to yield price outcomes very consistent with RPM pricing. These comments expand upon PSEG's explanation of how RPM Derivative Pricing would work. These comments also provide another procurement option that would be within the Board's existing authority to adopt, designated here as "Sealed Bid Marginal Pricing." These comments also detail the sources of the Board's legal authority and how these approaches would be consistent with retail open access in New Jersey.

Two of the most heavily debated issues associated with FRR procurement during the technical conference were cost and the potential for the exercise of market power by suppliers. Panelists such as the Independent Market Monitor for PJM ("IMM") and PJM Power Providers Group ("P3") alleged that an FRR will impose millions of dollars – or even hundreds of millions of dollars – of additional costs on customers. However, it is clear that they are assuming that the Board acts foolishly in designing an FRR. While PSEG is well aware that any potential market power concerns need to be addressed, a well-designed FRR need not be rife with invitations to exercise market power. To the contrary, PSEG is confident that the State can choose an FRR

[1] The basic elements associated with forming an FRR service area are discussed in our earlier comments and will not be repeated here. *See Joint Comments of PSEG and Exelon Generation Company, LLC,* Investigation of Resource Adequacy Alternatives, BPU Docket No. EO20030203, at pp. 10-19 (dated May 20, 2020).

[2] *See, e.g., Initial Comments of Public Interest Organizations Regarding Resource Adequacy Alternatives*, Investigation of Resource Adequacy Alternatives, BPU Docket No. EO20030203 (dated May 20, 2020); *JCP&L Reply Comments*, Investigation of Resource Adequacy Alternatives, BPU Docket No. EO20030203 (dated June 24, 2020).

procurement approach that would be resistant to any attempt to exercise market power. Further, in order to be doubly sure, the Board should adopt measures to ensure that it has robust oversight.

Another topic discussed at the technical conference was whether an FRR is needed at all. For example, the IMM, P3 and the New Jersey Division of Rate Counsel ("Rate Counsel") claimed that the MOPR will have minimal impacts on New Jersey customers.[3] They did, however, acknowledge that offshore wind will be affected but claim that nothing else will change. They suggest that New Jersey take a wait-and-see approach and hope that FERC changes course. But this complacency is not justified, particularly given that there is no indication that FERC intends to change any of its MOPR-related decisions. The known and probable impacts are substantial and the time to act is now.

First, the "double payment" impact on the 1,100 MW offshore wind project approved by the Board, by itself, is not trivial as the IMM, P3 and Rate Counsel imply. The impact calculated by the IMM is around $17 million a year, resulting in $85 million of lost value for New Jersey customers over the five-year FRR service area term. Second, other resource types are clearly at risk. At a minimum, new energy storage projects and new solar are at a high risk of failing to clear under the MOPR based on PJM's calculations.[4] Further, the MOPR could affect energy efficiency's ability to receive capacity revenues. Counting the reasonably foreseeable impacts, and assuming that New Jersey adheres to its clean energy implementation goals, the double payment would be about $65 million in the first year, and would increase each year, resulting in $577 million total impact over the course of a five-year FRR deployment.[5] There is also a risk that other clean energy resources could be affected by the expanded MOPR further out in the future. The MOPR impacts we have identified are considered to be the low end of the potential range and, in fact, could be much higher.

Last, what has been completely unacknowledged by proponents of a do-nothing approach is that the MOPR expansion was *designed* to raise prices.[6] Leaving aside the double payment impact of the MOPR expansion, it is also evident that preventing perfectly good capacity resources from participating in RPM will lead to higher clearing prices in RPM. Formation of an FRR mitigates this impact.

Underscoring all of these impacts is the fact that a series of delayed RPM auctions will soon be upon us and will occur in quick succession. As shown during the presentations at the technical conference, auctions covering three delivery periods going out to May 2025 could occur over the next 20 months.[7] The Board has a limited amount of time to get an FRR in place before

[3] Note – values assume an impact on only the first tranche of offshore wind. As additional tranches come online, these costs increase proportionally.

[4] PJM Interconnection, L.L.C., Docket Nos. EL19-58-003, *et al*., *Informational Filing With Indicative Values for Energy and Ancillary Services Offset* (submitted August 19, 2020).

[5] *See infra*, Section V, "Capacity Value of NJ-supported Non-nuclear Resources."

[6] *See Investigation of Resource Adequacy Alternatives Technical Conference, Final Slide Presentation*, at Slide 16 (September 18, 2020) (information prepared by The Brattle Group noting that MOPR was originally intended to address manipulative price suppression, and showing that MOPR requires certain resources to offer at higher prices), https://www.nj.gov/bpu/pdf/Sep18RA_Tech_Conf_PPT_FINAL.pdf.

[7] *Id*. at Slide 60.

experiencing most of the negative impacts of the MOPR expansion on New Jersey. We therefore encourage the Board to act promptly.

Other criticisms leveled by certain parties are just red herrings. The IMM claims any FRR structure will affect the level of Zero Emission Certificate ("ZEC") payments. This is simply untrue as the RPM Derivative Pricing and Sealed Bid Marginal Pricing models demonstrate. P3's claim that New Jersey could never transition out of an FRR if one was adopted is also false. This claim is completely unfounded and is belied by the fact that previous FRR areas in PJM have, in fact, transitioned to RPM participation.[8]

Finally, it is clear from the technical conference comments on panels 2 and 3 that other approaches for achieving New Jersey's clean energy goals such as a Clean Energy Standard ("CES"), carbon pricing or more stringent generation unit emission standards have significant merit and should continue to be explored. But it was apparent that these alternatives, alone, would not achieve New Jersey's plans for new clean energy resource development. Panelists also broadly recognized that more work needs to be done before those approaches could be successfully implemented in New Jersey. At best, full implementation will be years into the future and may include adoption of multiple approaches that could involve both capacity and energy market changes. Accordingly, New Jersey cannot avoid addressing the impact of the expanded MOPR simply by ignoring it; it has to confront the MOPR impacts head-on. The only the tool realistically available to do that in a timely manner is the FRR.

II. The Board Has The Authority to Form FRR Service Areas Under Existing Law

At the technical conference, PSEG explained that the Board has the power under existing law to direct EDCs subject to its jurisdiction to participate in the FRR. Other parties disagreed, however a step-by-step exposition of the controlling statutes, as well as consideration of the policies underlying the Board's mandate, show that the Board does currently have the power to order the creation of an FRR service area.

As a starting point in analyzing the Board's authority to form an FRR service area within New Jersey, it is useful to revisit PSEG's comments to "demystify" the FRR at the technical conference. As discussed there, at its core, an FRR is nothing more than a procurement mechanism to secure sufficient capacity resources to meet PJM's resource adequacy requirements. PJM has imposed resource adequacy requirements on its members since at least the late 1960s and, accordingly, New Jersey EDCs performed this function for many years. In fact, before RPM came into existence in 2007, all the Load Serving Entities ("LSEs") in PJM either owned or procured capacity bilaterally to meet their capacity obligations to PJM without a centralized capacity auction. There was an active bilateral market used by many LSEs for that purpose and LSEs routinely purchased capacity when needed to cover their positions.

By the same token, state public utility regulatory bodies, including the Board, regularly exercised oversight of the manner in which the EDCs under their jurisdiction performed these

[8] *See, e.g.,* PJM Interconnection, L.L.C., *Early Termination of Duke Energy Ohio, Inc. Election of FRR Alternative* (December 20, 2011), https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/pjm-response-to-duke-ohio-early-frr-alternative-termination.ashx?la=en.

procurement activities. For example, the Board has disallowed certain deferred balances based on "Staff's f[inding] [that] the cost of the Company's energy and capacity purchases obtained via a combination of forward contracts and residual PJM purchases [were] excessive, as compared to buying all of the same energy and capacity from PJM."[9] Nothing has occurred to eliminate or diminish the Board's oversight authority. Given that the formation of an FRR service area is essentially a procurement mechanism, it should not come as a surprise to anyone that the Board has the power to order that one be created when in the public interest to do so.

The basic jurisdictional grant to the Board is the directive to provide "safe, adequate and proper service." N.J.S.A. 48:2-23. As the Board noted in its order initiating this proceeding, the case law has consistently held that this grant – coupled with other provisions of the Board's governing statute – confers extremely broad authority.[10] As stated in In Re Jersey Cent. Power & Light Co., 150 P.U.R.4th 207 (Mar. 4, 1994), a case in which the Board exercised jurisdiction over a power purchase agreement with a non-utility generator that included capacity sales:

> [W]e note that it is well settled that the Board has been granted expansive jurisdiction, supervision, regulation and control over all public utilities. N.J.S.A. 48:2-13. This broad grant of jurisdiction extends beyond jurisdiction over the property rights of a utility. N.J.S.A. 48:2-25 provides that the Board is empowered to fix just and reasonable standards and practices to be imposed, observed and followed by a utility. 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.[11]

Under this authority, to serve the public interest, the Board can direct EDCs to procure energy and power to serve their customers and, in particular, can require that they do so consistently with market conditions. *See* In Re Jersey Cent. Power & Light Co., 154 P.U.R.4th 431 (N.J.B.P.U July 29, 1994) (Board finding "that future transactions [for energy and capacity] can best be assessed if they are subject to some type of market test. Under current bulk power market conditions, without such a test, it will be difficult if not impossible to reliably determine whether ratepayers are receiving the best possible price for equivalent power"); In Re Proposed Supply Side Procurement Procedures, Docket No. EX94120578, Dec. 21, 1994 (N.J.B.P.U.) (Board imposing "market test" on certain EDC activities including decisions to enter into long-term power contracts); In Re Proposed Supply Side Procurement Procedures, No. EX94120578, 1995 WL

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[9] In Re Jersey Cent. Power & Light Co., No. EO02070417, 2003 WL 21961993 (N.J.B.P.U. Aug. 1, 2003).

[10] In the Matter of BPU Investigation of Resource Adequacy Alternatives, No. EO20030203, 2020 WL 1902995 (N.J.B.P.U. March 27, 2020) ("The courts have long recognized that the Board has broad regulatory authority under Title 48. The Board has the authority to initiate an investigation into '*any matter* concerning *any public utility*.'" N.J.S.A. 48:2-19(a) (emphasis added)").

[11] Regarding the Board's generally expansive authority, *see also,* Natixis Financial Products, LLC v. Public Service Electric and Gas Co., 2014 WL 1691647, Case No. 2:13-cv-07076 (D.N.J. 2014) (finding that the Board "clearly has expansive jurisdiction and regulatory power over utilities" and citing the Supreme Court of New Jersey's determination in Matter of Valley Road Sewerage Co., 154 N.J. 224, 235 (N.J. 1998) that"[t]he New Jersey Legislature has vested the BPU with general supervision and regulation of and jurisdiction and control over all public utilities ... and their property, property rights, equipment, facilities and franchises so far as may be necessary for the purpose of carrying out the provisions of Title 48 of the New Jersey Statutes.").

387804 (June 14, 1995) (Board determining that certain "short-to-medium energy/capacity . . . agreements" resulting from an RFP held by JCP&L met the Board's market test requirements and thus could be recovered through rates).

Further, under the facts present here, requiring that an EDC form an FRR and procure electric power in a manner determined by the Board would clearly serve the public interest. Because of the expanded MOPR, the lack of an FRR within the state will inevitably result in higher costs to New Jersey customers as well as impede the ability of the Board to achieve its environmental objectives.[12] Formation of an FRR can eliminate the risk of "double payments" for capacity supplied by state-supported resources and prevent generally higher capacity prices that could occur if state-supported resources were to be effectively removed from the supply stack.

Second, nothing in the Electric Discount and Energy Competition Act ("EDECA") prevents the Board from exercising this authority. First, the formation of an FRR service area would be consistent with retail open access. The FRR construct allows a "third party supplier" ("TPS") with customers in an FRR service area to procure capacity and energy entirely separate from any involvement by the EDC. The PJM Tariff expressly permits a TPS to procure capacity on its own and then provide that capacity to the FRR Entity for inclusion in the FRR Entity's FRR Plan submittal to PJM. Accordingly, the formation of an FRR would not prevent a TPS from procuring capacity independently from the FRR Entity though a bilateral purchase.

Further, even if the TPS does not elect to procure capacity independently, EDECA defines "electric generation service" as the provision of bundled capacity and energy to retail customers. *See* N.J.S.A. § 48:3-51. This definition is satisfied under the FRR even when the EDC has procured the entire zonal capacity requirement and the TPS compensates the EDC for the capacity used by the TPS's customers. Because the TPS remains fully responsible for developing, pricing and administering a bundled energy/capacity service offering for the retail customer, both the letter and the spirit of the statute are met. The TPS not only can provide unique bundled service offerings to its customers as envisioned by EDECA but also retains full responsibility for direct customer interactions with respect to advertising, contract practices, billings and collections. Further, commercially, the procurement of capacity by an EDC under an FRR arrangement will have no different impact on how TPS's develop and price bundled capacity/energy services than when capacity prices are determined under RPM. In both cases, the capacity price is determined though a procurement conducted by a third party, i.e., PJM in the case of RPM and the EDC in the case of the FRR, and is treated as a fixed cost or market benchmark by market participants.[13]

An FRR can also be formed consistently with the provisions of EDECA that govern default service, i.e., BGS. EDECA requires that BGS be provided to customers not choosing a TPS, or

[12] Additional authority is supplied by N.J.S.A. 48:2-13 which confers power on the Board over the "production of electricity . . . to assure the reliability of electricity . . . supply to retail customers in the State as prescribed by the board." The formation of an FRR service area will help support resources receiving state support for their environmental attributes many of which are located within New Jersey and thus help provide reliable service to New Jersey retail customers.

[13] Although not the usual practice, some TPSs may obtain capacity through bilateral contracts with prices different than RPM pricing outcomes. To the extent that it does occur, as discussed above, this option will remain available under an FRR regime.

terminating their relationship with a TPS, "at prices consistent with market conditions." N.J.S.A. § 48:3-57. The current BGS procurement process consists of a declining clock auction in which participants bid on full requirements service to customers not being serviced by TPSs. To reduce volatility, BGS auctions are held annually, in early February, for one-third of the non-switching EDC load over the next three PJM "Delivery Years," with the most immediate Delivery Year commencing on June 1st of the same year in which a particular BGS auction is held.[14] Under this schedule, the RPM prices for all three Delivery Years covered by the three-year BGS procurement typically will be known when the auction is held. For prospective BGS suppliers, the capacity price that will underlie full requirements BGS service is known at the time of the auction.

An FRR procurement can be designed to be fully compatible with this structure. Consistent with Board previous orders imposing a "market test" on energy and capacity purchases,[15] an FRR procurement can be designed to utilize market forces and yield outcomes that are "consistent with market conditions." PSEG believes that there are several potential procurement approaches that would employ market forces and would lead to competitive outcomes. We discuss options for competitive procurements later in these comments. In addition, creation of FRR service areas – with separate capacity pricing – would not disrupt the current BGS auction process. To meet PJM tariff requirements for an FRR, an EDC will have to complete its procurement at least a month before the RPM auction for the corresponding Delivery Year. Accordingly, as is the case with RPM capacity prices, BGS bidders for load within an FRR service area will know the market price for capacity in that area at the time the BGS auction is held and thus can incorporate that knowledge into bids just as they do at present.

III. Competitive FRR Procurement Mechanisms

At the technical conference, PSEG noted that there were many possibilities for a competitive FRR procurement. However, some approaches will pose more implementation issues and thus require more administrative oversight than others. In evaluating competitiveness, it is necessary to take into account both market design and actual market conditions. Some potential approaches that we believe are worthy of further analysis are described below.

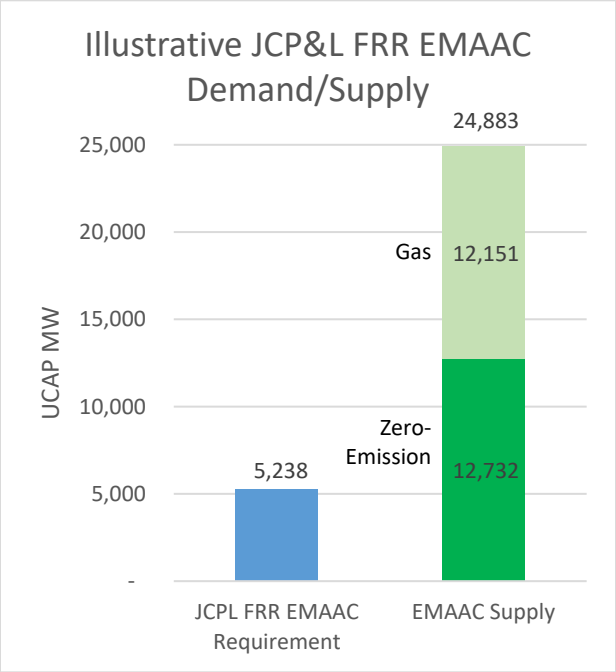
A. Designating the JCP&L Zone as the Initial FRR Service Area Addresses MOPR Impact Concerns While Providing a Sound Foundation For Competitive Outcomes

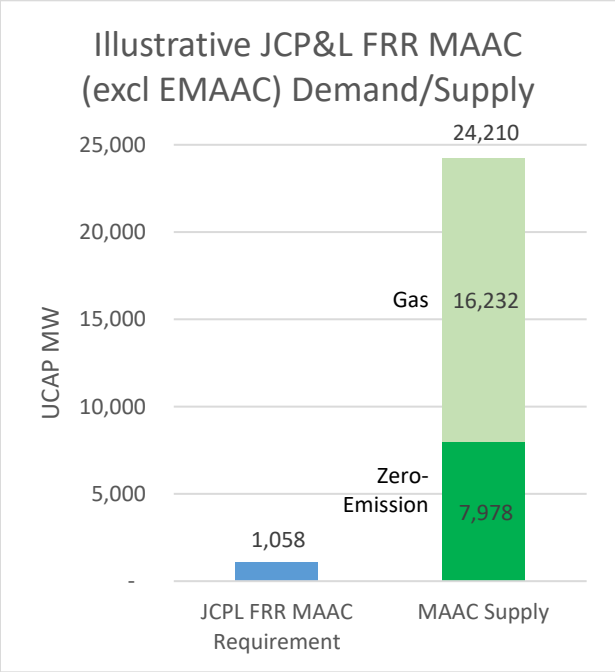
[14] Of course, this is not currently the case due to delays in RPM auctions resulting from FERC's actions expanding the MOPR. Over time, however, it is expected that RPM auctions will return to a normal schedule.

[15] *See* In Re Jersey Cent. Power & Light Co., 154 P.U.R.4th 431 (N.J.B.P.U. July 29, 1994) (Board finding "that future transactions [for energy and capacity] can best be assessed if they are subject to some type of market test. Under current bulk power market conditions, without such a test, it will be difficult if not impossible to reliably determine whether ratepayers are receiving the best possible price for equivalent power"); In Re Proposed Supply Side Procurement Procedures, Docket No. EX94120578, Dec. 21, 1994 (N.J.B.P.U.) (Board imposing "market test" on certain EDC activities including decisions to enter into long-term power contracts); In Re Proposed Supply Side Procurement Procedures, No. EX94120578, 1995 WL 387804 (June 14, 1995) (Board determining that certain "short-to-medium energy/capacity . . . agreements" resulting from an RFP held by JCP&L met the Board's market test requirements and thus could be recovered through rates.).

The market conditions facing an FRR procurement in New Jersey will largely be a function of the size and location of the FRR service area. PSEG has analyzed which EDC zones would provide the best fit as an FRR service area for New Jersey to achieve its clean energy goals in a cost-effective manner. Our conclusion was that the JCP&L Zone is the best choice. It is large enough to consume all clean energy resources currently supported by the state's goals at least through the end of the decade. This allows the state to have an FRR zone of sufficient size to provide a safety net for all state-supported resources affected by the MOPR while gaining experience with administering an FRR that does not cover the entire state.

More importantly, use of the JCP&L Zone would strongly militate against any exercise of market power. The JCP&L Zone is not internally constrained and can reliably procure capacity from two large PJM capacity zones - MAAC and EMAAC. Specifically, based on reliability factors in PJM's previous analyses, the JCP&L Zone can reliably acquire about 17% of needed capacity resources from MAAC with the remaining 83% coming from EMAAC. If all non-coal resources are allowed to participate in the FRR procurement, about 24,000 MWs could compete for the MAAC component and about 25,000 MWs could compete for the EMAAC component.





The only other EDC zone of sufficient size to accommodate all state-supported resources affected by the MOPR would be the PSE&G Zone. While an FRR for the PSE&G Zone could certainly be devised, it would pose the additional complication of needing to address potential market power concerns in capacity zones – the PSEG Zone and the PSEG North Zone – that have been constrained in some past RPM auctions.

The Board also could consider a statewide FRR but this would entail even more complications. Not only would such a procurement have to address the potentially constrained PSEG and PSEG North Zones, but the size of a full state procurement could create additional market power concerns due to its sheer volume. Choosing the JCP&L Zone as the first FRR

service area in the State would avoid these complications and, if and when additional FRR service territories are needed in the future, particular issues associated with forming the additional FRR service areas could be addressed.

B. The Board Should Consider Multiple Alternatives For A Competitive FRR Procurement Mechanism

In addition to considering whether a particular FRR service area will be conducive to achieving robust competitive outcomes, it is necessary to select a procurement design that can take advantage of those competitive conditions and that will provide safeguards to address any lingering market power concerns. PSEG believes that there are multiple options for the Board and its consultants to consider. We provided one option, an integrated FRR approach, in our earlier comments. Below, we discuss two additional options and some possible variations of those options.

a. The RPM Derivative Pricing Proposal Would Allow Competition To Occur and Would Result in Similar Outcomes As RPM

PSEG outlined one viable approach at the conference called "RPM Derivative Pricing." Under this approach, suppliers would submit bids as a percentage of the clearing prices in the upcoming PJM BRA for the same Delivery Year. The auction would have "tiers" of resources that would be filled up sequentially for each locational delivery area eligible to supply the FRR service area. Higher priority tiers would be cleared completely from the lowest to the highest bid before going to the next tier until the entire desired quantity of capacity is procured. Winning bidders would receive the price they bid as derived from the subsequent BRA. Further, they would be committed to providing capacity consistent with all PJM requirements and would be responsible for any penalties imposed by PJM for performance that did not meet PJM's standards.[16]

The highest priority tier would be for New Jersey supported clean energy resources. Bidders participating in this tier could submit supply offers up to 100% of the eventual BRA clearing price in the PJM "Locational Deliverability Area" ("LDA") in which they are located. The bid cap should be set at 100% of the subsequently determined RPM clearing price because the reason for forming the FRR procurement is to provide an option for state-supported resources that may not clear under the expanded MOPR. While bidding into the FRR is voluntary, resources that face this risk should not need any additional incentives to participate in the FRR procurement beyond being enabled to be paid for their capacity value consistent with other capacity resources.

The second tier could consist of other clean energy resources not eligible to participate in Tier 1. These resources could be permitted to bid up to 105% of the eventual BRA clearing price in the LDA in which the resource is located, to provide an incentive to take an FRR obligation in lieu of clearing in RPM. Although we believe that the first two tiers would likely be sufficient to cover all of JCP&L's requirements, resulting in a zone whose capacity needs are met entirely by clean energy resources, a third tier could consist of gas-fired resources also permitted to bid up to

[16] As noted in previous comments, JCP&L as the FRR Entity could opt to have performance under PJM Capacity Performance rules evaluated over its entire FRR portfolio of resources. This would reduce the likelihood of there being Capacity Performance penalties but would not eliminate that possibility entirely.

a fixed percentage (e.g., 105%) of the eventual BRA clearing price.[17] This would further expand the quantity of available resources to assure that the needs of the FRR service area are met.[18]

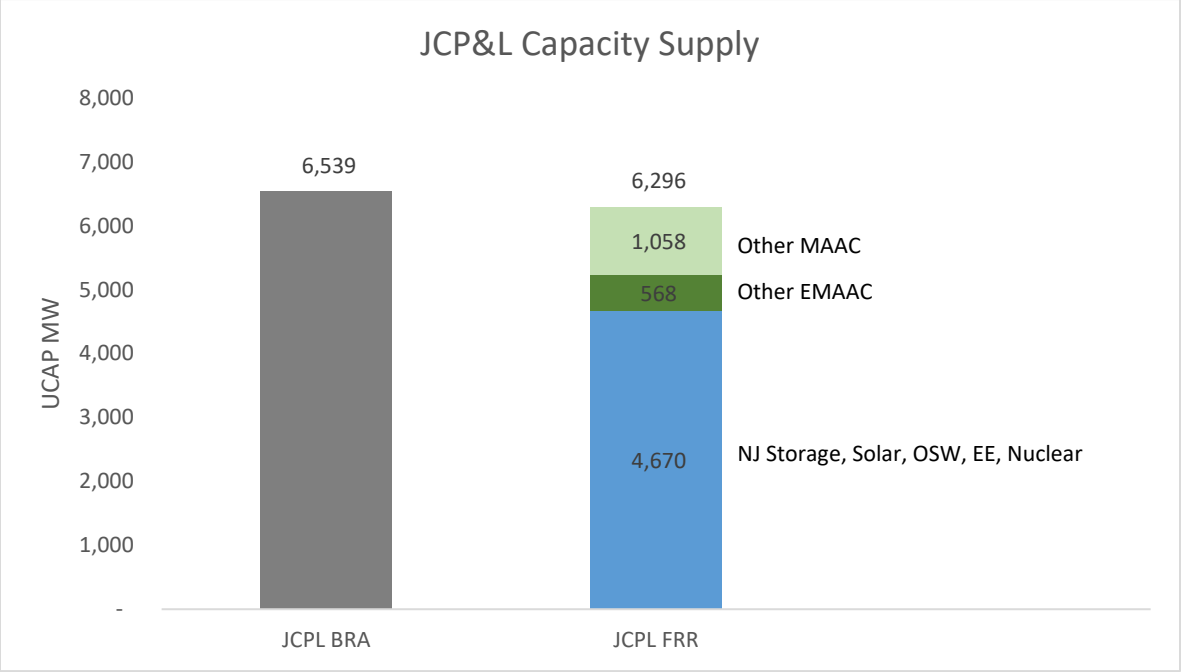
An illustrative procurement for the JCP&L Zone would as follows:

Tier 1 bids: 4,670 MWs in EMAAC consisting of solar, storage, offshore wind, energy efficiency and nuclear units receiving support payments from New Jersey environmental programs; all resources bid at 100% of Delivery Year BRA price.

Tier 2 bids: 568 MWs (EMAAC) and 1,058 MWs (MAAC) of other clean resources that do not receive New Jersey support payments

Tier 3 bids: Any remaining MWs not met in Tier 2 of gas-fired resources.

The chart below illustrates the expected outcome for this type of procurement:



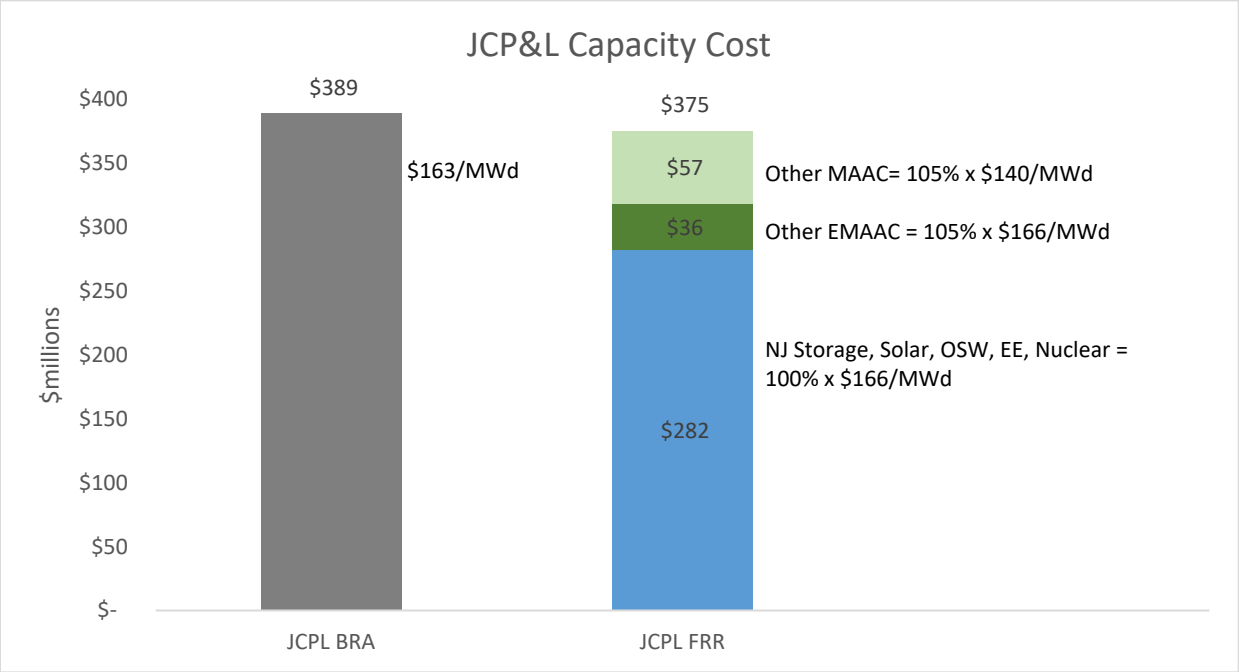
[17] Given the level of supply needed versus the available capacity, coupled with the incentives for supplying capacity to the FRR service area under this approach, the likelihood that sufficient capacity will not be acquired is extremely low. Nonetheless, as a precautionary measure, the FRR Entity should have the power to obtain necessary capacity bilaterally subject to BPU approval (or alternatively by increasing the bid cap for the third tier). This is similar to how the BGS procurement works: if the BGS auction manager determines that there is insufficient participant interest in a prospective BGS auction to ensure a competitive outcome, it cuts back the size of the auction procurement to a level that does; the affected EDC is then responsible for obtaining the necessary BGS services bilaterally. Further, in the extremely unlikely event that the EDC had to take on this responsibility, to the extent that the overall costs of the procurement exceeded the costs that the FRR service area would have paid under RPM, the Board would have the ability to recover the excess through a statewide charge under the societal benefits clause. *See* discussion in text *infra*.

[18] A possible variation of this approach would be to have only two tiers: Tier 1 consisting of state-supported resources and Tier 2 consisting of *both* clean resources and gas-fired resources. This structure likely would yield lower overall costs but would be less supportive of clean energy development.

This design would harness competitive forces because it would permit a large number of generators in MAAC and EMAAC to bid on a comparatively small amount of load in the JCP&L Zone. In addition, New Jersey supported units would be incentivized to bid into the FRR if they perceived a risk in clearing in RPM. These factors would result in a market design that is very resistant to any exercise of market power. Capacity pricing outcomes therefore would likely be similar to clearing prices in RPM.

In addition, because bids are based on the outcome of the RPM procurement which is subject to PJM mitigation rules and oversight of the PJM IMM, this design effectively incorporates PJM's market power mitigation regime. Further, as an added layer of protection to consumers, the procurement should be conducted by an independent auction manager and the BPU should have an opportunity to review the results and to approve the outcome. This would be similar to how BGS auctions are conducted.

This procurement design should yield results that are similar to RPM. Although some clearing prices, i.e., Tiers 2 and 3, could be higher than RPM outcomes, savings would be realized because a JCP&L FRR service area would be able to procure less capacity than it would under RPM.[19]



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[19] *See Joint Comments of PSEG and Exelon Generation Company, LLC*, Investigation of Resource Adequacy Alternatives, BPU Docket No. EO20030203, at p.19 and the NorthBridge Group report attached thereto at pp. 7-8, 10 (dated June 24, 2020).

[20] In terms of the values in this chart, $163/MW-d is the actual 2021/2022 Zonal Net Load Price for the JCP&L Zone. PJM calculates this value and it is net of the Capacity Transfer Rights ("CTRs"), which reflect the value of the import capability from lower priced regions. The MAAC and EMAAC Zone BRA clearing prices of $140 and $166 are the prices paid to generators in these zones. The blended FRR price is based on PJM's minimum locational requirements for a JCP&L FRR.

Finally, to the extent that the FRR procurement resulted in higher capacity charges to JCP&L customers than they would have paid had JCP&L continued to participate in RPM[21] – which is unlikely – the Board would have the authority to keep JCP&L customers whole by collecting any excess charges through the societal benefits clause ("SBC") from all distribution customers. The amount that could be reasonably collected in this manner should be more than sufficient to address any conceivable possibility of need. This is further explained below.

EDECA authorizes the Board, in consultation with the Department of Environmental Protection, to develop and fund through the SBC, *inter alia*, programs to foster energy efficiency and Class 1 renewables. *See* N.J.S.A. § 48:3-60. Class 1 renewable include solar and wind resources. The formation of an FRR should qualify as a "Clean Energy Program" as it would provide support to energy efficiency, solar resources and wind resources, including offshore wind resources.

First, the FRR would qualify as a Clean Energy Program by creating an income stream for any new State supported energy efficiency, solar or wind resources that would be prevented from clearing in RPM as capacity. Obviously, without the capacity income stream, more state support would be needed. Second, the formation of an FRR Entity also supports solar and wind because it can be used to reduce the Capacity Performance penalty risk to intermittent resources that accept a capacity commitment, as an FRR Entity may elect to have compliance with Capacity Performance requirements evaluated based on the performance of its entire portfolio. This would support not only new solar and wind resources that might be affected by the MOPR but it would also help solar and wind resources not subject to MOPR but unwilling to take on a capacity commitment due to the Capacity Performance risk. The level of funding that the FRR would receive as a Clean Energy Program could be based on a percentage of the capacity value of affected energy efficiency, solar and wind resources. At a minimum, this would include the 1,100 MW offshore wind project already approved by the Board as well as new grid solar projects.

b. A Sealed Bid Marginal Pricing Approach Could Also Yield Competitive Outcomes But Would Be More Likely to Deviate From RPM Prices

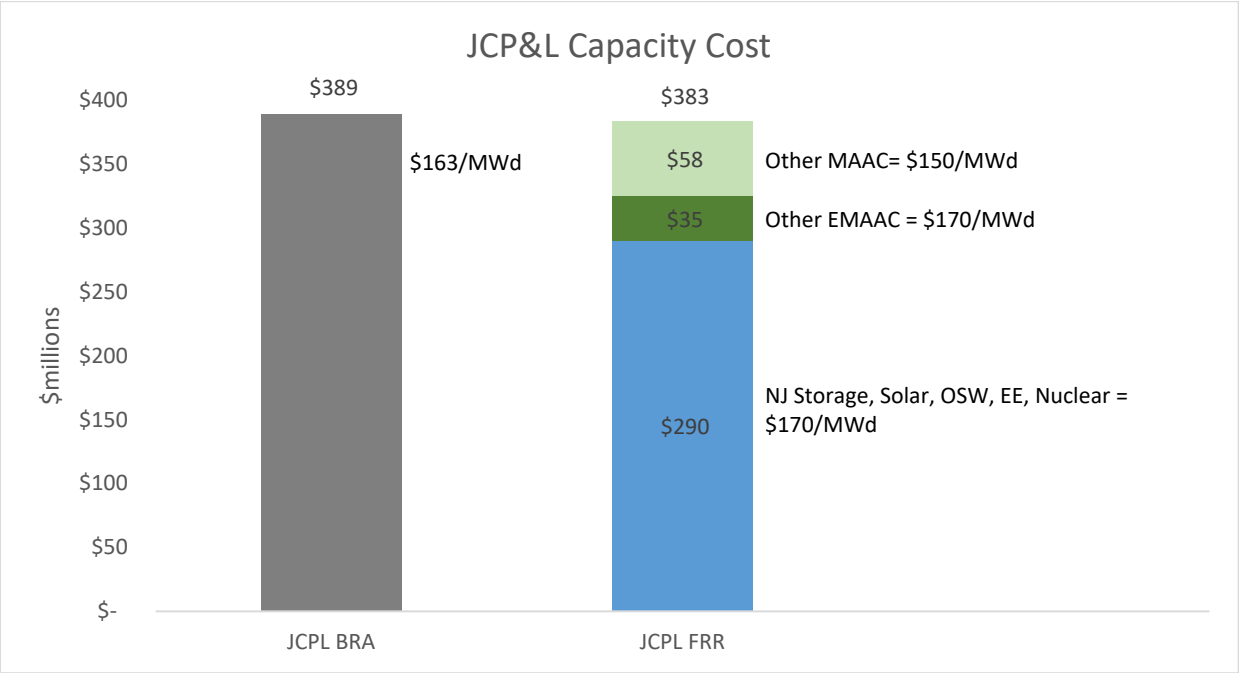
Another potential approach for the Board to consider is the "Sealed Bid Marginal Pricing" approach. This approach envisions a single clearing price auction in which eligible suppliers would submit bids at the price in which they are willing to supply capacity. All non-coal resources that meet the PJM locational requirements to supply the selected FRR service area could participate. If the JCP&L Zone is selected, the auction manager would create two bid stacks – one bid stack for MAAC and another for EMAAC. Resources would be selected from each bid stack starting with the lowest priced offers and moving up to higher priced offers until sufficient resources are obtained.[22] Under this approach, all resources in a particular PJM LDA would

[21] This would be calculated by multiplying the ultimate PJM clearing prices in MAAC and EMAAC, in the appropriate shares, times the zonal quantity that would have been allocated to Load Serving Entities in the JCP&L Zone under RPM. Notably, this quantity will be greater than the amount of capacity that JCP&L would acquire under the FRR alternative because of the impact of the downward sloping demand curve used in RPM.

[22] A potential refinement would be to consider whether a unit priced above the marginal unit should be allowed to set price if the overall cost to customers would be lower. This could happen for example, when the marginal unit is large

receive the same price based on the marginal clearing unit. Resources that may not clear in RPM under the expanded MOPR would likely bid as price takers to ensure that they receive a capacity commitment. But the marginal unit setting the clearing price for a given LDA would be expected to be a unit that could clear in RPM.

An illustrative clearing outcome for this approach in the JCP&L Zone would be as follows.



[23]

Under this approach, bidders that are not subject to the MOPR would be incentivized to submit offers near their expected RPM outcomes. In general, because units not affected by the MOPR would set prices for all resources, it would be reasonable to anticipate that FRR prices would generally track RPM prices over time. However, because bidders could not exactly predict RPM prices in advance of the auction and because there would not be an express tie to RPM prices as is the case under RPM Derivative Pricing, FRR clearing prices could be higher or lower than RPM clearing prices. Depending on the auction year, this price disparity could be significant. However, the capacity price should still be considered to be a market price for the zone under the provisions of EDECA because it would be the competitive price benchmark for *all* suppliers serving retail customers in that zone – both TPSs and BGS suppliers.[24]

compared to the quantity needed to reach the target supply level. In that case, a smaller but slightly higher priced offer might result in a lower overall cost of the procurement than clearing the lower priced but larger unit.

[23] In terms of the values in this chart, $163/MW-d is the actual 2021/2022 Zonal Net Load Price for the JCP&L Zone. PJM calculates this value and it is net of the Capacity Transfer Rights ("CTRs"), which reflect the value of the import capability from lower priced regions. The MAAC and EMAAC Zone BRA clearing prices of $150 and $170 are the prices paid to generators in these zones based on bids that reflect their expectations of RPM clearing prices. The blended FRR price is based on PJM's minimum locational requirements for a JCP&L FRR.

[24] While consideration could be given to including a true-up mechanism to keep charges to JCP&L customers consistent with RPM prices, treating the FRR as a Clean Energy Program in recognition of its support for Class 1

For the same reasons discussed *supra* regarding the RPM Derivative Pricing, no market power concerns should be associated with this type of procurement, which covers only the JCP&L Zone. This is because a large volume of resources are available to serve a relatively small need. Nonetheless, as suggested for RPM Derivative Pricing, added layers of protection to consumers should be included, in particular, the procurement should be conducted by an independent auction manager and the Board should have an opportunity to review the results and to approve the outcome.

c. Contracts Longer Than a Year Could Be Considered

Contracts with a duration longer than one year for meeting FRR requirements could also be considered and could be added as a feature either to RPM Derivative Pricing or to Sealed Bid Marginal Pricing. Longer term contracts would be desirable from the standpoint of providing certainty to bidders[25] who, in turn, would then be willing to accept lower prices. This feature, however, would complicate the clearing process and increase the risk that customers in the FRR service area were paying prices different (higher or lower) than customers in other EDC zones.

IV. A Properly Designed FRR Procurement Would be Resistant to Market Power

Certain panel members, notably IMM, P3 and Rate Counsel, argued that an FRR would allow generators to exercise market power, which would result in hundreds of millions of dollar per year in excessive costs on customers. But these sensationalistic claims do not bear even rudimentary analysis. In fact, the outcomes these panelists described could only occur if the Board abdicated its responsibilities and adopted inefficient procurement mechanisms.[26]

PSEG showed earlier in these comments that selecting the JCP&L Zone as the FRR service area and utilizing efficient procurement options will lead to competitive outcomes because a large volume of resources would be available to serve a relatively small load. Further, the Board could design the procurement in a way that harnesses competitive forces and provides sufficient

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renewables and energy efficiency might not be sufficient to serve this purpose. Because in particular years, Sealed Bid Marginal Pricing could vary significantly, the benefit provided by the FRR to Class 1 renewables and energy efficiency might not provide adequate funding to accomplish the true-up. In addition, because prices could be significantly lower in some Delivery Years, there would need to be some way to provide credits to other EDC zones when that occurred.

[25] Under the RPM Derivative Pricing approach, additional price certainty could be achieved by guaranteeing winning resources that their payments would not be affected by retroactive revisions to RPM clearing prices associated with legal challenges for the term of the commitment. Under Sealed Bid Marginal Pricing, long-term contracts could have negotiated prices for a specified term.

[26] PSEG's and Exelon Generations joint comments recounted many of the errors in the IMM's studies purporting to show significant market power concerns that they claim will result in high costs to consumers. Without recounting all of these criticisms in detail here, PSEG notes the following highlights: (1) the IMM analysis employs an "apples to oranges" comparison that contrasts past RPM outcomes with a projection of outcomes under an FRR; (2) the IMM analysis incorrectly assumes New Jersey would not take advantage of lower cost capacity outside of EMAAC; (3) the IMM analysis assumes in a number of scenarios that an FRR entity would be willing to pay for capacity at prices as high as the offer caps in the PJM capacity auction – prices that would be much higher than competitive outcomes in the PJM capacity auction. *See Joint Comments of PSEG and Exelon Generation Company, LLC,* Investigation of Resource Adequacy Alternatives, BPU Docket No. EO20030203, at pp. 6-7 (dated May 20, 2020).

incentives for eligible resources to participate. We describe below three widely recognized metrics that support this conclusion.[27]

As discussed in John Morris' affidavit, if the procurement is designed to allow gas-fired and clean resources to participate – as RPM Derivative Pricing and Sealed Bid Marginal Pricing contemplate – the procurement for the JCP&L Zone would not raise market power concerns under: (1) the Herfindahl-Hirschman Index ("HHI") analysis; (2) under a traditional pivotal supplier analysis; (3) and under the "Three Pivotal Supplier" analysis used by the IMM. The HHI analysis shows that the combined MAAC and EMAAC LDAs (this would be the MAAC LDA if EMAAC did not separate) has an HHI of 1,117 and that the EMAAC LDA has an HHI of 1,475. Under the Department of Justice Merger Guidelines, values below 1,500 are considered to be unconcentrated and both of these values are below that level.[28] Further, the Department of Justice also has used the HHI value of 2,500 to determine which markets were workably competitive and where competition would be likely to drive prices to levels at or below those achieved by regulation.[29] This values are well below that level by even larger margin.

Screening for potential pivotal suppliers does not raise market power concerns either. The purpose of screening for whether any supplier is pivotal is to determine whether a single supplier (or under the TPS test whether any combination of three suppliers) has a sufficient share of the market to be necessary for the market to clear. As shown in Dr. Morris's affidavit, no supplier, or even a combination of three suppliers, is pivotal.

Finally, IMM, P3 and the Rate Counsel assume that the Board will not exercise its oversight responsibilities. But as suggested *supra*, similar to the process used for approval of BGS results, the Board and its consultants could review FRR procurement outcomes and could identify any concerns.

V. The Complacency of the IMM, P3 and Rate Counsel Regarding the Impact of the Expanded MOPR is Unjustified and Irresponsible

The IMM, P3 and Rate Counsel each contend that the expanded MOPR is largely a non-issue for New Jersey because it would only affect offshore wind projects. This complacency is not justified and would needlessly expose New Jersey consumers to unnecessary costs and risks. First, the impact on offshore wind costs that they acknowledge will occur are, even standing alone, not inconsiderable. According to the IMM, double payment impacts associated with the offshore wind project already approved by the Board would be about $17 million per year or about $85 million over the term of a five-year FRR.

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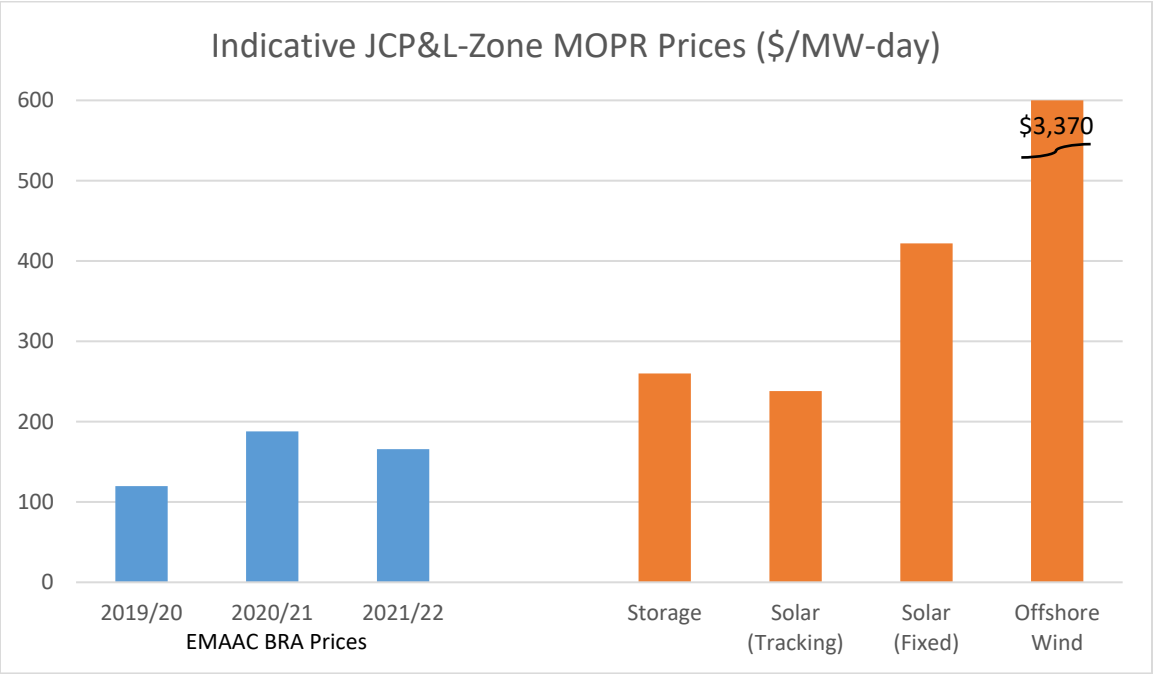
[27] The IMM also claimed at the technical conference that any FRR procurement mechanism would affect the Zero Emission Certificate ("ZEC") program for at-risk nuclear plants serving the state, insinuating that the level of ZECs would be increased. This assertion is completely unsupported. RPM Derivative Pricing and Sealed Bid Marginal Pricing are both clear counter-examples. These procurement models have no impact on ZEC payments and, as explained elsewhere, could be designed to result in clearing prices similar to RPM outcomes.

[28] *See* Morris Affidavit, p. 4, *citing* "Horizontal Merger Guidelines," August 19, 2010, Section 5.3 (https://www.justice.gov/atr/horizontal-merger-guidelines-08192010#5c).

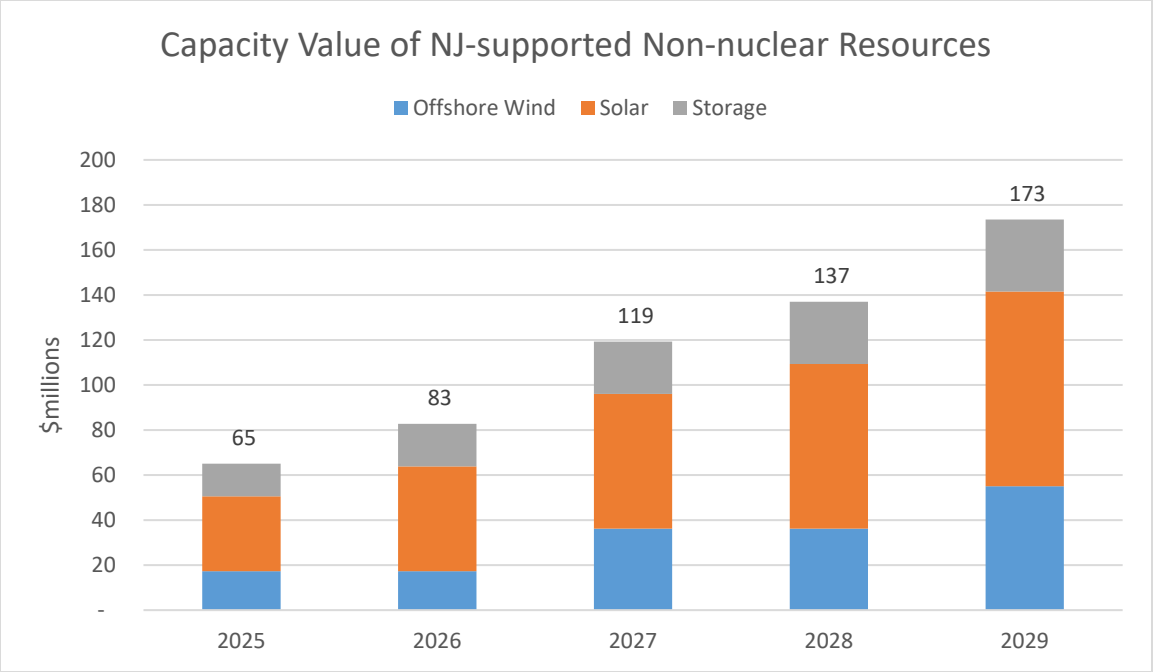
[29] *See* Morris Affidavit, p. 4, *citing* "Oil Pipeline Deregulation: Report of the U.S. Department of Justice," May 1986 (https://www.ferc.gov/sites/default/files/2020-06/doj-report.pdf).

Second, these critics fail to take account of the risk to other resource types, namely storage, new solar projects and potentially Energy Efficiency development. Below are PJM's estimates of offer floors under the expanded MOPR for these resource types:



As shown here, PJM's projected offer floors are higher than historical RPM clearing levels for EMAAC in recent years. It would be foolish to assume – as the IMM, P3 and Rate Counsel apparently do – that these resource types will not be impacted. Indeed, the IMM and P3 have been the most vocal advocates for FERC's expansion of the MOPR to "protect" PJM's capacity market. If these parties believe that state-supported resources will not be materially impacted, then it is far from clear why they have spent considerable resources over the past five years advocating for a strong MOPR.

Further, the impact for non-clearing resources is clearly significant. As shown below the double counting impact for the non-nuclear resources would be about $65 million in the first year, and would increase each year, resulting in a $577 million total for a five-year FRR as renewable resources grow over time (assuming an EMAAC capacity price equal to 2021/22). These impacts are depicted below:



Third, without an FRR, overall prices will be higher as Brattle indicated because, effectively, the expanded MOPR removes resources from the bid stack that would be expected to clear. While PSEG has not attempted to determine this impact quantitatively, we note that the expanded MOPR was designed to have this impact.

Non-nuclear New Jersey-supported resources that are impacted by the expanded MOPR are expected to total roughly 1,000 UCAP MWs by 2025. Without the MOPR, these resources would likely bid low into the BRA as a price taker, but the MOPR will effectively keep them out of RPM. In 2018, PJM completed a Scenario Analysis of the 2020/21 BRA that included a recalculation of BRA clearing prices assuming that 3,000 MW of MAAC capacity (including 1,626 MW of EMAAC capacity) was added to the supply stack.[30] PJM also ran a scenario with 3,000 MW removed from MAAC (including 1,626 MW removed from EMAAC). The results of those scenarios are reported in Table 1 below. They suggest that, although future RPM prices may be higher or lower than historic levels, all things being equal, the MOPR impact on New Jersey resources will cause the EMAAC price to be $10-20/MW-day higher than it would have been without the MOPR.

[30] *See* 2021-2022 BRA Scenario – PJM, available at: (https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2021-2022/2021-2022-bra-scenario-analysis.ashx?la=en).

Table 1

PJM Scenario	EMAAC Price Difference	EMAAC Price Difference per 1000 EMAAC MW
Add 3,000 MW MAAC Incl. 1,626 MW EMAAC	($16.83/MW-day)	($10.35/MW-day)
Remove 3,000 MW MAAC Incl. 1.626 MW EMAAC	$34.31.MW-day	$21.10/MW-day

Using the value of $10/MW-day as a benchmark, the impact on New Jersey for a single year for EMAAC purchases would be about $60 million/year in higher prices.[31]

Finally, the timing of upcoming RPM makeup auctions underscores the need for the Board not to just sit back and hope for favorable developments at FERC. The presentations showed that a series of RPM auctions are expected to be held in quick succession. Although the exact timeline is uncertain, the possibility that three auctions covering a period out to May 2025 will be held in the next 20 months is reasonable. It is critical that the Board not just wait for FERC to change its mind or for the courts to require FERC to modify its direction when the impacts of the expanded MOPR are real and are looming.

VI. There Is No Basis For the Claim that An FRR Service Area Could Not Transition Back to RPM Pricing If Circumstances Changed

P3's representative claimed that once an FRR service area was formed in New Jersey, it would not be possible to transition back to participation in RPM if future circumstances changed. This is patently untrue. As discussed *supra*, the formation of an FRR is nothing more than a mechanism that allows an LSE to use its own capacity or to contractually procure capacity from qualified capacity resources to meet load serving entity's resource adequacy requirements. While the election to become an FRR service area is for five years, at the end of the five-year period nothing would prevent the FRR service area from returning to PJM pricing. In fact, there are examples of parts of PJM that were at one point in time FRR service areas but now participate in RPM.[32]

Further, the FRR capacity procurement mechanisms suggested for study by PSEG in these comments could be limited to yearly commitments. In that case, an FRR service area that wished to transition back to RPM could switch without having to account for contractual commitments that extended beyond the term of the FRR. In addition, assuming that MOPR rules changed and no longer prevented state-supported resources from clearing, long-term contracts for those

[31] $10/MW-day (impact on EMAAC prices) times 20,000 MW (NJ capacity requirements) times 365 times 83% (level of EMAAC share of NJ capacity in last BRA) equals $60,590,000.

[32] *See, e.g.*, PJM Interconnection, L.L.C., *Early Termination of Duke Energy Ohio, Inc. Election of FRR Alternative* (December 20, 2011), https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/pjm-response-to-duke-ohio-early-frr-alternative-termination.ashx?la=en.

resources entered into by the FRR Entity would still not be problematic. In those circumstances, even if the FRR Entity's contracts extended beyond the term of the FRR, the PJM market rules would allow the company simply to bid the capacity secured under the contract into an RPM auction as a price taker and the capacity would then qualify as a RPM capacity resource.

VII. Work Should Continue on Multiple Fronts for Achieving New Jersey's Clean Energy Goals But the Formation of An FRR Service Area Is a Necessary Complement to New Jersey's Current Clean Energy Initiatives.

The presentations on panels 2 and 3 identified other potential approaches for helping New Jersey achieve its clean energy goals. These approaches include a CES, carbon pricing and the application of more stringent emission standards on New Jersey generators. In fact, PSEG has been a supporter of a national carbon pricing standard for more than two decades. But it was also apparent that these alternatives alone would not achieve New Jersey's plans for new clean energy resource development within the State. For example, it is not realistic that carbon pricing measures will be set high enough to support offshore wind development, at least until offshore wind development costs decrease significantly.

Further, it was clear from the panel discussion that widespread implementation of these options will not occur anytime soon. There was no disagreement among the participants in those panels that a lot of work needs to be done before these approaches can be fully implemented. This includes, for example:

- Analyzing how PJM's market design could impact implementation of these other approaches.[33]
- Exploring complex issues regarding leakage. As just one example, a panelist noted that under carbon pricing (unless applied across a very wide scope), there may be a tendency for increased leakage as carbon prices increase.[34]
- Reviewing the extent to which more intermittent resources on the supply side requires demand to play a more active role.[35]
- Addressing interconnection costs and timelines that may impact the availability of new resources to connect to the grid when and where they are needed.[36]

Discussions need to occur not only among constituencies within New Jersey but with other constituencies throughout the entire PJM footprint.

New Jersey cannot avoid addressing the impact of the expanded MOPR simply by waiting for another market solution. It must confront the MOPR impacts head-on, and the only tool realistically available to address the MOPR is the FRR option.

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[33] *See, e.g.*, Comments by Mason Emnett of Exelon Corporation, Casey Roberts of Sierra Club, and Ray DePillo of PSEG during panel 3.
[34] *See, e.g.*, Comments by Steven Corneli on behalf of the New Jersey Conservation Foundation during panel 3.
[35] *See, e.g.*, Comments by Travis Kavula of NRG Energy, Inc. during panel 2.
[36] *See, e.g.*, Comments by Scott Weiner of SAW Associates LLC and Katie Guerry of Enel North America during panel 2.

PSEG respectfully requests that the Board consider its comments.

We look forward to working with the Board and its consultant as a resource as the investigation proceeds.

Very truly yours,

Kenneth R. Carretta

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STATE OF NEW JERSEY

BOARD OF PUBLIC UTILITIES

Investigation of Resource Adequacy Alternatives	))))	BPU Docket No. EO20030203

Affidavit of
Dr. John R. Morris

October 2, 2020

I. Introduction

1. My name is Dr. John R. Morris. I am a Principal at Economists Incorporated, an economic consulting firm located at 2121 K Street, NW, Washington, DC 20037. I received a bachelor's degree from Georgetown University, and I received master's and doctorate degrees in economics from the University of Washington. I have taught economics at the University of Washington, Indiana University, and at Stanford University's "Stanford in Washington" program. I have been studying and consulting in the energy industries since joining the Federal Trade Commission (FTC) in 1985. Since joining Economists Incorporated in 1992, I have consulted on many mergers involving electric and gas companies, examined competitive issues relating to rates, and studied market power issues in state restructuring proceedings. I have published articles on competition and computer simulation models for the electric power industry, and I have spoken on numerous occasions concerning competition in natural gas, electric power, and other industries. I have previously been accepted as an expert witness on energy matters before this Board, other state commissions, the Federal Energy Regulatory Commission, and in federal court. A more detailed description of my qualifications is attached as Exhibit No. JRM-1

2. Counsel for PSEG asked that I conduct a market power study for potential capacity supplies for the JCPL Zone if JCPL were to procure capacity and satisfy PJM Interconnection, L.L.C. (PJM) capacity requirements via a Fixed Resource Requirement Alternative (FRR).

3. I find that no supplier would have unilateral market power and no reasonable collective group of suppliers would have market power. One basis for this

conclusion is that the Herfindahl-Hirschman Index, or HHI, indicates that the suppliers are unconcentrated, which is usually sufficient to conclude that the market is competitive and no further analysis is need. I also conducted a pivotal supplier test and a three pivotal supplier test, which are two other indicia of market power used to study electric power markets. I find that no single supplier is pivotal and no group of three suppliers combined would be pivotal. These tests indicate that no single supplier would have market power and no reasonable group of suppliers would have market power. Combined, all three tests provide persuasive evidence that market power would not be a concern for competitive procurement of capacity for the JCPL FRR if one limits supply options to gas-fired and clean (carbon-free) energy.

4. The remainder of this Affidavit is organized as follows: Section II discusses the methodology that I used to assess the potential for market power in the supply of clean and gas-fired generation capacity for the JCPL Zone; Section III discusses results for my market power assessments; and Section IV provides a conclusion.

II. Market Power Analyses

5. I performed a market power assessment for a plan in which the JCPL Zone would adopt a capacity requirement that would satisfy PJM standards for the FRR alternative to participating in the PJM capacity auctions in which all the capacity would either produce carbon-free energy or be natural gas-fired generation.

6. For generation data, I used derated capacities from our EI Energy databases. I included units that are currently operating and not expected to be retired by 2022 and new units currently under construction. Thermal units are derated for forced outages based upon NERC Generation Availability Data System (GADS)

category, and intermittent units are scaled down based on summer peak operating conditions. Pumped storage units are rated at 90 percent of their capacity. Although these values will not exactly match the unforced capacity (UCAP) values for PJM capacity auctions, they closely approximate UCAP for our calculations. I aggregate up to the holding company level for the analysis. This is conservative because some companies have capacity both under the control of a regulated utility and under merchant control, and it may not be possible to effectively coordinate those offers in a manner that is profit-maximizing for the holding company. Per standard practice in energy markets, small wind and solar facilities (25 MW and less) are considered under the control of their host utility. The analysis does not include planned resources that are not yet under construction.

7. My market power assessments consider supplies from two regions. First, it is my understand that of the 6,296 MW FRR for JCPL, 5,238 MW would need to be supplied from the EMAAC Locational Deliverability Area, or LDA, including the smaller LDAs within EMAAC. Therefore, I examine the ability to supply 5,238 MW of capacity to JCPL from EMAAC. Second, the remaining capacity would be sourced from elsewhere in the MAAC LDA. Therefore, I also examine the ability to supply 6,296 MW from MAAC.

8. I examined three measures of potential market power. First, I examine the HHI measure of market concentration. The HHI equals the sum of the suppliers' market shares. For example, a market with four suppliers having shares of 40, 30, 20, and 10 percent should have an HHI of 3,000, which equals $40^2 + 30^2 + 20^2 + 10^2$ or 1,600 + 900 + 400 + 100. Under the Horizontal Merger Guidelines, markets with a post-transaction HHI less than 1,500 are unconcentrated and

presumed competitive.[1] The U.S. Department of Justice also used the HHI value of 2,500 to determine which markets were workably competitive and where competition would be likely to drive prices to levels at or below those achieved by regulation when examining the potential for deregulating oil pipeline transportation markets.[2]

9. Second, I examined whether any supplier is pivotal in the two regions, EMAAC and MAAC. A pivotal supplier is one whose output is necessary to meet the demand or reliability obligation in an area. In electric power markets, some believe that being pivotal is an indication of market power. For example, the Federal Energy Regulatory Commission requires applicants for market-based rates outside of regional transmission organizations to perform a pivotal supplier test for wholesale markets. In the current case, the question is whether a supplier would be necessary to fulfill the JCPL FRR as opposed to being needed to fulfill resource obligations in the entire region.

10. Third, I also examined whether the three largest suppliers in EMAAC and MAAC would jointly be necessary to supply the JCPL Zone with capacity. This is known as a three pivotal supplier test.[3] This is not a generally recognized test of market power. However, the Independent Market Monitor of PJM utilizes the test in a number of its market power screens, and therefore, I also examined it for this matter.

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1 *See* Horizontal Merger Guidelines, August 19, 2010, Section 5.3 (https://www.justice.gov/atr/horizontal-merger-guidelines-08192010#5c).

2 Oil Pipeline Deregulation: Report of the U.S. Department of Justice, May 1986 (https://www.ferc.gov/sites/default/files/2020-06/doj-report.pdf).

3 To be more precise, the three pivotal supplier test assesses each supplier combined with the two largest other suppliers. But if the three largest suppliers pass the test, then every supplier passes the test.

III. Results

11. All three assessments that I performed indicate that market power would not exist for supplying capacity to fulfill JCPL FRR.

12. Table 1 shows the suppliers, their shares, and the HHI for EMAAC. The HHI level is 1,475, which is an unconcentrated market under the Horizontal Merger Guidelines. This level of market concentration is consistent with a workably competitive market that would produce competitive market outcomes.

Table 1 — EMAAC Gas-Fired and Clean Unforced Capacity Available for JCPL FRR

Holding Company	Unforced Capacity (MW)	Share (%)
Public Service Enterprise Group	7,285	28.5
Exelon Corp	5,434	21.3
Energy Capital Partners	2,562	10.0
Dominion Resources Inc	1,172	4.6
Starwood Capital Group Global	1,065	4.2
Essential Power LLC	1,053	4.1
Morgan Stanley	875	3.4
West Deptford Energy LLC	815	3.2
Competitive Power Ventures Inc	663	2.6
Energy Investors Funds Group	649	2.5
GenOn Energy, Inc.	534	2.1
Vistra Energy Corp	512	2.0
Riverstone Holdings LLC	470	1.8
LS Power Group	377	1.5
NextEra Energy Inc	259	1.0
Other	1,817	7.1
HHI	**1,475**	

Sources: EI, 2022-2023-rpm-resource-model.xlsx

13. Table 2 shows the suppliers, their shares, and the HHI for MAAC. The HHI level is 1,117, which is also an unconcentrated market under the Horizontal Merger Guidelines. The HHI for gas-fired and clean generation capacity in MAAC is consistent with a workably competitive market area in which I would expect competitive market outcomes.

Table 2 — MAAC Gas-Fired and Clean Unforced Capacity Available for JCPL FRR

Holding Company	Unforced Capacity (MW)	Share (%)
Exelon Corp	8,428	21.3
Public Service Enterprise Group	7,285	18.4
Riverstone Holdings LLC	5,010	12.6
Energy Capital Partners	3,632	9.2
Panda Energy Intl Inc	1,457	3.7
Competitive Power Ventures Inc	1,350	3.4
Dominion Resources Inc	1,241	3.1
Starwood Capital Group Global	1,065	2.7
Essential Power LLC	1,053	2.7
LS Power Group	1,043	2.6
Vistra Energy Corp	953	2.4
Morgan Stanley	875	2.2
West Deptford Energy LLC	815	2.1
GenOn Energy, Inc.	798	2.0
Platinum Equity	718	1.8
Other	3,936	9.9
HHI	**1,117**	

Sources: EI, 2022-2023-rpm-resource-model.xlsx

14. Table 1 and Table 2 allow me to conduct the pivotal supplier tests. The total unforced gas-fired and clean generation in EMAAC, excluding the largest supplier, is 18,257 MW. This is substantially greater than the JCPL FRR that must come from EMAAC of 5,238 MW. Therefore, no supplier in EMAAC is pivotal for supplying JCPL. The total unforced gas-fired and clean generation in MAAC, excluding the largest supplier, is 31,231 MW. This is substantially greater than the JCPL FRR that must come from within MAAC of 6,296 MW. Therefore, no supplier in MAAC is pivotal for supplying JCPL FRR—even when limiting suppliers to those with clean and gas-fired generation.

15. Table 1 and Table 2 also allow me to conduct the three pivotal supplier tests. The total unforced gas-fired and clean generation in EMAAC, excluding the three largest suppliers, is 10,261 MW. This is substantially greater than the JCPL FRR that must come from EMAAC of 5,238 MW. Therefore, no

reasonable group of suppliers in EMAAC is pivotal for supplying JCPL—even when limiting suppliers to those with clean and gas-fired generation. The total unforced gas-fired and clean generation in MAAC, excluding the three largest suppliers, is 18,936 MW. This is substantially greater than the JCPL FRR that must come from within MAAC of 6,296 MW. Therefore, no group of suppliers in MAAC is pivotal for supplying the JCPL FRR.

IV. Conclusion

16. I have conducted three market power screens, and none of those screens suggested that any entity unilaterally or collectively would exercise market power in supplying capacity for the JCPL FRR.

17. This concludes my Affidavit.

STATE OF NEW JERSEY

BOARD OF PUBLIC UTILITIES

Investigation of Resource Adequacy Alternatives	)	BPU Docket No. EO20030203

I depose and state under penalty of perjury that the foregoing Affidavit was prepared or assembled by me or under my direction, that I have read the foregoing, and that the foregoing is true and correct to the best of my information, knowledge, and belief.

Executed on this 2nd day of October 2020.

John R. Morris, Ph.D.
Principal
Economists Incorporated

Subscribed and sworn before me this 2nd day of October 2020.

Notary Public, State of Maryland

KRISTIN HARVEY NOTARY PUBLIC EXP July 9, 2021 ANNE ARUNDEL COUNTY, MD

KRISTIN C HARVEY
NOTARY PUBLIC
ANNE ARUNDEL COUNTY
MARYLAND
MY COMMISSION EXPIRES JULY 09, 2021

EXPERIENCE AND QUALIFICATIONS OF

Dr. John R. Morris

OVERVIEW	Dr. Morris, a recognized expert in studying competition in energy industries, currently is a Principal at Economists Incorporated. He began his research of competition in energy industries in 1985 while working for the Federal Trade Commission. Since joining Economists Incorporated in 1992, he has consulted on many mergers and acquisitions involving energy companies, examined competitive issues relating to rates, and studied issues in state restructuring proceedings. He has published articles on competition and energy matters, and he has spoken on numerous occasions concerning competition in natural gas, electric power and other industries. He has been accepted as an expert witness on energy matters before the Federal Energy Regulatory Commission, state regulatory commissions, and in federal court.
EDUCATION	Ph.D., University of Washington, August 1985 Dissertation: *Intellectual Property: Creating, Pricing, Copying* • M.A., University of Washington, December 1983 • A.B., Georgetown University, May 1981
PRESENT POSITION	Dr. Morris is a *Principal* at Economists Incorporated, an economic consulting firm located at 2121 K Street, NW, Suite 1100, Washington, DC 20037. (202-223-4700) Economists Incorporated studies competition and regulation in many industries in the United States and in other countries. It is a leading firm in studying the competitive effects of mergers and acquisitions.
PREVIOUS EXPERIENCE	*Senior Vice President*, Economists Incorporated, December 2001 – December 2002 • *Vice President*, Economists Incorporated, December 1995 – December 2001 • *Senior Economist*, Economists Incorporated, June 1992 – December 1995 • *Economic Tutorial Leader*, Stanford University (Stanford in Washington), April 1993 – June 1995 • *Visiting Assistant Professor*, Department of Business Economics and Public Policy, School of Business, Indiana University, September 1991 – May 1992 • *Assistant to the Director for Antitrust*, Bureau of Economics, Federal Trade Commission, November 1989 – August 1991 • *Economic Advisor*, Office of Commissioner Machol, Federal Trade Commission, December 1988 – October 1989 • *Economist*, Division of Antitrust, Bureau of Economics, Federal Trade Commission, October 1985 – December 1988
MEMBERSHIPS	Member, International Association of Energy Economics • Associate, Energy Bar Association • Member, American Economic Association • Member, Western Economic Association International • Associate, American Bar Association
AWARDS & HONORS	*Award for Excellence in Law Enforcement*, Federal Trade Commission, 1988 • Graduate School Scholarship, University of Washington, 1984 • Graduated Cum Laude Georgetown University, 1981 • Senior Comprehensive Passed with Distinction, Georgetown University, 1981

TESTIMONY BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION

Affidavit, Energy Texas, Inc., EC20-85-000 (2020) • Affidavit, Tampa Electric Company, ER10-1437-011 (2020) • Affidavits, American Transmission System, Inc., Docket No. ER20-1740-000 (2020) • Affidavits, NRG Wholesale Generation LP and Entergy Mississippi, LLC Docket No. EC19-63-000 (2019) • Affidavits, Louisville Gas and Electric Co. and Kentucky Utilities Co., Docket Nos. EC98-2-001, ER18-2162-000 (2018) • Affidavit, Upper Peninsula Power Company, Docket No. ER10-1901-011 (2018) • Affidavit, NRG Cottonwood Tenant LLC, ER18-1160-001 (2018) • Affidavit, PSEG Energy Resources & Trade LLC, ER10-1789-005 (2018) • Affidavit, Southern Indiana Gas and Electric Co. d/b/a Vectren Energy Delivery of Indiana, Inc., ER10-1338-002 (2017) • Affidavit, PSEG Keys Energy Center LLC, ER17-2426-000 (2017) • Affidavit, Tampa Electric Company, ER10-1437-006 (2017) • Prepared Answering Testimony, Deposition, and Hearing, People of the State of California, *ex rel*; Bill Lockyer, Attorney General of the State of California v. British Columbia Power Exchange, *et al.*, EL02-71-000 (2017) • Affidavit, Public Service Electric and Gas Company *et al.*, ER10-1789-004 (2016) • Affidavit, Alabama Power Company, *et al.*, ER17-514-000 (2016) • Affidavits (3), Alabama Power Company, *et al.*, EL15-39-000 (2016) • Affidavit, Combined Locks Energy Center, LLC, *et al.* , ER10-3042-004 (2015) • Affidavit, Alabama Power Company, *et al*., EL15-39-000 (2015) • Affidavit, PJM Interconnection, L.L.C., ER15-623-000 (2015) • Affidavit, Southern Indiana Gas and Electric Co. d/b/a Vectren Energy Delivery of Indiana, Inc., ER10-1338-000 (2014) • Affidavit, Quantum Choctaw Power, LLC *et al*., ER12-458-007 (2014) • Affidavit, NRG Power Marketing LLC, *et al.*, ER10-2265-004 *et al.* (2014) • Affidavit, TransCanada Entities, ER10-2870-004 *et al*. (2014) • Affidavit, Tampa Electric Company, ER10-1437-002 (2014) • Affidavit, Kendall Green Energy LLC, ER14-1363-003 (2014) • Affidavit, Quantum Lake Power, LP, ER13-1489-000 (2014) • Affidavit, NRG Power Marketing LLC, *et al.* ER10-2265-002 (2014) • Affidavit, NRG Yield, Inc., *et al*., EC14-101-000 (2014) • Affidavit, Community Wind Farm 1 et al., ER14-1668-000 (2014) • Seaway Crude Pipeline Company LLC, OR15-6-000 (2014) • Affidavit, Public Service Electric and Gas Company *et al.*, ER10-1789-003 (2013) • Affidavits, NRG Energy Holdings, Inc., Edison Mission Energy, EC14-14-000 (2013) • Affidavit, Silver Merger Sub, Inc., *et al.*, EC13-128-000 (2013) • Prepared Answering Testimony, Deposition, and Hearing, Puget Sound Energy, Inc., *et al.*, EL01-10-085 (2012) • Affidavit, Wisconsin Public Service Corporation, *et al*., ER10-1894-004 (2012) • Affidavit, PSEG New Haven LLC, ER12-1250-000 (2012) • Affidavit, Enterprise Product Partners L.P. and Enbridge, Inc., OR12-4-000 (2012) • Affidavit, Southern Indiana Gas and Electric Co., ER10-1338-001 (2011) • Affidavit, TransCanada Power Marketing Ltd. *et al.*, ER10-2780-001 (2011) • Affidavit, Tampa Electric Company, ER10-1476-001 (2011) • Affidavit, Cedar Creek Wind Energy, LLC, ER11-2577-000 (2010) • Affidavit, Public Service Electric and Gas Company *et al.*, ER97-837-014 (2010) • Affidavit, Morris Energy Group, LLC v. PSEG Energy Resources & Trade LLC; PSEG Fossil LLC; and PSEG Power LLC, EL10-79-000 (2010) • Affidavit, UGI Storage Company and UGI Central Penn Gas, Inc., CP10-23-000 (2010) • Prepared Answering Testimony, People of the State of California, *ex rel*; Bill Lockyer, Attorney General of the State of California v. Powerex Corp., *et al.*, EL02-71-000 (2009) • Affidavit, Integrys Energy Services,

Inc. v. New Brunswick Power Generation Corporation, EL09-32-002 (2009) • Affidavit, People of the State of California, *ex rel*; Edmund G. Brown Jr. Attorney General of the State of California v. Powerex Corp., *et al.*, EL09-56-000 (2009) • Affidavit, San Diego Gas & Electric Company v. Sellers of Energy and Ancillary Services, EL00-95-000 (2009) • Affidavit, Troy Energy, LLC, *et al.*, ER02-25-010 (2009) • Affidavit, Combined Locks Energy Center, LLC, *et al.*, ER01-2659-015 (2009) • Prepared Direct Testimony and Deposition, Energy Transfer Partners, *et al*., IN06-3-003 (2009) • Prepared Direct Testimony and Hearing, Mobil Pipe Line Company, OR07-21-000 (2009) • Idaho Power Company, ER06-787-002 (2009) • Affidavit, Southern Indiana Gas and Electric Co. d/b/a Vectren Energy Delivery of Indiana, Inc. ER96-2734-007 (2008) • Affidavit, Choctaw Gas Generation, LLC, *et al.* ER08-1332-002 • Affidavit, TransCanada Energy Sales Ltd., ER09-328-001 (2008) • Prepared Direct Testimony and Deposition, Oasis Pipeline L.P., *et al.*, IN06-3-004 (2008) • Affidavit, Tampa Electric Company, ER99-2342-012 (2008) • Affidavit, ANP Bellingham Energy Company, LLC, *et al.*, ER00-2117-005 (2008) • Affidavit, SUEZ Energy Marketing, NA, *et al.*, ER06-169-003 (2008) • Affidavit, TransCanada Energy Marketing ULC, *et al.*, ER07-1274-001 (2008) • Affidavit, Georgia-Pacific Brewton LLC, *et al.*, ER08-1126-000 (2008) • Affidavit, Montgomery L'Energia Power Partners LP, ER08-864-000 (2008) • Affidavit (with Joseph P. Kalt), Energy Transfer Partners, *et al*., IN06-3-002 (2008) • Affidavit, Energy Transfer Partners, *et al*., IN06-3-002 (2008) • Affidavit, TransCanada Maine Wind Development Inc., ER08-685-000 (2008) • Affidavit, O'Connor & Hewitt, LTD, RP08-30-000 (2007) • Affidavit (with Joseph P. Kalt), Energy Transfer Partners, *et al*., IN06-3-000 (2007) • Affidavit, Energy Transfer Partners, *et al*., IN06-3-000 (2007) • Affidavit, The People of the State of Illinois, *ex rel.* Illinois Attorney General Lisa Madigan v. Exelon Generation Co., LLC, *et al.*, EL07-47-000 (2007) • Affidavit, Baltimore Gas and Electric Company, ER07-576-000 (2007) • Affidavit, Trans-Allegheny Interstate Line Company, ER07-562-000 (2007) • Affidavit, TransCanada Energy Marketing Ltd., *et al.*, ER07-331-000 (2006) • Affidavit, Tampa Electric Company, ER99-2342-000, ER07-173-000 (2006) • Affidavit, Koch Supply & Trading, LP, ER07-100-000 (2006) • WPS Resources Corporation and Peoples Energy Corporation, EC06-152-000 (2006) • Affidavit, Sabine Cogen, LP, ER06-744-000 (2006) • Affidavit, Air Liquide Large Industries U.S. LP, ER06-743-000 (2006) • Affidavit, ANP Bellingham Energy Company, LLC., *et al.*, ER00-2117-000 (2005) • Affidavit, Duke Energy Corporation and Cinergy Corp., EC05-103-000 (2005) • Affidavit, El Paso Marketing, L.P., *et al.*, ER95-428-000 (2005) • Affidavit, TransCanada Energy Ltd., *et al.*, ER95-692-000 (2005) • Affidavit, Granite Ridge Energy, LLC, ER00-1147-000, ER05-287-001 (2005) • Affidavit, TransCanada Power (Castleton) LLC, ER05-743-000 (2005) • Affidavit, Tampa Electric Company, *et al*., ER99-2342-003 (2005) • Affidavit, Wisconsin Public Service Corporation, WPS Energy Services, Inc., and WPS Power Development, Inc., ER96-1088-035 and Wisconsin Public Service Corporation, ER95-1528-010 (2005) • Affidavit, Wisconsin River Power Company, ER05-453-000 (2005) • Affidavit, Upper Peninsula Power Company, ER05-89-001 (2005) • Affidavit, Southern Indiana Gas and Electric Company, ER96-2734-003 (2004) • Affidavit, Tampa Electric Company, *et al*., ER99-2342-003 (2004) • Affidavits, TransCanada Hydro Northeast, Inc., *et al*., EC05-12-000, ER05-111-000 (2004) •

Affidavits, Dominion Energy New England, Inc., *et al.*, EC05-4-000, ER05-34-000 (2004) • Affidavit, Wisconsin Public Service Corporation, WPS Energy Services, Inc., and WPS Power Development, Inc., ER96-1088-033 and Wisconsin Public Service Corporation, ER95-1528-008 (2004) • Affidavit, NorthPoint Energy Solutions Inc. ER04-1244-000 (2004) • Affidavit, Union Power Partners, L.P., ER01-930-004 (2004) • Affidavit, Panda Gila River, L.P., ER01-931-004 (2004) • Affidavit, Dominion Energy Kewaunee, Inc., ER04-318-000 (2003) • Affidavit, TPS GP, Inc., TPG LP, Inc., Panda GS V, LLC & Panda GS VI, LLC, EC03-90-000 (2003) • Affidavit, Berkshire Power Company, L.L.C. *et al.*, ER99-3502-001 (2002) • Affidavit, El Paso Merchant Energy, L.P., ER95-428-024 (2002) • Affidavit, Tampa Electric Company, ER99-2342-001 (2002) • Affidavit, Hardee Power Partners Limited, ER99-2341-001 (2002) • Affidavit, TECO-PANDA Generating Company, L.P., ER02-1000-000 (2002) • Affidavit, Commonwealth Chesapeake Company, LLC, ER99-415-004 (2002) • Affidavit, Wisconsin Public Service Corporation, WPS Energy Services, Inc., and WPS Power Development, Inc., ER96-1088-031 and Wisconsin Public Service Corporation, ER95-1528-006 (2001) • Affidavit, TPS McAdams, LLC and TPS Dell, LLC, ER02-507-000 and ER02-510-000 (2001) • Affidavits, Prepared Direct Testimony, and Hearing, CPUC v. El Paso Natural Gas Company, et al., RP00-241-000 (2000-2001), Affidavit, El Paso Energy Corporation and The Coastal Corporation, EC00-73-000, (2000) • Affidavit, El Paso Energy Corporation and Sonat Inc., EC99-73-000 (1999) • Prepared Testimony, San Diego Gas & Electric Company and Enova Energy, Inc., EC97-12-000 (1997) • Prepared Testimony and Hearing, Wisconsin Electric Power Co., Northern States Power Co. (Minnesota), Northern States Power Co. (Wisconsin), and Cenerprise, Inc., EC95-16-000 (1996)

TESTIMONY BEFORE STATE REGULATORY COMMISSIONS

Prepared Answering Testimony, Supplemental Testimony, and Cross-Examination, In the Matter of Eligibility Criteria for Energy Service Companies, Case 15-M-0127, New York Public Service Commission (2017) • Prepared Direct Testimony, In re: Petition for Determination of Cost Effective Generation Alternative to Meet Need Prior to 2018, by Duke Energy Florida, Inc., FPSC Docket No. 140111-EI (2014) • Affidavit and Prepared Testimony, In The Matter of the Petition of Public Service Electric and Gas Company for Approval of an Increase in Electric and Gas Rates and for Changes in the Tariffs for Electric and Gas Service, B.P.U.N.J. No. 14 Electric and B.P.U.N.J. No. 14 Gas Pursuant to N.J.S.A. 48:2-21 and N.J.S.A. 48:2-21.1 and for Approval of a Gas Weather Normalization Clause; A Pension Expense Tracker; and for Other Appropriate Relief, BPU Docket No. GR09050422, New Jersey Board of Public Utilities (2010) • Prepared Direct Testimony, Application of Wisconsin Power and Light Company for Issuance of a Certificate of Public Convenience and Necessity for Construction and Placement in Operation of an Approximately 300 MW Coal-Fired Baseload Facility and an Application for Approval of Fixed Financial Parameters and Capital Cost Rate-Making Principles for the Baseload Facility, Docket No. 6680-CE-170, Public Service Commission of Wisconsin (2008) • Prepared Rebuttal Testimony and Hearing, In the Matter of the Joint Petition of Public Service Electric and Gas Company and Exelon Corporation for Approval of a Change in Control of Public Service Electric and Gas Company, and Related Authorizations, BPU Docket No. EM05020106, OAL Docket No. PUC-01874-05, New Jersey Board of

	Public Utilities (2005, 2006) • Affidavit, Application of Duke Energy Corporation for Authorization to Enter Into a Business Combination Transaction with Cinergy Corp., Docket No. 2005-210-E, Public Service Commission Of South Carolina (2005) • Prepared Rebuttal Testimony and Hearing, Joint Application of PECO Energy Company and Public Service Electric and Gas Company for Approval of the Merger of Public Service Enterprise Group Incorporated with and into Exelon Corporation, Docket No. A-110550F0160, Pennsylvania Public Utility Commission (2005) • Prepared Direct Testimony and Hearing, Application of Washington Gas Light Company for amendments to Rate Schedule No. 9, Firm Delivery Gas Supplier Agreement of its Gas Tariff, Docket No. PUE-2004-00085 (2005) • Prepared Direct Testimony, Application of Wisconsin Public Service Corporation for a Certificate of Public Convenience and Necessity for Construction of A Large Electric Generating Plant with Associated Facilities, known as Weston 4, at Its Existing Weston Generating Station Located in Marathon County, Docket No. 6690-CE-187, Public Service Commission of Wisconsin (2004) • Prepared Direct Testimony, Metromedia Energy, Inc. - Regarding Washington Gas Light Company's Plan to Return Customers to Sales Service Effective December 1, 2003, Docket No. PUE-2003-00536 (2004) • Report (with Mark Frankena) and Testimony, Analysis of Competitive Implications: An investigations into whether electric industry restructuring and competition in the provision of retail electric service is in the public interest, Louisiana Public Service Commission Docket No. U-21453, U-20925 (SC), U-22092 (SC) (Subdocket A) (2000) • Report and Hearing, Atlantic City Electric Company: Audit of Restructuring, New Jersey Board of Public Utilities, Docket No. EA97060395 (1998) • Prepared Testimony and Hearing, Proceeding on Motion of the Commission to Redesign Niagara Mohawk Power Corporation's Current SC-7 Service Classification and Implement a New SC-7-A Service Classification, Case 94-E-0172, New York Public Service Commission (1995)
TESTIMONY BEFORE FEDERAL COURTS	Report, Deposition, and Bench Trial, FTC v. Arch Coal, Inc., et al., Civil Action 04-0534 (JDB), U.S. Dist. Court, Dist. of Columbia (2004) • Report, Deposition and Jury Trial, Trigen v. OG&E, CIV-96-1595L, U.S. Dist. Court, Western Dist. of Oklahoma (1998)
TESTIMONY BEFORE STATE COURTS	Affidavit, Retail Energy Supply Association, *et al.* v. Public Service Commission of the State of New York, *et al.*, Index No. 870-16, State of New York, Supreme Court, County of Albany (2016) • Affidavit, City Public Service Board of San Antonio vs. Public Utility Commission of Texas, et al., No. 97-02917, District Court of Travis County, Texas, 200th Judicial District (1997)
OTHER TESTIMONY	Report, Metromedia Energy, Inc. v. Mirant Americas Energy Marketing, RE: 18 198 Y 18484 03 (2005) • Report and Deposition, King Provision Corporation v. Burger King Corporation and Grand Metropolitan PLC, 90-05718-CA, 4th Cir., Duval Co., Florida (1992) • Deposition, West Texas Transmission L.P. v. Enron Corp. et al., SA 88 CA 0638, W.D. Texas, San Antonio Division (1988)
PUBLICATIONS	"Should market power still be a concern in the U.S. electric power industry?" with Jéssica Dutra and Tristan SnowCobb, *Electricity Journal*

33 (May 2020): 106725-28 • "Geographic Market Delineation in LMP Electric Power Markets," with Megan Accordino, *Electricity Journal* 23(3) (April 2010): 49-60 • "The Likely Effect of the Proposed Exelon-PSEG Merger on Wholesale Electricity Prices," with Dan Oska, *Electricity Journal* 21(1) (Jan./Feb. 2008): 45-54 • "FERC MBR Screens: The Good, the Bad, and the Ugly," *Public Utilities Fortnightly* 143(7) (July 2005): 37-42 • "Finding Market Power in Power Markets," *International Journal of the Economics of Business*, 7(2) (July 2000): 167-178 • "Why Applicants Should Use Computer Simulation Models to Comply with the FERC's New Merger Policy," with Mark Frankena, *Public Utilities Fortnightly*, 135(3) (February 1, 1997): 22-26 • *Electric Utility Mergers,* with Mark Frankena and Bruce Owen, Chapters 1, 4, & 5, 1994 • "International Trade and Antitrust: Comments," *University of Cincinnati Law Review*, 61(3) (1993): 945-953 • "Upstream Vertical Integration with Automatic Price Adjustments," *Journal of Regulatory Economics* 4 (1992): 279-287 • "Should the U.S. Department of Justice deviate from the 5% price test for market definition on a case-by-case basis?" with Gale Mosteller, *International Merger Law*, April 1992 • "Defining Markets for Merger Analysis," with Gale Mosteller, *Antitrust Bulletin* 36 (Fall 1991): 599-640 • "Analyzing Agreements Among Competitors: What Does the Future Hold?" with Jim Langenfeld, *Antitrust Bulletin* 36 (Fall 1991): 651-679 • "In Defense of Antitrust," with Jim Langenfeld, *Regulation* 14(2) (Spring 1991): (Letters) 2-4 • "Enforcement of Property Rights and the Provision of Public Good Attributes," *Information Economics and Policy* 3 (1988): 91-108

WORKING PAPERS

"Finding 'representative market prices' for calculating concentration in electric power markets," (with Jéssica Dutra and Tristan SnowCobb), submitted to *Energy Law Journal*, 2020 • "Advertising Restrictions as Rent Increasing Costs," FTC Bureau of Economics Working Paper No. 196, May 1992 • "Rent Increasing Costs: The Antitrust Implications from a Paradox in Value Theory," FTC Bureau of Economics Working Paper No. 182, November 1990 • "The Relationship Between Industrial Sales Prices and Concentration of Natural Gas Pipelines," FTC Bureau of Economics Working Paper No. 168, November 1988 • "Deregulation by Vertical Integration?" FTC Bureau of Economics Working Paper No. 166, November 1988

PRESENTATIONS & PROFESSIONAL ACTIVITIES

Comments to the Antitrust Division of the U.S. Department of Justice and the Federal Trade Commission Concerning U.S. Department of Justice and the Federal Trade Commission Draft Vertical Merger Guidelines Released for Public Comment on January 10, 2020, Feb. 25, 2020 (with Lona Fowdur) • Comments (with 7 others), Notice of Inquiry: Modifications to Commission Requirements for Review of Transactions under Section 203 of the Federal Power Act and Market-Based Rate Applications under Section 205 of the Federal Power Act, Docket No. RM16-21-000, Federal Energy Regulatory Commission, November 28, 2016 • Report, PJM Interconnection, L.L.C., Docket No. ER15-623-000, Federal Energy Regulatory Commission, January 20, 2015 • Comments, Notice of Inquiry: Analysis of Horizontal Market Power under the Federal Power Act, Docket No. RM11-14-000, Federal Energy Regulatory Commission, May 23, 2011 • Comments, Position Limits for Derivatives, RIN 3038–AD15 and 3038–AD16, Commodity Futures Trading Commission, March 28, 2011 • Comments, Guidance on

Simultaneous Transmission Import Limit Studies, AD10-2-000, Federal Energy Regulatory Commission, February 12, 2010 • "Geographic Market Delineation in LMP Electric Power Markets," presentation before representatives of the Federal Energy Regulatory Commission, U.S. Department of Justice, and U.S. Federal Trade Commission, January 27, 2010 • Comments, Notices of Intent to determine that 15 natural gas financial basis contracts traded on the Intercontinental Exchange, Inc. are Significant Price Discovery Contracts, Commodity Futures Trading Commission, October 26, 2009 • "Efficacy of Vertical Integration in Energy Industries with Applications to Proposed Standards of Conduct for Transmission Providers," submitted to FERC by Santee Cooper in Docket No. RM07-1-000 (2007) • Chair, Antitrust Committee, Energy Bar Association, 2004–2005 • "Competition in the Natural Gas Industry: An Antitrust Perspective, presentation to staff of the Federal Energy Regulatory Commission," March 28, 2005 • Vice Chair, Antitrust Committee, Energy Bar Association, 2003–2004 • "Weston 4 Effect on Wholesale Competition in WUMS," submitted to the Public Service Commission of Wisconsin by Wisconsin Public Service Corporation in Docket No. 6690-CE-187, September 26, 2003 • "Computer Models In The Electric Power Industry," presented to staff of the Federal Trade Commission, Washington, DC, June 11, 2002 • "TECO EnergySource Market Share Analysis," submitted to FERC by TECO EnergySource, Inc. in Docket No. ER96-1563-017, September 10, 2001 • "Finding Market Power in Power Markets," presented to staff of the Federal Trade Commission, Washington, DC, June 20, 2001 • "A Study of Marketing Affiliate and Other Affiliate Holdings of Firm Capacity on Interstate Natural Gas Pipelines and the Effects on Natural Gas Markets," April 30, 2001, submitted to FERC by the Interstate Natural Gas Association of America in Docket No. PL00-1-003 • "Why We Should Use Computer Models to Unveil Market Power," presented at the Sixth DOE–NARUC National Electricity Forum, Brown Convention Center, Houston, TX, September 16, 1998 • Comments, *Agency Information Collection and Dissemination Activities: Comment Request*, U.S. Department of Energy, Energy Information Administration, August 28, 1998 • Comments, *Revised filing Requirements Under Part 33 of the Commission's Regulations*, Federal Energy Regulatory Commission Docket No. RM98-4-000, August 21, 1998 • "Use of Computer Simulation Models to Unveil Market Power," presented to staff of the Federal Trade Commission, Federal Energy Regulatory Commission and U.S. Department of Justice, Federal Trade Commission, Washington, DC, April 10, 1998 • "Use of Computer Simulation Models to Unveil Market Power: The Primergy Case," presented to the Bureau of Economics, Federal Trade Commission, Washington, DC , December 8, 1997 • "Use of Computer Simulation Models to Unveil Market Power," presented at the 29th Annual Conference of the Institute of Public Utilities, Williamsburg, Virginia, December 3, 1997 • **"**Mergers and Market Power," presented at the National Association of State Utility Consumer Advocates Mid-Year Meeting, Charleston, South Carolina, June 9, 1997 • "Market Power Analysis: An Economic Perspective," (with Mark Frankena), presented at the Strategic Research Institute Conference on The Legal Challenges of Restructuring, Arlington, Virginia, April 16, 1997 • "Mergers and Market Power," presented at the Edison Electric Institute Workshop on FERC Merger Policy Guidelines, Arlington, Virginia, April 1, 1997 • "New Approaches to Controlling Distribution Company Market Power,"

presented at the New York Energy Efficiency Council Conference on Innovative Solutions to a Changing Energy Market, New York Athletic Club, February 7, 1997 • Description of the Western Power Model, with Mark Frankena, Exhibit 8 to Prepared Testimony Before the Nevada Public Service Commission, January 31, 1997 • Reviewer, American Bar Association, Section of Antitrust Law, *Manual on the Economics of Antitrust Law, 14th Supplement*, 1995 • Referee, *Quarterly Journal of Business and Economics*, 1994—1995 • Reviewer, American Bar Association, Section of Antitrust Law, *Manual on the Economics of Antitrust Law, 10th Supplement*, 1993 • Expert Witness, Federal American Inn of Court, Washington, DC, Winter 1993 • "Advertising Restrictions as Rent Increasing Costs," presented at a *Contemporary Policy Issues* Session of the Western Economics Association's 67th Annual Conference, July 1992 • "Let's Make Merger Policy 'Fully Consonant With Economic Theory,'" presented at a *Contemporary Policy Issues* Session of the Western Economics Association's 67th Annual Conference, July 1992 • "Advertising Restrictions as Rent Increasing Costs," Seminar, Department of Business Economics, Indiana University, October 1991 • "International Trade and Antitrust: Comments," presented at a *Contemporary Policy Issues* Session of the Western Economics Association's 66th Annual Conference, July 1991 • Discussant, Western Economics Association's 66th Annual Conference, July 1991 • Horizontal Restraints Cases at the Federal Trade Commission: From *American Medical Association* through the Present," with Jim Langenfeld, presented at the 60th Annual Conference of the Southern Economics Association, November 1990 • "Defining Markets for Merger Analysis," with Gale Mosteller, presented at a *Contemporary Policy Issues* Session of the Western Economics Association's 65th Annual Conference, cosponsored by the *Antitrust Bulletin* and the Antitrust and Trade Regulation Section of the Federal Bar Association, July 1990 • "Analyzing Agreements Among Competitors: What Does the Future Hold?" with Jim Langenfeld, presented at a *Contemporary Policy Issues* Session of the Western Economics Association's 65th Annual Conference, cosponsored by the *Antitrust Bulletin* and the Antitrust and Trade Regulation Section of the Federal Bar Association, July 1990 • "The Relationship Between Industrial Sales Prices and Concentration of Natural Gas Pipelines," Seminar, Office of Economic Policy, Federal Energy Regulatory Commission, Summer 1989 • "The Relationship Between Industrial Sales Prices and Concentration of Natural Gas Pipelines," Seminar, Economic Analysis Group, Antitrust Division, U.S. Department of Justice, February 1989 • "Deregulation by Vertical Integration?" Seminar, Department of Business Economics, Indiana University, January 1989 • Discussant, Industrial Organization Society Session, Annual Meeting of the American Economics Association, December 1988 • "Concentration and Price in the Natural Gas Industry," Seminar, Federal Trade Commission, July 1988 • "Relevant Measures of Concentration for Antitrust Policy," presented at an Industrial Organization Society Session of the 57th Annual Conference of the Southern Economics Association, November 1987