UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Calpine Corporation	)	
	)	
v.	)	**Docket No. EL16-49-000**
	)	
PJM Interconnection, L.L.C.	)	
PJM Interconnection, L.L.C.	))	**Docket No. ER18-1314-000** **Docket No. ER18-1314-001**
PJM Interconnection, L.L.C.	)	**Docket No. EL18-178-000**
		(Consolidated)

INITIAL BRIEF OF
THE ELECTRIC POWER SUPPLY ASSOCIATION

Pursuant to the June 29, 2018 order of the Federal Energy Regulatory Commission (the "Commission") in the above-captioned proceedings and the Commission's notice of extension of time,[1] the Electric Power Supply Association ("EPSA")[2] hereby submits its initial brief, as well as the affidavit of Paul M. Sotkiewicz,

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1 *See Calpine Corp. v. PJM Interconnection, L.L.C.*, 163 FERC ¶ 61,236 at Ordering Para. (F) (2018) (the "June 29 Order"), *reh'g pending*; *Calpine Corp. v. PJM Interconnection, L.L.C.*, Notice of Extension of Time, Docket Nos. EL16-49-000, *et al.* (August 22, 2018) (unreported).

2 Launched over 20 years ago, EPSA is the national trade association representing leading independent power producers and marketers. EPSA members provide reliable and competitively priced electricity from environmentally responsible facilities using a diverse mix of fuels and technologies. Power supplied on a competitive basis collectively accounts for 40 percent of the U.S. installed generating capacity. EPSA seeks to bring the benefits of competition to all power customers. This pleading represents the position of EPSA as an organization, but not necessarily the views of any particular member with respect to any issue. EPSA is a party to Docket Nos. EL16-49-000, ER18-1314-000 and subsequent sub-dockets thereof (including Docket No. ER18-1314-001). *See id.* at P 30 & Apps. 1, 2. EPSA has a pending motion to intervene in Docket No. EL18-178-000. *See* (doc-less) Motion to Intervene of Electric Power Supply Association, Docket No. EL18-178-000 (filed July 5, 2018).

Ph.D., provided in Attachment A hereto (the "Sotkiewicz Affidavit"), in the paper hearing established by the June 29 Order. In the June 29 Order, the Commission correctly held that state subsidies for existing resources and new resources not covered by the current Minimum Offer Price Rule ("MOPR")[3] "allow [such] resources to suppress capacity market clearing prices, rendering the rate unjust and unreasonable."[4] It established this paper hearing for purposes of determining a just and reasonable replacement rate.

EPSA strongly supports the Commission's proposal to require PJM to implement "[a]n expanded MOPR with few or no exceptions"[5] – essentially the "clean MOPR" described in prior filings in these and related proceedings[6] – and agrees that such a remedy will "protect PJM's capacity market from the price suppressive effects of resources receiving out-of-market support . . . ."[7] Unfortunately, the same cannot be said for the "FRR Alternative" proposed in the June 29 Order. As explained below and in the Sotkiewicz Affidavit, the FRR Alternative would exacerbate, not ameliorate, the price suppression problem identified in the June 29 Order. Accordingly, the Commission should adopt a "clean MOPR" and should abandon the unnecessary, unjust and unreasonable FRR Alternative.

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[3] This and other capitalized terms not otherwise defined herein have the meanings given them in the PJM Interconnection, L.L.C. ("PJM") Open Access Transmission Tariff (the "PJM Tariff").

[4] June 29 Order, 163 FERC ¶ 61,236 at P 149 (footnote omitted).

[5] *Id.* at P 158.

[6] *See*, *e.g.*, Protest of the PJM Power Providers, Docket Nos. ER18-1314-000, *et al.* (filed May 7, 2018) (the "P3 Protest"); *id.*, Attachment A, Affidavit of Roy J. Shanker, Ph.D., ¶¶ 46-52; Complaint Seeking Fast Track Processing at 18-22, Docket No. EL18-169-000 (filed May 31, 2018) (the "EL18-169 Complaint"); *id.*, Attachment A, Affidavit of Roy J. Shanker, Ph.D., ¶¶ 37-42 (the "EL18-169 Shanker Affidavit"); Comments on the Electric Power Supply Association at 6-7, Docket No. EL18-169-000 (filed June 20, 2018).

[7] June 29 Order, 163 FERC ¶ 61,236 at P 158.

I. BACKGROUND

In the June 29 Order, the Commission found, based on the record evidence in Docket Nos. ER16-49 and ER18-1314, that "PJM's existing Tariff is unjust and unreasonable and unduly discriminatory," because it:

> fails to protect the integrity of competition in the wholesale capacity market against unreasonable price distortions and cost shifts caused by out-of-market support to keep existing uneconomic resources in operation, or to support the uneconomic entry of new resources, regardless of the generation type or quantity of the resources supported by such out-of-market support.[8]

The Commission expressly found that continuing to limit the applicability of the MOPR to new, natural gas-fired resources was no longer just and reasonable.[9] While it has previously declined to extend the MOPR to subsidized existing resources, the Commission "agree[d] with PJM that retaining resources that the market does not regard as economic suppresses prices" and thereby "displace[s] resources that can meet PJM's capacity needs at a lower overall cost."[10] Similarly, with respect to the technology limitations of the current MOPR, the Commission found that "[p]rice suppression stemming from state choices to support certain resources or resource types is indistinguishable from that triggered through the exercise of buyer-side market power" and concluded that it could "no longer assume that there is any substantive difference among the types of resources participating in PJM's capacity market with the benefit of out-of-market support."[11]

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8 *Id.* at P 150.

9 *See id.*

10 *Id.* at P 154.

11 *Id.* at P 155.

At the same time, the Commission stated that it was "not able, based on the existing record . . . , to make a final determination regarding the just and reasonable replacement rate . . . ."[12] It specifically rejected PJM's "Capacity Repricing" and "MOPR-Ex" proposals as unjust, unreasonable and unduly discriminatory.[13] The Commission "preliminarily" found that the following changes to the Tariff "may produce a just and reasonable rate":[14]

- An "expanded MOPR that covers out-of-market support to all new and existing resources, regardless of resource type";[15] and
- The FRR Alternative, under which "resources receiving out-of-market support [could] choose to be removed from the PJM capacity market, along with a commensurate amount of load, for some period of time."[16]

The Commission established this paper hearing proceeding to consider these and other proposed replacement rates.[17]

II. ARGUMENT

For the reasons discussed below and in the Sotkiewicz Affidavit, the Commission should require PJM to implement a "clean MOPR" and should abandon the FRR Alternative proposal. Unless prevented from performing its intended function by the FRR Alternative or other price suppressive mechanisms, a "clean MOPR" will remedy the price suppression problem identified in the June 29 Order. By contrast, the FRR Alternative, even with a "clean MOPR," will make the problem worse and, as

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12 *Id.* at P 157.

13 *See id.* at PP 63-72, 100-106.

14 *Id.* at P 157.

15 *Id.* at P 158.

16 *Id.* at P 160.

17 *See id.* at P 172.

Commissioner LaFleur appeared to suggest, "could end up hastening the demise of the capacity markets, rather than preserving them."[18] While EPSA cannot imagine that this is the Commission's intent, the end result, like the price-suppressive effect of subsidized resources, will be the same, "regardless of intent."[19]

EPSA appreciates that, in proposing both an expanded MOPR and the FRR Alternative, the Commission was attempting to balance mitigation of price suppression and accommodation of state policies[20] and thereby to manage the "tension" described by Commissioner LaFleur "between relying on wholesale capacity markets to attract investment and state policies to support specific resources . . . ."[21] Some, including former Commissioner Powelson, have suggested that this tension is unmanageable, as these "two goals . . . are fundamentally in conflict and cannot coexist in one market."[22] Even assuming *arguendo* that these goals can be reconciled, the fact remains that an expanded MOPR and the FRR Alternative are fundamentally in conflict and cannot coexist, because the latter will effectively nullify the former and leave the RPM market unprotected "from the price suppressive effects of resources receiving out-of-market support . . . ."[23] More generally, EPSA submits that, in keeping with its statutory duty to

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[18] *Id.* at 62,224 n.8 (LaFleur, Comm'r, dissenting).

[19] *Id.* at P 155 (citation omitted).

[20] *Compare id.* at P 158 (finding that "[a]n expanded MOPR . . . should protect PJM's capacity market from the price suppressive effects of resources receiving out-of-market support") *with id.* at P 160 (proposing the FRR Alternative in order "to accommodate resources that receive out-of-market support, and mitigate or avoid the potential for double payment and over procurement").

[21] *Id.* at 62,222 (LaFleur, Comm'r, dissenting).

[22] *ISO New England Inc.*, 162 FERC ¶ 61,205 at 62,098 (2018) ("CASPR Order") (Powelson, Comm'r, dissenting).

[23] June 29 Order, 163 FERC ¶ 61,236 at P 158.

ensure that wholesale rates are just and reasonable,[24] the Commission should prioritize mitigation and the protection of the "integrity and effectiveness" of the Commission-jurisdictional wholesale capacity market[25] over accommodation of state policies. This is particularly important where, as here, the Commission is proceeding from a finding that the status quo is unjust and unreasonable by virtue of its "fail[ure] to ***mitigate*** price distortions."[26] Such a prioritization is not only compelled by good economic policy but by law given the Commission's statutory and constitutional obligation to ensure that suppliers are afforded "the *opportunity* to recover [their] costs" in the markets.[27]

A. The Commission Should Require PJM To Implement a "Clean MOPR"

As the Commission correctly recognized in the June 29 Order, out-of-market subsidies have "untenably threatened" the "integrity and effectiveness" of the RPM market.[28] These subsidies "allow the supported resources to reduce their price of their offers into capacity auctions . . . causing lower auction clearing prices," which, in turn, cause "more generation resources [to] lose needed revenues, increasing pressure on states to provide out-of-market support to yet more generation resources . . . ."[29] The

24 *See* 16 U.S.C. §§ 824d(a), 824e(a) (2012).

25 June 29 Order, 163 FERC ¶ 61,236 at P 1.

26 *Id.* at P 5.

27 *Bridgeport Energy, LLC*, 113 FERC ¶ 61,311 at P 29 (2005) (emphasis in original), *on reh'g*, 114 FERC ¶ 61,265 (2006). *See also*, *e.g.*, *FPC v. Hope Natural Gas Co.*, 320 U.S. 591, 603 (1944); *Price Formation in Energy and Ancillary Servs. Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, 153 FERC ¶ 61,221 at P 2 (2015); *Midwest Indep. Transmission Sys. Operator, Inc.*, 102 FERC ¶ 61,196 at P 49, *on reh'g*, 103 FERC ¶ 61,210 (2003).

28 June 29 Order, 163 FERC ¶ 61,236 at P 1.

29 *Id.* at P 2.

most direct and effective remedy for this problem is the "clean MOPR,"[30] as proposed in the EL18-169 Complaint[31] – *i.e.*, what the Commission appeared to be suggesting when it proposed, as the first element of a replacement rate, "[a]n expanded MOPR, with few or no exceptions."[32]

As Roy J. Shanker, Ph.D., explained in his affidavit in support of the EL18-169 Complaint, a "clean MOPR" would be straightforward to implement, as "[t]he objective is clear: remove the loopholes and extensive exceptions in the existing MOPR and in PJM's MOPR-Ex, and only allow competitive entry exceptions and mitigation to appropriate unit specific offers."[33] Mechanically, a "clean MOPR" could be implemented by taking PJM's "MOPR-Ex," as proposed by PJM in Docket No. ER18-1314,[34] and:

- Eliminating the exemptions that would have prevented MOPR-Ex from providing the needed protection to the market; and
- Broadening the definition of "Material Subsidy" to encompass federal subsidies.

As an initial matter, eliminating the exemptions, including that for renewable resources, addresses the reason for the rejection of PJM's MOPR-Ex proposal by ensuring that similarly situated resources are treated the same under the expanded MOPR.[35] More broadly, expansion of the MOPR in this way – to apply to all subsidized resources,

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30 *See generally* P3 Protest; EL18-169 Complaint.

31 *See* Sotkiewicz Affidavit, ¶ 121 (explaining that the Commission's statements in the June 29 Order and the record "lead[] to one clear conclusion: implement a so-called 'Clean MOPR' as proposed in Docket No. EL18-169-000").

32 June 29 Order, 163 FERC ¶ 61,236 at P 158.

33 Shanker EL18-169 Affidavit, ¶ 8.

34 *See generally* Capacity Repricing or in the Alternative MOPR-Ex Proposal: Tariff Revisions to Address Impacts of State Public Policies on the PJM Capacity Market, Docket No. ER18-1314-000 (filed Apr. 9, 2018) (the "April 9 ER18-1314 Filing").

35 *See id.* at PP 100-06.

regardless of resource type and vintage or the source of the subsidies – would be consistent with the Commission's findings that the limited scope of the current MOPR is unjust and unreasonable.[36]

To be clear, the "clean MOPR," as proposed in the EL18-169 Complaint and here, would not target all subsidized resources but only those receiving "Actionable Subsidies"[37] and thus would, despite the "clean MOPR" moniker, incorporate certain limited exceptions or exemptions. Notably, the "clean MOPR" would effectively retain the unit-specific exception in the current MOPR and would incorporate the "Competitive Exemption" proposed as part of MOPR-Ex in Docket No. ER18-1314.[38] While the "clean MOPR" would not include an explicit unit-specific exemption, such an exemption is built into the "clean MOPR" by virtue of its allowing sponsors of subsidized resources to justify offer floors lower than the default offer floors based on their unit-specific costs.[39] Similarly, even without an explicit Competitive Exemption, the "clean MOPR" would carry forward this element of MOPR-Ex by applying mitigation only to resources receiving "Actionable Subsidies."[40]

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36 *See* June 29 Order, 163 FERC ¶ 61,236 at PP 150-56.

37 *See* Sotkiewicz Affidavit, ¶¶ 122-25.

38 *See* Shanker EL18-169 Affidavit, ¶ 38.

39 *See id.*

40 PJM acknowledged that this aspect of the "Material Subsidy" definition rendered the explicit Competitive Exemption proposed as part of MOPR-Ex redundant. *See* April 9 ER18-1314 Filing, Transmittal Letter at 107 n.268.

1. A "Clean MOPR" Would Effectively Address The Price Suppression Problem Identified In The June 29 Order And Would Otherwise Be Just and Reasonable

A "clean MOPR" would retain, and build on, the approach to the problem of below-cost offers from subsidized resources that, as PJM observed, "has been part of the RPM framework from the beginning"[41] and that the Commission recently described as its "standard solution"[42] to this problem. The characterization of the MOPR as the Commission's "standard solution" to the problem faced here is in perfect accord with a long line of Commission orders accepting and even mandating the use of MOPR mechanisms in organized capacity markets. Not only has the Commission accepted the MOPR as a core element of RPM "from the beginning,"[43] it has accepted the use of a

41 April 9 ER18-1314 Filing at 97.

42 CASPR Order, 162 FERC ¶ 61,205 at P 22 (also stating that, "[a]bsent a showing that a different method would appropriately address particular state policies, we intend to use the MOPR to address the impacts of state policies on the wholesale capacity markets."). To be sure, Commissioner Glick is correct this statement was "not adopted by a majority of the Commissioners that support the order" in question. *Id.* at 62,101 (footnote omitted) (Glick, Comm'r, dissenting, in part, and concurring, in part). At the same time, former Commissioner Powelson's dissent strongly suggests that, while he did not support the CASPR Order, he would have supported this statement. *See id.* at 62,098-101 (Powelson, Comm'r, dissenting).

43 April 9 ER18-1314 Filing at 97. *See also PJM Interconnection, L.L.C.*, 117 FERC ¶ 61,331 at P 103 (2006) (accepting the MOPR to address concerns that "net buyers might have an incentive to depress market clearing prices by offering some self-supply at less than a competitive level"), *on reh'g*, 119 FERC ¶ 61,318, *reh'g denied*, 121 FERC ¶ 61,173 (2007); *PJM Interconnection, L.L.C.*, 135 FERC ¶ 61,022 at P 139 ("ER11-2875 Order") (accepting modifications to the MOPR in light of "mounting evidence of risk from what was previously only a theoretical weakness in the MOPR rules that could allow uneconomic entry has caused us to reexamine our acceptance of the existing state exemption"), *on reh'g*, 137 FERC ¶ 61,145 (2011) ("ER11-2875 Rehearing Order"), *reh'g denied*, 138 FERC ¶ 61,160 (2012), *aff'd sub nom. New Jersey Bd. of Pub. Utils. v. FERC*, 744 F.3d 74 (3rd Cir. 2014) ("*New Jersey BPU*").

MOPR mechanism in the New York capacity market going back a decade[44] and ***required*** the adoption of such a mechanism in the New England capacity market.[45]

The standard objection to this standard solution is that it allegedly interferes with state policy initiatives by forcing states to "pay twice" for capacity – first through the subsidy and then again through the RPM Auctions. But, as recognized in the June 29 Order, the courts have found no merit to this objection and instead have held that, under a MOPR structure, "states 'are free to make their own decisions regarding how to satisfy their capacity needs, but they "will appropriately bear the cost of [those] decision[s]," . . . including possibly having to pay twice for capacity.'"[46] Of course, in so holding, the courts were affirming Commission findings to the same effect.[47] In other words, both the Commission and the courts have recognized that there is nothing wrong with requiring states to "pay twice" for capacity when they subsidize uneconomic

44 *See New York Indep. Sys. Operator, Inc.*, 122 FERC ¶ 61,211 at PP 100-06, *on reh'g*, 124 FERC ¶ 61,301 (2008).

45 *ISO New England, Inc.*, 135 FERC ¶ 61,029 at P 19 (2011) ("ER10-787 Paper Hearing Order") ("[W]e will require ISO-NE to work with its stakeholders to develop an offer-floor mitigation construct akin to those in PJM and NYISO."), *on reh'g*, 138 FERC ¶ 61,027 at P 135 (2012) (discussing its "directive[] to ISO-NE and its stakeholders . . . to develop a mitigation mechanism similar to the MOPR mechanism used in PJM"), *aff'd sub nom. New England Power Generators, Inc. v. FERC*, 757 F.3d 283 (D.C. Cir. 2014) ("*NEPGA*"). *See also*, *e.g.*, *ISO New England, Inc.*, 142 FERC ¶ 61,107 at P 64 (2013) ("[A] resource should be subject to an offer floor until it has demonstrated that it is needed by the market."), *on reh'g*, 151 FERC ¶ 61,055 (2015).

46 June 29 Order, 163 FERC ¶ 61,236 at P 159 (citation omitted). *See also NEPGA*, 757 F.3d at 290-91; *New Jersey BPU*, 744 F.3d at 95-98.

47 See ER11-2875 Rehearing Order, 137 FERC ¶ 61,145 at P 89 ("[T]he MOPR does not interfere with states or localities that, for policy reasons, seek to provide assistance for new capacity entry if they believe such expenditures are appropriate for their state. We only seek to ensure the reasonableness of the wholesale, interstate prices determined in the markets PJM administers."); ER10-787 Paper Hearing Order, 135 FERC ¶ 61,029 at P 170 ("The Commission acknowledges the rights of states to pursue policy interests within their jurisdiction. Our concern, however, is where pursuit of these policy interests allows uneconomic entry of [subsidized] capacity into the capacity market that is subject to our jurisdiction, with the effect of suppressing capacity prices in those markets.").

resources in the face of a MOPR and that doing so "in no way divests the states . . . of their jurisdiction over generation facilities."[48] In EPSA's view, ensuring that states bear the costs of their decisions in this area should be regarded as a benefit of a MOPR.

Tellingly, some of those most troubled about the alleged impacts of a MOPR on state policy initiatives become positively effusive about the extent of the Commission's remedial powers, including its power to impose a MOPR, when their state subsidies are challenged on federal preemption grounds. Before the Commission, for example, Exelon Corporation ("Exelon") has (notwithstanding the precedent discussed above) steadfastly insisted that a "clean MOPR" would "thwart a broad swath of state programs by effectively forbidding resources participating in those programs from clearing in the wholesale markets."[49] At the same time, in preemption litigation before the U.S. Court of Appeals for the Seventh Circuit (the "Seventh Circuit"), Exelon has gushed about the Commission's power to "remedy any . . . distortion" caused by state subsidies[50] and eagerly directed the court's attention to the then-pending complaint in Docket No. EL16-49 asking that the Commission "apply a 'minimum offer price rule' to ZEC plants selling capacity in PJM's wholesale markets."[51] In the same case, the Commission similarly emphasized its "ability to ameliorate, as needed, detrimental effects on markets within

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48 June 29 Order, 163 FERC ¶ 61,236 at P 158.

49 Protest of Exelon Corporation and the PSEG Companies at 20, Docket No. EL18-169-000 (filed June 20, 2018).

50 Brief of Intervenor-Appellee Exelon Generation Company, LLC at 17, *Elec. Power Supply Ass'n v. Star*, ___ F.3d ___ (7th Cir. 2018) (No. 17-2433). 2017 WL 5054428 at *17.

51 *Id.* at 12.

its jurisdiction"[52] and specifically noted the then-pending complaint.[53] In affirming the dismissal of the preemption challenges to the Illinois ZECs scheme, the Seventh Circuit relied on these assurances regarding the Commission's ability – and, implicitly, its willingness – to address the impacts of subsidized resources on the organized markets.[54] Defenders of state subsidies cannot have it both ways: they cannot, on the one hand, defend state actions on the basis that the Commission has the power to counteract their effect on the wholesale markets but then object violently to any Commission effort to exercise that power. By the same token, the Commission, having assured the Seventh Circuit about its powers to address the impact of state subsidies on wholesale markets, cannot now decline to exercise those powers out of legally baseless concerns that doing so might interfere with state policy initiatives.

Significantly, the Commission did not find any conceptual flaws with the MOPR in the June 29 Order. To the contrary, the Commission's only criticism of the current MOPR was that it is not broad enough. Specifically, the Commission found the current MOPR to be unjust and unreasonable, because it "applies only to new natural gas-fired resources" and thus "fails to mitigate price distortions caused by out-of-market support granted to other types of new entrants or to existing capacity resources of any type."[55] The Commission rejected PJM's MOPR-Ex proposal for similar reasons, finding the proposed exemption for renewable resources to be unjust, unreasonable and unduly

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52 Brief of the United States and the Federal Energy Regulatory Commission as Amici Curiae in Support of Defendants-Respondents and Affirmance at 7, *Elec. Power Supply Ass'n v. Star*, ___ F.3d ___ (7th Cir. 2018) (No. 17-2433), 2018 WL 2746229 at *7.

53 *See id.* at 4-7.

54 *Electric Power Supply Ass'n v. Star*, ___ F.3d ___, 2018 WL 4356683 (7th Cir. 2018).

55 June 29 Order, 163 FERC ¶ 61,236 at P 5.

discriminatory.[56] As "[a]n expanded MOPR, with few or no exceptions,"[57] a "clean MOPR" would go to the heart of the problem with the current MOPR by broadening it to address price suppression caused by subsidies for other resources.

The record in these consolidated proceedings already includes ample evidentiary support for the commonsense proposition that a broader MOPR is the obvious and best remedy for the problem of a MOPR that is too narrow. For example, discussing PJM's MOPR-Ex proposal, economist Robert B. Stoddard has explained that "sweeping and unwarranted exemptions and exclusions from the rule will, in my judgment, undermine its intended and proper function."[58] In particular, Mr. Stoddard explains that the types of broad exemptions previously proposed by PJM are not "economically sound,"[59] and that "[d]eclining to review the alignment of bids and costs in these cases exposes the market to needless risk, volatility in prices, and premature retirements."[60] Accordingly, "all resources receiving a Material Subsidy should be subject to mitigation to ensure that the posted clearing prices reflect a fully mitigated, competitive supply curve."[61] As Dr. Sotkiewicz points out, even seemingly small exceptions or exemptions can have substantial impacts on clearing prices and the efficiency of the RPM auctions.[62]

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[56] *Id.* at P 105.

[57] *Id.* at P 158.

[58] Protest of the NRG Companies, Affidavit of Robert B. Stoddard on Behalf of the NRG Companies, ¶ 53, Docket No. ER18-1314-000 (filed May 7, 2018).

[59] *Id.*, ¶ 59.

[60] *Id.*, ¶ 58.

[61] *Id.*, ¶ 37.

[62] *See* Sotkiewicz Affidavit, ¶ 131.

In the same vein, Dr. Shanker stated that a "clean MOPR" is the "only realistic fix that works,"[63] and that "the Clean MOPR is the only option I am aware of that would ensure that PJM's capacity market satisfies the affirmative properties set out in the CASPR Order."[64] Specifically, Dr. Shanker explained that a clean MOPR would satisfy each of the "first principles" of capacity markets identified by the Commission, because:

- A Clean MOPR facilitates robust competition for capacity supply obligations, all units are on an equal footing in the Commission's jurisdictional markets.
- A Clean MOPR doesn't impede or distort price signals, risks reside on those who wish to support out of market subsidies, not on others. In turn it provides price signals that guide the orderly entry and exit of capacity resources.
- A Clean MOPR results in the selection of the least-cost set of RTO resources that satisfy market needs without artificial price suppression. There is no price distortion. Subsidies can exist, but at the expense of the sponsor should a mitigated subsidized unit fail to clear the RPM market.
- A Clean MOPR provides price transparency – there would be no subsidies to distort the auction process. An implementation issue would be assuring the accuracy of mitigated and unit specific offers.
- A Clean MOPR shifts risk as appropriate from customers to private capital or the political entities sponsoring or mandating the subsidies. There is open choice for those who propose the subsidy to either face the risk of not clearing in the auction or to potentially elect to remove themselves from the general capacity markets and accept FRR status. The decision is that of the state, and the associated costs are not foisted on the rest of the market.

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63 EL18-169 Shanker Affidavit, ¶ 37.

64 *Id.*, ¶ 17.

- A Clean MOPR helps mitigate market power. No rule per se eliminates market power, but it can make it more transparent and easier to identify then mitigate. In the absence of price distortions, the Clean MOPR accomplishes just these objectives.[65]

Importantly, a clean MOPR will also provide broad and continuing protection against evolving subsidy programs, rather than requiring market participants to re-litigate the issue whenever new subsidies emerge. This is particularly crucial because, as the June 29 Order observed, subsidy programs continue to grow and evolve "based on an ever-widening scope of justifications."[66] The RPM market cannot function effectively if there is always a cloud of uncertainty hanging over the market about whether and when the Commission will act to check the subsidy *du jour*. At the same time, it is neither necessary nor useful to require an examination of the validity of, or the rationale underlying, a particular subsidy, because "resources receiving out-of-market support are capable of suppressing market prices, regardless of intent."[67] Accordingly, the Commission should require PJM to implement a "clean MOPR" mechanism that will give market participants and investors much needed confidence that the RPM market will be protected from emergent threats.

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65 *Id.*, ¶ 40.

66 June 29 Order, 163 FERC ¶ 61,236 at P 1 (also noting that "[w]hat started as limited support primarily for relatively small renewable resources has evolved into support for thousands of [MW] of resources ranging from small solar and wind facilities to large nuclear plants").

67 *Id.* at P 155 (citation omitted).

2. The Term "Material Subsidy" Should Include Federal Subsidies

Federal subsidies are no less a threat to the "fundamental principles of supply and demand"[68] than state subsidies. Accordingly, there is no basis for a blanket exclusion of federal subsidies from the definition of the term "Material Subsidy."[69] Addressing the threat to the market from federal subsidies is particularly critical in light of the well-publicized presidential directive that the Department of Energy ("DOE") take action to prevent the retirement of coal-fired and nuclear-powered generation facilities in the PJM region and elsewhere.[70] As Commissioner LaFleur and others recognized when the Commission terminated a similar DOE-initiated rulemaking, such action threatens to "be highly damaging to the ability of the market to meet customer needs . . . fairly, efficiently, and transparently."[71] Federal actions of this sort are indistinguishable from state actions to prop up uneconomic facilities, and subsidized resources receiving federal subsidies must similarly be subject to mitigation.

It would be wholly improper and unlawful for the Commission to ignore the effect of certain subsidized resources simply because the subsidies are granted by federal, rather than state, actors. In fact, because there is no rational basis for distinguishing

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68 *Id.* at P 2.

69 EPSA would not object to the exclusion of federal subsidies adopted prior to the March 21, 2016 refund effective date established in the June 29 Order. *See* June 29 Order, 163 FERC ¶ 61,236 at P 174.

70 *See, e.g.*, Jennifer A. Dlouhy, *Trump Orders Action to Stem Coal, Nuclear Plant Shutdowns* (Bloomberg, June 1, 2018), https://www.bloomberg.com/news/articles/2018-06-01/trump-orders-perry-to-stem-coal-nuclear-power-plant-closures-jhw8smiv; Brad Plumer, *Trump Orders a Lifeline for Struggling Coal and Nuclear Plants* (New York Times, June 1, 2018), https://www.nytimes.com/2018/06/01/climate/trump-coal-nuclear-power.html.

71 *Grid Reliability & Resilience Pricing*, 162 FERC ¶ 61,012 at at 61,041 (2018) ("*Grid Reliability*") (LaFleur, Comm'r, concurring).

between state and federal subsidies, such an approach would present precisely the same undue discrimination problem as the exemption of renewable resources from PJM's MOPR-Ex: there would be no way for the Commission to show "that the exempted resources have a different impact on [PJM's] capacity market than those which are not exempted."[72]

Absent a clear congressional directive, there would certainly be no legal grounds for adopting a blanket distinction between federally-subsidized resources and state-subsidized resources. The Commission indisputably possesses exclusive jurisdiction over wholesale sales of electricity in interstate commerce, including (but not limited to) the rates, terms and conditions for sales in the PJM markets.[73] It is, to put it mildly, implausible to suggest that Congress would reallocate that jurisdiction to some other federal agency, such as DOE, the Department of Defense or the Internal Revenue Service (the "IRS"), merely by authorizing that other agency to grant subsidies to certain resources. Such a backhanded "infringement of the [Commission]'s exclusive jurisdiction" would "constitute a repeal by implication."[74] Repeal by implication is highly disfavored and will only be found where congressional "intent to repeal . . . is clear and manifest."[75] As the Supreme Court has held, Congress "does not alter the fundamental

[72] June 29 Order, 163 FERC ¶ 61,236 at P 105.

[73] *See, e.g., Hughes v. Talen Energy Mktg., LLC*, 136 S.Ct. 1288, 1297 (2016); *Mississippi Power & Light Co. v. Mississippi,* 487 U.S. 354, 371 (1988).

[74] *Hunter v. FERC*, 711 F.3d 155, 159 (D.C. Cir. 2013).

[75] *Agri Processor Co. v. NLRB*, 514 F.3d 1, 4 (D.C. Cir. 2008).

details of a regulatory scheme in vague terms or ancillary provisions – it does not, one might say, hide elephants in mouseholes."[76]

Even if this were a gray area (and it is not), the idea that Congress would casually reallocate jurisdiction in this way or would expect the Commission to refrain from exercising its jurisdiction where below-cost offers from federally subsidized resources were concerned does not hold water. The Commission is not just the one agency granted exclusive jurisdiction in this area; it is also the one federal agency expert in matters relating to wholesale markets and rates.[77] It defies credulity, therefore, to suggest that Congress would reallocate responsibility in this area without being explicit about it. The Supreme Court rejected just such a contention with respect to interpretation of the Affordable Care Act, stating: "It is especially unlikely that Congress would have delegated this authority to the *IRS*, which has no expertise in crafting health insurance policy of this sort . . . . This is not a case for the IRS."[78] Consistent with the presumption that Congress "delegates interpretive lawmaking power to the agency rather than the reviewing court" in light of the former's "historical familiarity and policymaking expertise," the Supreme Court has found that, when Congress delegates

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[76] *Whitman v. American Trucking Ass'ns, Inc.*, 531 U.S. 457, 468 (2001) (internal citation omitted). *See also Gonzales v. Oregon*, 546 U.S. 243, 267 (2006) ("The idea that Congress gave the Attorney General such broad and unusual authority through an implicit delegation . . . is not sustainable."); *FDA v. Brown & Williamson*, 529 U.S. 120, 160 (2000) (rejecting the idea that Congress would "have intended to delegate a decision of such economic and political significance to an agency in so cryptic a fashion").

[77] *See*, *e.g.*, *New England Power Generators Ass'n, Inc. v. FERC*, 757 F.3d 283, 297 (D.C. Cir. 2014) (deferring to "FERC's expertise" and stating that "whether its mitigation measures would encourage older resources to stay in the market . . . is precisely the sort of policy matter FERC is charged with considering").

[78] *King v. Burwell*, 135 S. Ct. 2480, 2489 (2015) (emphasis in original) (internal citation omitted).

powers to multiple federal agencies, it is appropriate to "presume here that Congress intended to invest interpretative power in the administrative actor in the best position to develop these attributes."[79] Where wholesale rates and markets are concerned, the Commission is clearly that administrative actor.

Relatedly, the Commission should not – and lawfully cannot – abdicate its "duty under the FPA to take actions necessary to assure just and reasonable rates" in organized capacity markets[80] out of deference to policy determinations about wholesale markets that may expressly or implicitly inform other federal agencies' subsidy decisions. Other federal agencies are free, within the constraints of their organic statutes and resources, to form their own opinions about the adequacy of the organized capacity markets, and at least one federal agency, DOE, even has some limited ability to force the Commission to consider its opinions.[81] But the views and actions of other federal agencies "deserve no deference where they proceed neither from a congressional delegation nor from agency expertise."[82]

B. The Commission Should Abandon The FRR Alternative Proposal

1. The FRR Alternative Is Inherently Unjust, Unreasonable and Unduly Discriminatory

As an initial matter, the June 29 Order offers little explanation for, and no evidence supporting, the Commission's preliminary conclusion that the FRR Alternative may be just and reasonable. The FRR Alternative is, in fact, demonstrably unjust and

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[79] *Martin v. Occupational Safety & Health Review Comm'n*, 499 U.S. 144,153 (1991).

[80] CASPR Order, 162 FERC ¶ 61,205 at P 21 (citation omitted).

[81] 42 U.S.C. § 7172 (2012).

[82] *Murphy Exploration & Prod. Co. v. Department of the Interior*, 252 F.3d 473, 479 (D.C. Cir. 2001).

unreasonable, and the "bifurcated capacity construct"[83] that will result will, as Commissioner LaFleur warns, "hasten[] the demise of the capacity market[] . . . ."[84] In fact, the FRR Alternative results in the same price suppression and price distortion that the Commission properly found to be unjust and unreasonable in the June 29 Order,[85] and thus, as Dr. Sotkiewicz explains, has effects equivalent to those of an exercise of buyer-side market power.[86]

At stakeholder meetings, the IMM has provided examples demonstrating that the FRR Alternative "results in price suppression if the subsidized resource would not clear in the [RPM] auction" and "in price increases and decreases if the subsidized resource would clear in the auction."[87] Dr. Sotkiewicz's analysis confirms that the FRR Alternative is likely to result in substantial price suppression when, as is likely to be the case, the resources being removed from the RPM market are uneconomic and would not have cleared.[88] The IMM has made clear that, with the FRR Alternative in place, the RPM Auction clearing prices "will not provide efficient entry and exit signals," and "[l]oad will pay more in the longer term due to the resulting inefficient fleet of resources."[89] This violates the capacity market principles articulated in the CASPR Order, including the

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83 June 29 Order, 163 FERC ¶ 61,236 at P 161.

84 *Id.* at 62,224 n.8 (LaFleur, Comm'r, dissenting).

85 *See id.* at PP 149-56.

86 *See* Sotkiewicz Affidavit, ¶¶ 19-26.

87 Joe Bowring, Monitoring Analytics, *Capacity Market Reforms* at 2 (Aug. 2, 2018) ("Bowring Presentation"), http://www.pjm.com/-/media/committees-groups/committees/mrc/20180802-special/20180802-imm-frr-presentation.ashx. *See also* Joe Bowring, Monitoring Analytics, Capacity Auction Clearing with Resource Specific FRR at 2 (Sept. 11, 2018), https://www.pjm.com/-/media/committees-groups/committees/mrc/20180911-special/20180911-imm-sensitivity-analysis.ashx.

88 *See* Sotkiewicz Affidavit, ¶¶ 100-19.

89 Bowring Presentation at 2.

principles that a capacity market should convey "price signals that guide the orderly entry and exit of capacity resources" and should "result in the selection of the least-cost set of resources that possess the attributes sought by the markets . . . ."[90]

Lest there was any doubt as to the FRR Alternative's impact on the market, PJM removed such doubt when it unveiled its initial proposal to implement the FRR Alternative, at an August 15, 2018 meeting of the Markets and Reliability Committee.[91] Under this approach, resources electing the FRR Alternative would "be self-scheduled in the auction and no adjustments will be made to the demand curve."[92] In other words, subsidized resources subject to the FRR Alternative would simply be offered into the RPM Auctions on a price-taker basis – with no mitigation at all – and would have exactly the same effect on clearing prices as unmitigated subsidized resources are having today, exactly the same effect that the June 29 Order correctly found to be unjust and unreasonable and unduly discriminatory.[93] While the mechanics of PJM's proposal underscore the point, the effect is the same regardless of whether the subsidized resource is offered into the RPM Auction or not. Indeed, Dr. Sotkiewicz describes how the FRR Alternative produces the same outcomes as an exercise of buyer-side market power, albeit by "demand . . . being brought to the higher cost resources outside the

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90 CASPR Order, 162 FERC ¶ 61,205 at P 21.

91 *See* PJM, *Current Approach to FERC Order on Capacity Markets and Public Policies* (Aug. 15, 2018), https://www.pjm.com/-/media/committees-groups/committees/mrc/20180815-special/20180815-item-02-current-approach-to-ferc-order-on-capacity-markets.ashx.

92 *Id.* at slide 11.

93 *See* June 29 Order, 163 FERC ¶ 61,236 at P 156 (stating that the current Tariff "allows resources receiving out-of-market support to significantly affect capacity prices in a manner that will cause unjust and unreasonable and unduly discriminatory rates").

market" rather than by "resources that were once out of market . . . being brought into the market . . . as price takers . . . ."[94]

From the perspective of the market, the FRR Alternative would, like the rejected "Capacity Repricing" proposal, discriminate against competitive resources by failing to account for the fact that "[t]he receipt of out-of-market support is a difference that requires different ratemaking treatment when such support has a material effect on price or cannot otherwise be justified by our statutory standards."[95] While the FRR Alternative would treat the subsidized resources differently in terms of how they are compensated, their offers into the RPM Auctions would, at least under PJM's proposal, be the same price-taker offers one would expect without a MOPR or under the "Capacity Repricing" proposal and would still have the same "material effect on price."[96] Acceptance of the FRR Alternative as a replacement rate thus cannot be reconciled with the Commission's findings in the June 29 Order or the requirement of Section 206 of the FPA that any replacement rate fixed thereunder be just and reasonable and not unduly discriminatory.

While EPSA appreciates the Commission's desire to accommodate state policies, the fact remains that the Commission and the courts have rejected claims that a MOPR infringes on state powers to make decisions regarding generation, and have found nothing wrong with states being required to bear the cost of those decisions, "including possibly having to pay twice for capacity."[97] In fact, the Commission acknowledged this

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94 Sotkiewicz Affidavit, ¶ 97.

95 June 29 Order, 163 FERC ¶ 61,236 at P 68.

96 *Id.*

97 *Conn. Dep't of Pub. Util. Control v. FERC*, 569 F.3d 477, 481 (D.C. Cir. 2009) ("*Connecticut DPUC*").

very precedent in the June 29 Order.[98] Inexplicably, however, right after doing so, the Commission turned around and declared that it may be just and reasonable to "mitigate or avoid the potential for double payment and over procurement . . . ."[99]

Similarly inexplicable and troubling is the Commission's proposal to effectively create a "bifurucated capacity construct"[100] through the FRR Alternative in an order that recognizes the existing problem of "'unplanned reregulation,' one subsidy and mandate at a time."[101] The only difference between unplanned regulation under the FRR Alternative and that which occurs under the existing construct is the alleged "increased transparency" of the former.[102] But even if the FRR Alternative provides greater transparency, that transparency does not make the resulting reregulation any more planned or any less damaging to what remains of the market. In fact, the Commission appears to concede as much, stating that the FRR Alternative "will not interfere with the states' ability to choose the path of re-regulation, whether via a conscious policy decision or ***a simple failure to take steps to prevent reregulation as described on an unplanned basis***."[103] The only advantage of the transparency afforded by the FRR Alternative is that "investors, consumers, and policymakers"[104] will have the opportunity to watch the collapse of the markets on the equivalent of a live-feed. That sort of

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98 *See* June 29 Order, 163 FERC ¶ 61,236 at P 160.

99 *Id.*

100 *Id.* at P 161.

101 *Id.* at P 163 (quoting CASPR Order, 162 FERC ¶ 61,205 at 62,098 (LaFleur, Comm'r, concurring)).

102 *Id.* at P 162.

103 *Id.* at P 163 (emphasis added).

104 *Id.* at P 162.

transparency does nothing to ensure that rates in those markets remain just and reasonable.

More broadly, as Dr. Sotkiewicz discusses at some length, the notion of a "bifurcated capacity construct" – under which a subsidized resource and a corresponding amount of load is perceived to be "outside of the PJM capacity market"[105] – appears to rest on a widely accepted "myth" that the existing FRR mechanism separates load and generation from the RPM market.[106] As he observes, "[t]his is clearly false."[107] First, because PJM's resource adequacy requirements are determined on a system-wide basis, taking demand out of the market, whether through the existing FRR or the FRR Alternative, necessarily and "fundamentally changes market outcomes, all other things being equal."[108] Second, where, as would presumably usually be the case under the FRR Alternative, the FRR resources are uneconomic, they are not being removed from the market at all because they would not have been part of the market solution.[109] From an RPM market perspective, therefore, it is simply not correct to imply that an FRR protects "the integrity of the PJM capacity market for competitive resources and load."[110]

The assertion in the June 29 Order that the FRR Alternative does "not interfere with the states' ability to choose the path of re-regulation"[111] is true enough, but that

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105 *Id.* at P 161.

106 Sotkiewicz Affidavit, ¶ 8.

107 *Id.*, ¶ 69.

108 *Id.*, ¶ 70.

109 *See id.*, ¶ 71.

110 June 29 Order, 163 FERC ¶ 61,236 at P 161.

111 *Id.* at P 163.

does not mean that the FRR Alternative is neutral on the issue. To the contrary, the FRR Alternative will actively push states towards the path of partial re-regulation by letting them choose to be part in and part out of the RPM construct and, more importantly, away from reliance on competitive, organized markets. The FRR Alternative thus departs from something that has been "a "core tenet of Commission policy" for "more than two decades now": Commission "support for markets and market-based solutions."[112] Admittedly, that support does not extend to mandating participation in regional transmission organizations ("RTOs"),[113] and states and utilities are certainly free to re-regulate and to withdraw from PJM if they see fit.[114] But that does not mean that the Commission should or must compromise its support for markets in order to carve out a comfortable middle ground that allows states to enjoy the significant benefits of RTO participation while avoiding the burdens. The Commission has, in fact, made clear that, while RTO participation is voluntary, states and utilities must bear the costs associated with their RTO choices.[115]

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112 *See Grid Reliability*, 162 FERC ¶ 61,012 at P 9.

113 *See Remedying Undue Discrimination through Open Access Transmission Serv. & Standard Mkt. Design*, 112 FERC ¶ 61,073 (2005) (terminating rulemaking proceeding in which the Commission proposed to make RTO participation mandatory).

114 *Regional Transmission Organizations*, Order No. 2000, FERC Stats. & Regs. ¶ 31,089 at 31,033 (1999) ("[W]e believe that a voluntary approach as we have structured it, with guidance and encouragement from the Commission, is most appropriate at this time."), *on reh'g*, Order No. 2000-A, FERC Stats. & Regs. ¶ 31,092 (2000), *aff'd sub nom. Public Util. Dist. No. 1 of Snohomish Cty., Wash. v. FERC*, 272 F.3d 607 (D.C. Cir. 2001).

115 *See American Transmission Sys., Inc. v. PJM Interconnection, L.L.C.*, 140 FERC ¶ 61,226 at P 31 (2012) (stating that "RTO participation is voluntary" and that, a transmission provider, after "considering the merits of its membership in PJM, elected to proceed and, thus, cannot now claim that PJM's [Regional Transmission Expansion Plan] cost allocation methodology created a barrier to entry"), *aff'd sub nom. FirstEnergy Serv. Co. v. FERC*, 758 F.3d 346 (D.C. Cir. 2014).

Moreover, while there is no question the FRR Alternative leaves the states free to reregulate, the Commission has previously held that, under the status quo, states already enjoy "full independence in resource procurement choices" without the FRR Alternative in that they "can implement a form of capacity procurement that complements the RPM or can opt out of the RPM markets via the FRR" mechanism.[116] What they do not enjoy is full independence from the consequences of their choices, but that should be regarded as a positive, not a negative. As the Commission stated in response to parties arguing that the existing FRR "may not be a viable substitute for many RPM participants," that "is an individual determination to be made by each state and distribution company. . . . based on their individual circumstances."[117] It is not the Commission's job to solve the "conundrum" described by former Commissioner Powelson, "where states chose to join an organized market, and yet want the ability to procure certain resources of their choosing."[118]

The June 29 Order implies that allowing a state to play the capacity market hokey-pokey, putting its left foot into the RPM market and pulling its right foot out, is a desirable design feature of the FRR Alternative proposal, touting this proposal as enabling states "to make informed decisions about the degree to which they prefer to rely on the capacity market versus out-of-market mechanisms . . . ."[119] This notion, however, is in direct conflict with the principles underlying the existing FRR, under which "FRR participants are not permitted to purchase any of their capacity through the [RPM]

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116 ER11-2875 Order, 135 FERC ¶ 61,022 at n.76.

117 ER11-2875 Rehearing Order, 137 FERC ¶ 61,145 at P 100.

118 CASPR Order, 162 FERC ¶ 61,205 at 62,099 (Powelson, Comm'r, dissenting).

119 June 29 Order, 163 FERC ¶ 61,236 at P 163.

auction while they are in the FRR option . . . ."[120] PJM proposed this prohibition in order to avoid "gaming" that will undermine other load-serving utilities and reliability.[121] Specifically, PJM explained:

> [I]f an FRR could place only part of its load in an FRR plan and then satisfy the remainder in RPM, it could obtain the long-term reliability benefits of the [demand] curve while protecting most of its load from the short-term reliability economic costs of the [demand] curve. PJM notes that such a result would be unfair to load serving entities that continue to participate in RPM and would encourage other load serving entities to follow the same approach, leaving only part of their loads in RPM and degrading the reliability assurances of the [demand] curve.[122]

Dr. Sotkiewicz explains how, irrespective of how it is implemented, the FRR Alternative will facilitate just such gaming.[123]

2. Requiring PJM To Implement The FRR Alternative Would Exceed The Commission's Authority Under FPA Section 206

Section 206 of the FPA[124] only authorizes the Commission to prescribe a replacement rate when it is actually remedying a rate or rate practice found to be unlawful (*i.e.*, unjust, unreasonable or unduly discriminatory). In other words, if it ain't broke, the Commission can't fix it. There is no question that the MOPR is broken in that it fails adequately to mitigate the "price suppressive impact of resources receiving out-of-market support,"[125] and the Commission is, therefore, authorized (and, indeed, required) to fix it. The Commission has not found anything broken in the MOPR or any

[120] *Midwest Indep. Transmission Sys. Operator, Inc.*, 139 FERC ¶ 61,199 at n.112 (2012).

[121] ER11-2875 Rehearing Order, 137 FERC ¶ 61,145 at P 175.

[122] *Id.* at P 176.

[123] *See* Sotkiewicz Affidavit, ¶¶ 52, 93-99.

[124] 16 U.S.C. § 824e (2012).

[125] June 29 Order, 163 FERC ¶ 61,236 at P 5.

provision of the Tariff that would be fixed by the FRR Alternative, which, as discussed above, does nothing to mitigate and would, in fact, exacerbate the price suppressive impact of subsidized resources. Consequently, even if the FRR Alternative were just and reasonable (and it is not), the Commission would have no basis for requiring PJM to adopt it.

To be sure, the Commission enjoys considerable discretion when "fashioning remedies" under Section 206 of the FPA.[126] But the Commission has no authority to fashion rate remedies in the absence of a demonstrated rate problem – *i.e.*, except as necessary to remedy an existing rate or practice to be unlawful under Section 206. It is black-letter law that "[a] finding that the existing provision is "'unjust, unreasonable, unduly discriminatory or preferential' is a condition precedent to the Commission's exercise of its power to fix a just and reasonable provision."[127] This condition precedent can only be satisfied where the Commission's remedy is "confined to the underlying

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[126] *Exxon Mobil Corp. v. FERC*, 571 F.3d 1208, 1216 (D.C. Cir. 2009)

[127] *New York State Elec. & Gas Corp. v. FERC*, 638 F.2d 388, 394 (2nd Cir. 1980) (quoting *FPC v. Sierra Pac. Power Co.*, 350 U.S. 348, 353 (1956)). *See also*, *e.g.*, *NRG Power Mktg., LLC v. FERC*, 862 F.3d 108, 114 n.2 (D.C. Cir. 2017) ("Section 206 requires FERC to demonstrate that *existing* rates are 'entirely outside the zone of reasonableness' before FERC imposes a new rate without the consent of the utility . . . ." (quoting *City of Winnfield v. FERC*, 744 F.2d 871, 875 (D.C. Cir. 1984)) (emphasis in original)); *South Carolina Pub. Serv. Auth. v. FERC*, 762 F.3d 41, 64-65 (D.C. Cir. 2014) (quoting 16 U.S.C. § 824e (2012)) (holding that the Commission "regulate a practice affecting rates pursuant to Section 206, the Commission must find that the existing practice is 'unjust, unreasonable, unduly discriminatory or preferential,' and that the remedial practice it proposes is 'just and reasonable.'" (quoting 16 U.S.C. § 824e)); *Public Serv. Comm'n of N.Y. v. FERC*, 642 F.2d 1335, 1343 (D.C. Cir. 2000) ("The Commission, then, has the power under the Natural Gas Act to impose its own rates or methods for their calculation upon regulated companies only after finding an existing or proposed rate unjust or unreasonable."); *Public Serv. Co. of N.M. v. FERC*, 832 F.2d 1201, 1208 (D.C. Cir. 1987) ("[W]hen FERC seeks to impose a change not proposed by the company, the statute provides that the Commission must first find the existing provision unjust or unreasonable.") (internal citation omitted); *Mississippi Valley Gas Co. v. FERC*, 659 F.2d 488, 503 (5th Cir. 1981) ("[T]he Commission was required to find the old [rate] method unlawful before it could impose a new method.").

violation" and "proportionate to the problem being addressed."[128] In other words, however broad the Commission's remedial discretion, that discretion is not so broad as to empower the Commission to perform a nose job when it has diagnosed the ratemaking equivalent of a ruptured spleen.[129] Having found the Tariff to be unjust and unreasonable solely because it fails adequately "to address price suppressive impact of resources receiving out-of-market support,"[130] the Commission may not propose a replacement rate that does nothing to address (and, in fact, exacerbates) the price suppression.

In the June 29 Order, the Commission found the Tariff to be unjust, unreasonable and unduly discriminatory, because the current MOPR fails adequately "to address the price suppressive impact of resources receiving out-of-market support."[131] More specifically, the Commission found that, "because the current MOPR applies only to new natural gas-fired resources, it fails to mitigate price distortions caused by out-of-market support granted to other types of new entrants or to existing capacity resources of any type."[132] "An expanded MOPR, with few or no exceptions,"[133] as proposed in the June 29 Order, addresses precisely the price suppression problem identified in the June 29 Order. It is thus a remedy "appropriately confined to the underlying violation"

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128 *United Distrib. Cos. v. FERC*, 88 F.3d 1105, 1132 (D.C. Cir. 1986) ("*UDC*").

129 Of course, as discussed above, the RPM market would be lucky if the FRR Alternative were as benign or even potentially beneficial as a nose job.

130 June 29 Order, 163 FERC ¶ 61,236 at P 5.

131 *Id.*

132 *Id.* (footnote omitted). *See also id.* at PP 150-56.

133 *Id.* at P 158.

and "proportionate to the problem being addressed."[134] That is not true of the FRR Alternative; in fact, the only connection between the FRR Alternative and the problem is that it would make that problem worse.

Nowhere in the June 29 Order did the Commission make any finding that the current FRR, the current MOPR or the current Tariff more broadly is unjust, unreasonable or unduly discriminatory in any way that would be remedied by the FRR Alternative. The only justification for the FRR Alternative offered in the June 29 Order is that the Commission would prefer to "accommodate" subsidized resources.[135] But the Commission did not find that the current Tariff is unjust and unreasonable by virtue of being insufficiently accommodating of subsidized resources. To the contrary, the Commission found the current Tariff to be unjust and unreasonable precisely because it is ***too accommodating*** of such resources inasmuch as it does nothing to mitigate price suppression caused by resources other than new natural gas-fired resources.[136]

Nor can the FRR Alternative be justified as a remedy for some unjust, unreasonable or unduly discriminatory "side effect" of an expanded MOPR. Arguably, the Commission's remedial discretion is broad enough that it could adopt a secondary remedy not directed to the underlying unlawfulness but to unlawful side effects of its primary remedy, much as it may "approve changes under section 206 in anticipation of the impacts of [a] section 205 filing rather than wait for those impacts to be realized."[137] Even so, the predicate for the exercise of the Commission's Section 206 authority

134 *UDC*, 88 F.3d at 1132.

135 June 29 Order, 163 FERC ¶ 61,236 at P 160.

136 *See id.* at P 5.

137 *Advanced Energy Mgmt. Alliance v. FERC*, 860 F.3d 656, 664 (D.C. Cir. 2017).

remains: the Commission would have to find the proposed primary remedy unjust, unreasonable or unduly discriminatory in some way that would justify a secondary remedy that, like the FRR Alternative, does nothing to address the "underlying violation."[138] Unless something about the remedy for the ruptured spleen causes the patient's nose to become unjust, unreasonable or unduly discriminatory, the Commission remains powerless to perform that nose job.

The Commission did not find any unjust, unreasonable or unduly discriminatory "side effects" of an expanded MOPR in the June 29 Order. To the contrary, the Commission acknowledged and reaffirmed Commission and judicial precedent holding that there is nothing unjust, unreasonable or unduly discriminatory about customers having to "pay twice" for capacity when states subsidize resources in the face of a MOPR.[139] There is nothing in the Commission's subsequent statement that it "do[es] not take this concern – or the states' right to pursue valid policy goals – lightly"[140] or elsewhere in the June 29 Order that suggests that the Commission now believes otherwise. And, even if it does, there is certainly nothing in the order that could be construed as acknowledging, much less provided a reasoned basis for, what would represent a significant departure from well-reasoned precedent.[141]

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138 *UDC*, 88 F.3d at 1132.

139 June 29 Order, 163 FERC ¶ 61,236 at P 159 (citing *Connecticut DPUC*, 569 F.3d 477, 481 (D.C. Cir. 2009). *See also New Jersey BPU*, 744 F.3d at 978 (explaining that, with a MOPR in place, the states "are free to make their own decisions regarding how to satisfy their capacity needs, but they 'will appropriately bear the costs of [those] decision[s],' . . . including possibly having to pay twice for capacity" (citation and footnote omitted)).

140 June 29 Order, 163 FERC ¶ 61,236 at P 159.

141 *See*, *e.g.*, *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009) (holding that, when changing policy, an agency "may not . . . depart from [the] prior policy *sub silentio*" and "must show that there are good reasons for the new policy"); *New England Power Generators,*

III. CONCLUSION

WHEREFORE, for the foregoing reasons, EPSA requests that the Commission (1) require PJM to implement a "clean MOPR," and (2) abandon the FRR Alternative.

Respectfully submitted,

ELECTRIC POWER SUPPLY ASSOCIATION

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On behalf of the
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Dated: October 2, 2018

Inc. v. FERC, 881 F.3d 202, 213 (D.C. Cir. 2018) ("Although FERC may be sincere in its change of heart and, as a substantive matter, correct that its new rationale is just and reasonable, the Commission must provide some analysis and explanation in its Orders regarding why it changed course."); *West Deptford Energy, LLC v. FERC*, 766 F.3d 10, 20 (2014) ("It is textbook administrative law that an agency must 'provide[ ] a reasoned explanation for departing from precedent or treating similar situations differently' . . . ." (quoting *ANR Pipeline Co. v. FERC*, 71 F.3d 897, 901 (D.C. Cir. 1995)).

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document on each person designated on the official service list compiled by the Secretary of the Federal Energy Regulatory Commission in this proceeding.

Dated at Washington DC, this 2nd day of October, 2018.

/s/ Stephanie S. Lim
Stephanie S. Lim

Attachment A

The Sotkiewicz Affidavit

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Calpine Corporation **v.** **PJM Interconnection, L.L.C.**	**)))))**	**Docket No. EL16-49-000**
PJM Interconnection, L.L.C.	**))**	**Docket No. ER18-1314-000** **Docket No. ER18-1314-001**
PJM Interconnection, L.L.C.	**)**	**Docket No. EL18-178-000**
		(Consolidated)

<u>AFFIDAVIT OF PAUL M. SOTKIEWICZ, PH.D.</u>

I. QUALIFICATIONS

1. My name is Dr. Paul M. Sotkiewicz. I am the President and Founder of E-Cubed Policy Associates, LLC ("E-Cubed") and formerly served as the Chief Economist in the Market Service Division of PJM Interconnection, L.L.C. ("PJM"). I have been asked by the Electric Power Supply Association ("EPSA") to submit this affidavit in support of comments in response to the Commission initiated paper hearing on PJM's Reliability Pricing Model ("RPM") in these proceedings.[1]

2. Prior to founding E-Cubed, I worked as a contractor and directly for PJM Interconnection, L.L.C. ("PJM") in Audubon, Pennsylvania from February 2008 until October 2016. In my time at PJM I first served as a Senior Economist until March 2010 and subsequently as the Chief Economist in the Market Service Division until June 2015. From July 2015 until October 2016, I worked as a contractor for PJM under

[1] *Calpine Corp. v. PJM Interconnection, L.L.C.*, 163 FERC ¶ 61,236 (2018) ("June 29th Order").

the Title of Senior Economic Policy Advisor. Prior to joining PJM, I served as the Director of Energy Studies at the Public Utility Research Center ("PURC"), University of Florida from August 2000 until February 2008 and I was an Economist at the Federal Energy Regulatory Commission ("FERC") from September 1998 until August 2000. I have a B.A. in History and Economics from the University of Florida (1991), and an M.A. (1995) and Ph.D. (2003) in Economics from the University of Minnesota.

3. I have 20 years of experience on matters at the intersection of utility regulatory policy, power system economics, and environmental economics. In my current role, I advise private- and public-sector clients on a range of economic issues related to electricity market design and performance, power generation economics, utility regulatory policy, and the economic impacts of state and federal environmental policies. At PJM I provided expert analysis, advice, and support for PJM initiatives related to market design changes in, and performance of, PJM's energy, ancillary service, and capacity markets.

While the Director of Energy Studies at PURC, I provided executive education and expert advice to regulatory staff and utility professionals from around the world in matters such as electric power regulation, market design, incentive regulation, and cost-of-service rate cases and rate design.

As an economist at FERC, I worked on market design issues and filings related to the newly formed ISO/RTO markets concentrating primarily on the New York ISO and the California ISO markets. The entirety of my experience and work history can be found in my CV attached as Attachment A.

A. Specific Experience with Respect to RPM in PJM and other Capacity Markets

4. During my tenure at PJM, I led the PJM team working with the Brattle Group conducting the triennial review (now quadrennial) of the cost of new entry for gas-fired combustion turbines and combined cycle resources in 2011 and 2014 and provided affidavits in support of PJM filings in both cases as shown on my CV. I was also part of the team that developed and implemented the Capacity Performance construct which was heavily influenced by the ISO New England work on what is now Pay-for-Performance in the Forward Capacity Market.

5. As Chief Economist at PJM, I was involved in the helping PJM develop various iterations of the Minimum Offer Pricing Rule ("MOPR") as filed at, and approved by, the Commission. Additionally, I was responsible for the administration of the unit specific MOPR exemption process at PJM, and I also oversaw the application of the Competitive Entry and Self-Supply Exemptions in the previous version of the MOPR that was later vacated in *NRG*.[2] I also worked with PJM staff to update the Avoidable Cost Rate ("ACR") default values used in the mitigation of offers into the PJM RPM Capacity Market.[3]

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[2]For the MOPR in place for the 2011 and 2012 BRA, *see PJM Interconnection, L.L.C.*, 153 FERC ¶ 61,022 (2011) ("April 2011 MOPR Order). For the MOPR in place from 2013 to 2017 until vacatur *see PJM Interconnection, L.L.C.*, 143 FERC ¶ 61,090, (2013) ("May 2013 MOPR Order"), *reh'g denied*, 153 FERC ¶ 61,066 (2015) ("October 2015 MOPR Order"), *vacated & remanded sub nom. NRG Power Mktg., LLC v. FERC*, 862 F.3d 108 (D.C. Cir. 2017), *reh'g denied*, 2017 U.S. App LEXIS 18218 (D.C. Cir. Sept. 20, 2017).

[3] *See* PJM Interconnection, L.L.C. *Revisions to the PJM OATT Attachment DD Avoidable Cost Rates* in Docket No. ER13-529, December 7, 2012. Attachment A to this filing was the analysis underlying the proposed changes.

6. Since Founding E-Cubed I have worked with the Alberta Electric System Operator ("AESO") on the development of their new capacity market construct providing advice on all facets of capacity market design and incentives. I have also provided capacity market advice to the New England Power Generators Association, Inc. (NEPGA) on ISO New England Forward Capacity Market (FCM) including recent changes to the Dynamic De-list Bid Threshold (DDBT) and in support of a complaint on the harm to the FCM construct by allowing resources held for reliability to be treated as price takers.

II. EXECUTIVE SUMMARY: KEY FINDINGS AND CONCLUSIONS

7. The details and facts around the Commission's determination in the June 29th Order are extremely technical in nature and require an extensive development within the body of the affidavit to reach the key conclusions. A summary of key findings and conclusions is presented along with the corresponding logic and intuition. The technical details are presented within the body of the affidavit starting with Section III.

A. The Concept that the Fixed Resources Requirement "Removes" Demand and Supply from the Market is a Myth and is Not Correct

8. One concept the comes up in the June 29th Order regarding the Fixed Resource Requirement ("FRR") as it exists in the PJM Tariff today and the FRR Alternative offered by the Commission is the idea that both supply resources and demand are simply removed from the market. This idea is a myth, it is incorrect, and is discussed in Sections V and VI below.

9. First, demand cannot be "taken out of the market". The demand for resource adequacy in PJM is determined for the entire PJM footprint and load, including load that opts into

FRR under the PJM Tariff today. When a load serving entity ("LSE") opts to use FRR under the PJM Tariff today, it is not taking its demand, or resource adequacy obligation, out of the market. The LSE is choosing to fulfill its portion of the entire PJM resource adequacy need with resources that it owns or has under contract. The FRR Alternative proposed as a remedy suffers from the fallacy.

10. Second, as a practical matter a corresponding amount of supply is "not taken out of the market". Historically, the resources used to satisfy the FRR obligations have had costs that were far above market prices in RPM. The most current price that has been reported for an FRR entity is by American Electric Power ("AEP") operating company Appalachian Power Company ("APCo") at $486/MW-day.[4] This is nearly 3.5 times the market price in RTO for the 2021/2022 Base Residual Auction ("BRA"). Going further back in history, the AEP operating companies had filed rates of $300-$400/MW-day when PJM capacity prices were below $50/MW-day.[5]

11. With the resources being used to meet the FRR load obligation above market prices, it is erroneous to say they are being removed from the market when they were never a part of the least-cost resource mix to meet the PJM resource adequacy obligation. You cannot remove supply from the market when it was not in the market. The FRR Alternative suffers from the same erroneous idea especially as the resources that would be used to meet the FRR Alternative are already assumed to "be out of the market" with costs well above the competitive price level.

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[4] This information is available from PJM at https://www.pjm.com/-/media/markets-ops/settlements/frr-lse-capacity-rates/capacity-formula-rate-summary.ashx?la=en.

[5] American Electric Power Service Corporation, PJM Interconnection, LLC, Docket No. ER11-2183, November 24, 2010, Attachment B, at 1.

12. Overall, the idea behind FRR and the proposed FRR Alternative talking demand and supply out of the market is a great sound-bite that gives the illusion of protecting the market but does nothing of the kind. It actually can and does inflict even greater damage to the market.

B. The Effect of FRR and the FRR Alternative is to Artificially Reduce Prices Below Competitive Levels, Inefficient Displace Lower Cost Resources in Favor of Higher Cost Resources, Shifts Costs and Benefits between Market Participants, and Reduce overall Market Efficiency

13. It is a myth the demand for resource adequacy can be removed from the market as described above. However, what FRR does, and the FRR Alternative would do is to remove a portion of the demand from the RPM price formation process and set it aside in another price formation process to be paid by load electing the FRR or FRR Alternative. Imagine taking the demand for FRR or the FRR Alternative out of the RPM Variable Resource Requirement ("VRR") Curve, the demand curve for capacity, and setting it off to the side for a price to be determined in another way.

14. But keep in mind it is a myth to remove the supply from the market because the supply being used for FRR or the FRR Alternative is not part of the competitive, least-cost resource mix. So effectively, nothing changes the supply in the RPM price formation process.

15. The net effect of this is to reduce the demand in the RPM price formation process while leaving the effective supply unchanged. This has the immediate effect of artificially reducing prices in RPM below the competitive level.

16. The next immediate effect is to displace resources that are lower cost and would have been a part of the least-cost resources mix absent FRR or the FRR Alternative. And these resources would be replaced by the higher cost resources selected by the LSE as

part of its FRR election or FRR Alternative election in the case of the proposed remedy. Not only are we switching out low cost resources, but there is a shift in benefits from the displaced resources to the higher cost, subsidized resources.

17. There is also a shifting of market benefits from load overall, the subsidized resources that would not have been part of the competitive, least-cost solution absent the FRR or FRR Alternative. And there is a shifting of market benefits from resources remaining in the RPM price formation, to the load remaining in the RPM price formation.

18. Finally, with all the shifting of costs, there is a loss in overall benefits. The analogy to this is thinking about transferring water from one trough to another. When the transfer of water takes place, water may slosh around spill out on the ground during the transfer to the other trough or the bucket may have a small hole in it leaking water along the way. In either case, the water in the second trough will be less than what you initially started with as water spilled or leaked out in the process. The transfer of benefits between market participants due to FRR and the FRR Alternative is now different.

C. The FRR Alternative Proposed Remedy, Unlike FRR, Is Equivalent to the Mechanism used to Exercise Buyer Side Market Power and Inflicts the Same Damage as Exercises of Buyer-Side Market Power

19. The exercise of buyer-side market power requires the load carrying out the strategy to pay above-market prices to a resource that would otherwise not be a part of the competitive, least-cost resource mix because its costs are above the competitive price. The next part of the strategy is to "bring that resource into the market" by inserting the uncompetitive, high cost resource into the market as if it were a low-cost resource, in all likelihood as a price taker. An extended discussion of this is contained in Section VIII.

20. The effect of this strategy is to expand the supply of “apparently low-cost resources” while holding the demand for capacity fixed. The resulting outcome from the successful execution of this strategy is to 1) artificially suppress prices below their competitive levels; 2) displace more efficient lower cost resources from the resource commitment in favor of the higher cost, but subsidized resources; 3) reduce revenues for remaining resources; 4) shift revenues from lower cost resources to higher costs resources; 5) shift market benefits from producers to consumers; and 6) reduce the overall benefits of the market as the shifting of revenues and consumer benefits results in a loss of total benefits akin to the leaky bucket example.

21. The load executing the buyer-side market power strategy benefits by paying more for some portion of their capacity obligation while driving down the market price, so it pays less for its remaining obligation so that their overall capacity expenditures are reduced.

22. The existence of this strategy is the reason for the MOPR as a mitigation measure against buyer-side market power.

23. The proposed FRR Alternative remedy uses a mechanism that would allow a load to pay for selected resources at above market prices, just as in the execution of the buyer-side market power strategy. But rather than holding demand constant, and inserting the subsidized resources into the market as a price taker, demand is removed from the RPM price formation step and competitive supply is held constant.

24. The effects on market outcomes are identical to an exercise of buyer-side market power. The FRR Alternative would: 1) artificially suppress prices below their competitive levels; 2) displace more efficient lower cost resources from the resource

commitment in favor of the higher cost, but subsidized resources; 3) reduce revenues for remaining resources; 4) shift revenues from lower cost resources to higher costs resources; 5) shift market benefits from producers to consumers; and 6) reduce the overall benefits of the market as the shifting of revenues and consumer benefits results in a loss of total benefits akin to a leaky bucket.

25. Furthermore, the proposed FRR Alternative provides the same incentive to exercise buyer-side market power since the FRR Alternative does not require an "all or nothing" decision on electing FRR as the FRR in the PJM Tariff requires. That is, the FRR Alternative allows a LSE to choose how much load to be in the FRR Alternative while exposing the remaining load to the lower market prices. In contrast, the FRR in the PJM Tariff requires that all load for an LSE face the high cost of paying for uncompetitive resources without the opportunity to benefit from lower market prices. And while the FRR in the PJM Tariff has exactly the same effects on market outcomes, it is not an exercise of buyer-market power. The "all or nothing" requirement provides a disincentive to load to exercise that option since they bear the entire cost of their FRR election while the FRR Alternative removes this disincentive.

26. Effectively, if the Commission were to approve the FRR Alternative remedy, it would be hard-wiring the ability for LSEs to exercise buyer-side marker power into the PJM market design and would be effectively destroying competitive wholesale power market and moving wholesale market back toward re-regulation.

D. PJM's Market Simulations of Different Scenarios from the 2020/2021 BRA Provide Estimates of the Damage that Can be Inflicted on the Market Through the Proposed FRR Alternative

27. Following the conclusion of each BRA, PJM has posted simulation scenarios that add capacity to the market as price takers or capacity out of the market at the bottom of the

supply stack. The purpose of these simulation scenario is to show the effects on market prices and market quantities in each LDA.

28. For the 2020/2021 BRA, PJM ran four scenarios that added capacity to the bottom of the supply stack as price takers: 1) add 3000 MW in RTO outside of MAAC; 2) add 6000 MW in RTO outside of MAAC; 3) add 3000 MW in MAAC; and 4) add 6000 MW in MAAC.[6] Recall, adding price taking capacity that is higher cost than the competitive price leads to identical outcomes to the proposed FRR Alternative, so that these scenarios show the extent of the damage that can be inflicted upon the market.

29. **Table 1** summarizes the results from the scenario runs. More detailed results by LDA can be found in Section IX.

Table 1: Summary Results from PJM 2020/2021 BRA Simulation Scenarios

	3000 MW in RTO	6000 MW in RTO	3000 MW in MAAC	6000 MW in MAAC
Price Reductions ($/MW-Day)				
RTO	**$7.21 (9.42%)**	**$16.53 (21.60%)**	**$2.03 (2.65%)**	**$1.53 (2.00%)**
MAAC	**---**	**---**	**$1.04 (1.21%)**	**$11.04 (12.83%)**
Displaced MW				
PJM Total	**2743.7 (91.46%)**	**5412.3 (91.21%)**	**2927.8 (97.59%)**	**5945.6 (99.09%)**
MAAC	**---**	**---**	**2981.5 (99.38%)**	**5458.5 (90.98%)**
Revenue Reductions ($millions)				
PJM Total	**$276.47 (4.12%)**	**557.02 (8.30%)**	**$538.95 (8.03%)**	**$904.59 (13.48%)**
MAAC	**---**	**---**	**$423.09**	**$778.41**

[6] PJM, *Scenario Analysis for the 2020/2021 Base Residual Auction*, July 296, 2017. Available at https://pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2020-2021-bra-scenario-analysis.ashx?la=en.

			(14.88%)	(27.38%)
Breakeven Subsidy ($/MW-day above Price)				
RTO	$252.48	$254.35	---	---
MAAC	---	---	$386.39	$355.44

30. **Table 1** shows clearly the decline in price from inserting above-market-cost resources into the market as price takers in both RTO and MAAC locational deliverability areas ("LDAs"). The displacement of lower cost resources by higher cost resources is not quite a 1-for-1 exchange, but it is over 90 percent. For example, in MAAC, adding 3000 MW of price taking capacity displaces over 99 percent of that value. The displacement figure shows the effect of higher cost, but subsidized resources on more efficient lower cost resources that would otherwise be a part of the least-cost mix to achieve resource adequacy. Another way of viewing the displacement results is the mismatch between prices, costs and actual resource commitments the Commission found to be unjust, unreasonable, and unduly discriminatory in the June 29th Order.

31. **Table 1** also shows the decline in revenues to resources, especially in the LDAs where the price taking behavior is undertaken. So not only are lower cost resources displaced by higher cost resources, but also revenues for all remaining competitive resources are eroded far below the competitive values.

32. Finally, the last two rows of **Table 1** show the amount of the subsidy, over the market clearing price, that could be paid in a successful attempt to exercise buyer-side market power. Note that the levels of the subsidy are more than 3 times the actual price in RTO, and 4 to 4.5 times the price in MAAC that could result in a successful exercise of buyer-side market power.

E. There Does Not Exist Any Form of Accommodation of State Policies that Preserves Efficient and Competitive Outcomes and a Clean MOPR is Necessary to Protect Against Buyer-Side Market Power

33. Any accommodation of state policies requires loads in the state pushing the policy to 1) subsidize above market cost resources to make them competitive with lower cost resources; 2) insert those subsidized resources into the RPM price formation mechanisms as price takers, or the load would need to be removed from the RPM price formation step. The first is a classic execution of old-fashioned buyer-side market power. The second is the proposed FRR Alternative. Both lead to the same negative results as explained above.

34. In this case, accommodation hard-wires and accepts buyer-side market power into the PJM Market design. The only defense against this potential is a Clean MOPR which mitigates any subsidized resource to a default going forward cost, or in which a unit specific going forward costs can be determined with the IMM and PJM. Otherwise, state policies can be used as the "trojan horse" by which buyer-side market power will not just be invited into the PJM wholesale market, but openly welcomed.

III. PURPOSE AND ORGANIZATION OF THE AFFIDAVIT

35. One over-arching purpose of my affidavit is to reaffirm and support the Commission's logic that out-of-market subsidies and mismatches between prices and commitments are damaging to the PJM RPM capacity market, as articulated in its rejection of the PJM Capacity Repricing Proposal and the IMM's MOPR-Ex proposals. The second over-arching purpose of my affidavit is to show the proposed remedy of the unit-specific Fixed Resource Requirement ("FRR"), what the Commission calls the "FRR Alternative," leads to the very same damage or harm the Commission has stated it wishes to guard against in its finding the current MOPR is unjust, unreasonable, and

unduly discriminatory and the rejection of the Capacity Repricing and MOPR-Ex proposals.

36. In reaffirming the Commissions overall logic that out-of-market subsidies and mismatching pricing and commitments are damaging to the market I take a two-prong approach. The first prong is to show analytically, through the use of a graphical analysis, the efficiency of the RPM Capacity market, absent out of market subsidies, and then compare this baseline to the current FRR as defined in the PJM Tariff and Reliability Assurance Agreement ("RAA") and then show the equivalence between the unit-specific FRR remedy (the FRR Alternative) and an exercise of buyer-side market for which MOPR is designed to mitigate. Under this graphical approach, I show the changes in prices, quantities, and overall market surplus, and shifts in surplus between market participants.

37. The second prong of the approach is to provide empirical evidence through the analysis of simulations scenarios provided by PJM following the 2020/2021 Base Residual Auction ("BRA"). The analysis shows the harm the proposed FRR Alternative could do to the PJM RPM Capacity Market through changes in market prices, overall PJM RPM Capacity Market revenues, displacement of otherwise cost-effective/economic resources by subsidized resources and break-even prices across selected Locational Deliverability Areas ("LDAs") that would permit the successful exercise of buyer-side market power.

38. The affidavit is organized in the following manner. Section IV I provide a broad review of what the characteristics of an efficient PJM capacity market are without subsidies or FRR showing market clearing prices, quantities, and the maximization of market

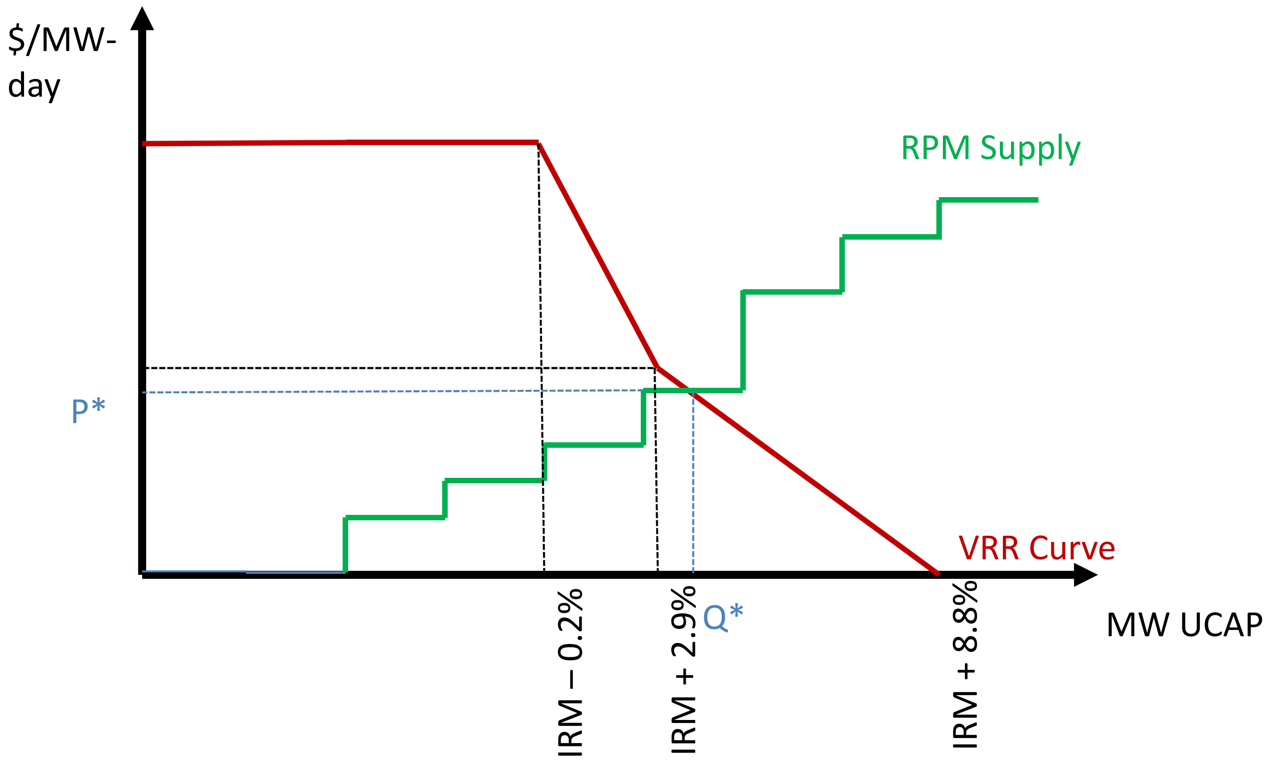
surplus. In Section V I provide a broad overview of the current FRR construct in PJM, some key history, and provide a graphical analysis of how the current FRR construct affects PJM RPM capacity Market outcomes, and the explicit incentives for opting into FRR. Section VI discusses a key myth surrounding the FRR and the incentives for load-serving entities ("LSEs") to elect the FRR. Section VII highlights the key differences between the FRR Alternative and the current PJM Tariff-defined FRR.

39. Section VIII shows the capacity market outcomes of exercise of buyer-side market power and the FRR Alternative remedy are identical and that the mechanical differences in implementing the two have one single distinction that is meaningless for market outcomes. Section IX provides the analysis of the PJM simulation scenarios reporting out the amount of 1) artificial price suppression; 2) displacement of otherwise cost-effective, economic resources by above-market-cost resources; 3) overall changes in RPM Capacity Market Revenue, and 4) breakeven prices that can be made to facilitate the successful exercise of market power disguised as unit-specific FRR in selected LDAs.

40. In light of the graphical analysis and the analysis of PJM simulations, Section X argues the only form of mitigation that can preserve the efficiency and just and reasonableness of the PJM Capacity market is a "Clean" MOPR that mitigates all subsidized resources to a default cost or their actual verified costs, and that all such subsidized resources should be subject to MOPR for as long as they are recipients of targeted subsidies. Section XI discusses the reason that there is no accommodation that exists that would preserve the efficient and just and reasonable outcome of the PJM capacity market and offers key questions for the Commission to consider.

IV. EFFICIENCY OF THE PJM RPM CAPACITY MARKET ABSENT SUBSIDIES OR FRR

Figure 1: Representation of the Supply and Demand in the Base Residual Auction Absent any Subsidies or FRR Elections



41. The reason for starting by examining the outcomes of the RPM capacity market absent subsidies, the FRR in the PJM Tariff, or the proposed FRR Alternative remedy is to show the competitive market as the baseline by which to measure changes to market outcomes resulting from subsidies, election of FRR in the PJM Tariff, or the FRR Alternative as a proposed remedy to the effects of state policy.

42. **Figure 1** provides a representation of the PJM BRA with the tariff-defined demand curve for capacity in red, and a supply curve in green reflecting the true marginal or

incremental costs of supplying capacity.[7] The demand curve is a representation of the marginal benefit of capacity as defined in the tariff. The marginal benefit of capacity is declining (demand is downward sloping) as additional amounts of capacity are procured, or as the PJM system commits additional capacity relative to its Installed Reserve Margin (IRM) target as shown in **Figure 1**. The market clearing price is denoted by P* and the market clearing quantity is denoted by Q*.

43. Efficient markets maximize surplus. Surplus is defined as the difference between what consumers are willing to pay as reflected by the demand curve, and what suppliers are willing to accept as reflected by the supply curve. So as a simple example, suppose consumers were willing to pay $450/MW-day while suppliers were willing to supply capacity at a flat price of $150/MW-day, and the demand to be satisfied were 100 MW. Then the total surplus would be ($450/MW-day - $150/MW-day) multiplied by the 100 MW or $30,000 per day.

44. The implication of efficient markets maximizing surplus is the following: 1) resources will continue to be committed so long as their marginal cost is less than the marginal benefit they provide to consumers; and 2) as a result of the cost-effective commitment of resources, market clearing prices reflect the point where the marginal (incremental) cost of supply is equal to the marginal benefit to consumers.

45. With respect to the first implication of maximizing surplus, if a resource has a marginal cost that exceeds the marginal benefit, then it is not cost-effective to commit to the

[7] With respect to capacity markets, the marginal or incremental costs are the going-forward costs of resources that include any fixed O&M costs and other fixed costs that must be incurred each year to remain in commercial operation that are not expected to be covered through net energy and ancillary service market revenues.

market and would reduce surplus. After all, it does not make sense to pay $10 for the next increment of supply when the benefit is only $7. Market clearing prices equal the marginal cost of supply and the marginal benefit of demand means that at that price, no supplier would wish to change its commitment status given the price. That is, resources with costs below the price receive a commitment and earn infra-marginal rents if their cost is less than the price. Conversely, resources that do not receive a commitment, have costs above the price and would lose money if they received a commitment.

46. The objective of the PJM RPM Capacity Market is to maximize surplus.[8] The maximum surplus, in the context of the PJM RPM Capacity Market is shown in **Figure 2**. The market clearing price in **Figure 2** is P* where the marginal cost (supply) equals the marginal benefit (demand) and the quantity of committed capacity is Q*. The total surplus has been split between the surplus accruing to consumers shown in the blue shaded area in **Figure 2** and the surplus accruing to producers as shown by the green shaded area in **Figure 2**.

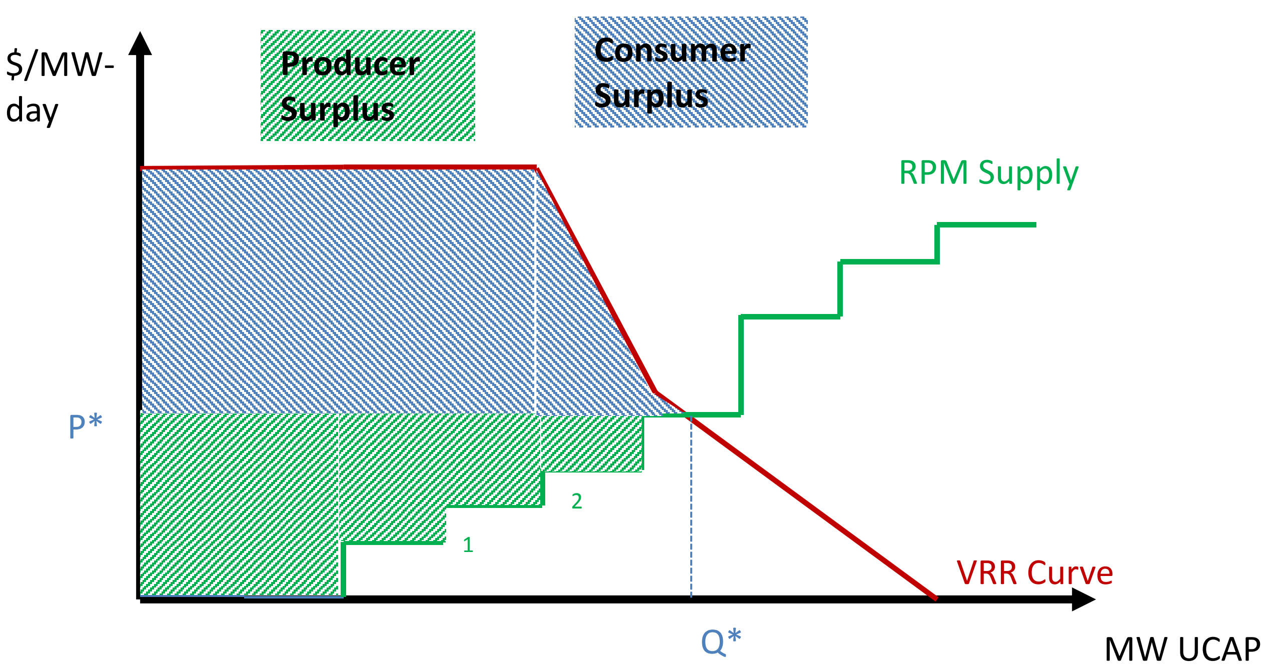
47. Consumer surplus is the difference between what they are willing to pay and the market price they pay. In **Figure 2** this is the area above the price, P*, below the demand (VRR Curve), and to the left of the cleared quantity Q*. If the price of capacity is $250/MW-day and consumers were willing to pay $450/MW-day and the cleared quantity were 100 MW, the consumer surplus would be ($450/MW-day - $250/MW-day) multiplied by 100 MW or $20,000/day. Another way of thinking about the consumer surplus is that they are getting the benefit of only paying $250/MW-day when they were willing

[8] PJM, *Base Residual Auction Optimization Formulation*, December 12, 2007. Available at https://pjm.com/-/media/markets-ops/rpm/20071212-rpm-optimization-formulation.ashx?la=en.

to pay $450/MW-day. But because of the downward sloping nature of the demand for capacity, the actual willingness to pay will vary as more capacity is committed.

48. The producer surplus is the difference between the price they are paid, and the marginal cost of supplying the capacity. In **Figure 2** this is the area above the supply curve, below the price P*, and to the left of the cleared quantity Q*. Again, and example helps to understand the benefit producers receive. As before in this section, suppose producers are willing to accept a payment of $150/MW-day to supply capacity but instead receive $250/MW-day for capacity. For the 100 MW of capacity sold the producer surplus is ($250/MW-day - $150/MW-day) multiplied by 100 MW or $10,000/day. Of course, as **Figure 1** and **Figure 2** show, producers have different willingness to accept based upon their going forward costs.

Figure 2: Maximizing Surplus in the PJM RPM Capacity Market



49. Absent any subsidies to supply resources and any FRR elections, the PJM RPM Capacity market will maximize total surplus and result in efficient market clearing

prices and resource commitments. And it is this efficient market results that serves as the baseline by which the current FRR provisions in the PJM Tariff can be assessed and compared.

V. THE CURRENT FRR PROVISIONS UNDER THE PJM TARIFF AND RELIABILITY ASSURANCE AGREEMENT

50. Since its inception, the PJM RPM Capacity Market has allowed LSEs to "opt out" of participation directly in the capacity market and allow load serving entities meet their IRM obligations through a combination of self-owned resources or contracted resources.[9] This is known as the FRR option for LSEs.

51. A discussion of the FRR option for LSEs as it currently exists in the FERC-approved PJM Tariff shows how this foreshadows market outcomes for the FRR Alternative as a proposed remedy for accommodating state policies and yet is also quite different in key ways that will be discussed in subsequent sections.

52. The FRR option has several conditions to which load serving entities must adhere. One condition is that this is an "all or nothing" option. An LSE electing the FRR option must satisfy its entire peak load obligation plus the reserve margin outside the capacity market. There is no ability to only opt to use FRR for only part of an LSE's load. Allowing an LSE to serve only part of its load under the FRR option is an invitation to exercise buyer-side market power as I discuss below in Section VIII of my affidavit. A second condition is that if the LSE has excess capacity it owns or has under contract, it faces strict limits on how much of that excess capacity can be offered into the RPM Capacity Market. Allowing unlimited excess capacity sales from an FRR entity invites

[9] PJM Interconnection, L.L.C., *Reliability Assurance Agreement Among Load Serving Entities in the PJM Region,* ("RAA") Schedule 8.1.

a form of market manipulation whereby the FRR entity uses the capacity market to offset excess costs due to oversupply to its load while artificially suppressing prices in the capacity market.

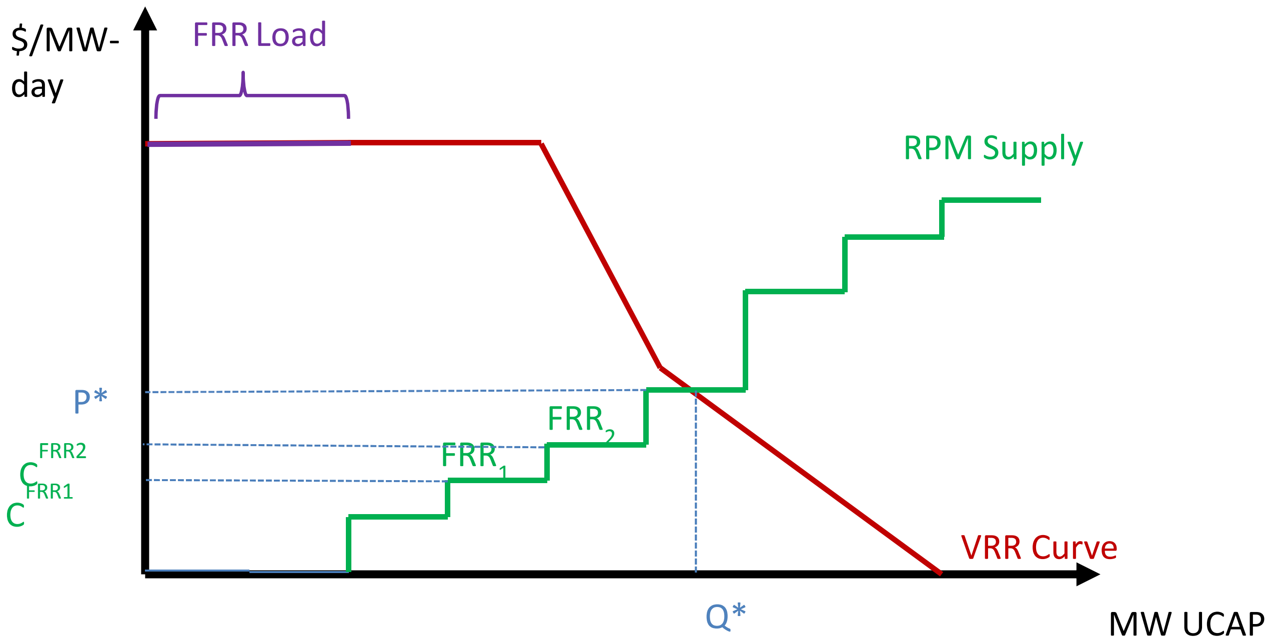
53. A third condition is that the FRR entity need only hold reserves above its peak load obligation at the IRM value set by PJM. In cases where the RPM Capacity Market clears at a reserve margin below the IRM, the results in the FRR entity holding more reserves (as a percentage of peak load) than the market. PJM has never cleared the market below its IRM target since the inception of RPM. However, with this third condition, the LSE electing the FRR option holds less reserve than the market (as a percentage) when the market clears above the IRM target set by PJM. This situation has been the case since RPM was implemented. The implication of this third condition is that the FRR load, during periods of extreme system stress such as during the polar vortex in January 2014, can essentially "free ride" on the excess capacity procured by the market if its own resources fail to perform and without needing to pay for those excess reserves procured by the market.

A. Current FRR Provisions Reduce Market Efficiency when the Cost of FRR Resources is Below the Market Price but the Efficiency Loss is Small

54. For the sake of example, suppose a LSE elects the FRR option with resources with costs below the market price of capacity. This situation is shown in **Figure 3** where there is an FRR load amount represented by the purple segment on the VRR Curve (demand curve for capacity) and two FRR resources, FRR_1 and FRR_2 with costs C^{FRR1} and C^{FRR2} respectively. **Figure 3** shows the RPM Capacity Market prior to the FRR Load and FRR Resources being removed from the capacity market. Absent the FRR

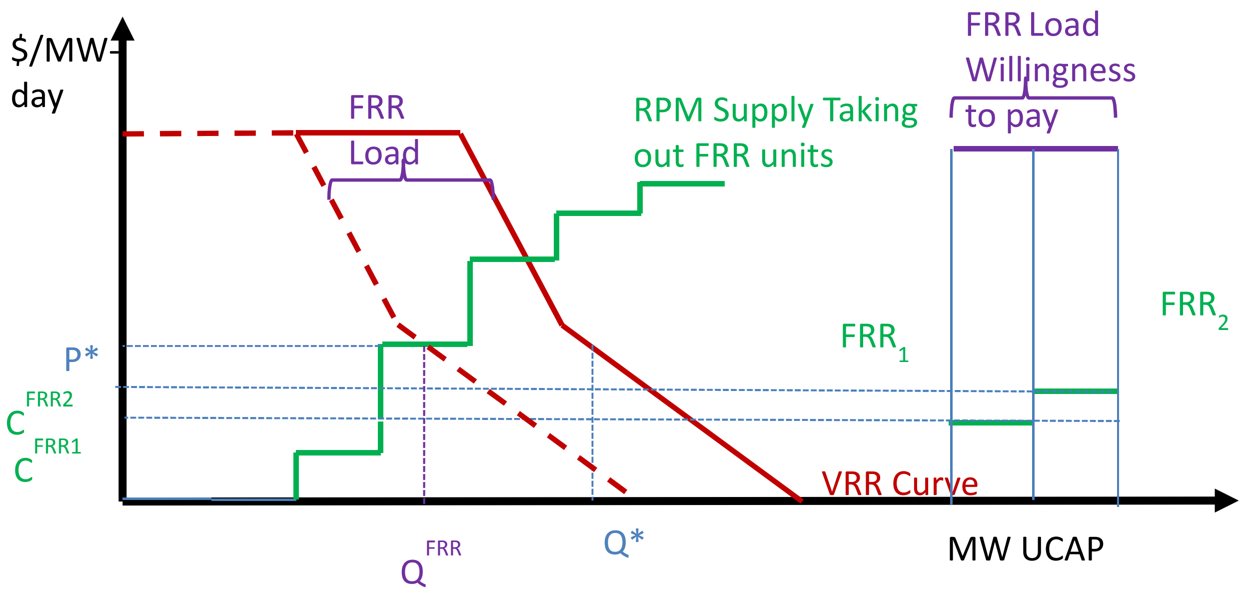
election, a market clearing price of P* and a market clearing quantity of Q* would prevail.

Figure 3: FRR Election with Resource Costs Below the Market Clearing Price



55. Removing the FRR Load from capacity market price formation shifts the VRR Curve back to the left by the amount of the FRR Load Removed as shown in **Figure 4**. The new VRR Curve is the red dashed curve. Taking out the below market price FRR resources shifts the supply curve back to the left as shown in **Figure 4**. The FRR resources and load are separated from the market and are shown off to the right in **Figure 4** with the associated costs of the FRR resources well below the willingness to pay, and with a distinct price formation function that looks like pay as bid for each resource. Despite taking the FRR load and resources out, the market clearing price remains at its efficient level of P*, but the clearing quantity in the market falls to Q^{FRR}.

Figure 4: Shifting Demand and Supply Resulting from FRR Election with Below Market Price Resources



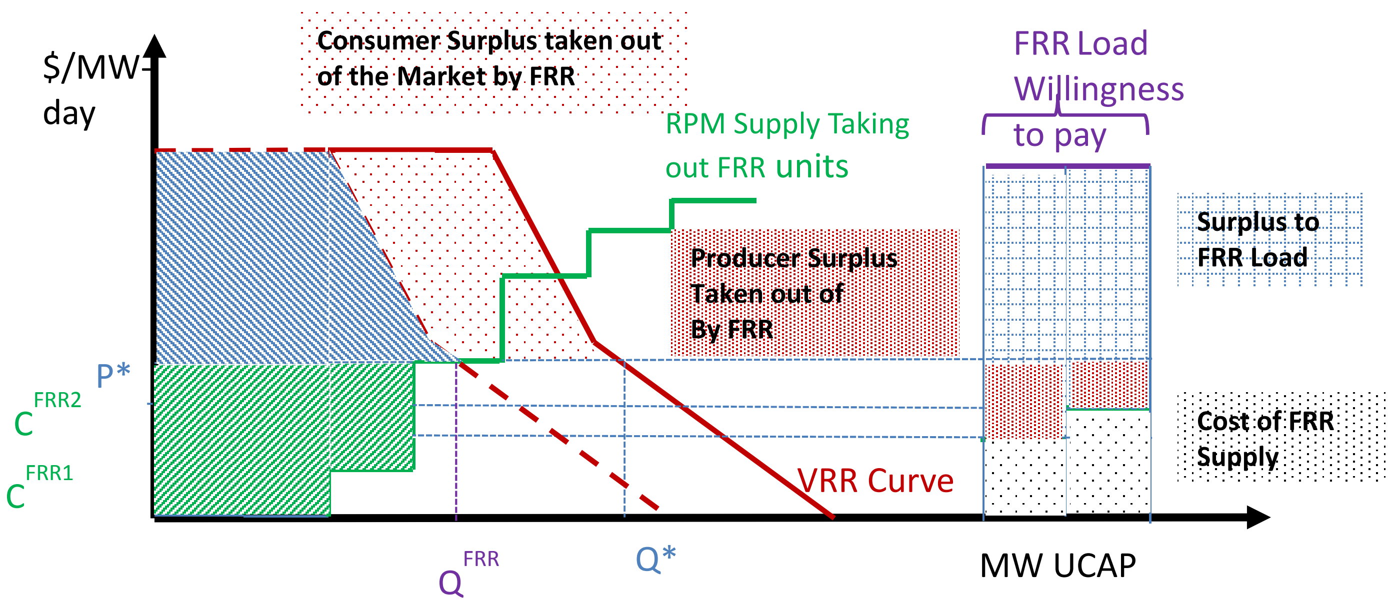
56. Though it is difficult to see graphically, given where the clearing price is being set on the VRR Curve, the overall amount of capacity cleared plus the FRR resources is below the clearing quantity Q* that would be committed in the absence of the FRR election. To provide a sense of this amount of capacity, the 2020/2021 BRA cleared at a 23.9 percent reserve margin. Had the 12,200 MW of FRR load for 2020/2021 had to hold the same reserve margin, it would have had to commit through contracts or self-owned generation an additional 831.5 MW of capacity.[10]

57. Total surplus and producer and consumer surplus get shifted around when an LSE elects the FRR option with resources that are below the market price. These changes are shown in **Figure 5**. Overall the surplus taken out of the market is largely shifted to the FRR load. Consumer surplus is represented by the blue shaded area and producer

[10] 2020/2021 BRA planning parameters and BRA auction report. Given the 6.59% forced outage rate and the 23.9% reserve margin cleared in the auction, the FRR entities would have had to hold their peak load obligation of 12,200.6 MW multiplied by (1.239)*(1-0.0659) = 14,120.4 MW of capacity or 831.5 MW greater than their FRR obligation of 13,288.9.

surplus is represented by the green shaded area in the same manner as discussed in regard to **Figure 2**. Producer surplus taken out of the market and shifted to the FRR load is shown in the red shaded area in **Figure 5**. Consumer surplus to the FRR Load is shown by the blue and white checkered area under the FRR Load and the consumer surplus taken out of the market by FRR is the red dotted area shown in **Figure 5**. Graphically, it only appears to be a shifting around of surplus, and that surplus is close to being maximized since the FRR resources are below market prices.

Figure 5: Changes in Surplus with FRR Election with Resources below Market Price



58. However, as I noted above, FRR entities need only hold a smaller percentage of reserves than has historically been cleared in RPM. And while this MW figure is small, this difference in quantities implies that there is some loss in surplus as it is shifted around. The reason some surplus is lost is analogous to the moving water from one trough to another using an old bucket. The water is the surplus that is being shifted between consumers and producers. As the water is moved from one trough to another, some water may accidently spill, or the bucket may have some small holes that allows

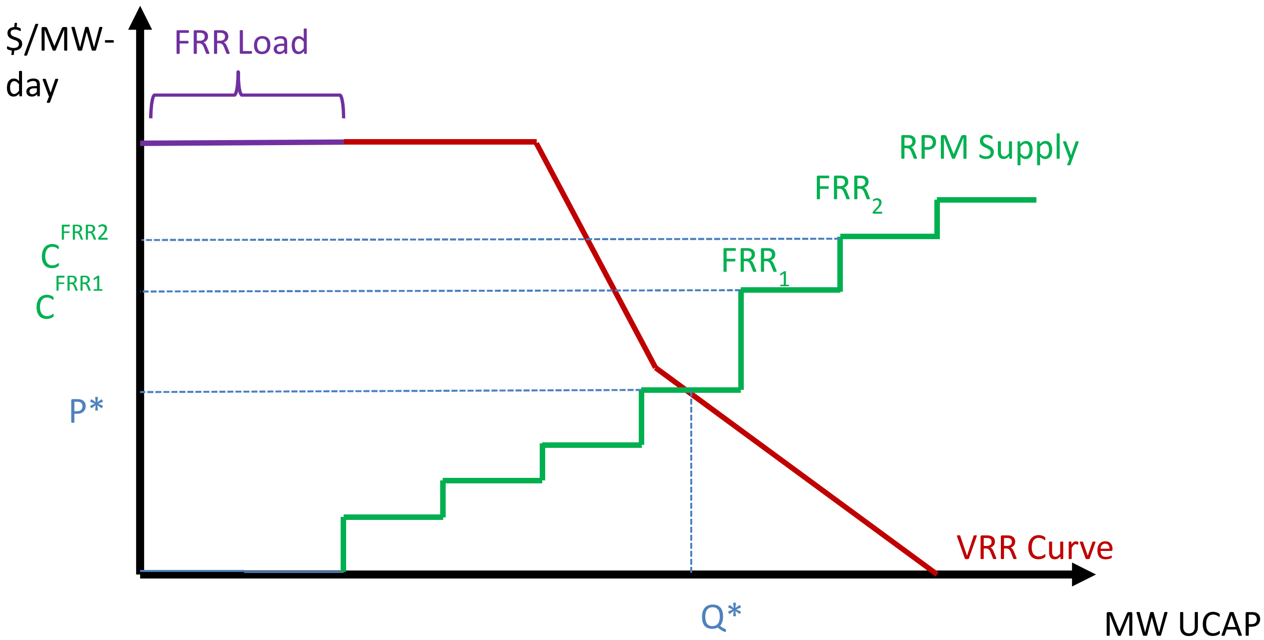
water to leak out as it is being moved. The same is true with all the surplus being moved around.

59. In **Figure 5**, given the nature of the supply curve, this loss comes from consumer surplus, albeit a small loss of surplus. So even under the best of circumstances when the cost of the FRR resources are below the market price, there is still the potential for a small loss in surplus overall, and by extension a loss in efficiency.

B. Current FRR Provisions Result in Large Losses in Market Efficiency when the Cost of FRR Resources is Above the Market Price

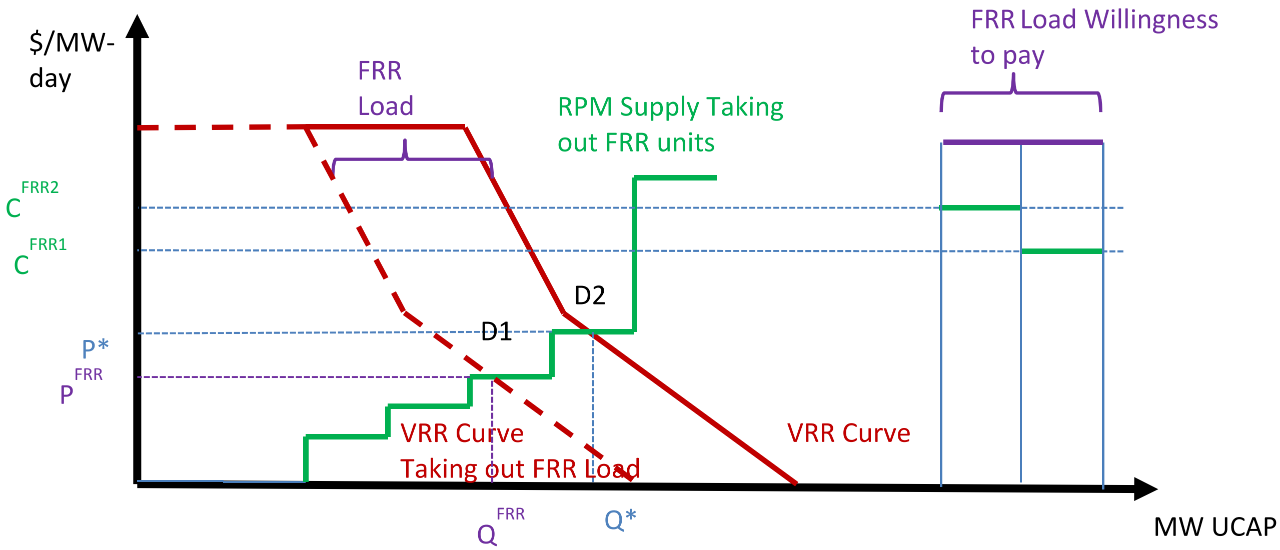
60. Following the previous example but changing the circumstances, suppose a LSE elects the FRR option with resources that have ***costs above*** the market price of capacity. This situation is shown in **Figure 6** where there is an FRR load amount represented by the purple segment on the VRR Curve (demand curve for capacity) and two FRR resources, FRR_1 and FRR_2 with costs C^{FRR1} and C^{FRR2} respectively. **Figure 6** shows the RPM Capacity Market prior to the FRR Load and FRR Resources being removed from the capacity market. Absent the FRR election, a market clearing price of P* and a market clearing quantity of Q* would prevail.

Figure 6: FRR Election with FRR Resource Costs Above the Market Price



61. Removing the FRR Load from the capacity market shifts the VRR Curve back to the left by the amount of the FRR Load Removed as shown in **Figure 7**. The new VRR Curve is the red dashed curve. Taking out the below market price FRR resources shifts the supply curve back to the left as shown in **Figure 7**. The FRR resources and load are separated from the market and are shown off to the right in **Figure 7** with the associated costs of the FRR resources well below the willingness to pay. Despite taking the FRR load and resources out, the market clearing price declines to P^{FRR} and the clearing quantity in the market falls to Q^{FRR}.

Figure 7: Shifting Demand and Supply Resulting from FRR Election with Above Market Price Resources



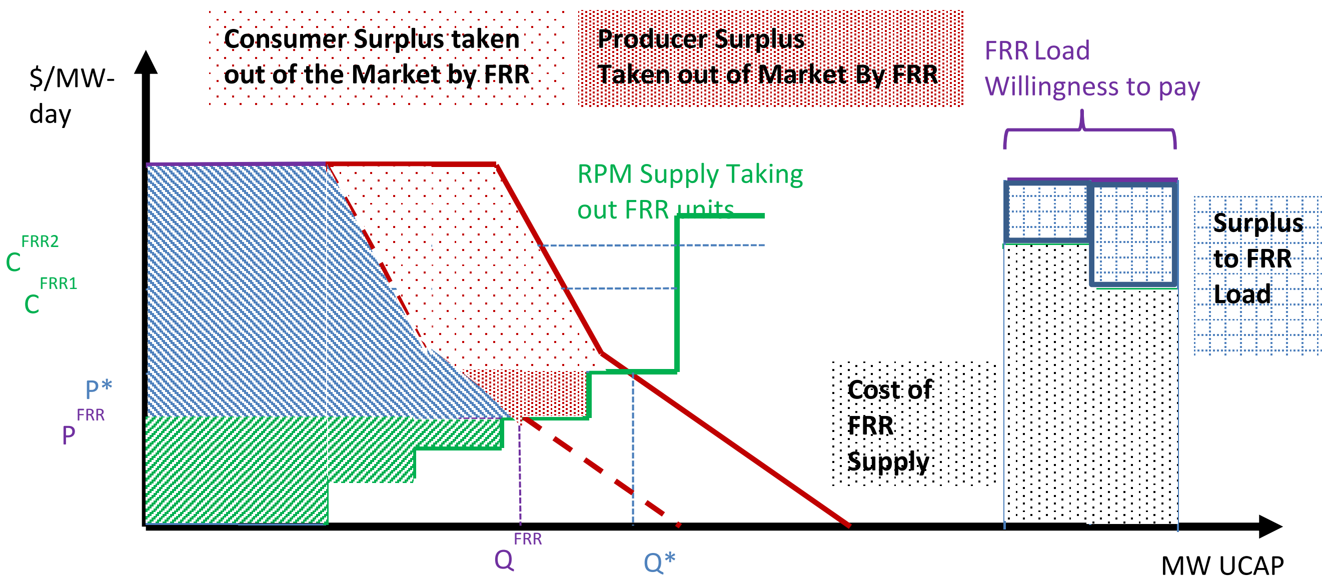
62. Unlike in the previous example where the sum of the clearing quantity in the capacity market, Q^{FRR} and the FRR Load amount will be less than the cleared quantity, the total quantity cleared could be greater than the cleared quantity, Q*, absent the FRR. To see this, note that in **Figure 7** Q^{FRR} is further down the demand curve and is associated with a lower price, P^{FRR} than was the case in the previous example in **Figure 4**. Even if the total quantities exactly matched the clearing quantity absent the FRR election, there would still be an inefficient set of resources satisfying the resource adequacy targets since some above market price resources are being committed for capacity. Notwithstanding this point, the FRR entity still does not carry the same percentage of resources cleared by the market resulting in the aforementioned "free rider" problem discussed previously in this section.

63. Furthermore, unlike the previous example, there are resources that were part of the least-cost, surplus maximizing solution absent the FRR election that have now been displaced by the use of above market price resources for the FRR Plan. These are

denoted by D1 and D2 in **Figure 7**. D1 and D2 have lower costs than the FRR resources with costs C^{FRR1} and C^{FRR2}. This result clearly shows that the FRR election has inefficiently substituted high cost resources for lower cost resources.

64. The substitution of higher cost resources for lower cost resources results in not only a shifting of surplus between market participants, but an overall loss of surplus due to the inefficient substitution of high cost resources for lower cost resources. This is shown in **Figure 8**.

Figure 8: Changes and Loss in Surplus with FRR Election with Resources Above the Market Price



65. Consumer surplus, shaded in blue, and producer surplus, shaded in green, are shown as they were in **Figure 2** and **Figure 5**. Unlike in the previous example, there is a loss in consumer surplus taken out of the market shown in the red-dotted area in **Figure 8**, and only a small portion of that is transferred to FRR Load as shown in the blue and white checkered area on the right side of the graph in **Figure 8**. That is, the FRR load is now paying more for capacity than they would have in a competitive market solution and their surplus is eroded as a consequence. The loss in consumer surplus is eroded by the

extra cost of the FRR resources as shown in the black dotted area under the FRR Load in **Figure 8**. Producer surplus is taken out of the market in the form of the red shaded area and is totally eroded by the higher cost of the FRR resources, while overall producer surplus is reduced compared to **Figure 2** where there was no FRR election. There is some producer surplus that ends up being transferred to consumers. In other words, the FRR resources are beneficiaries of the policy that takes surplus from competitive suppliers.

66. Overall, the transfer of surplus to cover the additional costs of the FRR resources results in a large loss of surplus that benefits the FRR resources at the expense of competitive resources and the load assigned to pay for the FRR resources. To place this in the context of the bucket analogy used earlier, this is equivalent to purposefully dumping several buckets of water out on the ground while moving water with the leaky bucket from one trough to another.

67. In short, an election under the existing FRR when the resources that have costs above market price leads to 1) artificially reduced capacity prices relative to prices absent FRR election; 2) The displacement of otherwise economic resources; and 3) a loss in market efficiency as evidenced by the reduction in market surplus overall. As discussed below, because the FRR Alternative would presumably only be used for uneconomic resources whose costs are above the competitive market price, it would inevitably have all of these negative consequences. However, the "all or nothing" nature of the existing FRR has desirable properties in that load faces the full cost of their FRR election and cannot cherry pick which resources and load to "take out" or "leave in" the market and thus provides a strong disincentive to choose the FRR path.

The existing FRR satisfies the Commission's intent of having the load pay for the consequences of their FRR election. In contrast the FRR Alternative eliminates this disincentive and likely encourages load and resources to elect the FRR Alternative with even greater damage to the market.

VI. MYTHS REGARDING FRR AND INCENTIVES FOR ELECTING THE FRR

A. It is a Myth to Conclude Removing FRR Load and Resources Separates Them from the Capacity Market

68. At best, the FRR Alternative only creates a minor distortion in market outcomes when the FRR resources taken out with load have costs below the market price. At worst, when FRR resources have costs above the market price, the FRR Alternative artificially reduces prices, reduces markets efficiency by reducing overall market surplus, and shifts surplus between market participants. Of course, as discussed below, the incentives to use the FRR Alternative are likely to be much stronger in the second, more troubling case.

69. It has often been suggested that because the existing FRR takes both generation and load out of the capacity market, it does not change market outcomes. This is clearly false. The preceding discussion on the current tariff-defined FRR option should dispel any notion that the FRR holds the market harmless.

70. Fundamentally, this myth breaks down because resource adequacy requirements are determined on a ***PJM system-wide basis***, which means the demand for resource adequacy is system-wide demand as represented by the VRR Curve in RPM. Consequently, taking FRR demand out of the market fundamentally changes market outcomes, all things being equal.

71. Furthermore, this demand taken out of the market is satisfied with resources that would not be a part of the efficient, least-cost solution absent targeted subsidies or the FRR option locks in the fundament change in market outcomes as shown above. In fact, to say that such an action "takes supply out of the market" is also a myth if, as will likely always be the case under the FRR Alternative, the resource used to satisfy demand in this case would never have been part of any market solution. You cannot take supply out of the market that never would have been part of the market solution. If anything, it is ***adding supply:*** high cost, inefficient supply to the market but treating that supply as if it had a zero cost.

B. Incentives for Electing the FRR Option: Reducing Load Costs through Reduced Reserve Obligations

72. If a LSE had self-owned or contracted resources that had costs below capacity market prices, what would be the incentives for electing the FRR option? Possessing such lower cost resources ultimately does not change the net costs to the LSE. Suppose the LSE's resources cost $40/MW-day and the market price was $70/MW-day. If the LSE stayed in the market, the load would pay $70/MW-day, and the resources would also receive $70/MW-day. On net, the LSE would still be paying $40/MW-day to meet its load obligations for RPM.

73. But it is also important to recognize that in the RPM Capacity Market, demand for capacity is downward sloping to reflect the idea that capacity beyond the installed reserve margin target has value, albeit at a value that is decreasing as the system adds more and more capacity beyond the reserve target. And this lower price means it is cost-effective to buy the extra capacity and results in overall lower costs to the system. Going back to the simple numerical example in the previous paragraph, suppose the

$70/MW-day price represents a reserve margin of 20 percent, but the IRM target is only 15 percent.

74. The LSE with low cost resources can elect the FRR option to “save 5 percent” off the reserve margin it needs to keep by avoiding the additional $70/MW-day cost it would pay for the additional 5 percent of reserve it would be responsible for purchasing if it stayed in the market.

C. Incentives for Electing the FRR Option: Protecting High Cost Generation from Competition

75. Consider an LSE with self-owned resources that has costs above the market price, but has made significant capital investments in these resources, and these resources are earning regulated rates of return at the state level so long as they can be shown to be “prudent” to keep in service or are deemed “used and useful”. In a competitive market environment, such resources would fail to clear the capacity market and their higher costs would likely be called into question by their state regulators.

76. Electing the FRR option in this situation isolates these higher cost resources from the transparency of competitive market outcomes and ensures the resources remain used and useful to the FRR load they serve, and the resources can continue to earn their regulated rate of return. Unfortunately, absent a major change at the state level in the regulatory paradigm, there is little market transparency into the costs of the FRR resources unless one wishes to dig deep into state regulatory filings or FERC Form 1

data and examine the FRR plans and costs on PJM's website.[11] The most recent FFR Plan on file with PJM would charge retail competitors $435.86/MW-day.[12]

77. However, there is some insight into these incentives from one case involving the Ohio operating companies of AEP, Ohio Power and Columbus Southern Power, when Ohio transitioned to retail competition beginning in 2009. The FRR rules state clearly that the default capacity charges from an FRR LSE to competitive retail providers in its service territory would be the unconstrained RPM clearing price.[13] But notwithstanding this default value, an FRR LSE could make a Section 205 filing at FERC with a showing of higher costs unless the state had clearly articulated a policy regarding the capacity costs that could be passed through to competitive retail providers.[14]

78. In Docket No. ER11-2183, AEP filed to charge competitive retail providers $310/MW-day in Columbus Southern Power territory and $401/MW-day in the Ohio Power territory.[15] It is worth noting that at the time of this filing, capacity prices in the unconstrained portion of PJM, where AEP load is located, had cleared as low as $16/MW-day. At no time since PJM has been operating the RPM Capacity Market has the unconstrained RTO market price been above $175/MW-day, as it was for the 2010/2011 Delivery Year.[16] [17]

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[11] https://www.pjm.com/markets-and-operations/billing-settlements-and-credit/frr-lse-capacity-rates.aspx

[12] https://www.pjm.com/-/media/markets-ops/settlements/frr-lse-capacity-rates/capacity-formula-rate-summary.ashx?la=en. This is the rate charged by APCo for the 2018/2019 Delivery Year.

[13] PJM, RAA Schedule 8.1, Section D.8.

[14] *Id.*

[15] American Electric Power Service Corporation, PJM Interconnection, LLC, Docket No. ER11-2183, November 24, 2010, Attachment B, at 1.

[16] PJM, *2021/2022 RPM Base Residual Auction Results*, May 23, 2018, Table 1 at 6. Available at https://pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2021-2022/2021-2022-base-residual-auction-report.ashx?la=en.

79. Filing for recovery for costs in rates that were demonstrably above market prices before and since this filing certainly reflects the incentives for protecting resources with costs above market prices from competition. And as a post-script, as Ohio embarked upon retail competition and vertically integrated companies spun off their generation resources, many of the resources previously owned by Ohio Power and Columbus Southern Power eventually retired.[18]

VII. THE PROPOSED FRR ALTERNATIVE REMEDY VS. THE EXISTING FRR: KEY DIFFERENCES AND SIMILARITIES

80. In its June 29th Order, the Commission proposed to expand the MOPR and to "implement a resource-specific FRR Alternative option, under which a resource receiving out-of-market support may remain on the system, but outside the capacity market."[19] The stated intent of the FRR Alternative is to "mitigate or avoid the potential for double payment and over procurement."[20]

81. The Commission proposed that "PJM adapt its current FRR option to allow, on a resources specific basis, resources receiving out-of-market support to choose to be removed from the PJM capacity market, along with some commensurate amount of load for some time."[21] The Commission explicitly acknowledges these subsidized

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[17] Subsequently, the Public Utilities Commission of Ohio ("PUCO") articulated a policy of taking the PJM price as the price to be charged to competitive LSEs pending the outcome of a docket in front of the PUCO, and AEP subsequently filed a complaint at FERC in EL12-32 that was later withdrawn by AEP and never ruled upon by the Commission. *See American Electric Power Service Corp*., 134 FERC ¶ 61,039 (2011) at P 10.

[18] See the PJM Deactivation page at https://pjm.com/planning/services-requests/gen-deactivations.aspx. Of these are the Muskingum River units 1-5, Conesville 3, and Picway 5.

[19] June 29th Order at P 157

[20] June 29th Order at P 160

[21] *Id.*

resources are unable to compete in the capacity market based on their costs and characterize the removal of the resource and commensurate amount of load to allow these resources to “exit the capacity market”.[22]

A. The Proposed Resource Specific FRR Remedy has Notable Differences from the Current FRR Option

82. There are a number of notable differences between the proposed FRR Alternative and the existing FRR, all of which make the former materially more problematic than the latter. These differences magnify the adverse effects of the existing FRR mechanism and create new adverse effects.

83. Unlike the current FRR option, which can only be exercised by a LSE, the resource specific FRR Alternative as proposed by the Commission appears to allow resource owners to make the election. Regardless of the specific implementation details, this shifting of the election right will have serious implications for load.

84. Under the current Option, the LSE knows what costs it will bear under its FRR election given the portfolio of resources it either owns or has under contract. Under the FRR Alternative as proposed by the Commission, the resource with out-of-market support (subsidy) makes the FRR election, but there remains a question of what load is “stuck” paying for cost of the “out-of-market resource” when it has lower cost capacity available through the market? At best this is undefined as to who makes this marriage between the FRR Alternative resource and the load that must pay for it. At worst, it allows for resources to seek subsidies and then stick the bill for the rest to a specific segment of load. In either case, the state, whose policy has created this situation, is

[22] *Id.*

likely to make a determination onto which wholesale loads the additional costs of FRR resources will be placed without any regard to the implications of cost shifting or the jurisdictional question of who should be responsible for assigning these costs.

85. The current FRR option requires an LSE satisfy its entire resource adequacy obligation with its own resources. And even if this results in lower capacity market prices, as demonstrated in Section V, at least the LSE cannot benefit from any potential exercise of buyer-side market power by having some its load paying the lower market price. By definition, the FRR Alternative allows for partial exit.

86. In contrast, under the Commission proposed remedy, if there is an LSE that wanted to serve part of its load with a resource electing the resource specific FRR Alternative, the LSE could use this subsidized higher cost resource to successfully execute a buyer-side market power strategy that would result in lower overall capacity market expenditures. This ability that had been previously foreclosed would now be hardwired into the market design if it were approved by the Commission.

87. The current FRR option if elected by a LSE places tight restrictions on the amount of excess capacity that can be sold into the capacity market. This forces the LSE electing the FRR option to pay for the consequences of its actions leading to oversupply and paying directly for those extra costs rather than trying to offset those costs of excess supply through capacity market transactions leading to depressed prices and inefficient outcomes.

88. In contrast, the proposed Commission remedy under the resource specific alternative would allow a ***supplier*** receiving support for specific resources and a large portfolio of other resources to avoid bearing the cost of its high cost resources, but effectively

receive out of market support for its uneconomic resources while enjoying market pricing for its remaining portfolio without restriction, or possibly even using proceeds for the out-of-market support to engage in an economic withholding strategy to raise market prices above competitive levels.[23]

B. The Proposed FRR Alternative Appears to Be Premised on Key Myths Associated with the Current FRR Option

89. The language of the June 29th Order suggests that the Commission has erroneously accepted the myth that the FRR simply "removes" load and resources from the market under all circumstances. As discussed above, load is not removed "from the market" under any circumstances, because the overall demand is determined for the entire PJM footprint as discussed previously. The demand for resource adequacy in PJM is in fact not changing at all, but the treatment of that demand is changing.

90. As also discussed above, generation is not removed from the market where it is uneconomic and would otherwise be out of the market. As recognized in the June 29th Order, the resources to be accommodated by the FRR Alternative are uneconomic and are, therefore, already "out of the market."[24] As a result, the FRR Alternative will not take these resources "out of the market" but will instead bring these resources from outside the market and inserting them into the market at an effective cost basis of zero.

91. The FRR Alternative will thus take uneconomic supply and treating it as a price taker as a practical matter which has the same effects on prices and market efficiency as shown in Section V. Moreover, LSEs could reduce their overall obligations relative to

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[23] *Comments of American Petroleum Institute, J-POWER USA Development Co., Ltd, and Panda Power Generation Infrastructure Fund. LLC* in Docket No. ER18-1314, Affidavit of Paul M. Sotkiewicz, Ph.D., May 7, 2018.

[24] June 29th Order P 160.

the market if they are only required to hold reserves up to the IRM on the resource specific FRR resource and load as is the case today under the current FRR option.

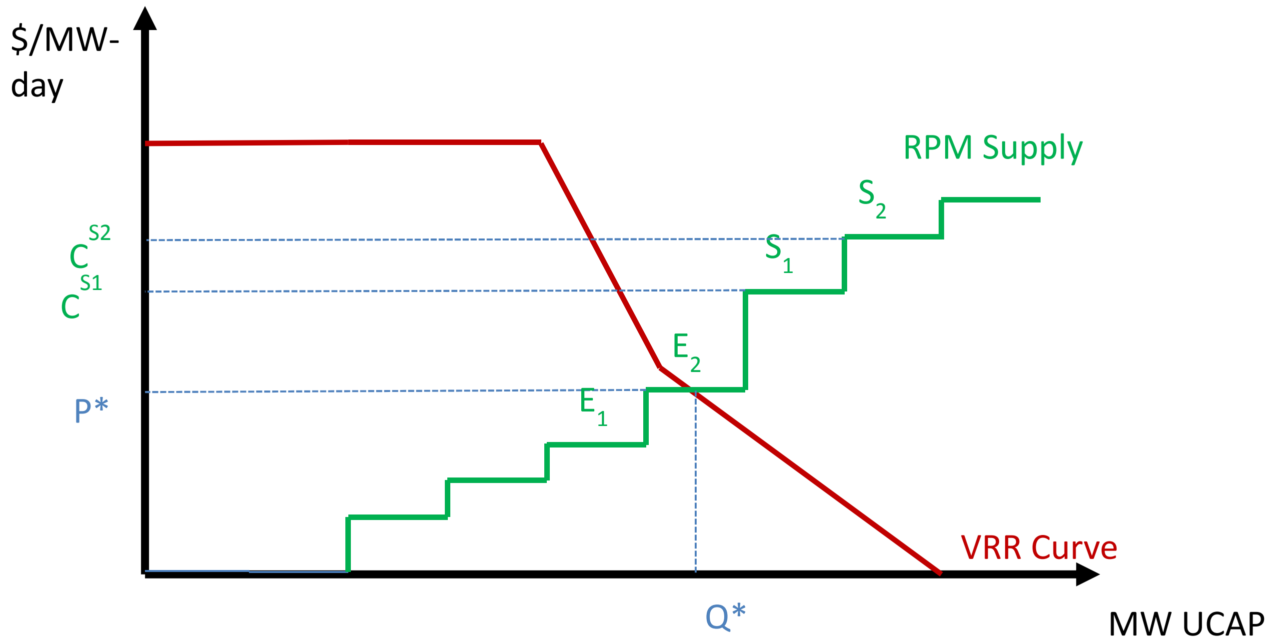
92. Furthermore, as noted in the previous section, the Commission's proposed remedy hardwires the incentives to protect resources with costs above market prices from competitive pressures. The Commission's proposed remedy also accentuates the incentives for load to potentially manipulate the proposed remedy to reduce their out-of-pocket costs for meeting its resource adequacy obligation through an exercise of buyer-side market power that will be hard-coded into the PJM market design should such a mechanism be approved.

VIII. THE OUTCOMES OF THE PROPOSED FRR ALTERNATIVE REMEDY ARE IDENTICAL TO AN EXERCISE OF BUYER-SIDE MARKET POWER

93. As alluded to in the previous Section, the FRR Alternative has the same implications for artificially reducing prices as an exercise of buyer-side market power. The objective of buyer-side market power is to pay extra money to a subset of above market price resources, insert those resources into the capacity market as price takers, and reduce the price of capacity to be paid for by the remaining load in the portfolio.

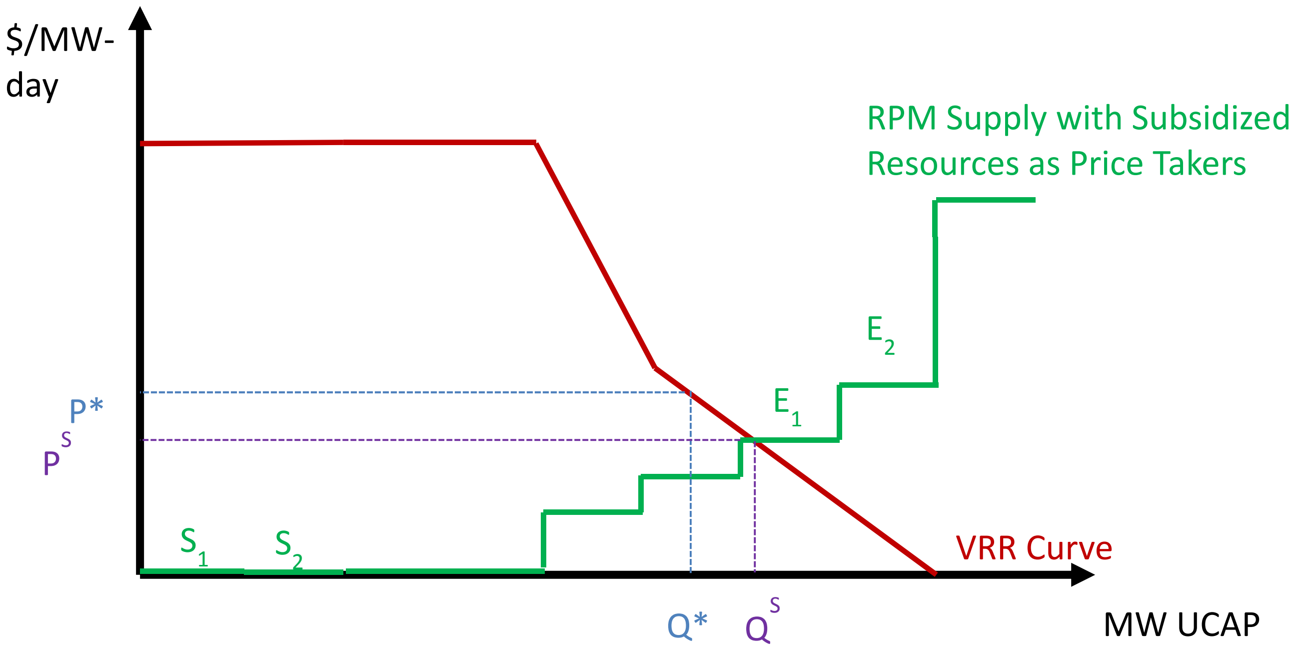
94. Consider the following simple example with two potentially subsidized resources, S_1 and S_2 as shown in **Figure 9** that have costs C^{S1} and C^{S2} respectively that are above the market price as shown in **Figure 9**. If these resources are offered at their respective costs, the market clearing price would be P* and the clearing quantity Q*. The market outcome is in fact identical to the market outcome shown in **Figure 1** in Section IV. Resource E2 is the marginal resource setting price, though only part of its capacity is committed, and resource E1 is infra-marginal with all its capacity committed.

Figure 9: Market Clearing with Potentially Subsidized Resources with Costs Above the Market Price



95. As an exercise of buyer-side market power, resources S_1 and S_2 are inserted into the capacity market as price takers as shown in **Figure 10**. The resulting price is artificially suppressed from P* to P^S. The cleared quantity of capacity increases from Q* to Q^S, though this increase in the cleared quantity of capacity is less the capacity from the subsidized resources inserted as price takers. Additionally, resources E_2 and E_1 that were originally part of the least cost solution have been displaced by the more expensive, yet subsidized resources.

Figure 10: Subsidized Resources Inserted as Price Takers as an Exercise of Buyer-Side Market Power Reduces Market Clearing Prices



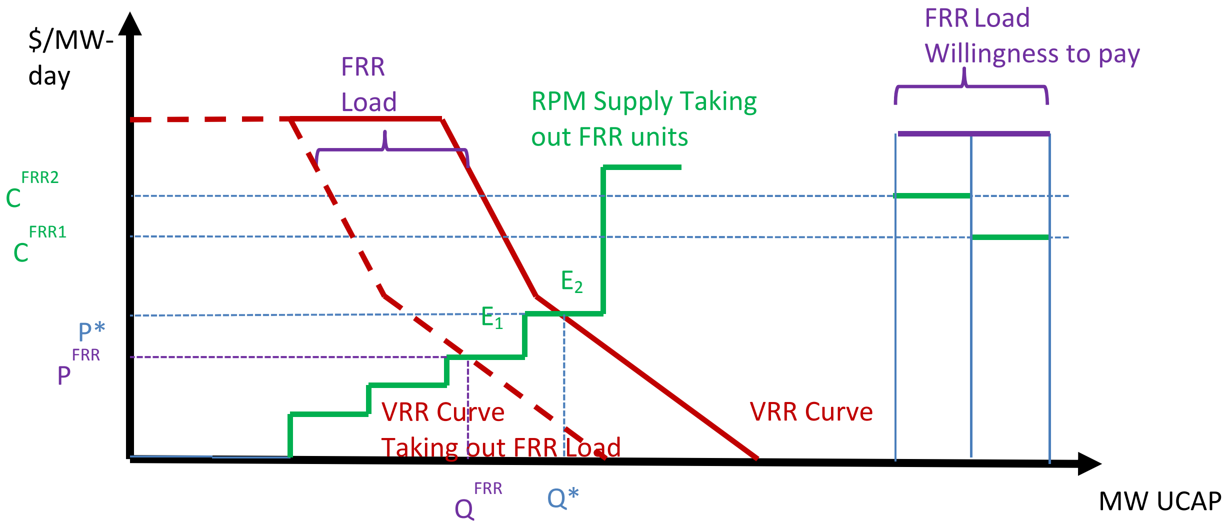
96. In terms of the effects on prices (artificially suppressed), and displacement of lower cost resources in favor of higher cost resources, the outcome of an attempted exercise of market power is no different from electing an FRR option for the same subsidized resources to brought into the market to satisfy part of the demand as was shown in **Figure 7** in Section V except now the FRR election is not for the entire load. **Figure 7** is reproduced below as **Figure 11** to make it easier to see the similar outcomes, and with the displaced resources labeled.[25]

97. The mechanisms by which these outcomes are achieved differ, but the outcomes are effectively identical. In the buyer-side market power case, the resources that were once out of market, are being brought into the market as price takers, shifting the balance

[25] The total quantity outcomes under the FRR Alternative versus buyer-side market power may differ, but only slightly and overall, and is not the main issue with regard to market distortions.

toward more "apparently" lower cost supply. In the case of the FRR Alternative, demand is being brought to the higher cost resources outside the market, again shifting the balance on net toward an "apparently" lower cost supply. The mechanisms differ, one brings in supply into price formation, and one takes out demand from price formation, but the net change is the same.

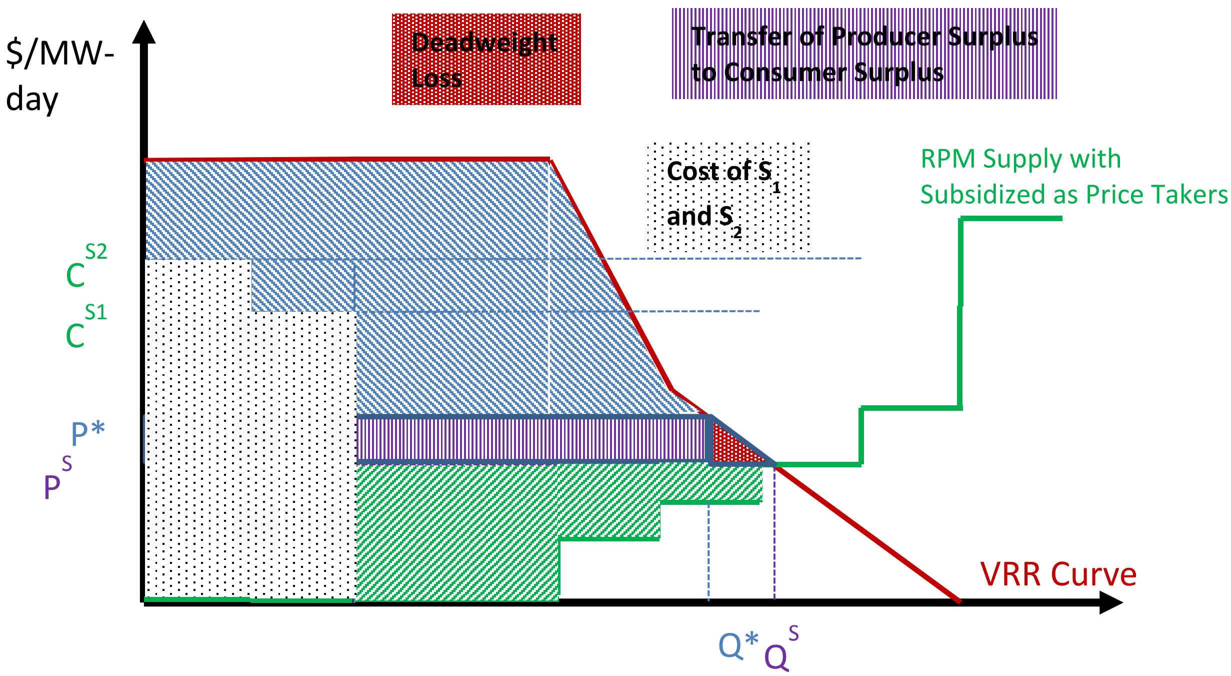
Figure 11: Reproduced Figure 7 Showing the Artificial Price Suppression and Displacement of Cost-Effective Resources



98. Given the distortions and inefficiencies caused by buyer-side market power, it should not be surprising that exercise of buyer-side market power reduces overall market surplus and by extension erode market efficiency. The loss in market surplus is attributable to the additional cost of the subsidized resources shown in the dotted area in **Figure 12**. Those costs significantly reduce producer surplus, and erode consumer surplus, though the impacts of the consumer surplus reduction are borne by the consumers subsidizing the above market price resources. As in the earlier examples, the remaining consumer surplus and producer surplus are represented in the blue and green shaded areas respectively in **Figure 12**. The additional quantity of capacity procured

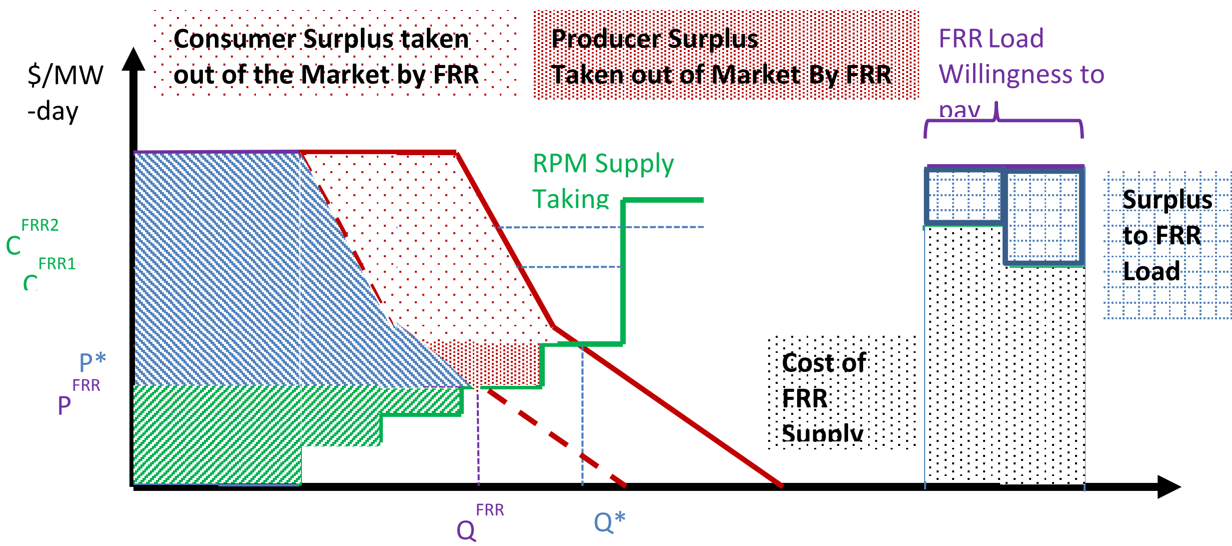
over and above the optimal quantity Q* results in the red shaded deadweight loss to overall surplus. Finally, the purple shaded area shows the transfer of surplus from producers to consumers.

Figure 12: Reduction in Market Surplus Due to an Exercise of Buyer-Side Market Power



99. This loss in overall surplus looks very similar to that shown under an FRR election with higher cost resources shown in **Figure 8** in Section V.B, and reproduced here as **Figure 13**. The remaining consumer and producer surplus match up exactly once one separates out the subsidized resources from the rest of the market in **Figure 12** as has been done in **Figure 13**. And give that in each example the demand curves for capacity are the same across both examples, and the supply curves are originally the same, before FRR or subsidized treatment, it is straightforward to see the equivalence surplus reduction and loss of efficiency between the exercise of buyer-side market power and the Alternate FRR.

Figure 13: Figure 8 Reproduced Showing the Reduction in and Transfer of Surplus from FRR Election



IX. **ANALYSIS OF PJM SIMULATION SCENARIOS PROVIDE A REAL-WORLD ESTIMATE OF THE HARM DONE FROM THE USE OF A UNIT SPECIFIC FRR REMEDY**

100. The graphical analysis provided in Sections IV, V, and VIII is designed to provide an intuitive understanding of the effects of the current FFR option and the equivalence between exercises of buyer-side market power and the FRR Alternative remedy in terms of market outcomes. Market simulation scenarios using real data from PJM confirms the concepts illustrated graphically and shows the magnitude of the damage to the market that can be done by the FRR Alternative. The same kind of damage has been shown in a recent analysis provided by the IMM for PJM for different levels of resources identified by the FRR Alternative.[26]

[26] Monitoring Analytics, Independent Market Monitor for PJM, *MOPR/FRR Sensitivity Analyses of the 2021/2022 RPM Base Residual Auction*, September 26, 2018. Available at http://www.monitoringanalytics.com/reports/Reports/2018/IMM_MOPR_FRR_Sensitivity_Analyses_Report_20180926.pdf.

101. Following the completion of base residual auctions, PJM performs and releases simulation scenarios to examine the price and quantity clearing effects of adding or removing capacity from large areas in the footprint. These have been RTO outside of MAAC and the MAAC region.[27] After the past two BRAs, PJM has provided scenario simulations adding 3,000 MW in RTO outside of MAAC, 6,000 MW in RTO outside of MAAC, 3,000 MW in MAAC, and 6,000 MW in MAAC.[28] In general these capacity additions were spread out over multiple locations in RTO and MAAC. **Table 2** provides the specific location and amounts of capacity added for each of the four scenarios listed.

Table 2: Location of Capacity Additions for Four Price Taking Scenarios in RTO and MAAC

LDA	3000 MW in RTO Outside of MAAC	6000 MW in RTO Outside of MAAC	3000 MW in MAAC	6000 MW in MAAC
Rest of ATSI	291	582	---	---
ASTI-Cleveland	146.3	292.7	---	---
COMED	754.8	1509.6	---	---
DAY	115.6	231.1	---	---
DEOK	156.2	312.4	---	---
Rest of RTO[29]	1536.1	302.2	---	---
Rest of MAAC[30]	---	---	302.4	64.9
Rest of EMAAC[31]	---	---	991.6	1983.2

[27] PJM, *Scenario Analysis for the 2020/2021 Base Residual Auction*, July 296, 2017. Available at https://pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2020-2021-bra-scenario-analysis.ashx?la=en.

[28] *Id.*

[29] This is the Rest of RTO that is not otherwise Modeled as a binding LDA. This would include the AEP, EKPC, APS, DUQ, and DOM zones.

[30] Rest of MAAC would include all LDAs that are not otherwise modeled in the analysis. These would include Penelec and MetEd zones.

Rest of PS	---	---	**259.3**	**518.7**
PS-North	---	---	**258**	**516**
DPL-South	---	---	**120.1**	**240.1**
Pepco	---	---	**336.9**	**673.7**
BGE	---	---	**352.3**	**704.6**
PPL	---	---	**379.4**	**758.8**

102. These price-taking scenarios were applied by PJM to run simulations to examine changes in market prices and cleared quantities of capacity. With additional calculations, additional information can be gleaned from these simulations such as 1) the amount of cost-effective capacity that is inefficiently displaced from the market by the price taking MW; 2) the overall changes in revenues available in the market; and 3) a first order estimate of the potential room for the exercise of buyer-side market power.

A. Changes in Locational Capacity Market Clearing Prices due to Additional MW of Price Taking Capacity in the 2020/2021 BRA

103. **Table 3** provides the actual market price from the 2020/2021 BRA along-side the reduced prices as shown by the PJM simulations in each scenario. There are three observations that I would make about **Table 3**. First, when one adds more price taking capacity, the price reductions are greater. This is not all that surprising. The second observation is that the price changes are greatest in the LDAs with the most capacity additions relative to size. This also should not be a surprise since the capacity additions in a smaller LDA should have a greater impact on the supply-demand balance. The third observation is that adding price taking capacity to otherwise constrained LDAs, such as EMAAC, has larger impacts than adding capacity in unconstrained LDAs.

[31] The Rest of EMAAC includes the RE, ACE, JCPL, PECO, and the DPL zone not included in DPL-South.

104. **Table 5** and **Table 5** provide a different look at the price changes reporting these in absolute terms and in percentage terms, respectively. Not surprisingly, adding additional capacity in the RTO does nothing to affect prices in MAAC LDAs. But capacity additions in MAAC, while primarily affecting MAAC LDAs, does have some spillover effects in the RTO zones.

Table 3: 2020/2021 BRA Prices and Price Taking Simulation Results in $/MW-day

LDA	2020/2021 BRA Results	3000 MW in RTO	6000 MW in RTO	3000 MW in MAAC	6000 MW in MAAC
RTO	$76.53	$69.32	$60.00	$74.50	$75.00
MAAC	$86.04	$86.04	$86.04	$85.00	$75.00
EMAAC	$187.87	$187.87	$187.87	$149.92	$124.70
SWMAAC	$86.04	$86.04	$86.04	$85.00	$75.00
PSEG	$187.87	$187.87	$187.87	$149.92	$124.70
PS-NORTH	$187.87	$187.87	$187.87	$149.92	$124.70
DPL-SOUTH	$187.87	$187.87	$187.87	$149.92	$124.70
PEPCO	$86.04	$86.04	$86.04	$85.00	$75.00
ATSI	$76.53	$69.32	$60.00	$74.50	$75.00
ATSI-C	$76.53	$69.32	$60.00	$74.50	$75.00
COMED	$188.12	$185.00	$174.36	$188.12	$188.12
BGE	$86.04	$86.04	$86.04	$85.00	$75.00
PPL	$86.04	$86.04	$86.04	$85.00	$75.00
DAY	$76.53	$69.32	$60.00	$74.50	$75.00
DEOK	$130.00	$122.50	$115.00	$130.00	$130.00

Table 4: Absolute Change in Capacity Prices Due to Price Taking Behavior in $/MW-day from the 2020/2021 BRA Prices

LDA	2020/2021 BRA Results	3000 MW in RTO	6000 MW in RTO	3000 MW in MAAC	6000 MW in MAAC
RTO	---	$7.21	$16.53	$2.03	$1.53
MAAC	---	---	---	$1.04	$11.04
EMAAC	---	---	---	$37.95	$63.17
SWMAAC	---	---	---	$1.04	$11.04
PSEG	---	---	---	$37.95	$63.17

PS-NORTH	---	---	---	$37.95	$63.17
DPL-SOUTH	---	---	---	$37.95	$63.17
PEPCO	---	---	---	$1.04	$11.04
ATSI	---	$7.21	$16.53	$2.03	$1.53
ATSI-C	---	$7.21	$16.53	$2.03	$1.53
COMED	---	$3.12	$13.76	---	---
BGE	---	---	---	$1.04	$11.04
PPL	---	---	---	$1.04	$11.04
DAY	---	$7.21	$16.53	$2.03	$1.53
DEOK	---	$7.50	$15.00	---	---

Table 5: Percentage Changes in Prices in Price Taking Scenarios from the 2020/2021 BRA Prices

LDA	2020/2021 BRA Results	3000 MW in RTO	6000 MW in RTO	3000 MW in MAAC	6000 MW in MAAC
RTO	---	9.42%	21.60%	2.65%	2.00%
MAAC	---	---	---	1.21%	12.83%
EMAAC	---	---	---	20.20%	33.62%
SWMAAC	---	---	---	1.21%	12.83%
PSEG	---	---	---	20.20%	33.62%
PS-NORTH	---	---	---	20.20%	33.62%
DPL-SOUTH	---	---	---	20.20%	33.62%
PEPCO	---	---	---	1.21%	12.83%
ATSI	---	9.42%	21.60%	2.65%	2.00%
ATSI-C	---	9.42%	21.60%	2.65%	2.00%
COMED	---	1.66%	7.31%	---	---
BGE	---	---	---	1.21%	12.83%
PPL	---	---	---	1.21%	12.83%
DAY	---	9.42%	21.60%	2.65%	2.00%
DEOK	---	5.77%	11.54%	---	---

105. The addition of 3,000 MW across the entire RTO is only 1.94 percent and 6,000 MW is only 3.89 percent of the reliability requirement respectively, in the 2020/22021 BRA.[32] So, another observation is that small percentages additions of price taking MW, can have an outsize percentage effect on price as shown in **Table 5**. A 3.89 percent increase in price taking MW can lead to a 21.6 percent decrease in price in the RTO. The additional 3,000 MW and 6,000 MW of price taking MW are 4.54 percent and 9.09 percent of the MAAC reliability requirement respectively.[33] Yet, the price impact in the EMAAC zones is a 20-33 percent decline in prices as shown in **Table 5**.

B. Displacement of Cost-Effective Resources by Price Taking Resources

106. In addition to artificial price suppression, another major distortion that can arise from buyer-side market power or equivalently the proposed FRR Alternative remedy, is the replacement of cost-effective resources with higher cost resources that have obtained subsidies to remain in service. **Table 6** and **Table 7** show the cost-effective capacity displaced by the 3,000 MW and 6,000 MW of price taking capacity in the RTO outside of MAAC.

Table 6: Displacement of Cost-Effective Capacity by 3000 MW of Price Taking Capacity in RTO Outside MAAC

LDA	Price Taking MW	Displacement MW	Displacement %
RTO Total	3000.0	2743.70	91.46%
Rest of RTO	1536.1	1773.00	115.42%
ATSI Total	437.3	58.10	13.29%

[32] PJM, *Planning Period Parameters for 2020/2021 Base Residual Auction*, May 23, 2017. Available at https://pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2020-2021-bra-planning-period-parameters.ashx?la=en. The reliability requirement is 154,355 MW after taking out FRR load.

[33] *Id.* The MAAC requirement is 66,385 MW

Rest of ATSI	291.0	39.90	13.71%
ATSI-C	146.3	18.20	12.44%
COMED	754.8	738.10	97.79%
DAY	115.6	31.10	26.90%
DEOK	156.2	143.50	91.87%

107. Overall in the RTO, the displacement ratio is over 90 percent as it also is for constrained zones in ComEd and DEOK. Dayton and ATSI already cleared with the RTO and inserting price taking capacity in those LDAs simply displaces more expensive capacity elsewhere in the RTO, such as the rest of the non-modeled RTO LDAs. This is true in both **Table 7** and **Table 7**. Effectively, for every 100 MW of higher cost, price taking capacity that comes into the market, 90 MW of lower cost capacity will get inefficiently displaced in the RTO eroding the cost-effectiveness and efficiency of the capacity market.

Table 7: Displacement of Cost-Effective Capacity by 6000 MW of Price Taking Capacity in RTO Outside MAAC

LDA	Price Taking MW	Displacement MW	Displacement %
RTO Total	6000.0	5412.30	90.21%
Rest of RTO	3072.2	2003.60	115.22%
ATSI Total	874.7	89.80	10.27%
Rest of ATSI	582.0	70.40	12.10%
ATSI-C	292.7	19.40	6.63%
COMED	1509.6	1435.80	95.11%
DAY	231.1	60.10	26.01%
DEOK	312.4	287.00	91.87%

108. As with inserting price taking MW into the RTO, inserting price taking MW into MAAC LDAs also has even higher overall displacement percentages between 97.5 and 99 percent as shown in **Table 8** and **Table 9**. As with inserting price taking capacity in the RTO, the displacement in LDAs that were not binding within MAAC, but cleared

with the MAAC LDA such as Pepco in SWMAAC and the rest of MAAC witnessed as much as 300 percent displacement relative to inserted price taking capacity because price taking capacity in the rest of MAAC displaced more expensive resources in those areas that had cleared previously. This is another example of cost shifting but in a geographic sense among producers where some zones experience greater resource displacement than others. It appears price taking capacity in EMAAC displaced a lot of capacity in the Rest of MAAC and, SWMAAC and Pepco LDAs indicating those areas had cost effective resources, but with costs closer to the market price. Additionally, there were some small spillover effects to the wider RTO from price taking capacity entering MAAC, but overall these effects were small.

Table 8: Displacement of Cost-Effective Capacity by 3000 MW of Price Taking Capacity in MAAC LDAs

LDA	Price Taking MW	Displacement MW	Displacement %
RTO	3000	2927.8	97.59%
Rest of RTO	0	-53.5	N/A
MAAC	3000	2981.5	99.38%
Rest of MAAC	302.4	772.3	255.39%
EMAAC	1629	1295.1	79.50%
Rest of EMAAC	991.6	934	94.19%
SWMAAC	689.2	1396.5	202.63%
PSEG Total	517.3	359.9	69.57%
Rest of PSEG	259.3	139.9	53.95%
PS-NORTH	258	220	85.27%
DPL-SOUTH	120.1	1.2	1.00%
PEPCO	339.9	1050.8	311.90%
ATSI	0	4.5	N/A
ATSI-C	0	3.2	N/A
COMED	0	0	N/A
BGE	352.3	345.8	98.15%
PPL	379.4	4.3	1.13%

DAY	0	1.8	N/A
DEOK	0	0	N/A

109. Overall, for every 1,000 MW of higher cost subsidized price taking capacity inserted in the market displaces between 975 and 990 MW of cost-effective capacity overall leading the same conclusion that that exercises of buyer market power, or equivalently the unit specific FRR Alternative will lead to an inefficient substitution of high cost resources, albeit subsidized, for lower cost resources.

Table 9: Displacement of Cost-Effective Capacity by 6000 MW of Price Taking Capacity in MAAC LDAs

LDA	Price Taking MW	Displacement MW	Displacement %
RTO	6000	5945.6	99.09%
Rest of RTO	0	693.1	N/A
MAAC	6000	5458.5	90.98%
Rest of MAAC	604.9	1309.7	216.53%
EMAAC	3258	2702.2	82.94%
Rest of EMAAC	1983.2	1827.9	92.17%
SWMAAC	1378.3	1675.4	121.56%
PSEG Total	1034.7	830.6	80.27%
Rest of PSEG	518.7	349.5	67.40%
PS-NORTH	516	481	93.22%
DPL-SOUTH	240.1	43.7	18.20%
PEPCO	673.7	1106.9	164.30%
ATSI	0	4.4	N/A
ATSI-C	0	3.2	N/A
COMED	0	0	N/A
BGE	704.6	492.4	69.88%
PPL	758.8	159.1	20.97%
DAY	0	1.8	N/A
DEOK	0	0	N/A

C. Revenues Reductions in the Capacity Market Due to Price Taking Behavior by Resources Receiving Out-of-Market Support.

110. **Table 11** and **Table 11** show the overall revenues collected by committed capacity resources and the absolute difference in revenues collected, respectively. Of course, as additional resources with out-of-market support enter as price takers, market prices decline as evidenced in **Table 5** and **Table 5** and so do corresponding revenues. The largest impact on revenues, as it is on prices, is due to pride taking behavior in the more constrained LDAs such as EMAAC, and to a lesser extent the binding LDAs in RTO such as ComEd and DEOK. **Table 11** shows an additional 6,000 MW of price taking resources in RTO, has about the same impact on overall revenues in PJM as 3000 MW of price taking resources in MAAC.

Table 10: Revenues from the 2020/2021 BRA and Scenarios with Price Taking Behavior of Capacity Receiving Out-of-Market Support

Area	2020/2021 BRA Results	3000 MW in Rest of RTO	6000 MW in Rest of RTO	3000 MW in MAAC	6000 MW in MAAC
RTO outside MAAC	$3,869,024,266	$3,592,557,604	$3,312,001,625	$3,753,163,285	$3,742,845,282
MAAC	$2,842,580,333	$2,842,580,333	$2,842,580,333	$2,419,485,221	$2,064,167,455
PJM Total	$6,711,604,599	$6,435,137,936	$6,154,581,958	$6,172,648,505	$5,807,012,737

Table 11: Difference in Revenues due to Price Taking Behavior of Capacity Receiving Out-of-Market Support Relative to the 2020/2021 BRA

Area	2020/2021 BRA Results	3000 MW in Rest of RTO	6000 MW in Rest of RTO	3000 MW in MAAC	6000 MW in MAAC
RTO outside MAAC	---	$276,466,663	$557,022,641	$115,860,982	$126,178,984
MAAC	---	$0	$0	$423,095,112	$778,412,878
PJM Total	---	$276,466,663	$557,022,641	$538,956,094	$904,591,862

111. **Table 12** provides the percentage change in revenues from the price taking scenarios. Again, keeping in mind that the additional MW are 1.94 and 3.89 percent of the reliability requirement in RPM across all of PJM, 4.54 and 9.09 percent of the MAAC

reliability requirement respectively. The percent changes in revenue are multiples of these values. For example, the change in revenue in the RTO outside of MAAC from a 3.89 percent increase in price taking MW from resources receiving out-of-market support results in a 14.4 percent change in revenue in the same area -- an impact 3.7 times greater than the change in price taking MW. Similarly, in MAAC, a 9.09 percent change increase in price taking MW results in a 27.38 percent decline in revenues in MAAC -- an impact 3 times greater than the change in price taking MW.

Table 12: Percentage Difference in Revenues due to Price Taking Behavior of Capacity Receiving Out-of-Market Support Relative to the 2020/2021 BRA

Area	2020/2021 BRA Results	3000 MW in Rest of RTO	6000 MW in Rest of RTO	3000 MW in MAAC	6000 MW in MAAC
RTO outside MAAC	---	7.15%	14.40%	2.99%	3.26%
MAAC	---	0.00%	0.00%	14.88%	27.38%
PJM Total	---	4.12%	8.30%	8.03%	13.48%

112. The bottom line is that relatively small changes in price taking capacity from resources receiving out-of-market support can have large impacts on capacity market revenues where the subsidies are being awarded. Such a large impact as shown in **Table 11** and **Table 12** can only rattle investor confidence in the markets with such a small percentage of FRR resources causing such a large reduction in revenues. And the Commission has already signaled its intent to maintain investor confidence in the context of state policies in ISO New England.[34] And given that the capacity market is

[34] *ISO New England Inc.*, 162 FERC ¶ 61,205 (2018) ("CASPR Order"), P 21, "A capacity market should facilitate robust competition for capacity supply obligations, provide price signals that guide the orderly entry and exit of capacity resources, result in the selection of the least-cost set of resources that possess the attributes sought by the markets, provide price transparency, shift risk as appropriate from customers to private capital, and mitigate market power. Ultimately, the purpose of basing capacity market

"financially the residual market" by which resources can cover their going forward costs, this reduction in revenues along with displacement threatens the ability of cost-effective resources to remain in commercial operation.

D. Determining the Ability to Exercise Buyer-Side Market Power, or How Much Subsidy can be Provided and Yet Reduce Overall Load Expenditures?

113. A successful exercise of buyer-side market power through the subsidization of resources that have costs above market prices will find the right level of payment, over and above the market price, that will still result in lower revenues paid out to all resources. And this is exactly the kind of behavior the proposed FRR Alternative encourages by its very design and the mechanisms through which it would be implemented. The idea is to get the high cost resource to enter the market as a price taker, effectively increasing the supply. The way to figure this out is to examine the difference in capacity revenues and simply divide by the MW of capacity receiving the subsidized support to enter the market as price takers.

114. As shown in **Table 11**, when 3,000 MW of price taking MW with subsidized support is added to RTO outside of MAAC, the difference in revenue is just over $276 million per year. Also note the price change is "only" a reduction in the market price of $7.21/MW-day as shown in **Table 4**. But divide the reduction in revenue by the 3,000 MW of capacity and then divide again by 365 to get the amount of the subsidy, over and above the market clearing price, that could be paid to all 3,000 MW of these resources. That breakeven subsidy level is $252/MW-day. Any subsidy payment below that amount can

constructs on these principles is to produce a level of investor confidence that is sufficient to ensure resource adequacy at just and reasonable rates."

result in lower overall revenues paid by load while displacing lower cost resources and reducing market revenues.

115. For the 3,000 MW of price taking MW with subsidized support is added to MAAC, the difference in revenue is just over $423 million per year in MAAC alone as shown in **Table 11**. The price change in MAAC is only $1.04/MW-day, but the big impact is in EMAAC where the capacity price falls by nearly $38/MW-day as shown in **Table 4**. Carrying out the same exercise I just described results in a breakeven subsidy level of $386/MW-day. Again, any subsidy paid below this amount will result in lower total expenditures to be paid by the load in MAAC while displacing lower cost resources and reducing market revenues.

Table 13: Level of Breakeven Subsidy Payable Over the Market Price ($/MW-day)

Area	3000 MW in Rest of RTO	6000 MW in Rest of RTO	3000 MW in MAAC	6000 MW in MAAC
RTO outside MAAC	**$252.48**	**$254.35**	**---**	**---**
MAAC	**---**	**---**	**$386.39**	**$355.44**

116. **Table 13** shows the breakeven subsidy payment in each of four price taking scenarios for revenue changes only in the identified areas overall. In MAAC, and mostly due to the binding constraints in EMAAC, the level of breakeven subsidy is much larger than it is in RTO. These numbers can easily be verified by simply taking the revenue decreases shown in **Table 11** and dividing by the price taking MW and dividing again by 365 to arrive at $/MW-day.

E. Implications for Known Subsidies in New Jersey and Illinois

117. The results shown on the breakeven subsidies are instructive for the approved subsidies for nuclear resources in New Jersey and Illinois. The New Jersey nuclear units are in

EMAAC where the biggest impact has been shown, and the affected capacity is equal to just over 3,500 MW. Moreover, New Jersey has already approved subsidies for offshore wind that would add another increment of subsidized capacity into RPM in EMAAC. [35] The kind of price suppression that could be observed is likely beyond that shown in this analysis.

118. In Illinois, approximately 1,400 MW of nuclear capacity from the Quad Cities Nuclear station has been awarded subsidies granted under the Future Energy Jobs Act.[36] Along with the Clinton Nuclear station in MISO, this amounts to the nuclear units receiving as much as $366/MW-day in subsidies.[37] The 1,400 MW of Quad Cities that is in PJM is just about the amount of capacity added to ComEd in the simulation scenario adding 6,000 MW of price taking capacity in RTO outside of MAAC. The change in price in this scenario is $13.76/MW-day as shown in **Table 4**. The change in revenue in ComEd alone is just over $115 million per year, with an implied breakeven subsidy of nearly $210/MW-day.

119. As an estimate, it appears that the subsidy in ComEd may not be a successful exercise of buyer-side market power in the sense that it has not reduced prices sufficiently to offset the cost of the subsidies. Nonetheless, it will still have the effect of distorting the market and effecting revenues for other suppliers in that LDA.

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[35] Joshua S. Hill, "New Jersey Makes Way For 1.1 Gigawatt Offshore Wind", September 21, 2018 available at https://cleantechnica.com/2018/09/21/new-jersey-makes-way-for-1-1-gigawatt-offshore-wind/

[36] Illinois General Assembly, Public Act 99-0906 ("Future Energy Jobs Act" or "FEJA"), November 30, 2016, available online at http://www.ilga.gov/legislation/publicacts/99/PDF/099-0906.pdf. The FEJA was signed into law by Governor Bruce Rauner on December 7, 2016.

[37] Combined the Quad Cities and Clinton nuclear stations in Illinois have approximately 2400-2500 MW of capacity. The maximum amount of money paid out under the Future Energy Jobs Act is about $330 million per year. This works out to payments equal to about $366/MW-day.

X. TO PRESERVE EFFICIENT OUTCOMES IN THE CAPACITY MARKET A "CLEAN" MOPR IS THE SIMPLEST AND MOST EFFECTIVE MITIGATION MEASURE

120. As the PJM scenario simulations and the graphical analysis illustrate, below-cost offers from subsidized resources artificially suppress clearing prices and thereby inefficiently displace otherwise cost-effective resources and reduce overall market efficiency. Given that the proposed resource specific FRR Alternative has the exact same impact on clearing prices, it would have the same effects in terms of inefficiently displacing otherwise cost-effective resources and reducing overall market efficiency.

121. The Commission already rejected the idea of a MOPR riddled with exemptions and exceptions when it rejected PJM's MOPR-Ex proposal.[38] Furthermore, the Commission has indicated a strong MOPR is absolutely necessary to protect the market from the kind of damage that can be inflicted by subsidized price taking resources. All of this leads to one clear conclusion: implement a so-called "Clean MOPR" as proposed in Docket No. EL18-169-000.

A. A Clean MOPR Only Mitigates Resources with Actionable Subsidies

122. Actionable subsidies should include subsidies that are not available to similarly situated resources. An actionable subsidy is one designed for specific generation technologies, generation fuel types, or specific generators in specific locations themselves. In this sense, actionable subsidies are inherently discriminatory with the intent of aiding one particular generation resource, or technology or in a resource at a particular location at the expense of other competitors in the market as has been shown in the graphical above. Simply stated, actionable subsidies are those explicitly designed to shift

[38] June 29th Order P 158.

revenues from more efficient, lower cost resources to higher cost, but preferred resources.

123. Furthermore, these sorts of subsidies are inherently anti-competitive in that there is generally no competition among ***all resource types*** for subsidies targeted toward specific goals such as the emissions reductions. The resource types targeted are chosen in advance regardless of the implied cost of emission abatement of the chosen technologies versus other technology types. And while the cost of pollution abatement is not within the Commission's purview, the related impacts in terms of cost shifting, price suppression, and inefficient outcomes in wholesale power markets are squarely within the Commission's bailiwick.

124. New, and now increasingly existing, resources are recipients of actionable subsidies and both new and existing resources should be subject to the Clean MOPR. Being subject to a Clean MOPR, these actionable subsidies are really impermissible in wholesale power markets.

125. There are various other subsidies that should not be actionable, consistent with those covered by PJM's proposed "Competitive Exemption." These include tax abatement for local economic development that are available to all resources types and generally other sectors of the economy as well.

B. A Clean MOPR Mitigates Resources with Impermissible Subsidies to a Measure of Net Going Forward Costs

126. Mitigation of new entrants that are recipients of actionable or impermissible subsidies can be done based on estimates for the Net Cost of New Entry ("Net CONE") as has been the case for new gas combined cycle and gas combustion turbines in PJM for

several years. The IMM has already computed Net CONE values for wind and solar resources that are potentially recipients of impermissible subsidies.

127. Mitigation of existing resources can be addressed in one of two ways. The first way is a bottom up approach by which the existing resource can submit all of its cost data and projected revenue data to come up with a unit specific mitigation value. The problem with this method is two-fold from my experience Chief Economist at PJM in charge of this unit specific mitigation process. First, the subsidized resource has an incentive to "shade" its costs on the low side to get a lower price floor to clear and verifying the cost data is a time and personnel intensive exercise. Second, the cost data presented may not be consistent with the data provided to the states to receive the subsidy.

128. The second approach to mitigating existing resources, which can also work for new resources, is to rely on the information inherent in the subsidy level and the data used in the legislation or regulatory proceeding to arrive at the subsidy level. In this sense, mitigation is using the idea of information revelation to ascertain the net going forward cost of the resource receiving the unpermitted subsidy. This eliminates the issue of conflicting information. Other information can be used to supplement the level of mitigation, but it tailors the mitigation to the level of the impermissible subsidy.

C. There are no Exemptions or Exceptions with a Clean MOPR

129. Any recipient of an actionable or impermissible subsidy should be subject to mitigation. This stands in sharp contrast to the MOPR that existed in PJM just prior to *NRG* where renewable resources and existing resources were still exempt from MOPR.

130. Resources not receiving actionable subsidies are, by definition, not subject to the Clean MOPR.

131. There should be no "carve outs" allowing for a certain amount of resources receiving unpermitted subsidies to be exempt from a Clean MOPR in any given year. As the analysis of the PJM simulations shows, even allowing such an exemption for less than two percent of the reliability requirement can lead to significant artificial price suppression, reduced revenues, displacement of otherwise economic resources, cost shifting, and reduced efficiency.

XI. NO FORM OF ACCOMMODATION EXISTS THAT WILL PRESERVE THE EFFICIENCY AND JUST AND REASONABLENESS OF PJM CAPACITY MARKET OUTCOMES

132. I understand the Commission's desire to accommodate state policies to prevent load from potential double payments for both subsidized resources and capacity resources. While this is an admirable goal, technically speaking, it is simply not possible to accommodate such polices and preserve efficient and just and reasonable outcomes in the PJM capacity market.

133. Any accommodation policy that permits resources with out-of-market support (subsidies) and costs above competitive market prices to enter the market as price takers to receive a capacity commitment can only result in harm to the market. This harm comes in the form of artificial price suppression, displacement of otherwise cost-effective resources, reductions in capacity market revenues to competitive resources, the shifting of costs and benefits among market participants, and inefficient outcomes that are characteristic of an exercise of buyer-side market power.

134. It does not matter whether this accommodation comes in the form of an exemption to a Clean MOPR or the use of the FRR Alternative. Such an accommodation opens up an avenue to explicitly permit exercises of buyer-side market power under the guise of satisfying other public policy objectives regardless of those objectives are.

135. It does not matter if the accommodation requires above market price resources to satisfy other conditions or require actions on the part of other market participants such as retirement. It is does not matter if the accommodation only allows damage to the market at some point in the future. The graphical analysis and simulation results are clear and unambiguous. Accommodation will eventually result in above-market-price resources receiving subsidies to enter the market as price takers to receive a capacity commitment leading to irreversible harm to the market. And such accommodation hard-wires buyer-side market power as part of the PJM market design.

136. This can be seen not only through the graphical analysis I have presented in this affidavit, but also through actual simulations run by PJM confirming the outcomes seen in the graphical analysis. The only question with an accommodation strategy is how much damage to competitive outcomes is "acceptable"? Or stated another way, how much in the way of "unjust, unreasonable, and unduly discriminatory" outcomes are "permissible"?

* *

137. This concludes my affidavit.

Attachment A

to the

Affidavit of Paul M. Sotkiewicz

In Docket Nos. EL16-49-000, ER18-1314-000, ER18-1314-001, EL18-178-000

PAUL M SOTKIEWICZ, Ph.D.

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E-mail: drpaulg8r@gmail.com Phone: +1-352-244-8800 Mobile: +1-610-955-2411

EDUCATION

PhD, Economics, University of Minnesota, 2003
M.A., Economics, University of Minnesota, 1995
B.A. (High Honors), History/Economics, University of Florida, 1991

PROFESSIONAL AND ACADEMIC EXPERIENCE

2016- President and Founder, E-Cubed Policy Associates, LLC, Gainesville, FL

- Founded to provide expert advice, testimony, and policy research to private sector and government clients at the intersection of energy, environmental, and economic policy and regulation
- Provided capacity market design expertise to the Alberta Electric System Operator in 2017 as they started their transition from an energy-only market to a combined energy and capacity market
- Authored a Meter Data Study for the NYISO encompassing a survey of metering requirements for demand resources and distributed energy resources in key ISO/RTO markets, the current use of demand response baseline methodologies and possible use of such baselines for distributed energy resources in the context of REV in New York.
- Work with clients in generation and merchant transmission development projects in different parts of PJM related to helping them through the interconnection process, understanding market rules, and regulatory policy and economic advice in the face of changing market rules.
- Supporting clients in docketed proceedings at FERC and at the Florida Public Service Commission providing expert testimony and analysis to be used in regulatory proceedings. These proceedings include need determinations, rate filings, RTO market design changes, and policy related proceedings.
- Supporting US government initiatives in exporting knowledge and experience regarding US electric power market development to the Chinese government as they undertake green energy initiatives and look to improve the overall efficiency of the power system.

2015-2016 Contractor, YOH Inc. and working under the title of Senior Economic Policy Advisor, PJM Interconnection, L.L.C., Audubon, PA
2010-2015 Chief Economist, Market Services Division, PJM Interconnection, L.L.C., Audubon, PA
2008-2010 Senior Economist, Market Services Division, PJM Interconnection, L.L.C., Audubon, PA

- Provide analysis and advice with respect to the PJM market design and market performance including demand response mechanisms, intermittent and renewable resource integration, market power mitigation strategies, capacity markets, ancillary service markets, and the potential effects of environmental policies on the PJM markets.
- Co-authored papers related to effects of the proposed Waxman-Markey climate change bill in 2009, the implementation of the Mercury and Air Toxics Standards (MATS) and Cross State Air Pollution Rule in 2011, and the potential effects of the EPA-proposed Clean Power Plan in 2015.
- Led the Stakeholder Process to implement reserve shortage pricing in PJM in 2009-2010 and provided expert testimony associated with FERC filings in 2010.
- Co-authored paper to explain various market and policy concepts for PJM and its stakeholders including a paper explaining generator costs and compensation in 2010, a paper on possible routes to take on transmission cost allocation in 2010, and a whitepaper on capacity market issues in 2012.
- Advised PJM executives on market power mitigation issues related to the Three Pivotal Supplier test and cost-based offers used for market power mitigation in the PJM Energy Market in 2008-2009

- Advised PJM executives and Board of Managers on demand response compensation prior to the issuance of FERC Order 745.
- Supported and advised the Capacity Market Operations staff and PJM executives on all matters related to the Reliability Pricing Model (RPM) capacity market including implementation of the Minimum Offer Pricing Rule in its various iterations, determinations and/or reasonableness of Market Seller Offer Caps during disputes between Capacity Market Sellers and the Independent Market Monitor.
- Provided advice to Capacity Market Operations staff and PJM executives on the RPM Triennial Parameter Review Process in 2011 and in 2014 including supporting legal staff in making filings, providing expert testimony, and providing expert advice during the 2011 and 2012 hearing and settlement process at FERC.
  Supported and provided advice to Capacity Market Operations staff and PJM executives on Capacity Performance through stakeholder presentations, regulatory filings, and working jointly with the IMM in developing many of the ideas and concepts taken from ISO New England's Pay for Performance design for us in PJM.
- Supported the Federal State Government Policy outreach through by providing subject matter expertise during one-on-one meetings with regulatory staff and Commissioners related to any issues of mutual interest and import between PJM and state commission, state environmental regulators, FERC staff, and EPA staff as needed.
- Co-authored and co-led PJM's responses to the Independent Market Monitor's (IMM's) *State of the Market Reports* as well as remaining in communication with the IMM on various matters of concern and interest related to PJM market performance and design.
- Led technical and non-technical external outreach efforts to promote PJM markets or explain PJM positions on policy or market design issues of current interest to industry stakeholders including academic audiences, and invited presentations at industry sponsored events.
- Provided support in gas/electric coordination discussions within PJM and the between the power and gas industries, as well as operations support during critical operating periods in January 2014 through calls and inquiries to PJM generators and pulling environmental permits to better understand generator operating limitations on back-up fuel.
- Provided periodic reports on market performance and the state of PJM's markets to the PJM Board of Managers Competitive Markets Committee including the relationship between PJM's markets and major fuel market, environmental policy, and macroeconomic trends.
- Acted in the role of an internal consultant and advisor to all PJM departments and divisions, as needed, to address any questions or concerns surround market performance, market design, and general economic or environmental policy questions.
- Supported development and issuance of the PJM Renewable Integration Study by outside vendors.

2000–2008 Director of Energy Studies, Public Utility Research Center and Lecturer,
Department of Economics, University of Florida, Gainesville, FL

- Designed and delivered executive education and outreach programs in electric utility and regulatory policy and strategy for professionals in government, regulatory agencies, and industry primarily for developing countries.
- Responsible for electricity regulatory policy curriculum for the *PURC/World Bank International Training Program on Utility Regulation and Strategy* offered twice per year for 65 to 95 industry and regulatory professionals in each course.
- Acted as the electricity expert and liaison to the Florida electric utilities who were contributing members of PURC.
- Developed electricity related topics and obtained speakers for the PURC Annual Conferences held each February on matters related to environmental policy, wholesale market restructuring, so-called "hurricane hardening" of power systems after the 2004-2005 hurricane seasons, and other policy related matters of interest to the state of Florida.

- Served the PURC liaison to the consultants retained by PURC to evaluate the hardening of electricity infrastructure in the wake of the 2004 and 2005 hurricane seasons.
- Conducted original academic research related to electricity regulation and policy and published in peer reviewed academic and policy journals
- Developed customized regulatory training courses or sessions jointly prepared with other organizations for on-site delivery in Panama, Trinidad & Tobago, Brazil, Mexico, Peru, Bolivia, Argentina, Grenada, South Africa, Zambia, Namibia, and Cambodia
- Served as an advisor and subject matter expert on wholesale restructuring and market issue to Florida Governor Jeb Bush's *Energy 2020 Study Commission* 2000-2001.
- Taught classes as needed in the Economics Department on environmental economics, regulatory economics, and a large lecture class of managerial economics

1999–2000 Economist, Office of Markets, Tariffs, and Rates, United States Federal Energy Regulatory Commission, Washington, DC

1998–1999 Economist, Office of Economic Policy, United States Federal Energy Regulatory Commission

- Provided analysis and research related to filings made by ISO/RTO markets as they commenced operations as centralized wholesale power markets.
- Led the economic analysis and evaluation of the NYISO wholesale power market in its initial filings of its market design and subsequent filings after operations commenced.
- Led economic analysis and evaluation of multiple filings by the California ISO related to requested market design changes filed after starting operations in 1998.
- Supported analysis and evaluation of other ISO/RTO markets as needed.
- Supported and provided analysis on merger applications as needed.
- Conducted original research while on the staff of the Chief Economic Advisor in the Office of Markets, Tariffs, and Rates related to unit commitment models used in day-ahead electricity markets and pricing in the presence of lumpy decisions and operational characteristics (technically known as non-convexities).

1992–1998 Instructor, Department of Economics, Augsburg College, Minneapolis, MN

- Taught small classes of introductory microeconomics, labor economics, money and banking, and environmental economics

1992–1998 Instructor, Department of Economics, University of Minnesota, Minneapolis, MN

- Taught large lecture classes of primarily introductory microeconomics to classes of up to 600 students 3 times per year, managing a staff of teaching assistants and graders and developing curriculum and exams.
- Taught smaller classes of introductory microeconomics as well as environmental economics

PUBLICATIONS AND BOOK CHAPTERS

Covino, Susan, Andrew Levitt, and Paul Sotkiewicz, "The Fully Integrated Grid: Wholesale and Retail, Transmission and Distribution", in *Future of Utilities- Utilities of the Future: How Technological Innovations in Distributed Energy Resources Will Reshape the Electric Power Sector*, Fereidoon P. Sioshansi, editor, Chapter 22, pp.417-434, 2016.

M. Ahlstrom; E. Ela; J. Riesz; J. O'Sullivan; B. F. Hobbs; M. O'Malley; M. Milligan; P. Sotkiewicz; J. Caldwell, "The Evolution of the Market: Designing a Market for High Levels of Variable Generation", *IEEE Power and Energy Magazine*, Volume: 13, Issue: 6, 2015, Pages: 60 – 66.

Bresler, Stuart, Paul Centollela, Susan Covino, and Paul Sotkiewicz, “Smarter Demand Response in RTO Markets: The Evolution Towards Price Responsive Demand in PJM”, in *Energy Efficiency: Towards the End of Demand Growth*, Fereidoon P. Sioshansi, editor, Chapter 16, pp.419-442, 2013.

Covino, Susan, Pete Langbein, and Paul Sotkiewicz, “The Fully Integrated Grid: Wholesale and Retail, Transmission and Distribution”, in *Smart Grid: Integrating Renewable, Distributed, and Efficient Energy*, Fereidoon P. Sioshansi, editor, Chapter 17, pp.421-452, 2012.

P. M. Sotkiewicz, “Value of Conventional Fossil Generation in PJM Considering Renewable Portfolio Standards: A Look into the Future”, *Power and Energy Society General Meeting, 2012 IEEE*

R. F. Chu; P. F. McGlynn; P. M. Sotkiewicz, “Transmission Planning for Generation at Risk due to Environmental Regulations and Public Policy Initiatives” *Power and Energy Society General Meeting, 2012 IEEE*

P. M. Sotkiewicz; J. M. Vignolo, “The Value of Intermittent Wind DG under Nodal Prices and Amp-mile Tariffs”, *Transmission and Distribution: Latin America Conference and Exposition (T&D-LA), 2012 Sixth IEEE/PES*

Helman, Udi, Harry Singh, and Paul Sotkiewicz, “RTOs, Regional Electricity Markets, and Climate Policy”, in *Generating Electricity in Carbon Constrained World,* Fereidoon P. Sioshansi, editor, Chapter 19, pp.527-564, 2010.

J. C. Smith; S. Beuning; H. Durrwachter; E. Ela; D. Hawkins; B. Kirby; W. Lasher; J. Lowell; K. Porter; K. Schuyler; P. Sotkiewicz, “The Wind at Our Backs”, *IEEE Power and Energy Magazine*, Volume: 8, Issue: 5, 2010 Pages: 63 - 71

J. C. Smith; S. Beuning; H. Durrwachter; E. Ela; D. Hawkins; B. Kirby; W. Lasher; J. Lowell; K. Porter; K. Schuyler; P. Sotkiewicz, “Impact of Variable Renewable Energy on US Electricity Markets”, *Power and Energy Society General Meeting, 2010 IEEE*

Holt, Lynne, Paul M. Sotkiewicz, and Sanford V. Berg. 2010. "Nuclear Power Expansion: Thinking About Uncertainty" *The Electricity Journal*, 235:26-33.

Holt, Lynne, Sotkiewicz, Paul, and Berg, Sanford, “(When) To Build or Not to Build? The Role of Uncertainty in Nuclear Power Expansion.” *Texas Journal of Oil, Gas, and Energy Law*, Volume 3, Number 2, 2008, pp. 174-217.

Sotkiewicz, Paul M. and Vignolo, J. Mario, “Towards a Cost Causation Based Tariff for Distribution Networks with DG.” *IEEE Transaction on Power Systems,* Vol. 22, No. 3, August 2007, pp. 1051-1060.

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Sotkiewicz, Paul M. and Vignolo, Jesus Mario “Nodal Pricing for Distribution Networks: Efficient Pricing for Efficiency Enhancing DG.” *IEEE Transaction on Power Systems*, Vol. 21, No. 2, May 2006, pp. 639-652.

Sotkiewicz, Paul M. and Vignolo, Jesus Mario “Allocation of Fixed Costs in Distribution Networks with Distributed Generation,” *IEEE Transaction on Power Systems*, Vol. 21, No. 2, May 2006, pp. 1013-1014.

Sotkiewicz, Paul M., and Lynne Holt, "Public Utility Commission Regulation and Cost Effectiveness of Title IV: Lessons for CAIR." *Electricity Journal* 18(8): 68-80, October 2005.

O’Neill, Richard P., Sotkiewicz, Paul M., Hobbs, Benjamin F., Rothkopf, Michael H., and Stewart, William R. Jr., “Efficient Market Clearing Prices in Markets with Non-Convexities.” *European Journal of Operational Research*, Volume 164, Issue 1, 1 July 2005, Pages 269-285.

Sotkiewicz, Paul M., “The Impact of State-Level Public Utility Commission Regulation on the Market for Sulfur Dioxide Allowances, Compliance Costs, and the Distribution of Emissions” Ph.D. Dissertation, Department of Economics, University of Minnesota, January 2003.

O’Neill, Richard P., Helman, Udi, Sotkiewicz, Paul M., Rothkopf, Michael H., and Stewart, William R. Jr., “Regulatory Evolution, Market Design, and the Unit Commitment Problem” The Next Generation of Unit Commitment Models, B. Hobbs, M. Rothkopf, R. O’Neill, and H.P. Chao editors. 2001.

Sotkiewicz, Paul M. “Opening the Lines”, Forum for Applied Research and Public Policy, Special Issue on the Role of Public Power in Utility Restructuring, Summer 2000, pp. 61-64.

SELECTED WORKING PAPERS AND UNPUBLISHED MANUSCRIPTS

Holt, Lynne, and Paul M. Sotkiewicz. "Understanding Fuel Diversity Trade-Offs and Risks: Making Decisions for the Future (pdf)" University of Florida, Department of Economics, PURC Working Paper, 2007.

O’Neill, Richard P., Sotkiewicz, Paul and Rothkopf, Michael. “Equilibrium Prices in Exchanges with Non-convex Bids.” PURC Working Paper, January 2006, updated September 2007.

Sotkiewicz, Paul M. "Cross-Subsidies That Minimize Electricity Consumption Distortions" University of Florida, Department of Economics, PURC Working Paper, 2003.

CONSULTING AND ADVISING EXPERIENCE PRIOR TO JOINING PJM IN 2008

2007 Advisor to the Government of Vietnam regarding the design and experience of wholesale electricity markets as Government looked at the creation of US style ISOs to attract investment in generation assets for IPPs

2007 Independent Expert in the Matter of the Public Utilities Commission of Belize Initial Decision in the 2007 Annual Review Proceeding for Belize Electricity Limited

2006 Advisor to the Division of Air Resource Management, Florida Department of Environmental Protection (FDEP) Regarding Implementation the Clean Air Interstate Rule (CAIR)

HONORS AND AWARDS

2007 Fulbright Senior Specialist Grant in Economics with a specific request for expertise in electricity markets, electricity regulation, and distribution tariff design, Universidad de la República, Montevideo, Uruguay.

2007 Principal Investigator, PPIAF/World Bank Grant to conduct two on-site training courses on the regulation of the electric power sector and on independent power producers and power purchase agreements for the Electricity Authority of Cambodia. Grant award $59,900.

2006 "Efficient Market Clearing Prices in Markets with Non-Convexities" published in *European Journal of Operational Research* received New Jersey Policy Research Organization Bright Idea Research Award in Decision Sciences.

2003 Transportation and Public Utilities Group, Ph.D. Utilities Dissertation Award for "The Impact of State-Level Public Utility Commission Regulation on the Market for Sulfur Dioxide Allowances, Compliance Costs, and the Distribution of Emissions"

1992-97 Distinguished Instructor, Department of Economics, University of Minnesota

1995-96
1994-95 Walter Heller Award for Outstanding Teaching of Economic Principles, Department of Economics,
1993-94 University of Minnesota
1992-93

1991-92 Distinguished Teaching Assistant, Department of Economics, University of Minnesota

1991 Phi Beta Kappa, University of Florida

Referee and Review Experience

IEEE Transactions on Power Systems

Ecological Economics

Environmental Science and Technology

Determining the Economic Value of Coastal Preservation and Restoration on Critical Energy Infrastructure, prepared for The Economic and Market Impacts of Coastal Restoration: America's Wetland Economic Forum II, September 28, 2006 Washington, DC

National Research Council of the National Academy of Sciences report entitled "Changes in New Source Review Programs for Stationary Sources of Air Pollutants", February 2006

California Energy Commission (CEC) Energy Innovations Small Grant (EISG) Program

Energy Journal

Journal of Environmental Economics and Management

IEEE PES Letters

IASTED International Journal of Power and Energy Systems

The Next Generation of Unit Commitment Models B. Hobbs, M. Rothkopf, R. O'Neill, and H.P. Chao editors

2001.

Professional Affiliations

American Economic Association
International Association for Energy Economics
Association of Environmental and Resource Economists
IEEE Power and Energy Society

EXPERT TESTIMONY

PJM Interconnection, L.L.C. FERC Docket No. ER09-1063-006, Affidavit in Support of PJM's Compliance Filing with Order No. 719 and Order on Compliance Filing *PJM Interconnection, L.L.C.*, 129 FERC ¶ 61,250 (2009). June 18, 2010
In support of its compliance filing to establish a mechanism that ensures appropriate pricing during periods of operating reserve shortages, as required by the Commission's Order No. 719, I provided the following: 1) A high-level overview of PJM's markets, planning, and operations, including a description of what is meant by an operating reserve shortage, and how such shortages arise; 2) An overview of PJM reserve requirements, current reserve market structure, and data on PJM's prices and operations at times when the grid it manages has experienced operating reserve shortages; 3) A showing why PJM's then current scarcity pricing not satisfy the Commission's Order No. 719 criteria for operating reserve shortage pricing mechanisms; 4) Description of the main elements of PJM's proposal to comply with Order No. 719's shortage pricing policy, and how PJM's proposal satisfies the six criteria for reserve shortage pricing set by Order No. 719.

PJM Interconnection, L.L.C. FERC Docket No. ER09-1063-004, Affidavit in Support of Answer to Comments and Motion for Leave to Answer to Protests, August 23, 2010. The purpose of this affidavit is to provide the following regarding PJM's proposed shortage pricing mechanism: 1) The complementary relationship between capacity adequacy in the Reliability Pricing Model ("RPM") and shortage pricing; 2) Additional evidence showing why PJM' shortage pricing proposal leads to energy prices that reflect the cost and/or value of energy, allocates energy to those who value it most, enhance operational reliability, and leads to efficient market outcomes while the alternate proposal from the Independent Market Monitor (IMM) fails to achieve any of these goals; 3) An explanation of how the proposed mechanism is consistent with shortage pricing mechanisms in the New York Independent System Operator ("NYISO") and ISO New England ("ISO-NE") that the Commission has already approved as Order 719 compliant.

PJM Interconnection, L.L.C. FERC Docket No. ER12-513, Affidavit in Support of Filing to Update its RPM Auction Parameters (aka Triennial Review) December 1, 2011. This affidavit was submitted in support of three aspects of PJM's proposed changes related to PJM's capacity market, known as the Reliability Pricing Model ("RPM") including: 1) the continued use of a nominal levelized approach to calculating the estimated Cost of New Entry ("CONE") that is used in RPM's Variable Resource Requirement ("VRR") Curve; 2) retention of a combustion turbine ("CT") as the Reference Resource.

PJM Interconnection, L.L.C. FERC Docket No. ER-14-2490, Affidavit in Support of Filing to Update its RPM Auction Parameters (aka Quadrennial Review) September 25, 2014 This affidavit was submitted in support of five aspects of PJM's proposed changes related to PJM's capacity market, known as the Reliability Pricing Model ("RPM"): 1) adoption of The Brattle Group's ("Brattle") recommended VRR Curve shape right shifted by 1% of the Installed Reserve Margin ("IRM"); 2) continued use of a nominal levelized approach to calculating the estimated Cost of New Entry ("CONE") that is used in RPM's Variable Resource Requirement ("VRR") Curve; 3) retention of a combustion turbine ("CT") as the Reference Resource; 4) use of a composite of Bureau of Labor Statistics ("BLS") indices to adjust Gross CONE estimates in between periodic VRR parameter reviews; and 5) adoption of the labor estimates provided by the PJM Independent Market Monitor ("IMM") to determine Gross CONE values.

Grid Reliability and Resilience Pricing FERC Docket No. RM18-1, Affidavit in Support of the Electric Power Supply Association (EPSA), October 23, 2017. This affidavit provides evidence the Department of Energy Notice of Proposed Rulemaking ("NOPR" or "Proposal") released on September 28, 20171 and appearing in the Federal Register on October 2, 2017 does nothing to enhance reliability or "resiliency" of the bulk power system and will only succeed in distorting wholesale power markets while also raising costs. Consequently, my affidavit supports EPSA's contention the NOPR should be rejected outright by the Commission.

ISO New England Inc. and New England Power Pool Participants Committee, FERC Docket No. ER18-620-000, Affidavit in Support of the Protest of the New England Power Generators Association, Inc. January 29, 2018. In summary, my affidavit explains that the proposed updated DDBT from $5.50/kW-month to $4.30/kW-month: 1) Relies on a flawed and logically inconsistent methodology that differs from the DDBT methodology approved by the Commission three years ago; 2) Sets a dangerous precedent in ISO-NE taking a position on the direction of its Forward Capacity Market ("FCM") in terms of supply-demand balance and expected market prices that could anchor expectation of market participants. The anchoring of such expectations can change FCA bidding and operational behavior that could harm reliability; 3) The previous methodology approved by the Commission of using Static De-List Bids from oil steam and oil combustion turbine generators remains the appropriate methodology for determining the DDBT; and 4) The cost-based DDBT is likely higher than for FCAs 10-12 given that net going forward costs for oil steam and oil combustion turbine units has likely increased given their age, and other risks and opportunity costs that may be coming into play. My affidavit concludes that the current DDBT should be retained until such time as a new DDBT threshold and be determined using the current Commission-approved methodology following the discovery of the actual costs and risks faced by oil units.

Petition for Determination of Need for Seminole Combined Cycle Facility in Docket No. 20170266-EC and Joint Petition for Determination of Need for Shady Hills Generating Facility in Docket No. 20170267-EC, January 29, 2018. Testimony and Exhibits on Behalf of Quantum Pasco Power, LP, Michael Tulk, and Patrick Daly. My testimony supports the notion that there is no need for either combined cycle facility as Seminole Electric has consistently over-forecast its load growth since the "great recession" and that once correcting for these large errors, there is no need to build two new combined cycle facilities when there where other lower cost merchant generator facilities that offered their capacity to Seminole.

PJM Interconnection, L.L.C. FERC Docket No. E18-34, Affidavit in Support of EPSA's Filing and Comments in PJM's Fast Start Pricing Proposal, March 14, 2018 My affidavit in this proceeding provides support for PJM's desire to allow resources with up to two-hour start up times to be considered "fast start" resources and to set price in accordance with the fast start pricing principles the Commission has enumerated in its Fast Start Pricing NOPR. I explain PJM's use of IT SCED and request to allow two-hour start time resources to set prices as fast start resources is entirely consistent with the ideas the Commission has enumerated with respect to fast start pricing.

PJM Interconnection, L.L.C. Capacity Repricing or in the Alternative MOPR-Ex Proposal: Tariff Revisions to Address Impacts of State Public Policies on the PJM Capacity Market, FERC Docket No. ER18-1314-000, Affidavit is Support of Comments of American Petroleum Institute, JPower USA Development, Ltd., and Panda Power generation Infrastructure Fund, LLC May 7, 2018. My affidavit provides evidence that 1) The PJM Capacity Repricing Proposal is not just and reasonable and is unduly discriminatory and results in an inefficient commitment of resources; 2) The alternative proposal from PJM, MOPR-Ex, is just and reasonable and results in the most efficient and cost-effective se of resource commitments; and 3) The current and previous iterations of the MOPR are not just and reasonable and are unduly discriminatory because they do not apply to existing resources and they only apply to gas-fired resources. Furthermore, my affidavit provides evidence that MOPR has always been viewed as a market power mitigation mechanism that was originally intended to thwart or mitigate the exercise of buyer-side market power. I show in this affidavit that MOPR, and in particular MOPR-Ex, still is a powerful market power mitigation tool that mitigates exercise of supplier market power that are facilitated by the current round of state subsidies to generation. Moreover, I show that Capacity Repricing helps facilitate the exercise of supplier market power through three different means.

Grid Resilience in Regional Transmission Organizations and Independent System Operators, FERC Docket No. AD18-7-000, Affidavit is Support of Comments of the American Petroleum Institute, May 9, 2018. This affidavit focuses of the comments submitted by PJM and: 1) Supports the idea that in the context bulk power system markets and operation resilience and reliability are indistinguishable and that markets and well-designed incentives are the best avenue to achieve a resilient and reliable bulk power system; 2) Explains why market mechanisms rather than suspension of market and command and control regimes are better at achieving resiliency/reliability even during emergency conditions and that PJM has not made a case for being given the authority to suspend markets; 3) That PJM has not made the case that price formation through integer relaxation is linked to resilience/reliability while other price formations that are crucial to reliability/resilience such as shortage pricing and fast start pricing are being considered concurrently; and 4) So-called "fuel security" is only a minimal contributor to resilience/reliability while transmission and distribution assets are the leading causes for shedding firm load and gas-fired units have been shown to not even being the leading category of generation outages. With respect to generator reliability/resilience, simply providing additional compensation (or minimize penalties) to generators in wholesale markets, without any ties to generator performance, does nothing to enhance reliability/resilience of generators to withstand or minimize the impact of adverse events on the bulk power system. Experience in PJM prior to, and following the discussion and implementation of capacity performance has shown this to be the case as generator performance has improved even in the face of lower energy market prices.

New England Power Generators Association, Complainant v. ISO New England Inc., Respondent. FERC Docket No. Docket No. EL18-154-000, Affidavit in Support of Complaint and Request for Expedited Consideration of the New England Power Generators Association, Inc. May 24, 2018 This affidavit in support of NEPGA's complaint shows the impact of treating Mystic Units 8 and 9 as a price taker on the ISO-NE markets as well as NEPGA's proposed alternative to accommodating the participation of the Mystic units. Discussions include: 1) treating Mystic and other resources retained for fuel security as price takers will do significant harm to the competitiveness of the FCM market and is inconsistent with the first principles of capacity markets articulated by the Commission; 2) the proposal to insert an above market cost resource into the FCM as a price taker does exactly the same harm as an exercise of buyer-side market power, which he Commission has found to be unjust, unreasonable, and unduly discriminatory; and 3) the proposed remedy offered by NEPGA does not distort the results of the Forward Capacity Auction, results in competitive pricing outcomes in FCA, does not displace otherwise economic resources, and provides better reliability outcomes for ISO-NE load than the current ISO-NE proposal.

New England Power Generators Association, Complainant v. ISO New England Inc., Respondent. FERC Docket No. Docket No. EL18-154-000, Affidavit in Support of the Motion for Leave and Answer of the New England Power Generators Association, Inc. June 19, 2018. This affidavit in support of NEPGA's answer refutes the answer of ISO-NE and protesters and responds that nothing in ISO-NE's answer to the Complaint or the protests to the Complaint provides a basis for ignoring that treating the Mystic Units as price takers would suppress prices below competitive levels and inefficiently displace otherwise economic resources in a manner that is observationally equivalent to the harm done by an exercise of buyer-side market power.

Panda Stonewall, LLC. FERC Docket No. ER17-1821-002, Testimony is Support of Panda Stonewall, LLC Reactive Power Filing, July 2, 2018. This testimony supports Panda Stonewall's reactive power rate case that has gone to hearing and in particular supports the inclusion of firm gas pipeline transportation, the use of proxy cost of capital values from the PJM CONE study, and supports the inclusion of other administrative and overhead costs consistent with fixed, going forward costs incurred by Panda Stonewall to remain in commercial operation. Furthermore, the testimony puts the costs of reactive power into the context of the wiser PJM market and other opportunities for compensation and well as providing historical context around the Commission-approved AEP Methodology for reactive power rates.

ISO New England Inc. FERC Docket No. ER18-2364-000, Affidavit in Support of the Protest of the New England Power Generators Association, Inc. September 21, 2018. This testimony supports NEPGAs protest that the proposed ISO-NE treatment of resources held for winter fuel security as price takers in the FCA makes no sense since winter fuel security is not associated with overall resource adequacy which is based on the summer peak. Moreover, the testimony shows clearly the artificial price suppression that would occur based on ISO-NE proposed treatment of resources held for winter fuel security in the FCA.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Calpine Corporation	)	
	)	
v.	)	**Docket No. EL16-49-000**
	)	
PJM Interconnection, L.L.C.	)	
PJM Interconnection, L.L.C.	))	**Docket No. ER18-1314-000** **Docket No. ER18-1314-001**
PJM Interconnection, L.L.C.	)	**Docket No. EL18-178-000**
		(Consolidated)

AFFIDAVIT OF PAUL M. SOTKIEWICZ, PH.D.

Paul M. Sotkiewicz, Ph.D., being duly sworn, deposes and states that the statements contained in the foregoing Affidavit of Paul M. Sotkiewicz, Ph.D. are true and correct to the best of his knowledge and belief.

Paul M. Sotkiewicz, Ph.D.

Subscribed and sworn to before me
this 1st day of October, 2018

Notary Public for
the State of Florida

State of Florida
County of Alachua

Notary Public State of Florida
Cesar Jose Andrade
My Commission FF 903861
Expires 07/27/2019

My Commission expires: 07/27/19