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January 25, 2017

VIA ELECTRONIC FILING

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: Independent Power Producers of New York, Inc., v. New York Independent System Operator, Inc., Docket No. EL13-62-002, Errata to Answer of Exelon Corporation to Request for Expedited Action

Dear Secretary Bose:

On January 24, 2017, Exelon Corporation filed an Answer to a Request for Expedited Action that was submitted by the Electric Power Supply Association on January 9, 2017 in the above-referenced docket. Due to administrative oversight two Exhibits were not included as attachments to the Declaration of Robert Willig. These Exhibits are included as pages 65 and 66 of the attached corrected version of our filing. The insertion of the two Exhibits is the only correction to the filing.

This filing will be served on the EL13-62-002 Service List.

Respectfully submitted,

/s/Christopher A. Wilson

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Independent Power Producers of New York, Inc.,	)	
Complainant	)	
v.	)	**Docket No. EL13-62-002**
New York Independent System Operator, Inc.	)	
Respondent	)	

ANSWER OF EXELON CORPORATION TO REQUEST FOR EXPEDITED ACTION

Pursuant to Rule 213 of the Federal Energy Regulatory Commission's (the "Commission") Rules of Practice and Procedure, 18 C.F.R. § 385.213 (2016), Exelon Corporation ("Exelon") hereby responds to the Request for Expedited Action[1] filed by the Electric Power Supply Association ("EPSA") in the above referenced proceeding.

At the outset, the Commission should reject the Request for Expedited Action as procedurally improper. EPSA's Request seeks action that goes well beyond NYISO's compliance obligations in this proceeding. It also identifies issues beyond the scope of the complaint that triggered this proceeding, and fails to offer any proposed tariff language that would remedy the harm it alleges. But even if its Request were procedurally proper and concerned matters within the scope of this proceeding, it should still be rejected on the merits. Imposing a minimum offer price rule ("MOPR") on existing resources merely because they receive payments for their environmental attributes would be an unprecedented departure from the Commission's longstanding practice and precedent. Payments for environmental attributes—such as the New

[1] *See* Request for Expedited Action, Docket No. EL13-62-002 (filed January 9, 2017) ("Request for Expedited Action").

York zero-emission credit program—have long existed side-by-side with wholesale markets, and the Commission has long viewed those programs as advancing legitimate state policies that are complementary of its markets. The Commission has sought to accommodate and even facilitate those programs. EPSA has not satisfied the burden it bears under Section 206 of the Federal Power Act to demonstrate that the existing NYISO Market Administration and Control Area Services Tariff ("Tariff") is unjust or unreasonable, and accordingly its Request should be denied.

BACKGROUND

I. The Commission's Denial Of IPPNY's Complaint.

This proceeding began with a Complaint filed by the Independent Power Producers of New York, Inc. ("IPPNY") on May 10, 2013.[2] The Complaint requested that the Commission order the NYISO to "revise its Market Administration and Control Area Services Tariff ... to prevent continued artificial suppression of prices in the New York Control Area ("NYCA") installed capacity ("ICAP") market resulting from below-cost offers of capacity from resources that would have exited the market but for out-of-market revenues under reliability must-run ("RMR") contracts" and "RMR-type agreements."[3] The Complaint requested that capacity from these resources "be excluded from the capacity market altogether or be offered at levels no lower than the resources' going-forward costs ...."[4] The Complaint focused almost exclusively on these "RMR-type agreements" and on a series of Reliability Support Services Agreements ("RSSAs")

[2] *See* Complaint Requesting Fast Track Processing of the Independent Power Producers of New York, Inc., Docket No. EL13-62-000 (filed May 10, 2013).

[3] *Id.* at 1-2.

[4] *Id.* at 2.

entered into by Cayuga Operating Company, LLC ("Cayuga") and Dunkirk Power LLC ("Dunkirk").[5] Exelon moved to intervene on May 23, 2013.[6]

IPPNY amended its Complaint on March 28, 2014.[7] IPPNY's amendment focused exclusively on the market impact of a Term Sheet entered into between Dunkirk and Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid"), pursuant to which Dunkirk receives annual payments from National Grid in connection with the repowering of the facility.[8]

The Commission denied IPPNY's Amended Complaint on March 19, 2015.[9] The Commission concluded that IPPNY had "failed to show that NYISO's tariff is unjust and unreasonable without imposing minimum bid requirements for existing resources needed for short-term reliability ...."[10] The Commission reasoned that:

> [W]hen RSSA revenues are taken into consideration, the Cayuga and Dunkirk units' going-forward costs would likely be low. Because Cayuga and Dunkirk are needed for reliability and would clear a capacity market that also reflected local reliability needs, RSSA revenues received by these resources reflect the value of the services provided by these resources to customers. In calculating the going-forward costs of these two resources, it is reasonable to deduct their RSSA revenues, because the revenues do not overstate the value provided by the resources to customers. It is therefore reasonable, and fully consistent with NYISO's tariff rules, for the units to bid at *de minimus* levels.[11]

The Commission acknowledged "concerns regarding potential price suppressive impacts of repowering agreements," because the Dunkirk repowering agreement "procure[d] more capacity than is needed for short-term reliability, and for a much longer term."[12] But because IPPNY had

[5] *See id.* at 4-5, 11-18, 21-29 (focusing almost exclusively on the Cayuga and Dunkirk RSSAs).

[6] *See* Motion to Intervene of Exelon Corporation under EL13-62-000, Docket No. EL13-62-000 (filed May 23, 2013).

[7] *See* Motion to Amend, and Amendment to, Complaint of the Independent Power Producers of New York, Inc., Docket No. EL13-62-000 (filed Mar. 25, 2014).

[8] *See id.* at 1-4, 6-8, 10-16 (focusing exclusively on the Dunkirk repowering agreement).

[9] *Indep. Power Producers of N.Y., Inc. v. N.Y. Indep. Sys. Operator, Inc.*, 150 FERC ¶ 61,214 (2015), *reh'g pending*.

[10] *Id.* at P 65.

[11] *Id.* at P 66 (footnote omitted).

[12] *Id.* at PP 1, 69.

"offer[ed] limited evidence for the relief it seeks," and because of the complexity of applying mitigation to repowered resources—which would require a "process for calculating legitimate costs and a process for evaluating ... whether a mitigation exemption is warranted"—the Commission denied IPPNY's Complaint.[13] Instead, the Commission directed "NYISO to establish a stakeholder process to consider (1) whether there are circumstances that warrant the adoption of buyer-side mitigation rules in the rest-of-state; and (2) whether resources under repowering agreements ... have the characteristics of new rather than existing resources, triggering a buyer-side market power evaluation because of their potential to suppress prices in the capacity market and what mitigation measures need to be in place to address such concerns."[14] The Commission required the NYISO to submit a compliance report detailing the results of that stakeholder process.[15]

The NYISO submitted its compliance report on June 17, 2015,[16] and added new information in response to an Information Request from the Commission on December 16, 2015.[17] The NYISO recommended that the "Commission not take any action at this time" regarding "Rest of State" new entry,[18] and that, with respect to "uneconomic retention and repowering of units," NYISO "screen and monitor for suspicious behavior, and be required to refer any suspicious behavior identified to the Commission's Office of Enforcement for further review."[19]

[13] *Id.* at P 70.

[14] *Id.* at P 71.

[15] *See id.*

[16] *See* Compliance Report, Docket No. EL13-62-002 (filed June 17, 2015) ("NYISO Compliance Report").

[17] *See* Response to Information Request, Docket No. EL13-62-002 (filed Dec. 16, 2015) ("NYISO Response").

[18] Capitalized terms not defined herein have the meaning set forth in the NYISO's Market Administration and Control Area Services Tariff ("Services Tariff") and if not defined therein, then in the NYISO's Open Access Transmission Tariff ("OATT").

[19] NYISO Response 3.

IPPNY filed a Protest on January 19, 2016.[20] IPPNY's Protest proposed a screening test that would purportedly distinguish between a proper hedging contract for capacity and energy and a "contract or payment arrangement" that is an improper exercise of buyer-side market power requiring mitigation.[21] Pursuant to that test, certain contracts would be subject to mitigation if they were "not the result of a non-discriminatory procurement process" and paid a generator "greater than 5% of the near-term market value of the products sold under the contract."[22]

II. The New York Public Service Commission's Order Adopting a Clean Energy Standard.

On August 1, 2016, the New York Public Service Commission ("PSC") issued its Order Adopting a Clean Energy Standard ("CES Order").[23] The CES Order embraces goals, first set by Governor Andrew Cuomo, to ensure a 40 percent reduction in greenhouse gas emissions by 2030 and to ensure that 50 percent of the state's electric generation will be renewable by 2030.[24] In the CES Order, the PSC acknowledged that these goals are "aggressive," but it asserted that such ambitious goals are appropriate, particularly given "the urgent challenge of climate change" and the health and social benefits that will result from reduced toxic emissions like nitrogen oxides, sulfur dioxide, and particulate matter.[25]

The CES Order establishes a multi-pronged strategy to meet these ambitious targets. It adopts a two-tiered Renewable Energy Standard, which is designed to promote new, and maintain

[20] *See* Protest of Independent Power Producers of New York, Inc., Docket No. EL13-62-002 (filed January 19, 2016) ("IPPNY Protest").

[21] *Id.* at 19.

[22] *Id.*

[23] *See* N.Y. Pub. Serv. Comm'n, Order Adopting a Clean Energy Standard, Docket No. 15-E-0302 (Aug. 1, 2016) ("CES Order").

[24] *Id.* at 2.

[25] *Id.* at 3, 6.

existing, renewable generation resources.[26] A third tier creates a program designed to preserve the environmental contributions made by existing nuclear generation facilities that are at risk of retiring: the ZEC Program.[27]

1. The ZEC Program.

Existing nuclear power plants play a critical role in limiting the emission of greenhouse gases and other hazardous air pollutants. "New York's upstate nuclear plants avoid the emission of over 15 million tons of carbon dioxide per year."[28] Nuclear plants make up 31 percent of New York's current generation, and more than 50 percent of New York's zero-emissions generation.[29] If these plants were to retire before new renewable resources are developed, the PSC explained, the result would be "significantly increased air emissions due to heavier utilization of existing fossil-fueled plants or the construction of new gas plants."[30]

The environmental contributions made by nuclear facilities, however, "are at serious risk" of being lost, as nuclear plants have faced increasing economic pressure in recent years.[31] The ZEC Program seeks to prevent the "backsliding in the State's carbon reduction performance" that would result if the nuclear generation that historically has served New York consumers is lost.[32] It does so through the creation and sale of ZECs, which compensate nuclear plants for their environmental attributes. A ZEC is a "credit for the zero-emissions attributes of one megawatt-hour of electricity production by an eligible" nuclear facility participating in the program.[33] The

[26] *Id.* at 14-18.

[27] *Id.* at 19.

[28] *Id.*

[29] *Id.* at 19.

[30] *Id.* at 128.

[31] *Id.* at 124.

[32] *Id.* at 145.

[33] CES Order, App. E at 1.

concept of a ZEC is modeled on REC programs, which have been adopted by nearly 30 states, including New York, to support the development of new renewable generation facilities.[34]

The eligible nuclear facilities will enter into contracts to sell ZECs to the New York State Energy Research and Development Authority ("NYSERDA") through 2029.[35] Each of New York's load serving entities ("LSEs") will be required to purchase ZECs from NYSERDA in an amount proportional to its customers' share of the total energy consumed in New York.[36] LSEs may then recover the costs of the ZECs through a commodity charge on customers' bills.[37]

The price of a ZEC is based on the Social Cost of Carbon, as calculated by the federal government's Interagency Working Group at the time of the CES Order. The Social Cost of Carbon is an estimate of the cost imposed on society by a given quantity of carbon emissions.[38] This price accords with the ZEC Program's purpose, which is to compensate nuclear facilities for the environmental value of producing electricity without emitting any carbon. The ZEC price can never rise above the Social Cost of Carbon, but in years 3 through 12, the price can fall below that cost if projected energy and capacity prices rise above a benchmark of $39/MWh.[39] That ensures the program will remain affordable for consumers, even if the projected cost of electricity rises. In that sense, it is comparable to an alternative compliance payment under a renewable portfolio standard, which similarly caps payment for environmental attributes from renewable resources in many states.

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[34] CES Order at 9.

[35] *Id.* at 19-20.

[36] *Id.* at 20, 151. LSEs may choose to purchase ZECs directly from the eligible nuclear facilities. *Id.* at 152.

[37] *Id.* at 20.

[38] *See Technical Support Document - Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866*, Interagency Working Group on Social Cost of Greenhouse Gases, U.S. Government, at 3 (Aug. 2016) (on file with author).

[39] *See* CES Order at 129-41.

2. Eligibility Requirements.

A nuclear facility is eligible to participate in the ZEC Program if the PSC finds there is a "public necessity to encourage the preservation of [its] zero-emission environmental values."[40] This public necessity determination is plant-specific and is based on the evaluation of five factors: (a) the "historic contribution the facility has made to the clean energy resource mix consumed by retail consumers in New York State regardless of the location of the facility"; (b) the degree to which the facility's projected revenues are "insufficient to provide adequate compensation to preserve" the facility's zero-emission attributes; (c) the "costs and benefits" of providing ZEC payments to the facility; (d) "the impacts of such costs on ratepayers"; and (e) "the public interest."[41] Every two years, the PSC will revisit the eligibility of nuclear plants not already participating in the program.[42]

3. The Eligible Facilities.

In the CES Order, the PSC found three nuclear facilities to be eligible to participate in the first two-year phase of the program, based on information that the PSC already had in its possession: the R.E. Ginna Nuclear Power Plant ("Ginna") in Ontario, New York; the James A. FitzPatrick Nuclear Generating Facility ("FitzPatrick") in Oswego, New York; and the Nine Mile Point Nuclear Station ("Nine Mile Point"), also in Oswego.[43] The PSC explained that if the facilities were to retire, the result would be "significantly increased air emissions" due to heavier reliance on fossil-fuel burning plants.[44] By "lock[ing] in 12 years of significant carbon reductions," New Yorkers would reap long-term benefits from the program while renewable

[40] CES Order, App. E at 2.

[41] *Id.*

[42] *See* CES Order at 20.

[43] *Id.* at 128.

[44] *Id.* at 128.

resources are developed.[45] In total, "[c]onsidering the anticipated costs of the ZEC Program against the benefits related to the large amount of zero-emission power the facilities will produce, the benefits clearly outweigh the costs," based on the carbon-avoidance and other pollution-avoidance benefits.[46]

4. The NYISO's Support For The ZEC Program.

In comments before the PSC, the NYISO stated that "[r]etaining all existing nuclear generators is critical to the State's carbon emission reduction requirements as well as maintaining electric system reliability," and that a program compensating nuclear facilities for their environmental attributes is "a necessary bridge to retain existing, zero-emission nuclear generators until a market-based solution can be implemented."[47] NYISO ultimately commented that it "has reviewed and evaluated [the ZEC Program] proposal pursuant to its market monitoring and mitigation obligations" and had "concluded, based upon current market conditions, that [the] proposal does not raise wholesale market power concerns."[48]

III. EPSA's Request for Expedited Action.

On January 9, 2017, EPSA filed a Request for Expedited Action in this proceeding, requesting "that the Commission promptly direct the NYISO to file tariff revisions to address artificial price suppression by uneconomic retention ...."[49] In its Request for Expedited Action, EPSA focused on the ZEC Program, which EPSA contends "creat[es] incentives for below-cost offers for certain existing resources."[50] EPSA requests that the Commission "order the NYISO to

[45] *Id.* at 126.

[46] *Id.*

[47] NYISO Supp. Comments 12-13, No. 15-E-0302 (N.Y. P.S.C. July 8, 2016).

[48] NYISO Comments 2, No. 15-E-0302 (N.Y. P.S.C. July 22, 2016).

[49] Request for Expedited Action 16.

[50] *Id.* at 10; *see also id.* at 7-9.

promptly propose modifications to the Services Tariff based on the approach set forth in the IPPNY Protest."[51]

On the same day it filed its Request for Expedited Action in this docket, EPSA, along with other generator complainants, filed a Motion to Amend, and Amendment to, Complaint and Request for Expedited Action on Amended Complaint in Docket No. EL16-49-000 that is virtually identical in substance to the Request for Expedited Action in this docket.[52] Docket No. EL16-49-000 was initiated by a Complaint filed on March 21, 2016, which sought to modify PJM Interconnection, L.L.C.'s ("PJM") Minimum Offer Price Rule to address what complainants viewed as the "threat" of "State-approved subsidies."[53] In its Amended Complaint, EPSA and the other complainants discussed the recent Illinois legislation creating a "zero emission standard" (the "ZES legislation"), which the complainants similarly contend "create[s] incentives for below-cost offers for certain existing resources."[54]

COMMENTS

I. The Commission Should Deny The Request As Procedurally Improper.

EPSA's Request goes well beyond the scope of this proceeding and can be denied on this ground alone. IPPNY's Complaint and Amended Complaint concern only a small set of RSSA and repowering agreements. As a result, the Commission's denial of the Amended Complaint was similarly focused on the RSSA and repowering agreements on which the parties in this proceeding have long focused. Specifically, the Commission framed the question in this proceeding as "whether NYISO's tariff is unjust and unreasonable because it permits existing capacity resources

[51] Request for Expedited Action 15.

[52] *See* Motion to Amend, and Amendment to, Complaint and Request for Expedited Action on Amended Complaint, Docket No. EL16-49-000 (filed January 9, 2017).

[53] *Id.* at 2.

[54] *Id.* at 10.

needed for short-term reliability and capacity resources with repowering agreements to offer their capacity at *de minimus* levels."[55] The questions referred by the Commission to the NYISO stakeholder process were cabined to: (1) whether to apply "buyer-side mitigation rules" to *new* entry "in the rest-of-state" and (2) "whether resources under repowering agreements ... have the characteristics of new rather than existing resources, triggering a buyer-side market power evaluation ...."[56] NYISO's compliance filings, and the stakeholder process, accordingly focused on these narrow issues—whether new entry should be mitigated in Rest of State, and the risks associated with repowering agreements.[57] Even IPPNY, in its Protest of the NYISO's compliance filings, sought only to "apply [Buyer-Side Mitigation] Measures to uneconomic *new entry* in the [Rest of State]" and to screen "agreements similar to the Dunkirk agreement."[58] Thus, at no point in this proceeding have the parties addressed whether buyer-side mitigation rules should apply to any *existing* resource aside from those retained for reliability or repowering—let alone those receiving environmental attribute payments.

Nonetheless, EPSA now seeks to inject into this ongoing proceeding issues regarding certain existing resources that are not subject to reliability or repowering agreements: nuclear facilities that are eligible to receive ZEC payments under the ZEC Program. That is improper. The Commission has made clear that protests to compliance filings are limited to the issue of whether the public utility's filing *complies* with the Commission's directives, and are not a vehicle to relitigate the justness and reasonableness of the Commission's directives or to propose other tariff revisions. "[C]ompliance filings must be limited to the *specific directives* ordered by the

[55] *Indep. Power Producers of N.Y., Inc.*, 150 FERC ¶ 61,214, at P 64.

[56] *Id.* at P 70.

[57] *See* NYISO Compliance Report 1-5; NYISO Response 1, 3.

[58] *See* IPPNY Protest 4 (emphasis added).

Commission,"[59] and it is "improper to challenge the substance of those directives" in a protest or rehearing request.[60] This proceeding is "limited to the consideration of whether NYISO has complied with the directives" in the Commission's Complaint Order, which (as noted above) concerned RSSA and repowering agreements.[61] Thus, ordering the changes requested by EPSA would be contrary to the Commission's well-established "procedural policies against reviewing accepted tariff provisions in a proceeding to review a subsequent compliance filing and open[ing] an investigation *sua sponte* into the issues raised in the protests ...."[62] EPSA's Request also goes well beyond the scope of IPPNY's Complaint and Amended Complaint, neither of which addresses mitigation of entities receiving payments under the ZEC Program, REC programs, or any other environmental programs.[63]

If IPPNY, EPSA, or any other party thinks NYISO should have been directed to go further in its compliance filing and address other state programs, existing resources, or other issues, the appropriate course of action was to preserve these arguments on rehearing of the Commission's order directing the compliance filing or in a separate Complaint filed under Section 206. Indeed, in its request for rehearing of the Commission's order denying its Amended Complaint,[64] IPPNY specifically requests that the Commission "clarify" that it will "unilaterally order modifications to

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[59] *Consol. Edison Co. of N.Y., Inc. v. N.Y. Indep. Sys. Operator, Inc.*, 152 FERC ¶ 61,110, P 71 n.130 (2015) (emphasis added).

[60] *San Diego Gas & Elec. Co. v. Sellers of Market Energy and Ancillary Services Into Markets Operated by the Cal. Indep. Sys. Operator Corp.*, 127 FERC ¶ 61,269, P 259 (2009), *order clarified on reh'g*, 131 FERC ¶ 61,144 (2010).

[61] *Consol. Edison Co. of N.Y., Inc.*, 152 FERC ¶ 61,110, at P 71 & n.130 (collecting cases); *see N.Y. Indep. Sys. Operator, Inc.*, 127 FERC ¶ 61,042, P 28 & n.44 (2009) (collecting cases).

[62] *See N.Y. Indep. Sys. Operator, Inc.*, 127 FERC ¶ 61,042, at P 31.

[63] *See, e.g., N. Ind. Pub. Serv. Co. v. Midcontinent Indep. Sys. Operator, Inc.*, 155 FERC ¶ 61,058, P 94 (2016) (rejecting issue that "was not raised in the Complaint and, as such, goes beyond the scope of the Complaint"); *Elec. Power Supply Ass'n v. FirstEnergy Sols. Corp.*, 155 FERC ¶ 61,101, P 67 (2016) (same); *Indep. Energy Producers Ass'n v. Cal. Indep. Sys. Operator Corp.*, 118 FERC ¶ 61,096, P 197 (2007) (same).

[64] *See* Request for Clarification and Rehearing of the Independent Power Producers of New York, Inc., Docket No. EL13-62-001 (filed Apr. 20, 2015).

the [NYISO] Tariff pursuant to its authority under Section 206 ... if NYISO, after consulting with stakeholders, fails to propose a concrete, just and reasonable remedy for this problem."[65] The Commission has not yet acted on that rehearing request,[66] and it would preempt consideration of that rehearing request to implement these changes via EPSA's Request for Expedited Action.

EPSA's requested relief demonstrates the inappropriateness of attempting to shoehorn the validity of environmental programs into a compliance proceeding regarding mitigation of RSSAs and repowering agreements. EPSA requests that the Commission "order the NYISO" to adopt "the approach set forth in the IPPNY Protest."[67] But the screening test set forth in IPPNY's Protest would subject certain contracts to mitigation if they were "not the result of a non-discriminatory procurement process" and paid a generator "greater than 5% of the near-term market value *of the products sold under the contract*."[68] That test would be nonsensical if applied to environmental programs like the ZEC Program. The "products sold under the" NYSERDA contracts referenced by EPSA in its Request for Expedited Action are environmental attributes, not energy or capacity, as the Commission has recognized in numerous cases.[69] The "near-term market value" of those environmental attributes *is* the price paid under the relevant contract for them, which will always exceed 5% of that same price. The screening test proposed by IPPNY's Protest would appear facially inapplicable to contracts for the sale of environmental attributes.

But even if that were not so, and IPPNY's proposed screening test could be applied in this context, that would only underscore that the Tariff revisions urged by EPSA improperly exceed

[65] *Id.* at 10.

[66] *See* Order Granting Rehearing for Further Consideration, Docket No. EL16-49-001 (2015).

[67] Request for Expedited Action 15.

[68] IPPNY Protest 19 (emphasis added).

[69] *See, e.g.*, *WSPP Inc.*, 139 FERC ¶ 61,061, PP 18-24 (2012).

the scope of the compliance proceeding and IPPNY's original Complaint. The IPPNY Protest in no way differentiates between generators based on size, technology, or whether those resources further state policy. Thus, even if the screening test set forth in the IPPNY Protest could be read to apply to contracts for environmental attributes like ZECs, granting the relief sought by EPSA would require the mitigation of existing renewable generators, just like every other type of generator, if they receive REC payments that together exceed 5% of their market revenues. The relief requested would therefore sweep in programs that have never been part of this proceeding and the validity of which has never been subject to doubt. These types of massive disruptions to the status quo should not be ushered in under the guise of a "Request for Expedited Action" on a protest to a compliance filing regarding specific RSSA and repowering agreements. EPSA's Request for Expedited Action should be denied on this ground alone.

If the Commission does not deny EPSA's Request altogether, then it should do no more than refer the issues raised by that Request to the NYISO stakeholder process. The Commission regularly rebuffs attempts to initiate major substantive changes to the Tariff through motions or protests in ongoing proceedings when those changes have not been considered by all relevant parties in the stakeholder process and a factual record is lacking.[70] Indeed, in this proceeding the Commission recognized "that mitigation proposals must have the support of a fully developed factual record and a stakeholder process."[71] EPSA's Request for Expedited Action is supported by neither.

[70] *See, e.g.*, *FirstEnergy Solutions Corp. v. PJM Interconnection, L.L.C.*, 138 FERC ¶ 61,158, PP 45-47 (2012); *N.Y. Indep. Sys. Operator, Inc.*, 126 FERC ¶ 61,046, P 54 (2009).

[71] *Indep. Power Producers of N.Y., Inc.*, 150 FERC ¶ 61,214, at P 71.

II. The Commission Should Not Generally Impose A MOPR On Existing Units Or Rest-of-State Units, And Doing So Would Be Unprecedented.

"The original purpose of buyer-side mitigation rules—and minimum offer price rules (MOPR) generally—was to address buyer-side market power, *i.e.*, the market power exhibited by entities seeking to lower capacity market prices for the capacity they buy."[72] Buyer-side mitigation rules are necessary because entities that purchase more capacity than they sell into the market "may have both the incentive and the ability to depress prices through uneconomic entry."[73] The Commission has rightfully focused on this "incentive and ability" to suppress wholesale prices in its buyer-side mitigation cases. As the Commission recently said, its "generally-applied minimum offer price rule policy" is "that buyer-side market power mitigation rules are intended to address market power exhibited by certain entities *seeking to* lower capacity market prices."[74]

The Commission has never applied buyer-side mitigation rules to existing resources,[75] for good reason. Existing resources already are participating in the market, and their supply of capacity has contributed to prices the Commission has found to be just and reasonable. Indeed, existing nuclear resources, which are the main subject of the Request for Expedited Action, have supplied capacity to consumers for decades and predate the advent of capacity markets. Their cost of construction has already been sunk, and they have been licensed by the Nuclear Regulatory Commission to operate years into the future. The Commission should reject the notion that a nuclear unit's continued supply of capacity through the end of its NRC license somehow distorts

[72] *Consol. Edison Co. of N.Y., Inc. v. N.Y. Indep. Sys. Operator, Inc.*, 150 FERC ¶ 61,139, P 2 (2015), clarification granted, 152 FERC ¶ 61,110 (2015).

[73] *N.Y. Indep. Sys. Operator, Inc.*, 122 FERC ¶ 61,211, P 101 (2008), *on reh'g*, 124 FERC ¶ 61,301, *clarifying order on reh'g*, 131 FERC ¶ 61,170 (2010), *on reh'g*, 150 FERC ¶ 61,208 (2015).

[74] *N.Y. Pub. Serv. Comm'n v. N.Y. Indep. Sys. Operator, Inc.*, 153 FERC ¶ 61,022, P 10 (2015) (emphasis added), *reh'g denied*, 154 FERC ¶ 61,088 (2016); Affidavit of Robert D. Willig ¶ 39 (Jan. 24, 2017) ("Willig Aff.").

[75] *See, e.g., Indep. Power Producers of N.Y., Inc.*, 150 FERC ¶ 61,214, at P 65 (noting that existing rules apply only to new entry).

the capacity market, and should maintain its longstanding and well-grounded limitation of buyer-side mitigation to new entrants only.

EPSA would also have the Commission upset another longstanding limitation on the application of buyer-side mitigation rules by extending them, for the first time, to the Rest of State zone in the New York Control Area, where the ZEC-eligible nuclear facilities are located. The Commission should reject that invitation, and instead continue its long-standing policy of applying mitigation rules only to new resources located in the In-City zone that have the potential to alter the status quo.

III. Subjecting ZEC-Eligible Nuclear Facilities To Mitigation Rules Would Frustrate Legitimate State Policy Goals and Reduce Market Efficiency.

Even if the Commission determined that buyer-side mitigation rules should be applied to certain existing units under some circumstances, mitigation should not be applied to a unit on the ground that it receives payments for its environmental attributes. Applying buyer-side mitigation solely because a state has opted to address environmental externalities through an environmental credit program—rather than direct regulation of emissions, cap-and-trade program, or carbon tax—would frustrate state policies the Commission has recognized as legitimate, require the over-procurement of redundant capacity, and increase harmful environmental emissions. As a program that addresses and mitigates environmental externalities, the ZEC Program should accordingly not be subject to mitigation.

A. Buyer-Side Mitigation Is Aimed At Exercises Of Market Power Seeking To Suppress Prices, Not Programs Seeking To Achieve Legitimate State Policies.

As noted above, the NYISO's buyer-side mitigation rules "seek[] to prevent market buyers from offering new, otherwise uneconomic resources into the NYISO's capacity auctions at a very

low price, or zero, in order to push down monthly spot capacity market prices."[76] In that limited context, buyer-side mitigation serves a useful function in preventing "large buyer[s]" from "intentionally increas[ing] supply" that would be "at a loss even accounting for externalities," but for its "suppression of market prices."[77]

But the overbroad application of buyer-side mitigation can interfere with legitimate state policies and lead to consumers paying twice for redundant capacity. "[T]he regulation of utilities," the Supreme Court has explained, "is one of the most important of the functions traditionally associated with the police power of the States."[78] That power was expressly reserved under the Federal Power Act.[79] Under that reservation of authority, states subsidize generators in a variety of ways in order to pursue legitimate policy goals, and not to exercise buyer market power.

If a mitigation rule were nevertheless applied in those circumstances, thereby preventing the state-supported generator from clearing the capacity auction, the State would face a dilemma: either it must abandon a legitimate policy goal that goes to the core of its sovereign interests, or it must force its consumers to pay twice for capacity, once to replace the capacity payment lost by the environmentally desirable generator, and again for redundant, unnecessary capacity procured through the RTO auction. As the Commission has explained, if an ISO "determines that it will need 300 MW of new capacity in a particular year, and 60 MW of new state-subsidized resources are developed but cannot clear the [capacity market], the [capacity market] would nevertheless clear (and require customers to fund the construction of) 300 MW of new capacity, when it would

[76] Willig Aff. ¶ 39.

[77] *Id.* ¶ 41.

[78] *Ark. Elec. Co-op. Corp. v. Ark. Pub. Serv. Comm'n*, 461 U.S. 375, 377 (1983).

[79] 16 U.S.C. § 824(b)(1) (reserving states authority over "facilities used for the generation of electric energy").

only be necessary to fund the construction of 240 MW of capacity ..."[80] The Commission should not approve market rules that place States in that kind of bind.

Instead, buyer-side mitigation must be applied sensitively to avoid forcing sovereign states into the untenable position of either abandoning legitimate policy goals or forcing consumers to procure redundant capacity. Properly designed market mitigation mechanisms must distinguish between (1) impermissible state programs that exercise buyer market power by subsidizing new generation for the purpose of suppressing capacity prices; and (2) permissible state programs that pursue legitimate state policy goals.[81]

The Commission has recognized as much and has accordingly applied mitigation rules in a careful and sensitive manner. The Commission has recognized that its statutory mandate to "assur[e] just and reasonable rates" requires it to "protect[] consumers from overpaying for … capacity."[82] And the Commission has therefore applied buyer-side mitigation in a manner that respects state authority and "accommodat[es] the ability of states to pursue … legitimate state policy objectives."[83]

B. The Commission Has Held That State Environmental Programs Pursue Legitimate State Policies.

In particular, the Commission has repeatedly recognized that mitigation rules should not be universally applied to state environmental programs that compensate generation for their environmental attributes. Instead, the Commission has held that it is just and reasonable to design

[80] *ISO New England Inc.*, 155 FERC ¶ 61,023, P 25 n.61, P 33 (2016) (citing *New England Power Generators Association, Inc. v. ISO New England Inc.*, 146 FERC ¶ 61,039, P 52 (2014); *New York Indep. System Operator, Inc.*, 122 FERC ¶ 61,064, P 54 (2008)); *cf. also Indep. Power Producers of N.Y., Inc.*, 150 FERC ¶ 61,214, at P 68 (rejecting mitigation for RMR resources because "it would be inefficient to procure other capacity elsewhere in the NYCA footprint to satisfy the NYCA capacity needs met by the RMR capacity").

[81] *See* Willig Aff. ¶¶ 38, 45.

[82] *ISO New England Inc.*, 155 FERC ¶ 61,023, at P 34.

[83] *New England States Comm. on Elec. v. ISO New England Inc.*, 142 FERC ¶ 61,108, at P 35 (2013) ("NESCOE"), *reh'g denied*, 151 FERC ¶ 61,056 (2015).

buyer-side mitigation rules to "complement[] state programs promoting renewable resources" and other environmental aims.[84] For this reason, on several occasions, the Commission has declined to impose a broad MOPR even for *new* renewable resources.[85] In 2016, for example, the Commission approved ISO-NE's MOPR exemption for new renewable resources in part because doing so would "accommodate the ability of states to pursue their policy goals" of increasing the penetration of renewable generation.[86] And the Commission has never, of course, applied mitigation to an *existing* resource that is paid for its environmental attributes.

The Commission's specific solicitude for state environmental programs is appropriate. Such programs fall within the state's inherent police power and go to the core of a state's sovereign interests: "Air pollution prevention falls under the broad police powers of the states, which include the power to protect the health of citizens in the state. Environmental regulation traditionally has been a matter of state authority."[87] And such regulation often *complements* the efficiency of FERC's wholesale markets by reducing or eliminating environmental externalities that would otherwise go unaddressed.[88] As Dr. Willig explains, "all electric generation resource technologies that consume fossil fuels in the production of electricity emit pollutants into the environment."[89]

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[84] *ISO New England Inc.*, 147 FERC ¶ 61,173, P 82 (2014), *reh'g denied*, 150 FERC ¶ 61,065.

[85] *PJM Interconnection, L.L.C.*, 143 FERC ¶ 61,090, at P 166 (2013), *reh'g denied*, 153 FERC ¶ 61,066 (2015), *appeal pending*; *N.Y. Pub. Serv. Comm'n v. N.Y. Indep. Sys. Operator, Inc.*, 153 FERC ¶ 61,022, at P 36 (2015), *reh'g denied*, 154 FERC ¶ 61,088, at P 12 (2016); *ISO New England Inc.*, 155 FERC ¶ 61,023, at PP 32-36.

[86] *ISO New England Inc.*, 155 FERC ¶ 61,023, at P 23; *see also NESCOE*, 142 FERC ¶ 61,108, at P 35 (in considering a similar exemption for renewables, stating that FERC must "balance two considerations," the first being "its responsibility to promote economically efficient markets and efficient prices," and the second being "its interest in accommodating the ability of states to pursue other legitimate state policy objectives").

[87] *Exxon Mobil Corp. v. EPA*, 217 F.3d 1246, 1255 (9th Cir. 2000); *Nat'l Solid Wastes Mgmt. Ass'n v. Killian*, 918 F.2d 671, 676 (7th Cir. 1990) ("Environmental regulation has long been recognized as an 'historic police power[ ] of the States.'" (citation omitted)), *aff'd sub nom. Gade v. Nat'l Solid Wastes Mgmt. Ass'n*, 505 U.S. 88 (1992); *N.Y. State Pesticide Coal., Inc. v. Jorling*, 874 F.2d 115, 117 n.2 (2d Cir. 1989) (recognizing New York's "inherent police powers to protect public health and the environment").

[88] *See* Willig Aff. ¶¶ 17, 27-32.

[89] *Id.* ¶ 14.

These pollutants, which include carbon dioxide, are "negative externalities" because they "reduce other individuals' welfare, but the associated costs to others are not accounted for by the individual polluter when deciding whether and how much to pollute."[90] As a result, the private cost of generating electricity using fossil fuels is much lower than the social cost, which includes the negative pollution impacts of carbon dioxide and other pollutants.

Importantly, when "marginal social costs or benefits diverge from private marginal costs or benefits, the market outcome is unlikely to be efficient"—that is, the outcomes do not maximize social welfare.[91] To "correct for the market inefficiency," basic economics teaches that "a tax or subsidy could be used to internalize the negative or positive externality so that it would be taken into account by market participants."[92] But the "capacity and energy wholesale markets are not currently designed to induce suppliers to account in their decisions for the social externality costs of carbon emissions that result from generation."[93] Instead, the Commission has left the task of environmental regulation to other federal agencies and state regulators. So it is efficient for states and the federal government to implement their own, complementary taxes or subsidies to help producers internalize the negative externality into their decision-making.[94] These taxes or subsidies "align suppliers' market-based decision making with social efficiency"[95] and are "complementary to the ordinary workings of competitive wholesale markets,"[96] which do not attempt to address externalities.

[90] *Id.* ¶ 19.

[91] *Id.* ¶ 20.

[92] *Id.*

[93] *Id.* ¶ 17.

[94] *Id.* ¶¶ 17, 24-25, 27.

[95] *Id.* ¶ 17.

[96] *Id.* ¶ 27.

The relevance of this synergy is well illustrated by the Commission's reasoning in its order in this proceeding rejecting IPPNY's Complaint.[97] The Commission reasoned that although units receiving reliability services payments might be uneconomic if viewed solely from the perspective of the capacity auction, they are "economic from the perspective of satisfying the NYISO's reliability requirements."[98] Indeed, "[i]f the reliability needs satisfied by these units were reflected in the capacity market, the units would ... clear."[99] Because the units "are needed for reliability and would clear a capacity market that also reflected local reliability needs, RSSA revenues received by these resources reflect the value of the services provided by these resources to customers."[100] Accordingly, the Commission thought it permissible for these units to make *de minimis* capacity bids, because those bids reflected their low going-forward costs once the RSSA revenues were taken into consideration.[101]

The same logic applies to state environmental programs. Payments pursuant to such programs represent the "value of the [environmental] services provided by these resources to customers."[102] If resources that receive payment for their environmental services submit *de minimis* bids, that is because those bids reflect their lower going-forward costs once payments for their environmental attributes are taken into consideration.[103] That is why the Commission has

[97] *Indep. Power Producers of N.Y., Inc.*, 150 FERC ¶ 61,214.

[98] *Id.* at P 66 (quoting Patton Aff. ¶ 26).

[99] *Id.* (quoting Patton Aff. ¶26).

[100] *Id.*

[101] The Commission distinguished the Dunkirk repowering agreement because it "appear[ed] to procure more capacity than is needed for short-term reliability, and for a much longer term." *Id.* at P 69. In other words, the repowering agreement's term did not match its purported objective, which was to satisfy short-term reliability needs. Although the ZEC Program is for a longer term than the RSSAs of which the Commission approved, there is no similar mismatch between the term and the state's objective. The ZEC Program is not aimed at a "short-term reliability" need, but rather at the long-term environmental need to minimize carbon emissions. Thus, a long-term environmental program does not result in "more capacity than is needed" to achieve New York's long-term environmental goals.

[102] *Id.* at P 66.

[103] Willig Aff. ¶ 54.

approved the deduction of revenues from REC payments in the calculation of the offer review trigger price applicable to new renewable resources in ISO-NE.[104] And that is why the Commission approved California Independent System Operator Corporation's proposal to lower its "bid floor" in the energy markets "from negative $30/MWh to negative $150/MWh" [105]: to permit "variable energy resources" to bid at such extremely low prices because they "generally receive, in addition to market revenues, production tax credits, renewable energy credits, and contractual energy payments."[106] As a result, such variable resources can submit large negative energy offers and presumably reduce energy market revenues for other participants because the Commission understands that the negative $150/MWh offer reflects the "opportunity cost" of not receiving significant revenues tied to clean energy production.[107] In other words, the Commission recognized that renewable resources receive significant compensation for their environmental attributes, but instead of mitigating them, it approved a change in the energy market bidding rules to allow them to account for that compensation in their bids.

At bottom, the Commission's repeated accommodation of state environmental programs that compensate resources for their environmental attributes reflects the reality that states could pursue these same ends in a number of ways. States could undoubtedly accomplish their carbon-reduction or other environmental aims via emissions controls on emitting generators or an emissions tax on emitting generators.[108] Either route would result in the same market

[104] *See ISO New England Inc.*, 146 FERC ¶ 61,084, P 32 (2014) (rejecting argument that REC revenues are out-of-market revenues, and approving reduction of ORTP for new renewable resources to account for REC revenues).

[105] *California Indep. Sys. Operator Corp.*, 145 FERC ¶ 61,254, P 34 (2013).

[106] *Id.* at P 5.

[107] *Id.* at P 34.

[108] *See* Willig Aff. ¶ 21 ("Basic economics teaches that externalities can be corrected either through taxing behavior that results in harmful (negative) externalities, or subsidizing behavior that results in beneficial (positive) externalities, including behavior that prevents negative externalities.").

consequences as here: the retention of clean resources that do not pollute.[109] Yet in those circumstances, the Commission presumably would not mitigate (and indeed has never mitigated) the bids of clean resources that are exempt from emissions controls, carbon taxes, or other forms of environmental regulation—even though those resources could underbid polluting resources because they are not so regulated.[110] It thus makes little sense to mitigate clean resources in the parallel situation: when clean resources could underbid polluting resources because they receive a payment for their environmental services.

That is especially so when purchasing the environmental attribute rather than taxing the environmental externality is a more effective form of state regulation. Taxes are a "classical *theoretical* approach for internalizing the cost of a negative environmental externality,"[111] but taxes imposed by isolated jurisdictions can lead to "leakage, wherein high-emitting in-state resources impacted by the tax shift their facilities out-of-state, and reshuffling, wherein high-emitting out-of-state resources not impacted by the tax in adjacent geographic regions substitute for taxed in-state generation resources."[112] That is why states and the federal government have turned primarily to targeted subsidies for zero-carbon electricity generation, which have an economic effect similar to a tax on the negative externality that cannot be avoided by emitting resources restructuring their behavior to avoid the tax.[113] As one group of academics has put it: "[S]maller jurisdictions, such as US cities or states, may find subsidies more appealing than other

[109] *See id.* ¶ 30 ("Aligning private incentives with social welfare, whether through a tax or subsidy, will shift the market's generation resource mix as resources that impose environmental costs on society through their carbon emissions will face reduced production levels and reduced net revenues.").

[110] *See id.* ¶ 23 (explaining that if a carbon tax were imposed, fossil fuel producers would "experience higher costs due to the tax, charge higher prices, [and] experience less demand" in the wholesale markets).

[111] *Id.*

[112] *Id.* ¶ 24.

[113] *See id.* ¶¶ 24-26.

regulatory tools that can be more easily circumvented. In fact, subsidies may be the only means to meaningfully impact emissions on a local level."[114]

In short, the Commission has signaled, time and time again, that it will apply its market-power mitigation rules so as to respect, rather than disrupt, states' authority to pursue environmental programs. That makes sense, given the efficiency gains those programs provide and because those programs are indistinguishable in economic effect from carbon taxes or emissions regulations, which the Commission would not subject to mitigation even though one state's policy affects the prices charged in neighboring states. Therefore, the only remaining question is whether the ZEC Program is properly characterized as an environmental program or a price-suppressive artifice. As explained below, it is indisputably the former.

C. The New York ZEC Program Is An Environmental Program, Not a Price-Suppression Scheme, And Does Not Warrant Mitigation.

Like many other state environmental programs, the ZEC Program aims at the legitimate state policy goal of supporting non-polluting generation by valuing environmental services that would otherwise be uncompensated. When one takes account of *what* the state buys (environmental attributes unbundled from energy or capacity), *how* it buys them (through a credit program with a price capped at the social value of the environmental attribute), and *the reason* the state buys them (to promote environmental goals), it should be clear that the ZEC Program is a legitimate environmental program and cannot plausibly be characterized as a program aimed at exercising buyer-side market power to suppress wholesale prices. [115]

[114] James Bushnell et al., *Local Solutions to Global Problems: Climate Change Policies and Regulatory Jurisdiction*, 23 REV. ENVTL. ECON. & POL'Y 175, 182 (2008).

[115] *See* Willig Aff. ¶ 46.

First, under the ZEC Program, the state is purchasing an environmental attribute, not energy or capacity. Through the Program, New York purchases the environmental benefit of having a set number of megawatt-hours of zero-carbon energy,[116] which New York rightly assumes will displace the generation of an equivalent amount of emitting generation.[117] The ZEC Program does not require the zero-carbon generator to take any action with respect to the wholesale energy or capacity markets in order to be paid a zero-emission credit.[118] Thus, ZECs are not tied to energy or capacity sales.[119] A price-suppression mechanism, by contrast, "would clearly condition payment on generation unit participation in the capacity market in order most directly to forestall increases in capacity prices."[120]

In decoupling ZECs from energy or capacity sales, the ZEC Program mirrors the REC programs that the Commission has long recognized as within states' authority to enact.[121] The Commission has acknowledged states' authority under the Federal Power Act to enact programs that value a generator's environmental attributes and require the purchase of those environmental attributes unbundled from any wholesale sale. Dozens of states have relied on that authority in crafting their environmental policies over the last twenty years. Indeed, today, the majority of states and the District of Columbia have adopted programs recognizing RECs and requiring their procurement.[122] The ZEC Program follows this well-trodden path.

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[116] CES Order, App. E at 1 (defining a "zero emission credit").

[117] *See* CES Order at 19.

[118] *See* Willig Aff. ¶ 51.

[119] *See id.*

[120] *See id.*

[121] *See WSPP Inc.*, 139 FERC ¶ 61,061, at PP 18-24.

[122] *See, e.g.*, Ariz. Admin. Code § 14-2-1803; Cal. Pub. Util. Code § 399.21; Colo. Rev. Stat. § 42-2-124(1)(d); Conn. Gen. Stat. §§ 16-244r, 16-244t; Del. Code Ann. tit. 26, § 354(h); 20 Ill. Comp. Stat. 3855/1-10, 1-56; Ind. Code § 8-1-37-3; Iowa Code § 476.44A; Kan. Stat. Ann. §§ 66-1257(e), 1258; Me. Rev. Stat. tit. 35-A, §§ 3210(2)(B-2), 3210(8); Md. Code Ann. Pub. Util. Cos. §§ 7-701(n), 7-703(d); Mass. Gen. Laws ch. 25A, § 11F; 225 Mass. Code Regs. 14.09(2)(c); Mich. Comp. Laws §§ 460.1011(d), 460.1041; Minn. Stat. § 216B.1691, subdiv. 4; Mo. Rev. Stat.

Second, the pricing mechanism for ZECs carefully matches the value of the environmental attribute purchased.[123] As the PSC recognized when approving the ZEC Program, by valuing the environmental attributes of zero-emissions generation, states can "address[] a well-recognized externality that otherwise would lead to economic inefficiencies [due] to the costs [of] environmental damage … [and] climate change."[124] New York has limited the amount it will pay to reflect the value of that environmental externality it is paying to avoid.[125] Compensation for the credit is set based on the Social Cost of Carbon as determined by the U.S. Interagency Working Group,[126] which represents the value to society of not emitting a ton of carbon dioxide.[127]

Third, the value of the ZEC is capped at the Social Cost of Carbon. This pricing scheme ensures that the ZEC Program will be cost-justified based solely on the environmental benefit to consumers—unlike a price-suppression mechanism, in which the anticipated price-suppression benefits would be necessary to render the program cost-effective.[128] As the NYISO Tariff states, mitigation is appropriate "if the conduct would not be in the economic interest of the [buyer] in the absence of market power."[129] Here, because the price of the ZECs will never exceed the value

§§ 393.1025(4), 393.1030(2); Mont. Code Ann. §§ 69-3-2003(14), 69-3-2004; Nev. Stat. §§ 704.7803, 704.7821, 704.78215; N.H. Rev. Stat. Ann. § 362-F:6; N.J. Rev. Stat. § 48:3-49 et seq.; N.M. Stat. Ann. § 62-16-5; CES Order at 106-109; N.C. Gen. Stat. § 62-133.8; N.D. Cent. Code §§ 49-02-24, 49-02-26, 49-02-31; Ohio Rev. Code Ann. § 4928.645; Or. Rev. Stat. § 469a.130-135; 52 Pa. Code §§ 75.1, 75.61-70; R.I. Gen. Laws §§ 39-26-2(13), 39-26-4(d); S.D. Codified Laws § 49-34A-95; Tex. Util. Code Ann. § 39.904(b); Utah Code Ann. § 54-17-603; Va. Code § 56-585.2; Wash. Rev. Code §§ 19.285.030(20), 19.285.040; Wis. Stat. 196.378; D.C. Code §§ 34-1432(d), 34-1433.

[123] *See* Willig Aff. ¶¶ 36-37, 48.

[124] *See* CES Order 133.

[125] *See* Willig Aff. ¶¶ 36, 48.

[126] *See* CES Order 129-30, 138.

[127] *See* Willig Aff. ¶¶ 36, 48.

[128] *See* CES Order 128; Willig Aff. ¶ 52.

[129] *See* NYISO Tariff § 23.2.3.2.

of the environmental externality being abated, the purchase of ZECs necessarily is in the State's economic interest regardless of whether market power is present.

Fourth, while the ZEC price can be adjusted *downward* pursuant to a consumer protection provision that takes into consideration projected future energy and capacity prices, the credit can never rise above the value of the environmental externality being abated, regardless of whether wholesale prices fall below current levels or whether a unit's costs rise.[130] As a result, ZEC-eligible facilities still bear market risk because if market prices drop (or costs rise), ZEC payments will not increase to cover those lost revenues. A price-suppression mechanism, by contrast, would be expected to guarantee sufficient revenues for the uneconomic supplier to remain in the capacity market.[131]

Finally, the ZEC Program's avowed purpose is to mitigate environmental harm through the promotion of zero-carbon energy. The ZEC Program is part of the Clean Energy Standard, a broader initiative to promote renewable resources and reduce greenhouse gas emissions.[132] The Program advances these goals by "preserv[ing] existing zero-emissions nuclear generation resources as a bridge to the clean energy future," in order to "prevent backsliding … that likely could not be avoided in any other way."[133] The PSC emphasized this purpose repeatedly:

- "ZECs provide a vehicle for monetizing the State's environmental preferences and … allow time for new clean energy technologies to mature … [ZECs] contribute uniquely to serving the long-term goal of achieving a largely de-carbonized energy system by the middle of the century."[134]

[130] CES Order 128; Willig Aff. ¶ 52.

[131] *See id.* ¶ 49. For example, the program at issue in *Hughes v. Talen Energy Mktg., LLC*, 136 S. Ct. 1288 (2016), was a contract-for-differences that guaranteed generators a particular level of revenue regardless of whether wholesale prices increased or decreased. *See id.* at 1295 (describing the mechanics of the program).

[132] *See* CES Order 1-6.

[133] *Id.* at 1, 145.

[134] *Id.* at 152.

- "[P]reservation of [nuclear facilities'] zero-emissions attributes ... is crucial in the strategy to fight climate change and to achieve New York State's commitment to reduce carbon emissions."[135]

- "The Commission is instituting this program to prevent widespread damage from carbon emissions …."[136]

- "Retention of the [nuclear facilities] would avoid the emission of approximately 15 million tons of carbon per year."[137]

New York is thus pursuing a goal entirely separate from the wholesale market, namely, the improvement of air quality and the reduction in climate impacts in New York.

In sum, the ZEC Program is aimed at redressing environmental externalities to achieve a legitimate environmental goal, and in so doing promotes efficient market outcomes. As Dr. Willig explains, mitigation would be a mistake, because it "could hamper low bids that are competitive and reflections of truly low costs, where costs include offsets or subsidies based on positive environmental externalities that are not otherwise reflected in market operations."[138] As Dr. Willig elaborates, because market prices do not automatically account for the social cost of environmental externalities, they "create[] the appearance that financially challenged nuclear units are not efficiently competitive. In fact, these units are economically efficient and their continued presence in the market, if justified under the ZEC program, should be viewed as pro-competitive when considering the benefit to society of their zero carbon emissions attributes."[139] The Program does not satisfy the Commission's longstanding guidelines for programs warranting buyer-side mitigation.

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[135] *Id.* at 150.

[136] *Id.* at 149.

[137] *Id.* at 128.

[138] Willig Aff. ¶ 54.

[139] *Id.*

Indeed, mitigation would be particularly unwarranted with respect to this environmental program, because the expansion of New York's zero-carbon energy programs to include the ZEC Program improves the efficiency of the market as compared to the status quo. Previously, New York and other states compensated a variety of renewable generators, including wind, solar, and some hydropower facilities, for their zero-emitting attributes.[140] But New York did not compensate nuclear units for that same attribute. When combined with the wholesale market, the result was a system that selected less efficient forms of emissions abatement.[141] The New York ZEC Program reduces that inefficiency.[142]

IV. EPSA's Cursory Request For Expedited Action Fails To Satisfy Its Section 206 Burden.

In the face of all of the above, EPSA would bear an extraordinarily high burden in attempting to show that the existing NYISO Tariff is unjust and unreasonable under Section 206 of the Federal Power Act. Yet, remarkably, EPSA offers no evidence in support of its Request. The Request claims that the ZEC Program "threatens to artificially suppress prices in the NYISO ICAP market,"[143] and "represent[s] an existential threat to the organized wholesale markets."[144] Yet despite its alarmist rhetoric, the Request provides not a single piece of evidence—be it in the form of market data, expert testimony, or anything else—as to what the actual price-suppressive effects of the ZEC Program will be, whether reliability will or will not be compromised, or why those effects render the NYISO Tariff unjust and unreasonable. Indeed, the closest the Request comes to citing any evidentiary support at all is a brief quotation from testimony submitted by the

[140] *See* Order Regarding Retail Renewable Portfolio Standard, No. 03-E-0188 (N.Y. P.S.C. Sept. 24, 2004).

[141] *See* Willig Aff. ¶ 31.

[142] *See id.*

[143] Request for Expedited Action at 10.

[144] *Id.* at 2.

Independent Market Monitor of a different regional transmission organization, in a separate proceeding, describing various theoretical constructs on which a capacity market could be based.[145] That testimony, which predates the ZEC Program and does not purport to address it, is hardly an adequate basis for the Commission to take the unprecedented step of imposing a MOPR on existing units receiving payments for environmental attributes.

In addition to not possessing the evidence necessary to demonstrate that the existing NYISO Tariff is unjust and unreasonable, EPSA is also unsure whether it should be seeking mitigation in the capacity market or instead in the energy market. Although EPSA's Request nominally seeks relief specific to the NYISO ICAP market, EPSA acknowledges that ZEC payments "are tied to energy production," and do not turn on whether a facility offers into or clears the wholesale capacity markets.[146] And EPSA primarily complains that ZEC payments "can create incentives for below-cost offers into the *energy* markets."[147] EPSA's barebones Request and its uncertainty regarding the appropriate remedy manifestly fail to meet EPSA's burden for action under Section 206, and only underscore that it is foolhardy to make dramatic changes to the NYISO Tariff without an informed, deliberate stakeholder process to determine whether and if so what market rule changes might be appropriate.

Finally, although EPSA does not make clear the implications of its Request for Expedited Action, the IPPNY Protest would apply buyer-side mitigation to programs that the Commission has never considered mitigating, and which have not been the subject of any briefing in this proceeding. As explained above, because REC payments are out-of-market revenues, existing

[145] *See id.* at 12-13 (quoting Comments of the Independent Market Monitor for PJM, Attachment B-1, First Supplemental Testimony of Joseph E. Bowring on Behalf of the Independent Market Monitor for PJM at 5, Docket No. EL16-49-000 (filed Apr. 11, 2016)).

[146] *Id.* at 11.

[147] *Id.* (emphasis added).

renewable generators receiving REC payments would presumably have to be mitigated pursuant to EPSA's reading of IPPNY's protest. Although the Commission has at times drawn distinctions between intermittent renewable resources with low capacity factors and larger generators for purposes of mitigating *new* entry,[148] existing large renewable generation facilities receiving REC payments are indistinguishable from ZEC-eligible facilities, and thus would inevitably be mitigated if EPSA's Request were granted. Similarly, other state subsidies or tax credits—like the Coal Refuse Energy and Reclamation Tax Credit recently passed in Pennsylvania, providing a $4 per ton tax credit to "electric generation plants that use coal refuse for fuel"[149]—may have to be mitigated under the same logic.

Similarly, if the Commission were to mitigate ZEC-eligible facilities out of a misguided concern that New York was seeking to suppress wholesale prices, the same concern would require that certain existing cost-of-service, vertically integrated, and public power resources ("self-supply" resources) also be mitigated. The Commission has never mitigated existing self-supply resources.[150] But the state can permit these resource to be supported by captive ratepayers even when they would be uneconomic if forced to compete in the wholesale markets. Moreover, these resources typically bid in as price-takers, because they do not rely on market revenues, and therefore suppress wholesale prices.[151] A state clearly has the incentive to force captive ratepayers

[148] *See, e.g., N.Y. Pub. Serv. Comm'n*, 153 FERC ¶ 61,022, at P 47 (collecting cases and stating that "intermittent renewable with low capacity factors and high development costs, including many wind and solar resources, narrowly defined, provide their developer with limited or no incentive and ability to exercise buyer-side market power to artificially suppress ICAP market prices" (footnote omitted)).

[149] *See* Press Release, *Environmental Protection Triumphs: Coal Refuse Energy and Reclamation Tax Credit a Winner* (July 27, 2016), http://www.senatoryudichak.com/environmental-protection-triumphs-coal-refuse-energy-and-reclamation-tax-credit-a-winner/.

[150] *See N.Y. Pub. Serv. Comm'n*, 153 FERC ¶ 61,022, at PP 61-63 (discussing mitigation of certain new, but not existing, self-supply resources).

[151] *See, e.g., PJM Interconnection, L.L.C.*, 135 FERC ¶ 61,022, P 195 (2011) ("permitting new self supply investment to compete as a price-taker in RPM impermissibly shifts the investment costs of self-supply to competitive supply by suppressing market clearing prices"), *order clarified on reh'g*, 137 FERC ¶ 61,145 (2011); *ISO New England, Inc.*,

to subsidize older, uneconomic self-supply resources; those resources would then bid into the market as price-takers, lowering capacity prices; and non-captive ratepayers in the state would benefit from these reduces prices. Thus, if EPSA's Request were approved and ZEC-eligible facilities were mitigated, the inevitable result would be mitigation of existing self-supply resources that receive above-market revenues from captive ratepayers. Yet EPSA fails to even mention these drastic implications of its Request.

In sum, if the Commission reaches the merits of EPSA's Request for Expedited Action—which it should not do—then the Commission should reject its request to apply a MOPR to the ZEC Program or any other existing resources receiving environmental attribute payments.

V. If The Commission Applies A MOPR To Existing Units, ZEC Payments Should Be Treated As A Revenue Stream That Offsets A Unit's Going-Forward Costs.

For all the reasons given above, the Commission should reject EPSA's request that the NYISO Tariff be modified to apply a MOPR to existing units receiving ZEC payments. However, if the Commission disagrees, it should treat ZEC payments as a permissible revenue stream that can be deducted from going-forward costs for purposes of the mitigation test.[152]

As described above, ZECs are akin to RECs, state-created attributes that are not FERC-jurisdictional.[153] A payment for a ZEC or REC is "not compensation for capacity or energy," because ZECs and RECs are "separate commodities" that provide "[c]ompensation for … environmental externalities."[154] The Commission has approved, in ISO-NE, the deduction of

135 FERC ¶ 61,029, P 232 (2011) ("[W]e find that any new self-supplied capacity that clears (through a zero-price offer rather than at full net entry cost) would distort the market clearing price."), *order clarified on reh'g*, 138 FERC ¶ 61,027 (2012).

[152] *See* Willig Aff. ¶ 56.

[153] *See WSPP, Inc.*, 139 FERC ¶ 61,061, at P 21 ("RECs are state-created and state-issued instruments ... a REC does not constitute the transmission of electric energy in interstate commerce or the sale of electric energy at wholesale in interstate commerce. Therefore, RECs and contracts for the sale of RECs are not themselves jurisdictional facilities subject to the Commission's jurisdiction under FPA section 201.")

[154] *See Cal. Pub. Utils. Comm'n*, 133 FERC ¶ 61,059, P 31 n.62 (2010)

revenues from RECs in the calculation of the offer review trigger price applicable to new renewable resources in ISO-NE.[155] And in NYISO, the Commission has approved the deduction of "federal tax credits" and "state incentives for renewable energy" from a unit's unit-specific net Cost of New Entry, which "means that the resource is less likely to be subject to mitigation" under NYISO's buyer-side mitigation test.[156] In both cases, payments for environmental attributes would have the effect of lowering units' offers. If the Commission were to apply mitigation to existing nuclear units, ZEC payments should similarly be counted as energy and ancillary services revenues that are deductible from the calculation of those units' going forward costs, to achieve the same effect.[157]

VI. If The Commission Applies A MOPR To Existing Units It Should Make Clear That It Is *Not* Doing So Because The ZEC Legislation Poses A Conflict Warranting Preemption.

If the Commission determines that applying a MOPR to existing units is appropriate, it should make clear in its order that mitigation is not evidence of a conflict between the ZEC program and the Commission's goals, but is instead another instance of FERC harmonizing the wholesale markets with states' complementary and legitimate initiatives.

EPSA concedes in its Request for Expedited Action that the "Commission need not *and, indeed, should not,* address preemption questions in this proceeding."[158] Exelon agrees that preemption issues are clearly beyond the scope of this proceeding. Nonetheless, there is a risk that federal courts will misconstrue an order from the Commission applying buyer-side mitigation to ZEC-eligible units as evidence of a conflict between the ZEC Program and FERC's wholesale-

[155] *See ISO New England Inc.*, 146 FERC ¶ 61,084, at P 32 (rejecting argument that REC revenues are out-of-market revenues, and approving reduction of ORTP for new renewable resources to account for REC revenues).

[156] *N.Y. Pub. Serv. Comm'n*, 153 FERC ¶ 61,022, at PP 43 n.103, 48.

[157] *See* Willig Aff. ¶ 56.

[158] Request for Expedited Action at 11 n.46 (emphasis added).

market design. Some federal courts have already made that mistake.[159] Notwithstanding that it now urges the Commission not to address preemption issues, EPSA would surely raise any order from the Commission mitigating ZEC-eligible nuclear units as evidence of conflict preemption in federal court.

Thus, if the Commission were to decide to apply a MOPR to an existing unit receiving ZEC payments (which it should not), the Commission should explicitly clarify that its mitigation order does not reflect, and should not be read to reflect, the view of the Commission on preemption questions. Imposing a mitigation remedy in order to ensure a state program harmonizes with, and works in conjunction with, federal policies is distinct from determining the state program poses such an irreconcilable conflict with federal priorities that the program is preempted and therefore void. "[T]he Federal Power Act, like all collaborative federalism statutes, envisions a federal-state relationship marked by interdependence."[160] Here, even if it were to subject existing units to market-power mitigation, the Commission's aim would be to integrate "the ability of states to pursue … legitimate state policy objectives," including incentivizing clean energy and environmental protection, into the wholesale market design, not to override states' policy choices.[161] Therefore, if the Commission directs a change in the NYISO tariff (which it should not), the Commission must make clear that its action does not reflect any modification to the Commission's historical view that state environmental programs complement, rather than disrupt, FERC's wholesale markets.

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[159] *PPL EnergyPlus, LLC v. Nazarian*, 753 F.3d 467, 479 (4th Cir. 2014) (stating in dicta that imposition of MOPR "tends to confirm rather than refute the existence of a conflict"), *aff'd sub nom. Hughes v. Talen Energy Mkts.*, 136 S. Ct. 1288 (2016).

[160] *Hughes*, 136 S. Ct. at 1300 (Sotomayor, J., concurring).

[161] *NESCOE*, 142 FERC ¶ 61,108, at P35.

CONCLUSION

Exelon respectfully requests that the Commission deny the Request for Expedited Action and reject EPSA's call for a minimum offer price rule or other mitigation mechanism directed at existing nuclear resources.

Respectfully submitted,

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Dated: January 24, 2017

Certificate of Service

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

Dated at Washington, D.C. this 24th day of January, 2017.

/s/ *Marianne Alvarez*

_____

Marianne Alvarez
Exelon Corporation

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Independent Power Producers of New York, Inc.,	)	
Complainant	)	
v.	)	**Docket No. EL13-62-002**
New York Independent System Operator, Inc.	)	
Respondent	)	

DECLARATION OF ROBERT WILLIG

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I. QUALIFICATIONS, ASSIGNMENT AND SUMMARY OF CONCLUSIONS

A. QUALIFICATIONS

1. My name is Robert D. Willig. I am Professor of Economics and Public Affairs Emeritus at the Woodrow Wilson School of Public and International Affairs and the Economics Department of Princeton University. There I served for many years as the Field Coordinator for Economics at the Woodrow Wilson School and as the Faculty Chair of the Masters Program in Public Affairs. Before joining the senior faculty of Princeton University in 1978, I was Supervisor in the Economics Research Department of Bell Laboratories. My teaching and research have specialized in the fields of industrial organization, government-business relations, and social-welfare theory.

2. I served as Deputy Assistant Attorney General for Economics in the Antitrust Division of the U.S. Department of Justice from 1989 to 1991. I also served on the Defense Science Board task force on the antitrust aspects of defense industry consolidation and on the Governor of New Jersey's task force on the market pricing of electricity.

3. I am the author of *Welfare Analysis of Policies Affecting Prices and Products, Contestable Markets and the Theory of Industry Structure* (with William Baumol and John Panzar), and numerous articles in the professional literature of economics and law. I am a co-editor of *The Handbook of Industrial Organization*, and have served on the editorial boards of the *American Economic Review*, the *Journal of Industrial Economics* and the MIT Press Series on regulation. I am also an elected Fellow of the Econometric Society.

4. I have performed applied research and have developed expertise on market structure, competitive conduct, contractual relations, optimal pricing, micro-economic reforms, and the architecture and practice of infrastructure regulation. I have been a consultant to firms in many sectors of the economy, including telecommunications, transportation, energy, health care, pharmaceuticals, aeronautics, automobiles, information technology, chemicals, consumer products, and financial markets.

5. I have researched, taught, consulted, and testified on antitrust issues including horizontal mergers, vertical mergers, allegedly monopolizing conduct and allegedly collusive conduct in a host of industries. I have researched, taught, consulted, and testified on regulatory issues

including pricing, access, vertical and horizontal firm structure and the roles of governments and markets in the energy, telecommunications, and transportation industries.

6. I have worked as a consultant with the Federal Trade Commission, the Organization for Economic Cooperation and Development, the Inter-American Development Bank, the World Bank, and various private clients. I serve as a senior consultant to Compass Lexecon, an economic consulting firm that I helped to found. A list of my articles, books, and other professional publications and activities is presented in my curriculum vitae (Attachment A).

B. BACKGROUND AND PURPOSE OF TESTIMONY

7. On August 1, 2016 the New York Public Service Commission ("NYPSC") issued an Order[1] intended to transition to a clean energy future in which New York's electricity supply will become more reliant on renewable resources and less reliant on fossil fuels.[2] Among the state policy actions encompassed by the Order is a program "to preserve existing zero-emissions nuclear generation resources as a bridge to the clean energy future," to prevent the State from backsliding on environmental progress during the transition to renewable resources.[3] The program's means of accomplishing this goal is to compensate nuclear generators that might otherwise retire for the environmental attributes of their production.

8. To compensate certain New York nuclear generation units for the social benefits of avoiding the carbon dioxide emissions that would otherwise result if these units retired, the NYPSC Order calls for the creation of Zero Emission Credits ("ZECs"). The value of a ZEC is based on the U.S. government's estimated social cost of carbon emissions, which is not currently reflected in wholesale-power market prices.[4]

9. In response to the NYPSC Order, the Electric Power Supply Association ("EPSA") filed a Request for Expedited Action in an open Federal Energy Regulatory Commission ("FERC" or

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[1] *Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard*, Order Adopting a Clean Energy Standard, Case Nos. 15-E-0302, *et al.*(Aug. 1, 2016) (the "NYPSC Order"), available at http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b44C5D5B8-14C3-4F32-8399-F5487D6D8FE8%7d.

[2] NYPSC Order at 1-2.

[3] Id. at 1.

[4] The level of ZECs is adjusted downward to account for the value of carbon emissions already reflected in the Regional Greenhouse Gas Initiative ("RGGI").

"Commission") docket considering the disposition of a pending complaint by the Independent Power Producers of New York, Inc. ("IPPNY").[5] In the IPPNY proceeding, the complainants sought buyer-side market power mitigation in association with existing generating unit repowering agreements that result in maintaining the operations of a generating unit that would otherwise retire. The identified concern is the potential for a state, or by extension a state agency, to extend the life of a resource through a repowering agreement in order to suppress wholesale-power market prices. The EPSA request for expedited action asks that the Commission extend IPPNY's proposal for buyer-side market power mitigation in the NYISO up-state capacity market auctions to the NYPSC ZEC program.[6]

10. I have been asked by counsel for Exelon to evaluate the impact of the implementation of a ZEC program on electricity market efficiency and whether the impact of the NYPSC Order requires the Commission to impose buyer-side market power mitigation in order to prevent harm to market efficiency.

C. SUMMARY OF FINDINGS AND CONCLUSIONS

11. I have reached the following findings and conclusions:

(a) When environmental externalities are not accounted for in a marketplace, the result is an inefficient allocation of resources. Taxes and subsidies can be designed to minimize the costs to society from negative environmental externalities, or to obtain the benefits of positive environmental externalities.

(b) The NYPSC ZEC program provides compensation to nuclear power generation plants that reflects the cost of carbon dioxide emissions that society avoids as a result of the production of electricity from these generation resources. The program is designed to ensure that the estimated monetary benefit to society of the avoided carbon dioxide emissions is always at least as great as the amount paid to nuclear power plants to avoid those emissions. The economic rationale for the NYPSC ZEC program is grounded in the field of welfare economics, which

[5] EPSA Request for Expedited Action, FERC Docket No. EL13-62-002, 1/9/2017 ("EPSA Request").

[6] EPSA Request at 15-16.

addresses the social benefits associated with eliminating a negative environmental externality or facilitating a positive environmental externality.

(c) Compensating nuclear generation for its zero emissions attributes is a move toward greater economic efficiency, as compared to compensating the environmental attributes of only renewable generators. Preserving existing nuclear generation by compensating it for its positive environmental externalities is more socially beneficial than allowing it to retire. Moreover, if the cost of preserving existing nuclear generation is less than the cost of building new renewables to replace that generation, then preserving nuclear generation is a more efficient method of abating carbon emissions than subsidizing construction of new renewable generation. By offering appropriate environmental attribute payments, the ZEC program complements the workings of competitive wholesale electricity markets and ensures that there will be incentives to preserve existing nuclear generation if it is socially efficient to do so, taking both externalities and private production costs into account.

(d) The owners of two of the participating nuclear generation units have announced that the plants will be shut down absent compensation for their environmental attributes, and a third facility is in danger of being shut down as well. It is economically efficient and appropriate in such circumstances to target a narrowly-focused subsidy where it will have a direct impact and achieve the desired result of reducing harmful environmental externalities in a cost-effective manner. Although nuclear units not facing the possibility of imminent retirement may not be eligible for the environmental attribute payments, that does not render the attribute payments unduly discriminatory, because these other units will continue to produce power even without such payments.

(e) The Commission approves buyer-side market power mitigation in centralized wholesale capacity markets in order to prevent the successful bidding of uneconomic capacity resources that are brought to market to suppress capacity-market prices. There are a number of reasons why it is clear that the ZEC

program is not an exercise of buyer market power. The recipients of ZEC payments therefore should not be subject to buyer-side market power mitigation.

(f) First, the ZEC program is clearly not an exercise of buyer market power because the estimated benefits of the program exceed the costs without any consideration of the impact the program may otherwise have on market prices. The cost of a ZEC and its financial benefit to its recipient are based on the value of the externality being addressed – the social cost of the abated carbon dioxide emissions. According to the program design, the value of the ZEC cannot rise above the cost of this externality. This ensures that the receipt of the ZECs does not result in participating nuclear plants making economically inefficient decisions about whether or not to continue operating. If the sum of market revenues and the value of the abated externality exceeds the costs of production, then production is socially worthwhile, and is privately compensatory as well due to the ZEC. This alignment of private and social incentives to produce power from the participating nuclear units is the core economically beneficial characteristic of the ZEC program. In an exercise of buyer-side market power, by contrast, there is no alignment of social value and private incentives; instead, the exercise of market power is based on the buyer's private incentive to transfer value from other producers to itself by suppressing market prices, even if the added supply that suppresses prices is socially inefficient.

(g) Second, the ZEC program does not insulate the participating nuclear generation unit owners from market risk or guarantee financially viable operations. Under the ZEC program, the generating units could fail to produce and/or be retired in the event of significant unforeseen costs and/or operational problems. If the externality benefits of production, as reflected by the ZECs, are insufficient to close the gap between the expected private costs of production and the expected revenues derived from the market sales of production, then production from the participating units will not be compensatory. A program designed to exercise buyer-side market power, by contrast, would provide sufficient compensation to guarantee future plant operations even if the plants' operation were economically inefficient.

(h) Third, the ZEC program does not require a unit to bid into the wholesale energy or capacity market, or clear in the wholesale capacity market. The ZEC program provides narrowly defined compensation associated with plant production, not the sale of energy or capacity. By contrast, efforts to exercise buyer market power ordinarily, so as to warrant mitigation, would require bidding and clearing as a condition for compensation, in order to ensure that compensation is paid only if prices are suppressed through direct market participation. As such, the ZEC program complements FERC's competitive market policies and does not directly interfere with FERC's market pricing mechanisms.

(i) A program intended to exercise market power would be structured differently without its incentives so closely linked to emissions-reducing production. Compensation intended to support generation for the suppression of market prices would not be limited, as is compensation under the ZEC program, to the social benefits of the averted carbon emissions. Instead, the exercise of buyer-side market power would motivate compensation up to the size of the buyers' financial gains from the lowered prices.

(j) Finally, the absence of the internalization of the social cost of carbon emissions in market prices creates the appearance that financially challenged nuclear units are not efficiently competitive. In fact, these units are economically efficient and their continued presence in the market, if justified under the ZEC program, should be viewed as pro-competitive when considering the benefit to society of their zero carbon emissions attributes.

12. It is imperative that the ZEC recipients be allowed to bid into the organized electricity markets without the constraints of mitigation. The ZECs must be permitted to offset production costs in the determination of their recipients' market bids because the ZECs compensate real social benefits of the units' production that avert the social costs of the negative environmental externality. Socially efficient production by the recipients will only occur if that production is privately compensatory. And production will be privately compensatory only if the revenues from the ZECs can be given full consideration as cost offsets. The imposition of a regulatory floor on the recipients' bidding would prevent the full consideration of the ZECs as cost offsets

and would thus permit the continued occurrence of unnecessary and inefficient environmental externality harms.

13. In the following sections of my declaration I first review the economics of environmental externalities. I then provide an overview of the NYPSC ZEC program and explain how it compensates units for the currently uncompensated positive externalities of continued generation by certain nuclear plants. Finally, I analyze the Commission's buyer-side market power rules and explain why there is no reason to apply these rules to nuclear generating units eligible for ZEC payments.

II. THE ECONOMICS OF ENVIRONMENTAL EXTERNALITIES

14. The generation of electricity causes environmental externalities to different degrees depending on the generation technology and the fuel type. In particular, all electric generation resource technologies that consume fossil fuels in the production of electricity emit pollutants into the environment.[7] The degree to which an electric generation production process emits pollutants depends on the type of fossil fuel consumed (i.e., coal, oil, gas, etc.) and the efficiency of the fuel to electricity conversion technology employed by the electric generation unit. Electric generation resource pollutants impact air, water, and land. As a result electric generation units have been the subject of extensive federal and state environmental regulation for decades. While fossil fuel generation creates pollution, zero-emission generation resources that displace these polluting generators yield positive externalities by reducing the pollution that would have otherwise occurred.

15. Various federal and state programs directly regulate the impact of electric generation units on air quality. One of the most well-known examples of air pollution regulation is a "cap and trade" air emission control policy. The U.S. Environmental Protection Agency has relied on a federal cap and trade policy to control emissions of sulfur dioxide and nitrogen oxides from electric power generation units for decades. More recently, California and the Northeastern and Eastern Mid-Atlantic States have relied on the same type of regulatory policy for control of carbon dioxide emissions.

[7] Other electric generation resources impact the environment as well, although not with the same type of direct impact that result from fossil fuel resources.

16. In the U.S., there is not a uniform federal regulatory policy that controls the costs imposed on society by emissions of carbon dioxide through cap and trade programs. Instead, there are numerous federal and state programs that promote investment in resources with zero carbon dioxide emissions, either with forms of subsidy or with regulatory requirements.[8] Such programs include renewable-resource production and investment tax credits, and a variety of renewable portfolio-standard programs, by just over half the states, that require investment in zero emission resources.[9]

17. Programs to limit the negative externalities from carbon dioxide emissions are needed to complement otherwise socially efficient electricity market mechanisms. The Commission's capacity and energy wholesale markets are not currently designed to induce suppliers to account in their decisions for the social externality costs of carbon emissions that result from generation. Instead, the Commission has left environmental regulation to other federal agencies and state governments, and these other federal and state programs influence the decisions of participants in the Commission's markets so as to promote environmental goals. As a result, even as our wholesale markets are designed to stimulate and harness competition to yield an efficient allocation of resources, market outcomes would predictably be socially inefficient in the absence of complementary environmental programs adopted by other regulators. Markets would result in the emission of too much carbon dioxide, creating corresponding social externality costs. Complementary programs, whether implemented at the state or federal level, can align suppliers' market-based decision making with social efficiency by taking environmental externalities into account, without undermining the design and effectiveness of our competitive wholesale markets. Such programs can result in better outcomes for society, without conflicting with the policy goals or operations of competitive wholesale markets.

18. In the following sections I define and provide examples of externalities. I then explain how economists analyze the impact of externalities and identify policies, including taxes and subsidies, that can be adopted to complement markets and correct for the impact of externalities.

[8] See, generally, NC Clean Energy Technology Center, Database of State Incentives for Renewables & Efficiency, available at: http://www.dsireusa.org/.

[9] Id.

A. EXTERNALITIES

19. Basic economics defines an externality as the effect of an individual's action on a bystander that is not taken into account by the individual undertaking the action.[10] Common examples of negative externalities are air and water pollution that reduce other individuals' welfare, but the associated costs to others are not accounted for by the individual polluter when deciding whether and how much to pollute.[11] Obversely, positive externalities arise when an individual's activity improves the welfare of others, but the individual does not account for these benefits when deciding whether and how much to engage in the beneficial activity.

20. Stated more formally, externalities exist when the private benefits or costs of actions are not equal to the social benefits or costs. The first formal analysis of the impact of externalities was provided by Arthur C. Pigou, who demonstrated that when marginal social costs or benefits diverge from private marginal costs or benefits, the market outcome is unlikely to be efficient.[12] Pigou showed that a tax or subsidy could be used to internalize the negative or positive externality so that it would be taken into account by market participants and correct for the market inefficiency that would otherwise result.

B. CORRECTING FOR THE IMPACT OF EXTERNALITIES

21. Basic economics teaches that externalities can be corrected either through taxing behavior that results in harmful (negative) externalities, or subsidizing behavior that results in beneficial (positive) externalities, including behavior that prevents negative externalities. When seeking to correct for a negative externality, such as carbon dioxide emissions, the ideal theoretical approach is to measure the marginal external cost associated with the externality and compare it to the marginal private benefits net of marginal private costs (i.e., net marginal private benefits) in order to define the cost of the externality that is not being captured by private individuals in their decision making. This idea is illustrated conceptually in Exhibit No. RDW-1. Marginal external cost rises as economic activity increases, while net marginal private benefits

[10] See, for example, Samuelson, P. A. and Nordhaus, W. D., *Economics*, page 751, McGraw-Hill, Inc., 1995.

[11] Environmental externalities are the classic example found in almost every economics textbook. See, for example, Samuelson, P. A. and Nordhaus, W. D., *Economics*, at 346-355, McGraw-Hill, Inc., 1995 and Pindyck, R. S. and Rubinfeld, D. L., *Microeconomics*, Second Edition, at 639-657, Macmillan Publishing Company, 1992.

[12] Pigou, A. C. *The Economics of Welfare*, 4th edition, Macmillan and Co., 1932, available at: http://www.econlib.org/library/NPDBooks/Pigou/pgEW.html.

decline. Increases in marginal external cost represent the impact of the damage from the amount of atmospheric carbon dioxide on society, expressed monetarily. Decreases in the net marginal private benefit represent the decline in private profitability as production levels increase and produce higher levels of atmospheric carbon dioxide.[13]

22. As Exhibit No. RDW-1 shows, economic activity (production) is assumed to be at an equilibrium without any policy intervention to reflect the externalities where net marginal private benefits equal zero (i.e., marginal cost equals marginal revenue). Here, without market participants internalizing the marginal external cost associated with their activities, the level of actual production (shown as Q_{Actual}) is greater than its optimal level ($Q_{Optimal}$), represented as the intersection of the curves showing marginal external cost associated with the externality and net marginal private benefits. Although the exhibit depicts a stylized framework, there is an ever-increasing body of empirical analysis that estimates a range of values for the social (external) cost of carbon dioxide emissions over an assumed future trajectory of economic activity.[14] By having a measure of the social cost of carbon emissions it is possible to approximate the marginal external cost of activities that emit carbon dioxide and, and through a tax or subsidy, internalize the cost of the negative externality.

23. A classical theoretical approach for internalizing the cost of a negative environmental externality, such as carbon dioxide emissions associated with fossil fuel combustion, is the imposition of a Pigouvian tax.[15] The objective of a Pigouvian tax is to internalize the marginal external cost associated with the externality that is otherwise not accounted for in producers' marginal costs. As such, producers experience higher costs due to the tax, charge higher prices, experience less demand, move away from technologies that create relatively more of the harmful externality, and reduce production to reflect the social cost of the externality.

[13] This example assumes markets are competitive and that price does not vary with production level, and applies to linear functions. However, this does not limit the conceptual application which also can apply to non-linear functions.

[14] See, for example, Technical Support Document (2016): Technical Update of Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866 Interagency Working Group on Social Cost of Greenhouse Gases, United States Government, August 2016, available at: https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf.

[15] Baumol, W. J. and Oates, W. E., *The theory of environmental policy*, Second Edition, Chapter 3, Cambridge University Press, 1995.

24. A general tax on carbon emissions has not been the policy action of choice in the U.S. for addressing the social cost of carbon, for many complex and practical reasons.[16] For example, if New York had sought to impose a tax on electric generation resources that emit carbon dioxide, it would have encountered difficulties designing the tax so as to ensure carbon dioxide reduction. Most prominent among these difficulties would be leakage, wherein high-emitting in-state resources impacted by the tax shift their facilities out-of-state, and reshuffling, wherein high emitting out-of-state resources not impacted by the tax in adjacent geographic regions substitute for taxed in-state generation resources. Experiences to date in California and RGGI make clear the complexity that would be faced by a small geographic region considering the use of a tax policy to reduce carbon dioxide.[17] The use of a targeted subsidy—such as the payment of environmental attribute credits—simplifies and ensures that the costs incurred will directly reduce carbon dioxide emissions.

25. In the U.S. there has been a mixture of federal tax incentives and state Renewable Portfolio Standards ("RPS") that provide subsidies to zero emission resources. States generally rely on RPS programs to account, in part, for environmental externalities arising from emissions of carbon dioxide. California is a leading example where a cap and trade program and RPS work in combination to reduce emissions of carbon dioxide and provide a less carbon-intensive footprint for the future. In particular, California has determined that "[m]eeting the state's climate change goals by reducing emissions of greenhouse gases associated with electrical generation" is itself justification for the implementation of RPS.[18] Moreover, several other states have evaluated the impact of RPS programs on emissions of carbon dioxide and sought to estimate the costs avoided by reduced emissions.[19] The NYPSC ZEC program is in essence one

[16] Although the carbon dioxide cap and trade programs in the U.S. do seek to internalize the externality, the resulting cost per ton of carbon emissions under these programs has been lower than the estimated social cost of carbon.

[17] See, for example, Bushnell, J., Peterman, C., and Wolfram, C., Local Solutions to Global Problems: Climate Change Policies and Regulatory Jurisdiction, *Review of Environmental Economics and Policy*, volume 2, issue 2, summer 2008 at 175-176. Note also when California implemented its carbon emissions cap and trade policy it struggled with complex issues associated with trying to accommodate what would be considered acceptable resource shuffling (See State of California Air Resources Board, California Cap-and-Trade Program, Resolution 12-51, October 18, 2012, Appendix A). Similarly, emissions leakage continues to be an important issue for the RGGI program with ongoing studies analyzing the impact (See , Ramseur, J. L., The Regional Greenhouse Gas Initiative: Lessons Learned and Issues for Congress, Congressional Research Service, 7-5700, April 27, 2016 at 16).

[18] Cal. Pub. Util. Code § 399.11(b).

[19] See, for example, Heeter, J., Barbose, G., Bird, L., Weaver, S., Flores-Espino, F., Kuskova-Burns, K. and Wiser, R., 2014, A Survey of State-Level Cost and Benefit Estimates of Renewable Portfolio Standards, *National*

such program, but unlike programs encouraging development of new zero emission resources, the level of compensation is explicitly tied to the externality being abated—namely, the social cost of carbon emissions avoided by the continued operation of existing zero-emission nuclear generation resources. Thus, from the standpoint of economics, the ZEC program is more efficient than many REC programs, which may allow the REC price to rise to a level far greater than the value of the environmental externalities the renewable resources are abating.

26. Estimates of the social cost of carbon emissions are a theoretically sound basis for incorporating the external cost of carbon emissions into zero-emission resource subsidization policies (both generally and specifically in the case of the ZEC program). Given that the policy purpose of compensating zero-emission attributes is to avoid the harm that would be caused by otherwise higher emissions of carbon dioxide from more carbon-intensive resources, it is appropriate to base the level of the subsidy on the avoided social cost of carbon dioxide emissions (assuming that the subsidy is paid in accordance with output).

C. MARKET IMPACT OF CORRECTING EXTERNALITIES

27. Correcting for externalities – whether via appropriate taxes or subsidies – is likely to affect prices and the mix of resources in the market. However, economic theory teaches that such taxes and subsidies are complementary to the ordinary workings of competitive markets, and help to guide private economic supply and demand decisions towards socially efficient outcomes that reflect both the underlying positive and negative externalities, along with the privately experienced costs of production and benefits of consuming the production's outputs. The impacts of Pigouvian taxes or subsidies on the outcomes of competitive markets improve social welfare by internalizing to the private decision-makers the costs of negative externalities through the tax and the benefits of positive externalities through the subsidy, thus ensuring that the private decision-makers take the externalities into account and adjust accordingly.

28. It is possible to design a subsidy to encourage production from resources whose generation does not impose negative externalities. For example, consider a program that offers subsidies to production to prevent harmful environmental externalities, where the per-unit subsidy is equated to the social (external) cost of the negative externality that the unit of

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Renewable Energy Laboratory. NREL/TP-6A20-61042(May 2014) at 52-56. Available at: http://www.res4med.org/uploads/studies/1402067633NREL.pdf.

production prevents. Such a program does not necessarily guarantee the production. But it does efficiently complement market incentives, so that production will be motivated to occur if the market price of production output plus the unit subsidy exceeds the private cost of production. This motivation is socially efficient since the production is socially worthwhile if its value to its purchaser, which is reflected by the price of its output, plus its value from reducing negative externalities, which is reflected by the unit subsidy, together exceed the cost of production. Without the subsidy program, such socially efficient production would be lost if the output price alone failed to cover the cost of production.

29. By providing zero-emission generators with compensation for the external benefits they provide, the ZEC program reduces the amount of carbon emissions and improves the social desirability of the market outcome.[20] This is especially the case with respect to the NYPSC Order, where the design of the ZEC specifically targets the preservation of zero emission resources that would otherwise exit the marketplace. These nuclear resources' current production significantly reduces negative environmental externalities associated with the generation of electricity, to the extent that this production replaces output by carbon-emitting generators. Since the level of the proposed environmental attribute payments corresponds to the social value of reduced carbon dioxide emissions, the total direct costs of those payments are aligned with the benefits realized by society.[21]

30. Moreover, it is not a socially inefficient outcome if compensating nuclear units for their environmental attributes results in lower production from, or retirement of, polluting resources. Aligning private incentives with social welfare, whether through a tax or subsidy, will shift the market's generation resource mix as resources that impose environmental costs on society through their carbon emissions will face reduced production levels and reduced net revenues.

31. Compensating nuclear generators for their zero emissions attributes is a move toward greater efficiency relative to compensating only new renewable resources going forward. This is

[20] See, for example, Case, K. E., Fair R. C., and Oster, S. M., Principles of Microeconomics, Ninth Edition, Prentice Hall, 2009 at 327 noting that "[a]ctivities that provide such external social benefits may be subsidized at the margin to give decision makers an incentive to consider them."

[21] It is important to note that the derivation of the value of a ZEC is based on the average marginal emission rate of carbon dioxide in New York (Appendix: The Benefits and Costs of Net Energy Metering in New York," Energy and Environmental Economics, Inc., December 11, 2015, p. 57, submitted December 17, 2015 in Case 15-E-0703 – In the Matter of Performing a Study on the Economic and Environmental Benefits and Costs of Net Metering Pursuant to Public Service Law §66-n).

because preserving existing nuclear generation may very well be more socially cost effective than allowing its retirement, in view of its positive externalities, and it may be a more efficient method of abating carbon emissions than subsidizing new renewable construction. By offering appropriate subsidies, the ZEC program complements and supports the workings of competitive wholesale markets so that there will be incentives to preserve existing nuclear generation only if doing so is socially efficient, taking externalities and private production costs into account.

32. Finally, and critically, the NYPSC ZEC program complements the Commission's policy of reliance on competitive markets. The NYPSC ZEC program complements the FERC-approved markets by providing compensation for environmental attributes that is directly and explicitly based on environmental externalities that FERC has left other regulators to address. These programs work in tandem with FERC-approved market mechanisms to produce outcomes that are more socially efficient. If the facilities receiving ZECs are cheaper than fossil-fueled competitors once the value of the environmental externality is taken into account, then the facilities receiving ZEC revenues should run. The NYPSC ZEC program represents a narrow, targeted approach to contribute to the objective of complementing FERC's wholesale power markets.

33. In contrast, the previously proposed Maryland and New Jersey new generation-unit subsidization programs resulted in state regulatory agencies directly interfering with prices set in FERC-regulated capacity market auctions. These programs were not attempting to address an environmental externality. However, as I have explained before, a program that subsidizes a generation technology based on its environmental attributes is "just another element of compensation for the benefits that the state feels that generator is bringing to the population through the environmental impact. So it doesn't displace, it influences, but it doesn't displace the market mechanism."[22]

III. THE NEW YORK ZEC PROGRAM

34. The New York ZEC program is an effort to correct for the increase in the harmful environmental negative externalities of fossil fuel generation by providing environmental attribute payments to zero-emission generation that would otherwise retire. As the NYPSC

[22] Testimony of Robert D. Willig, In the United States District Court for the District of Maryland Northern Division, Case No. MJG-12-1286, March 8th, 2013 at 81.

Order explains, closure of the ZEC-eligible nuclear plants would result in a tremendous increase in carbon dioxide emissions and threaten the state's ability to meet its greenhouse gas reduction goal.[23]

35. The NYPSC ZEC program provides attribute payments to selected nuclear units for a period of 12 years, consisting of six two-year tranches.[24] Generators not chosen for the program's initial two-year tranche can enter the program in later tranches if selected by the NYPSC. To be eligible for ZECs the NYPSC must find that there is a public necessity to encourage preservation of a generation unit's zero emission environmental benefits, evaluated with a five factor eligibility test.[25] Under the ZEC program, the New York State Energy Research and Development Authority ("NYSERDA") will offer participating nuclear facilities a contract for the purchase of ZECs for the duration of the program.[26] Under the agreements with NYSERDA, the incentive to produce ZECs is indirect: If the units' production levels fall in a particular year below predefined levels (that allow for considerable operational flexibility), the number of ZECs available in future years will decrease. However, in the event a generation unit ceases operation as a result of an unexpected increase in capital cost, or other unforeseen operational problems that result in the need for increased capital cost expenditures, prior to the completion of the 12-year contract term, ZEC purchases will be terminated.[27]

36. The program is designed to ensure that compensation for the environmental attributes of the participating nuclear facilities, to stimulate the positive externalities created by the displacement of socially harmful carbon emissions, does not exceed the estimated cost to society associated with the displaced carbon emissions. In particular, under the NYPSC Order, the value of the attribute payments is defined to be the Social Cost of Carbon as reported by the United States Interagency Working Group ("USIWG") in effect at the time of the NYPSC Order,

[23] NYPSC Order at 45.

[24] The 12-year time period corresponds approximately to the time period over which the state is expanding its supply of renewable zero emission resources that it expects will replace nuclear generation units which will subsequently retire as the end of their license extensions is reached.

[25] NYPSC Order, Appendix E, at 2.

[26] NYPSC Order at 19-20. New York electricity consumer's Load Serving Entities ("LSEs") will purchase ZECs from NYSERDA based on load ratio shares and collect costs from consumers via a commodity charge added to the bills.

[27] NYPSC Order, Appendix E, at 4.

converted to $/MWh based upon the average marginal emissions of generation facilities serving New York, and reduced by: 1) The value of carbon dioxide emissions already captured under the Northeastern U.S. RGGI; and, 2) An adjustment which accounts for future increases in wholesale power prices (in the second through sixth tranches).[28] The attribute payments compensate nuclear resource zero-emission generation for the value of its environmental attributes, for which the FERC regulated markets do not attempt to compensate (instead leaving other regulators with the task of addressing environmental externalities).

37. The value of the attribute payments will adjust every two years to account for changes in the estimated social cost of carbon, and to reflect certain forecasted increases in wholesale-power market prices. Specifically, to limit New York state power consumers' overall cost burden, if electricity prices for consumers are projected to rise above the baseline level of $39/MWh, the ZEC price would decline so that the financial burden of the ZEC Program does not apply in years when electricity prices are high.[29] The value of the ZEC compensates nuclear generation resources for the avoided environmental externalities that would otherwise be borne by society if the nuclear units were to shut down.

IV. APPLYING A MOPR TO RESOURCES RECEIVING ZEC REVENUES WOULD BE INAPPROPRIATE

38. The EPSA Request asks the Commission to expand the NYISO's buyer-side market power mitigation to NYISO's upstate capacity market, and apply it to those existing nuclear generation resources that are eligible for ZECs under the NYPSC Order.[30] However, EPSA's request fundamentally misconstrues the purpose of the FERC's reliance on buyer-side market power mitigation (i.e., MOPRs). Moreover, EPSA's contention that it would be appropriate to apply a capacity market MOPR in any circumstance where a resource – new or existing – receives any form of subsidization would undermine state policies that are validly complementary to, rather than in conflict with, FERC's wholesale market policies.

[28] NYPSC Order at 131.

[29] The subsidy can also adjust one time to account for possible change over time in the geographic power price differential (basis) across the New York region (NYPSC Order, Appendix E, at 8-9).

[30] Request for Expedited Action at 15-16.

A. A MOPR PREVENTS THE EXERCISE OF BUYER MARKET POWER

39. The FERC has approved market-power mitigation rules for capacity markets that protect against the potential exercise of buyer market power. Under the NYISO Market Administration and Control Area Services Tariff ("MST"), the NYISO implements FERC-approved buyer market power protection.[31] To guard against buyer market power, the NYISO applies a market offer price floor (often referred to generally as a MOPR) to sellers of new capacity in mitigated capacity zones.[32] The NYISO's buyer market power protection seeks to prevent market buyers from offering new, otherwise uneconomic resources into the NYISO's capacity auctions at a very low price, or zero, in order to push down monthly spot capacity market prices.[33] The NYISO MST does not apply its capacity market power mitigation rules outside of the mitigated capacity zones. Accordingly, capacity buyers and sellers in upstate New York are currently not subject to capacity offer price caps and floors.

40. The FERC has acknowledged on several occasions that its approval of MOPRs is associated with protecting capacity markets from possible attempts by buyers to introduce new, otherwise uneconomic capacity into a capacity market auction to lower capacity prices enough to compensate the buyer for the additional costs of adding the new uneconomic capacity. As the FERC recently reiterated: "The Commission has approved various buyer-side market power mitigation tariff provisions as just and reasonable mechanisms to mitigate the potential for uneconomic entry and deter the exercise of buyer-side market power. By mitigating actual buyer-side market power, these tariff provisions can help to ensure markets reflect competitive prices and adequate capacity in the short-run and the long-run."[34]

41. The FERC's concern that the exercise of buyer market power in capacity markets could distort prices away from otherwise competitive levels is well founded. When a large buyer intentionally increases supply, and but for its suppression of market prices that supply would be at a loss even after accounting for externalities, the resulting market prices will not reflect

[31] The MST can be accessed at: http://www.nyiso.com/public/markets_operations/documents/tariffviewer/index.jsp.

[32] NYISO MST at Attachment H, 23.4.5. In the NYISO geographic region, NYC and the G-J Locality are mitigated capacity zones (NYISO MST at Section 2, definitions).

[33] The term "uneconomic" refers to new capacity resources that would otherwise be offered at prices that do not clear in the capacity auctions.

[34] *Consolidated Edison Company of New York, Inc.*, 150 FERC ¶ 61,139 (2015) at P 3 (footnote omitted).

competitive levels at the time of the auction. Such an exercise of market power can be anticompetitive, interfering with the efficient workings and outcomes of otherwise well-functioning markets.

42. For example, Exhibit No. RDW-2 illustrates the effect of introducing 500 MW of new uneconomic capacity into a hypothetical monthly capacity market auction. The exhibit depicts a capacity market auction supply curve with and without the introduction of the new, uneconomic generation capacity.[35] As the exhibit shows, the addition of new capacity shifts the supply curve to the right. The downward sloping demand curve used in capacity markets will intersect the supply curve that is shifted to the right at a lower price than the original supply curve. As a result, the introduction of new, uneconomic capacity will lead to lower prices (all other things equal) for all auction participants. By depressing prices in the capacity auction, the exercise of buyer market power makes the owners of other capacity resources worse off because they receive a lower price for their generation capacity.

43. For the large buyer that committed the new, uneconomic capacity to the auction, the intention is to lower the price paid for all other capacity in order to lower its total capacity costs. For example, assume that in Exhibit No. RDW-2 the large buyer that has purchased uneconomic capacity has a total capacity obligation of 5,000 MW, and that the auction clearing price is $8/kW-month including the addition of the new, uneconomic capacity. Next assume that this buyer paid $10/kW-month for the 500 MW of uneconomic capacity, and $8/kW-month for the remaining 4,500 MW, for a total of $41 million. Had the buyer purchased 5,000 MW at a clearing price of $9/kW-month (the clearing price without the addition of the new, uneconomic supply), its cost would have been $45 million. Thus, by introducing new, uneconomic capacity into the capacity auction the buyer saved $4 million for the month.

44. FERC-approved MOPRs guard against the potential exercise of market power illustrated in Exhibit No. RDW-2. As the acronym implies, the application of a MOPR prevents buyers that bring to market new, otherwise uneconomic resources from offering the resource at an artificially low price, or zero. Instead, the resource must be offered at a price level no less than that defined in association with what the estimated cost of a similar resource would be absent out-of-market

[35] For simplicity, Exhibit No. RDW-2 shows the effect of bidding the new generation capacity at a price of $0/kW-Month and also assumes most capacity is offered at a price of 0 for expositional purposes.

payments. Depending upon the mitigated offer price, the resource may not clear the capacity auction in part, or at all, and the auction price suppression will be reduced from what would have resulted if the capacity resource were allowed to make a price offer significantly lower than the mitigated level.

45. Because mitigating resources can significantly impact the capacity markets, restrain competitive pricing, and interfere with states' legitimate policies, FERC has consistently adhered to the principle that the application of buyer-side market power mitigation should be limited to those instances where there is an incentive and ability to exercise market power by bringing new, otherwise uneconomic capacity resources to the marketplace.

B. ZEC PROGRAM GENERATION RESOURCES SHOULD NOT BE SUBJECT TO A MOPR

46. Compensating zero emission resources for their environmental attributes using a payment structure like the ZEC program does not give rise to the buyer market power concerns that justify the application of a MOPR. The ZEC program is a legitimate environmental program aimed at addressing the externalities of carbon-based power generation, and not an exercise of market power. New York State's policy of moving toward a reduced carbon footprint resulted in the approval of a ZEC program in the NYPSC's Order.

47. The NYPSC clearly explained the purpose of the ZEC Program in its order: "to preserve the nuclear units' environmental attributes" in order to "provide a vehicle for monetizing the State's environmental preferences and the program will allow time for new clean energy technologies to mature and take their place in the ultimate generation mix" and to "contribute uniquely to serving the long-term goal of achieving a largely de-carbonized energy system by the middle of the century."[36] None of these aims is price suppression.

48. There are a number of objective characteristics of the ZEC Program that bear out the NYPSC's avowed purpose and distinguish the ZEC program from a program that may be considered an exercise of buyer market power. First, the cost of a ZEC and its financial benefit to its recipient are based on the social cost of the abated carbon dioxide emissions – which is the value of the externality being addressed – and cannot rise above that amount. The cost of a ZEC

[36] NYPSC Order at 20.

may decline over time as power market conditions change (see above), and New York's generation mix becomes cleaner, but it will not increase based on the financial obligations of the generating units. This ensures that nuclear generators will participate in the program and continue producing electricity only if they believe it will be sufficiently compensatory, and this aligns with economic efficiency, taking into account the social cost of the abated carbon emissions. In contrast, buyer-side market power increases the private incentives to build electricity plants beyond the plants' social value by the suppression of market prices caused by the plants' construction.

49. Second, the payment of the ZECs to the nuclear units does not guarantee that the facilities will remain in operation over the 12-year term of the contracts. If the units receiving ZECs do not remain financially viable due to operational or other issues resulting in unexpected capital investment needs, even after their carbon abatement value is accounted for, market forces will impel the units to retire, which would be the socially efficient outcome under those circumstances. Thus, the ZEC payments do not shelter the units from market forces as would a program that sought to guarantee that they would remain operational in order to suppress prices.

50. Third, the ZEC program does not insulate eligible units from market risk. The generating unit owners still bear the risk of increasing costs and the risk that market prices will fall below levels that prevailed at the time the ZEC program was approved. The program is designed to align with social efficiency the incentives for the decision to continue operation, inclusive of the impact on emissions.

51. Fourth, the ZEC program does not require any bid into the wholesale energy or capacity market nor that the unit clear the wholesale capacity market. Thus, if the units fail to clear the capacity market, ZEC payments will still be made, in accordance with actual production, and it is that actual production that has the positive environmental impact of displacing substitute production that creates socially costly emissions. If the ZEC program sought to exercise buyer market power, it would clearly condition payment on generation unit participation in the capacity market in order most directly to forestall increases in capacity prices.

52. Finally, there is no exercise of buyer market power as the benefits of the ZEC program exceed the costs regardless of any ancillary impact on market prices. The benefit/cost analysis of reduced carbon emissions resulting from the program's environmental benefits alone is the basis

for the NYPSC's Order. The NYPSC articulated that any impact on market prices is not appropriately considered in a cost-benefit analysis.[37] In particular, in its recent Benefit-Cost Framework Order, the NYPSC noted that power market prices are reduced when resource investment (e.g., demand side management) reduces power consumption, but concluded that any price suppression is a transfer payment and not properly included in a benefit cost analysis.[38] The NYPSC held that the value of the ZEC program to consumers is the benefit it provides through the preservation of zero-emission resources, not any ancillary impacts on the marketplace that would be subject to speculation. By contrast, in a typical exercise of buyer-side market power, as explained with the example above, it is *only* economic for the owner of the new resource to pay for an uneconomic resource because of the price-suppression benefits that result.

53. In summary, the features of the ZEC program are indicia that any potential impacts on prices are an ancillary result of its environmental goal, not the goal of the program. As explained above, a program intended to exercise market power would be structured differently, without its incentives so closely linked to emissions-reducing production. A program focused on exercising market power would place its emphasis on providing long-term plant financial guarantees and would condition payment on bidding and clearing in wholesale power markets.

54. Application of buyer-side market power mitigation in the absence of anticompetitive concerns would be a serious policy mistake, because it could hamper low bids that are competitive and reflections of truly low costs, where costs include offsets or subsidies based on positive environmental externalities that are not otherwise reflected in market operations. In other words, the absence of the internalization of the social cost of carbon emissions in market prices creates the appearance that financially challenged nuclear units are not efficiently competitive. In fact, these units are economically efficient and their continued presence in the market, if justified under the ZEC program, should be viewed as pro-competitive when considering the benefit to society of their zero carbon emissions attributes. Thus, generating units receiving environmental credit revenue should not be subjected to a MOPR because the ZEC payment accounts for otherwise unaccounted for environmental attributes.

[37] NYPSC Order Establishing the Benefit Cost Analysis Framework, Case 14-M-0101 at 24 (Jan. 21, 2016) ("Benefit-Cost Framework Order").

[38] *Id.*

55. Moreover, if FERC were to apply buyer-side market power mitigation to eligible generating units under the NYPSC ZEC program due to assumed impacts on capacity market prices, for consistency FERC would logically need to extend its application of mitigation measures more broadly. FERC would almost certainly find itself evaluating on a case-by-case basis all valid State subsidization programs for all types of resources with environmental as well as possible market-price implications.

56. To the extent the general application of a MOPR to existing units is found to be necessary, revenue received from environmental credits should be considered a cost offset in the same way that I have shown applies to ZECs. Decisions on long-lasting investments in capacity are generally influenced by forward-looking expectations about capacity market revenues. Thus, if applications of MOPRs to existing units disallowed environmental credits as cost offsets, the result would be diminished expectations that future capacity market bids would succeed, thereby discouraging socially efficient investments in capacity with favorable environmental attributes.

C. ELIGIBILITY CRITERIA FOR THE ZEC PROGRAM THAT LIMIT IT TO NUCLEAR UNITS AT RISK OF RETIREMENT ENSURES PROGRAM COST EFFECTIVENESS

57. The NYPSC Order establishes eligibility for receipt of ZECs. For the first tranche of ZECs, the facilities that were selected to receive ZECs include facilities that had announced that they would retire or for which retirement was imminent. Targeting the payment for ZECs from these facilities is a cost effective policy decision that is in the public interest of the State of New York.

58. The purpose of a subsidy is to incentivize behavior that would not otherwise take place. Here, the goal of the NYPSC Order as a whole, including the ZEC program, is to place a value on zero-emissions generation in order to incentivize that generation. With respect to the ZEC program, the NYPSC Order provides a payment for those nuclear generation facilities that can provide ZECs now at the least cost, for a given quantity, recognizing that a failure to provide the subsidy will result in a loss of zero-emissions generation that cannot be timely replaced.[39] Moreover, the NYPSC Order explains that the "marginal cost of additional increments of

[39] NYPSC Order at 126-127.

renewable resources is expected to always be significantly higher than ZEC prices."[40] Finally, as explained above, the cost of the ZECs is limited by the estimated marginal social cost of carbon emissions not otherwise reflected in wholesale power prices already, ensuring that New York State consumers enjoy positive net benefits from the avoided carbon emissions resulting from the ZEC program. The NYPSC eligibility criteria appropriately focus on minimizing ZEC expenditures and the value of implementing the program beginning in 2017 when it will avoid imminent nuclear facility closures.

59. Financially viable nuclear plants do not need attribute payments to continue generating, however. Private incentives are already sufficiently aligned with social welfare for these plants that environmental attribute payments are not necessary to ensure that society continues to receive the benefits. Thus, at this time it is in the public interest to target the ZEC payments to the plants that are otherwise at risk of retirement. The NYPSC Order does not prevent other nuclear facilities that may face similar financial difficulties from being eligible for ZEC payments in the future. The NYPSC Order provides for "Subsequent determinations of facility-specific public necessity [ ] at every two-year interval after inception for Zero Carbon Electric Generating Facilities that were not qualified upon inception of the program."[41] The NYPSC Order appropriately focuses on facilities that contemporaneously face shut-down that would otherwise detrimentally impact New York State consumers by the loss of their zero-emission attributes.

60. While a single uniform tax on carbon emissions, or a single uniform subsidy for production that displaces carbon emissions, would accomplish the needed internalization of externalities and correction of incentives, and would make advance information unnecessary on whether entities would or would not otherwise behave as they would with the tax or subsidy, such a program is not in the offing, perhaps due to its complexities, distributional impacts and necessary implementation costs. The theoretical benefits of such a program should not be viewed, in its absence, as a valid argument against more practical programs like ZECs, inasmuch as the latter contribute to environmental benefits without causing inefficient interference with well-functioning wholesale markets for electric capacity and energy. The ZEC program's

[40] *Id.* at 127.

[41] NYPSC Order, Appendix E at 2.

targeted subsidy design ensures that costs borne by consumers result in a direct reduction of a harmful environmental externality.

61. This concludes my declaration.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Independent Power Producers of New York, Inc.,	)	
Complainant	)	
v.	)	**Docket No. EL13-62-002**
New York Independent System Operator, Inc.	)	
Respondent	)	

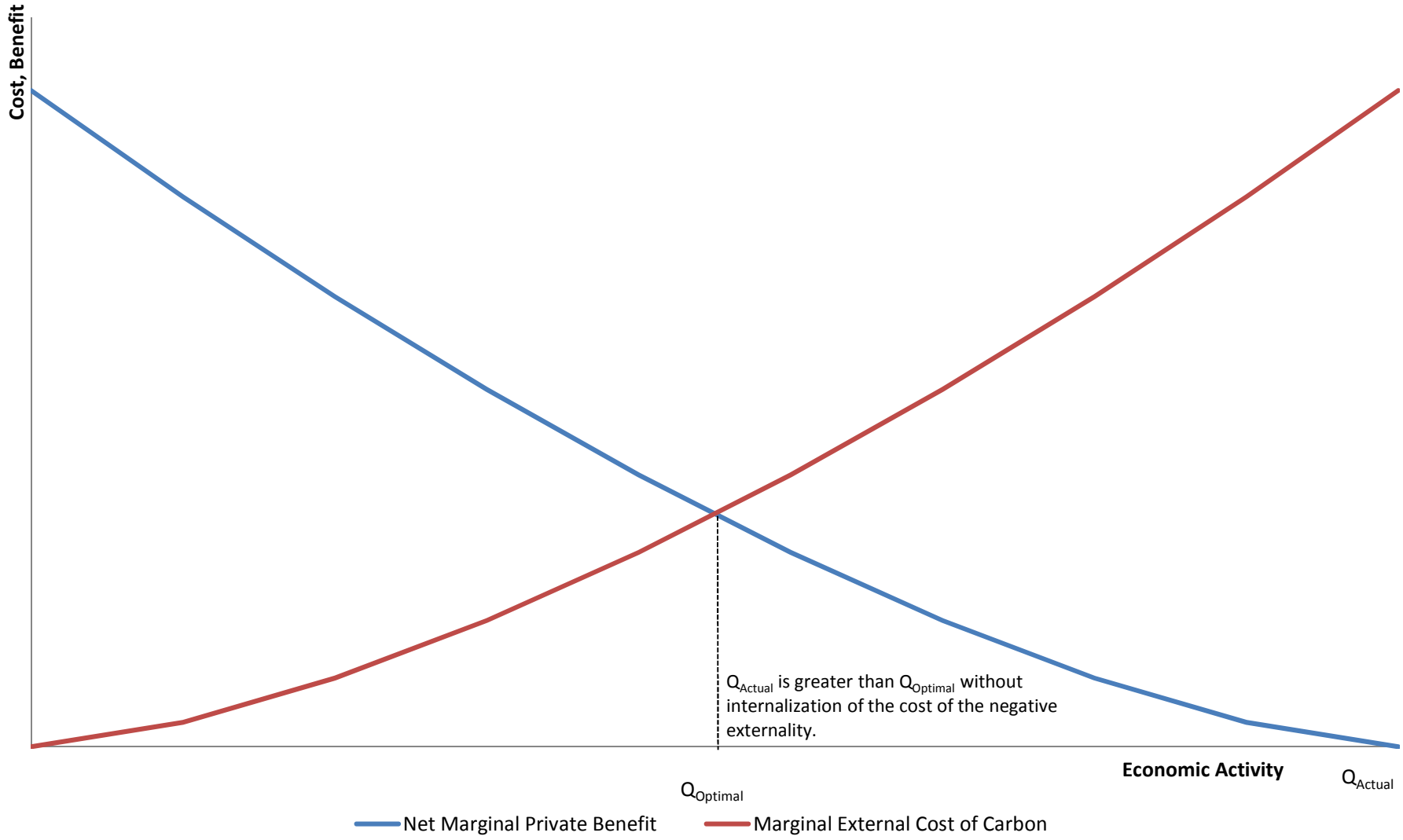
DECLARATION OF ROBERT WILLIG

I, Robert Willig, declare under penalty of perjury that the foregoing is true and correct.

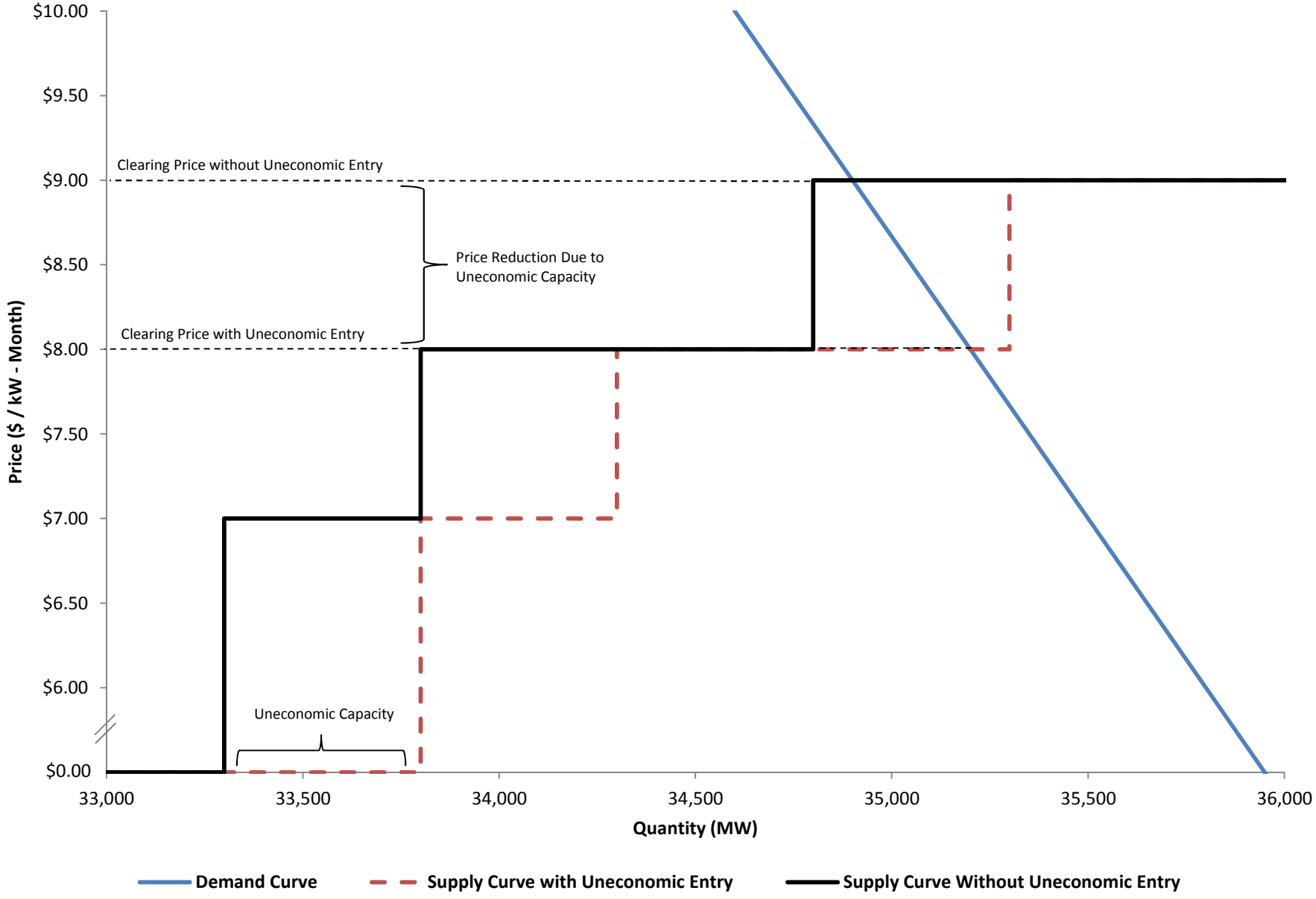
Executed: January 23, 2017

Robert Willig

Impact on Society of Carbon Dioxide Emissions



Example of Impact of Buyer Market Power in Capacity Market



October, 2016

Curriculum Vitae

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Ph.D. Economics, Stanford University, 1973
Dissertation: Welfare Analysis of Policies Affecting Prices and Products.
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M.S. Operations Research, Stanford University, 1968.

A.B. Mathematics, Harvard University, 1967.

Professional Positions:

Professor of Economics and Public Affairs, Emeritus, Princeton University, 7/2016 –

Professor of Economics and Public Affairs, Princeton University, 7/1978 - 6/2016.

Principal External Advisor, Infrastructure Program, Inter-American Development Bank, 6/97-8/98.

Deputy Assistant Attorney General, U.S. Department of Justice, l989-1991.

Supervisor, Economics Research Department, Bell Laboratories, 1977-1978.

Visiting Lecturer (with rank of Associate Professor), Department of Economics and Woodrow Wilson School, Princeton University, 1977-78 (part time).

Economics Research Department, Bell Laboratories, 1973-77.

Lecturer, Economics Department, Stanford University, 1971-73.

Other Professional Activities

ABA Section of Antitrust Law Economics Task Force, 2010-2012

Advisory Committee, Compass Lexecon 2010 -

OECD Advisory Council for Mexican Economic Reform, 2008 - 2009

Senior Consultant, Compass Lexecon, 2008 -

Director, Competition Policy Associates, Inc., 2003-2005

Advisory Bd., Electronic Journal of I.O. and Regulation Abstracts, 1996-2008.

Advisory Board, Journal of Network Industries, 2004-2010.

Visiting Faculty Member (occasional), International Program on Privatization and Regulatory Reform, Harvard Institute for International Development, 1996-2000.

Member, National Research Council Highway Cost Allocation Study
Review Committee, 1995-98.

Member, Defense Science Board Task Force on the Antitrust Aspects of Defense Industry Consolidation, 1993-94.

Editorial Board, Utilities Policy, 1990-2001.

Leif Johanson Lecturer, University of Oslo, November 1988.

Member, New Jersey Governor's Task Force on Market-Based Pricing of Electricity, 1987-89.

Co-editor, Handbook of Industrial Organization, 1984-89.

Associate Editor, Journal of Industrial Economics, 1984-89.

Director, Consultants in Industry Economics, Inc., 1983-89, 1991-94.

Fellow, Econometric Society, 1981-.

Organizing Committee, Carnegie-Mellon-N.S.F. Conference on Regulation, 1985.

Board of Editors, American Economic Review, 1980-83.

Nominating Committee, American Economic Association, 1980-1981.

Research Advisory Committee, American Enterprise Institute, 1980-1986.

Editorial Board, M.I.T. Press Series on Government Regulation of Economic Activity, 1979-93.

Program Committee, 1980 World Congress of the Econometric Society.

Program Committee, Econometric Society, 1979, 1981, 1985.

Organizer, American Economic Association Meetings: 1980, 1982.

American Bar Association Section 7 Clayton Act Committee, 198l.

Principal Investigator, NSF grant SOC79-0327, 1979-80; NSF grant 285-6041, 1980-82; NSF grant SES-8038866, 1983-84, 1985-86.

Aspen Task Force on the Future of the Postal Service, 1978-80.

Organizing Committee of Sixth Annual Telecommunications Policy Research Conference, 1977-78.

Visiting Fellow, University of Warwick, July 1977.

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Published Articles and Book Chapters:

"Unilateral Competitive Effects" (with Bryan Keating), in The Oxford Handbook on International Antitrust Economics, (Roger D. Blair and D. Daniel Sokol, eds.), Oxford University Press, 2014.

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Invited Conference Presentations:

George Mason Law Review Annual Antitrust Symposium: Antitrust in an Interconnected World
"GUPPI and the Safe Harbor" 2016

Competition Law & Policy Institute of New Zealand Annual Workshop
"Merger Analysis Keynote" 2015

Economic Studies at Brookings: Railroads, Policy and the Economy
"The Industry Perspective" 2015

Georgetown University McDonough School of Business Railroad Economics Symposium
"The Role of Economic Theory in the 'Deregulated' Rail Industry" 2015

Brazilian School of Economics and Finance (FGV EPGE) Seminario
"Public Interest Regulation: Lessons from Railroads" 2015

NYU School of Law Conference on the Fiftieth Anniversary of United States v. Philadelphia National Bank: The Past, Present and Future of Merger Law
"Discussion with Agency Economists" 2013

Brookings Institution Conference on The Economics of the Airline Industry
"Airline Network Effects and Consumer Welfare" 2012

AGEP Public Policy Conference on Pharmaceutical Industry Economics, Regulation and Legal Issues; Law and Economics Center, George Mason University School of Law
"Pharmaceutical Brand-Generic Disputes" 2012

U.S.-EU Alliance Study Peer Review Conferences
"Review of Cooperative Agreements in Transatlantic Airline Markets" 2012
"The Research Agenda Ahead" 2012

Antitrust in the High Tech Sector Conference
"Developments in Merger Enforcement" 2012

Georgetown Center for Business and Public Policy, Conference on the Evolution of Regulation
"Reflections on Regulation" 2011

Antitrust Forum, New York State Bar Association
"Upward Price Pressure, Market Definition and Supply Mobility" 2011

American Bar Association, Antitrust Section, Annual Convention
"The New Merger Guidelines' Analytic Highlights" 2011

OECD and World Bank Conference on Challenges and Policies for Promoting Inclusive Growth
"Inclusive Growth From Competition and Innovation" 2011

Villanova School of Business Executive MBA Conference
"Airline Network Effects, Competition and Consumer Welfare" 2011

NYU School of Law Conference on Critical Directions in Antitrust
"Unilateral Competitive Effects" 2010

Conf. on the State of European Competition Law and Enforcement in a Transatlantic Context
"Recent Developments in Merger Control" 2010

Center on Regulation and Competition, Universidad de Chile Law School
"Economic Regulation and the Limits of Antitrust Law" 2010

Center on Regulation and Competition, Universidad de Chile Law School
"Merger Policy and Guidelines Revision" 2010

Faculty of Economics, Universidad de Chile
"Network Effects in Airlines Markets" 2010

Georgetown Law Global Antitrust Enforcement Symposium
"New US Merger Guidelines" 2010

FTI London Financial Services Conference
"Competition and Regulatory Reform" 2010

NY State Bar Association Annual Antitrust Conference
“New Media Competition Policy” 2009

Antitrust Law Spring Meeting of the ABA
"Antitrust and the Failing Economy Defense" 2009

Georgetown Law Global Antitrust Enforcement Symposium
"Mergers: New Enforcement Attitudes in a Time of Economic Challenge" 2009

Phoenix Center US Telecoms Symposium
"Assessment of Competition in the Wireless Industry" 2009

FTC and DOJ Horizontal Merger Guidelines Workshop
"Direct Evidence is No Magic Bullet" 2009

Northwestern Law Research Symposium: Antitrust Economics and Competition Policy
"Discussion of Antitrust Evaluation of Horizontal Mergers" 2008

Inside Counsel Super-Conference
"Navigating Mixed Signals under Section 2 of the Sherman Act" 2008

Federal Trade Commission Workshop on Unilateral Effects in Mergers
"Best Evidence and Market Definition" 2008

European Policy Forum, Rules for Growth: Telecommunications Regulatory Reform
"What Kind of Regulation For Business Services?" 2007

Japanese Competition Policy Research Center, Symposium on M&A and Competition Policy
"Merger Policy Going Forward With Economics and the Economy" 2007

Federal Trade Commission and Department of Justice Section 2 Hearings
"Section 2 Policy and Economic Analytic Methodologies" 2007

Pennsylvania Bar Institute, Antitrust Law Committee CLE
"The Economics of Resale Price Maintenance and Class Certification" 2007

Pennsylvania Bar Institute, Antitrust Law Committee CLE
"Antitrust Class Certification – An Economist's Perspective" 2007

Fordham Competition Law Institute, International Competition Economics Training Seminar
"Monopolization and Abuse of Dominance" 2007

Canadian Bar Association Annual Fall Conference on Competition Law
"Economic Tools for the Competition Lawyer" 2007

Conference on Managing Litigation and Business Risk in Multi-jurisdiction Antitrust Matters
"Economic Analysis in Multi-jurisdictional Merger Control" 2007

World Bank Conference on Structuring Regulatory Frameworks for Dynamic and Competitive South Eastern European Markets
"The Roles of Government Regulation in a Dynamic Economy" 2006

Department of Justice/Federal Trade Commission Section 2 Hearings
"(Allegedly) Monopolizing Tying Via Product Innovation" 2006

Fordham Competition Law Institute, Competition Law Seminar
"Monopolization and Abuse of Dominance" 2006

Practicing Law Institute on Intellectual Property Antitrust
"Relevant Markets for Intellectual Property Antitrust" 2006

PLI Annual Antitrust Law Institute
"Cutting Edge Issues in Economics" 2006

World Bank's Knowledge Economy Forum V
"Innovation, Growth and Competition" 2006

Charles University Seminar Series
"The Dangers of Over-Ambitious Antitrust Regulation" 2006

NY State Bar Association Antitrust Law Section Annual Meeting
"Efficient Integration or Illegal Monopolization?" 2006

World Bank Seminar
"The Dangers of Over-Ambitious Regulation" 2005

ABA Section of Antitrust Law 2005 Fall Forum
"Is There a Gap Between the Guidelines and Agency Practice?" 2005

Hearing of Antitrust Modernization Commission
"Assessment of U.S. Merger Enforcement Policy" 2005

LEAR Conference on Advances in the Economics of Competition Law
"Exclusionary Pricing Practices" 2005

Annual Antitrust Law Institute
"Cutting Edge Issues in Economics" 2005

PRIOR Symposium on States and Stem Cells
"Assessing the Economics of State Stem Cell Programs" 2005

ABA Section of Antitrust Law – AALS Scholars Showcase
"Distinguishing Anticompetitive Conduct" 2005

Allied Social Science Associations National Convention
"Antitrust in the New Economy" 2005

ABA Section of Antitrust Law 2004 Fall Forum
"Advances in Economic Analysis of Antitrust" 2004

Phoenix Center State Regulator Retreat
"Regulatory Policy for the Telecommunications Revolution" 2004

OECD Competition Committee
"Use of Economic Evidence in Merger Control" 2004

Justice Department/Federal Trade Commission Joint Workshop
"Merger Enforcement" 2004

Phoenix Center Annual U.S. Telecoms Symposium
"Incumbent Market Power" 2003

Center for Economic Policy Studies Symposium on Troubled Industries
"What Role for Government in Telecommunications?" 2003

Princeton Workshop on Price Risk and the Future of the Electric Markets
"The Structure of the Electricity Markets" 2003

2003 Antitrust Conference
"International Competition Policy and Trade Policy" 2003

International Industrial Organization Conference
"Intellectual Property System Reform" 2003

ABA Section of Antitrust Law 2002 Fall Forum
"Competition, Regulation and Pharmaceuticals" 2002

Fordham Conference on International Antitrust Law and Policy
"Substantive Standards for Mergers and the Role of Efficiencies" 2002

Department of Justice Telecom Workshop
"Stimulating Investment and the Telecommunications Act of 1996" 2002

Department of Commerce Conference on the State of the Telecom Sector
"Stimulating Investment and the Telecommunications Act of 1996" 2002

Law and Public Affairs Conference on the Future of Internet Regulation
"Open Access and Competition Policy Principles" 2002

Center for Economic Policy Studies Symposium on Energy Policy
"The Future of Power Supply" 2002

The Conference Board: Antitrust Issues in Today's Economy
"The 1982 Merger Guidelines at 20" 2002

Federal Energy Regulatory Commission Workshop
"Effective Deregulation of Residential Electric Service" 2001

IPEA International Seminar on Regulation and Competition
"Electricity Markets: Deregulation of Residential Service" 2001
"Lessons for Brazil from Abroad" 2001

ABA Antitrust Law Section Task Force Conference
"Time, Change, and Materiality for Monopolization Analyses" 2001

Harvard University Conference on American Economic Policy in the 1990s
"Comments on Antitrust Policy in the Clinton Administration" 2001

Tel-Aviv Workshop on Industrial Organization and Anti-Trust
"The Risk of Contagion from Multimarket Contact" 2001

2001 Antitrust Conference
"Collusion Cases: Cutting Edge or Over the Edge?" 2001
"Dys-regulation of California Electricity" 2001

FTC Public Workshop on Competition Policy for E-Commerce
"Necessary Conditions for Cooperation to be Problematic" 2001

HIID International Workshop on Infrastructure Policy
"Infrastructure Privatization and Regulation" 2000

Villa Mondragone International Economic Seminar
"Competition Policy for Network and Internet Markets" 2000

New Developments in Railroad Economics: Infrastructure Investment and Access Policies
"Railroad Access, Regulation, and Market Structure" 2000

The Multilateral Trading System at the Millennium
"Efficiency Gains From Further Liberalization" 2000

Singapore – World Bank Symposium on Competition Law and Policy
"Policy Towards Cartels and Collusion" 2000

CEPS: Is It a New World?: Economic Surprises of the Last Decade
"The Internet and E-Commerce" 2000

Cutting Edge Antitrust: Issues and Enforcement Policies
"The Direction of Antitrust Entering the New Millennium" 2000

The Conference Board: Antitrust Issues in Today's Economy
"Antitrust Analysis of Industries With Network Effects" 1999

CEPS: New Directions in Antitrust
"Antitrust in a High-Tech World" 1999

World Bank Meeting on Competition and Regulatory Policies for Development
"Economic Principles to Guide Post-Privatization Governance" 1999

1999 Antitrust Conference
"Antitrust and the Pace of Technological Development" 1999
"Restructuring the Electric Utility Industry" 1999

HIID International Workshop on Privatization, Regulatory Reform and Corporate Governance
"Privatization and Post-Privatization Regulation of Natural Monopolies" 1999

The Federalist Society: Telecommunications Deregulation: Promises Made, Potential Lost?
"Grading the Regulators" 1999

Inter-American Development Bank: Second Generation Issues In the Reform Of Public Services
"Post-Privatization Governance" 1999
"Issues Surrounding Access Arrangements" 1999

Economic Development Institute of the World Bank -- Program on Competition Policy
"Policy Towards Horizontal Mergers" 1998

Twenty-fifth Anniversary Seminar for the Economic Analysis Group of the Department of

Justice
"Market Definition in Antitrust Analysis" 1998

HIID International Workshop on Privatization, Regulatory Reform and Corporate Governance
"Infrastructure Architecture and Regulation: Railroads" 1998

EU Committee Competition Conference – Market Power
"US/EC Perspective on Market Definition" 1998

Federal Trade Commission Roundtable
"Antitrust Policy for Joint Ventures" 1998

1998 Antitrust Conference
"Communications Mergers" 1998

The Progress and Freedom Foundation Conference on Competition, Convergence, and the Microsoft Monopoly
Access and Bundling in High-Technology Markets 1998

FTC Program on The Effective Integration of Economic Analysis into Antitrust Litigation
The Role of Economic Evidence and Testimony 1997

FTC Hearings on Classical Market Power in Joint Ventures
Microeconomic Analysis and Guideline 1997

World Bank Economists --Week IV Keynote
Making Markets More Effective With Competition Policy 1997

Brookings Trade Policy Forum
Competition Policy and Antidumping: The Economic Effects 1997

University of Malaya and Harvard University Conference on The Impact of Globalisation and Privatisation on Malaysia and Asia in the Year 2020
Microeconomics, Privatization, and Vertical Integration 1997

ABA Section of Antitrust Law Conference on The Telecommunications Industry
Current Economic Issues in Telecommunications 1997

Antitrust 1998: The Annual Briefing
The Re-Emergence of Distribution Issues 1997

Inter-American Development Bank Conference on Private Investment, Infrastructure Reform and Governance in Latin America & the Caribbean
Economic Principles to Guide Post-Privatization Governance 1997

Harvard Forum on Regulatory Reform and Privatization of Telecommunications in the Middle East
Privatization: Methods and Pricing Issues 1997

American Enterprise Institute for Public Policy Research Conference
Discussion of Local Competition and Legal Culture 1997

Harvard Program on Global Reform and Privatization of Public Enterprises
"Infrastructure Privatization and Regulation: Freight" 1997

World Bank Competition Policy Workshop
"Competition Policy for Entrepreneurship and Growth" 1997

Eastern Economics Association Paul Samuelson Lecture
"Bottleneck Access in Regulation and Competition Policy" 1997

ABA Annual Meeting, Section of Antitrust Law
"Antitrust in the 21st Century: The Efficiencies Guidelines" 1997

Peruvian Ministry of Energy and Mines Conference on Regulation of Public Utilities
"Regulation: Theoretical Context and Advantages vs. Disadvantages" 1997

The FCC: New Priorities and Future Directions
"Competition in the Telecommunications Industry" 1997

American Enterprise Institute Studies in Telecommunications Deregulation
"The Scope of Competition in Telecommunications" 1996

George Mason Law Review Symposium on Antitrust in the Information Revolution
"Introduction to the Economic Theory of Antitrust and Information" 1996

Korean Telecommunications Public Lecture
"Market Opening and Fair Competition" 1996

Korea Telecommunications Forum
"Desirable Interconnection Policy in a Competitive Market" 1996

European Association for Research in Industrial Economics Annual Conference
"Bottleneck Access: Regulation and Competition Policy" 1996

Harvard Program on Global Reform and Privatization of Public Enterprises
"Railroad and Other Infrastructure Privatization" 1996

FCC Forum on Antitrust and Economic Issues Involved with InterLATA Entry
"The Scope of Telecommunications Competition" 1996

Citizens for a Sound Economy Policy Watch on Telecommunications Interconnection
"The Economics of Interconnection" 1996

World Bank Seminar on Experiences with Corporatization
"Strategic Directions of Privatization" 1996

FCC Economic Forum on the Economics of Interconnection
Lessons from Other Industries 1996

ABA Annual Meeting, Section of Antitrust Law
The Integration, Disintegration, and Reintegration
of the Entertainment Industry 1996

Conference Board: 1996 Antitrust Conference
How Economics Influences Antitrust and Vice Versa 1996

Antitrust 1996: A Special Briefing
Joint Ventures and Strategic Alliances 1996

New York State Bar Association Section of Antitrust Law Winter Meeting
Commentary on Horizontal Effects Issues 1996

FTC Hearings on the Changing Nature of Competition in a Global and Innovation-Driven Age
Vertical Issues for Networks and Standards 1995

Wharton Seminar on Applied Microeconomics
Access Policies with Imperfect Regulation 1995

Antitrust 1996, Washington D.C.
Assessing Joint Ventures for Diminution of Competition 1995

ABA Annual Meeting, Section of Antitrust Law
Refusals to Deal -- Economic Tests for Competitive Harm 1995

FTC Seminar on Antitrust Enforcement Analysis
Diagnosing Collusion Possibilities 1995

Philadelphia Bar Education Center: Antitrust Fundamentals
Antitrust--The Underlying Economics 1995

Vanderbilt University Conference on Financial Markets

Why Do Christie and Schultz Infer Collusion From Their Data? 1995

ABA Section of Antitrust Law Chair=s Showcase Program
Discussion of Telecommunications Competition Policy 1995

Conference Board: 1995 Antitrust Conference
Analysis of Mergers and Joint Ventures 1995

ABA Conference on The New Antitrust: Policy of the '90s
Antitrust on the Super Highways/Super Airways 1994

ITC Hearings on The Economic Effects of Outstanding Title VII Orders
"The Economic Impacts of Antidumping Policies" 1994

OECD Working Conference on Trade and Competition Policy
"Empirical Evidence on The Nature of Anti-dumping Actions" 1994

Antitrust 1995, Washington D.C.
"Rigorous Antitrust Standards for Distribution Arrangements" 1994

ABA -- Georgetown Law Center: Post Chicago-Economics: New Theories - New Cases?
"Economic Foundations for Vertical Merger Guidelines" 1994

Conference Board: Antitrust Issues in Today's Economy
"New Democrats, Old Agencies: Competition Law and Policy" 1994

Federal Reserve Board Distinguished Economist Series
"Regulated Private Enterprise Versus Public Enterprise" 1994

Institut d'Etudes Politiques de Paris
"Lectures on Competition Policy and Privatization" 1993

Canadian Bureau of Competition Policy Academic Seminar Series, Toronto.
"Public Versus Regulated Private Enterprise" 1993

CEPS Symposium on The Clinton Administration: A Preliminary Report Card
"Policy Towards Business" 1993

Columbia Institute for Tele-Information Conference on Competition in Network Industries, New York, NY
"Discussion of Deregulation of Networks: What Has Worked and What Hasn't" 1993

World Bank Annual Conference on Development Economics
"Public Versus Regulated Private Enterprise" 1993

Center for Public Utilities Conference on Current Issues Challenging the Regulatory Process
"The Economics of Current Issues in Telecommunications Regulation" 1992
"The Role of Markets in Presently Regulated Industries" 1992

The Conference Board's Conference on Antitrust Issues in Today's Economy, New York, NY
"Antitrust in the Global Economy" 1992
"Monopoly Issues for the '90s" 1993

Columbia University Seminar on Applied Economic Theory, New York, NY
"Economic Rationales for the Scope of Privatization" 1992

Howrey & Simon Conference on Antitrust Developments, Washington, DC
"Competitive Effects of Concern in the Merger Guidelines" 1992

Arnold & Porter Colloquium on Merger Enforcement, Washington, DC
"The Economic Foundations of the Merger Guidelines" 1992

American Bar Association, Section on Antitrust Law Leadership Council Conference, Monterey, CA
"Applying the 1992 Merger Guidelines" 1992

OECD Competition Policy Meeting, Paris, France
"The Economic Impacts of Antidumping Policy" 1992

Center for Public Choice Lecture Series, George Mason University Arlington, VA
"The Economic Impacts of Antidumping Policy" 1992

Brookings Institution Microeconomics Panel, Washington, DC,
"Discussion of the Evolution of Industry Structure" 1992

AT&T Conference on Antitrust Essentials
"Antitrust Standards for Mergers and Joint Ventures" 1991

ABA Institute on The Cutting Edge of Antitrust: Market Power
"Assessing and Proving Market Power: Barriers to Entry" 1991

Second Annual Workshop of the Competition Law and Policy Institute of New Zealand
"Merger Analysis, Industrial Organization Theory, and Merger Guidelines" 1991
"Exclusive Dealing and the Fisher & Paykel Case" 1991

Special Seminar of the New Zealand Treasury
"Strategic Behavior, Antitrust, and The Regulation of Natural Monopoly" 1991

Public Seminar of the Australian Trade Practices Commission
"Antitrust Issues of the 1990's" 1991

National Association of Attorneys General Antitrust Seminar
"Antitrust Economics" 1991

District of Columbia Bar's 1991 Annual Convention
"Administrative and Judicial Trends in Federal Antitrust Enforcement" 1991

ABA Spring Meeting
"Antitrust Lessons From the Airline Industry" 1991

Conference on The Transition to a Market Economy - Institutional Aspects
"Anti-Monopoly Policies and Institutions" 1991

Conference Board's Thirtieth Antitrust Conference
"Antitrust Issues in Today's Economy" 1991

American Association for the Advancement of Science Annual Meeting
"Methodologies for Economic Analysis of Mergers" 1991

General Seminar, Johns Hopkins University
"Economic Rationales for the Scope of Privatization" 1991

Capitol Economics Speakers Series
"Economics of Merger Guidelines" 1991

CRA Conference on Antitrust Issues in Regulated Industries
"Enforcement Priorities and Economic Principles" 1990

Pepper Hamilton & Scheetz Anniversary Colloquium
"New Developments in Antitrust Economics" 1990

PLI Program on Federal Antitrust Enforcement in the 90's
"The Antitrust Agenda of the 90's" 1990

FTC Distinguished Speakers Seminar
"The Evolving Merger Guidelines" 1990

The World Bank Speakers Series
"The Role of Antitrust Policy in an Open Economy" 1990

Seminar of the Secretary of Commerce and Industrial Development of Mexico
"Transitions to a Market Economy" 1990

Southern Economics Association
"Entry in Antitrust Analysis of Mergers" 1990
"Discussion of Strategic Investment and Timing of Entry" 1990

American Enterprise Institute Conference on Policy Approaches to the Deregulation of Network Industries
"Discussion of Network Problems and Solutions" 1990

American Enterprise Institute Conference on Innovation, Intellectual Property, and World Competition
"Law and Economics Framework for Analysis" 1990

Banco Nacional de Desenvolvimento Economico Social Lecture
"Competition Policy: Harnessing Private Interests for the Public Interest" 1990

Western Economics Association Annual Meetings
"New Directions in Antitrust from a New Administration" 1990
"New Directions in Merger Enforcement: The View from Washington" 1990

Woodrow Wilson School Alumni Colloquium
"Microeconomic Policy Analysis and Antitrust--Washington 1990" 1990

Arnold & Porter Lecture Series
"Advocating Competition" 1991
"Antitrust Enforcement" 1990

ABA Antitrust Section Convention
"Recent Developments in Market Definition and Merger Analysis" 1990

Federal Bar Association
"Joint Production Legislation: Competitive Necessity or Cartel Shield?" 1990

Pew Charitable Trusts Conference
"Economics and National Security" 1990

ABA Antitrust Section Midwinter Council Meeting
"Fine-tuning the Merger Guidelines" 1990
"The State of the Antitrust Division" 1991

International Telecommunications Society Conference
"Discussion of the Impact of Telecommunications in the UK" 1989

The Economists of New Jersey Conference
"Recent Perspectives on Regulation" 1989

Conference on Current Issues Challenging the Regulatory Process
"Innovative Pricing and Regulatory Reform" 1989
"Competitive Wheeling" 1989

Conference Board: Antitrust Issues in Today's Economy
"Foreign Trade Issues and Antitrust" 1989

McKinsey & Co. Mini-MBA Conference
"Economic Analysis of Pricing, Costing, and Strategic Business Behavior" 1989
1994

Olin Conference on Regulatory Mechanism Design
"Revolutions in Regulatory Theory and Practice: Exploring The Gap" 1989

University of Dundee Conference on Industrial Organization and Strategic Behavior
"Mergers in Differentiated Product Industries" 1988

Leif Johanson Lectures at the University of Oslo
"Normative Issues in Industrial Organization" 1988

Mergers and Competitiveness: Spain Facing the EEC
"Merger Policy" 1988
"R&D Joint Ventures" 1988

New Dimensions in Pricing Electricity
"Competitive Pricing and Regulatory Reform" 1988

Program for Integrating Economics and National Security: Second Annual Colloquium
"Arming Decisions Under Asymmetric Information" 1988

European Association for Research in Industrial Economics
"U.S. Railroad Deregulation and the Public Interest" 1987
"Economic Rationales for the Scope of Privatization" 1989
"Discussion of Licensing of Innovations" 1990

Annenberg Conference on Rate of Return Regulation in the Presence of Rapid Technical Change
"Discussion of Regulatory Mechanism Design in the Presence
of Research, Innovation, and Spillover Effects" 1987

Special Brookings Papers Meeting
"Discussion of Empirical Approaches to Strategic Behavior" 1987
"New Merger Guidelines" 1990

Deregulation or Regulation for Telecommunications in the 1990's
"How Effective are State and Federal Regulations?" 1987

Conference Board Roundtable on Antitrust
"Research and Production Joint Ventures" 1990
"Intellectual Property and Antitrust" 1987

Current Issues in Telephone Regulation
"Economic Approaches to Market Dominance: Applicability of Contestable Markets" 1987

Harvard Business School Forum on Telecommunications
"Regulation of Information Services" 1987

The Fowler Challenge: Deregulation and Competition in The Local Telecommunications Market
"Why Reinvent the Wheel?" 1986

World Bank Seminar on Frontiers of Economics
"What Every Economist Should Know About Contestable Markets" 1986
Bell Communications Research Conference on Regulation and Information
"Fuzzy Regulatory Rules" 1986

Karl Eller Center Forum on Telecommunications
"The Changing Economic Environment in Telecommunications: Technological Change and Deregulation" 1986

Railroad Accounting Principles Board Colloquium
"Contestable Market Theory and ICC Regulation 1986

Canadian Embassy Conference on Current Issues in Canadian -- U.S. Trade and Investment
"Regulatory Revolution in the Infrastructure Industries" 1985

Eagleton Institute Conference on Telecommunications in Transition
"Industry in Transition: Economic and Public Policy Overview" 1985

Brown University Citicorp Lecture
"Logic of Regulation and Deregulation" 1985

Columbia University Communications Research Forum
"Long Distance Competition Policy" 1985

American Enterprise Institute Public Policy Week
"The Political Economy of Regulatory Reform" 1984

MIT Communications Forum
"Deregulation of AT&T Communications" 1984

Bureau of Census Longitudinal Establishment Data File and Diversification Study Conference
"Potential Uses of The File" 1984

Federal Bar Association Symposium on Joint Ventures
"The Economics of Joint Venture Assessment" 1984

Hoover Institute Conference on Antitrust
"Antitrust for High-Technology Industries" 1984

NSF Workshop on Predation and Industrial Targeting
"Current Economic Analysis of Predatory Practices" 1983

The Institute for Study of Regulation Symposium: Pricing Electric, Gas, and Telecommunications Services Today and for the Future
"Contestability As A Guide for Regulation and Deregulation" 1984

University of Pennsylvania Economics Day Symposium
"Contestability and Competition: Guides for Regulation and Deregulation" 1984

Pinhas Sapir Conference on Economic Policy in Theory and Practice
"Corporate Governance and Market Structure" 1984

Centre of Planning and Economic Research of Greece
"Issues About Industrial Deregulation" 1984
"Contestability: New Research Agenda" 1984

Hebrew and Tel Aviv Universities Conference on Public Economics
"Social Welfare Dominance Extended and Applied to Excise Taxation" 1983

NBER Conference on Industrial Organization and International Trade
"Perspectives on Horizontal Mergers in World Markets" 1983

Workshop on Local Access: Strategies for Public Policy
"Market Structure and Government Intervention in Access Markets" 1982

NBER Conference on Strategic Behavior and International Trade
"Industrial Strategy with Committed Firms: Discussion" 1982

Columbia University Graduate School of Business, Conference on Regulation and New Telecommunication Networks
"Local Pricing in a Competitive Environment" 1982

International Economic Association Roundtable Conference on New Developments in the Theory of Market Structure

"Theory of Contestability" 1982
"Product Dev., Investment, and the Evolution of Market Structures" 1982

N.Y.U. Conference on Competition and World Markets: Law and Economics
"Competition and Trade Policy--International Predation" 1982

CNRS-ISPE-NBER Conference on the Taxation of Capital
"Welfare Effects of Investment Under Imperfect Competition" 1982

Internationales Institut fur Management und Verwalturg Regulation Conference
"Welfare, Regulatory Boundaries, and the Sustainability of Oligopolies" 1981
NBER-Kellogg Graduate School of Management Conference on the Econometrics of Market Models with Imperfect Competition
"Discussion of Measurement of Monopoly Behavior: An Application to the Cigarette Industry" 1981

The Peterkin Lecture at Rice University
"Deregulation: Ideology or Logic?" 1981

FTC Seminar on Antitrust Analysis
"Viewpoints on Horizontal Mergers 1982
"Predation as a Tactical Inducement for Exit" 1980

NBER Conference on Industrial Organization and Public Policy
"An Economic Definition of Predation" 1980

The Center for Advanced Studies in Managerial Economics Conference on The Economics of Telecommunication
"Pricing Local Service as an Input" 1980

Aspen Institute Conference on the Future of the Postal Service
"Welfare Economics of Postal Pricing" 1979

Department of Justice Antitrust Seminar
"The Industry Performance Gradient Index" 1979

Eastern Economic Association Convention
"The Social Performance of Deregulated Markets for Telecom Services" 1979

Industry Workshop Association Convention
"Customer Equity and Local Measured Service" 1979

Symposium on Ratemaking Problems of Regulated Industries
"Pricing Decisions and the Regulatory Process" 1979

Woodrow Wilson School Alumni Conference
"The Push for Deregulation" 1979

NBER Conference on Industrial Organization
"Intertemporal Sustainability" 1979

World Congress of the Econometric Society
"Theoretical Industrial Organization" 1980

Institute of Public Utilities Conference on Current Issues in Public Utilities Regulation
"Network Access Pricing" 1978

ALI-ABA Conference on the Economics of Antitrust
"Predatoriness and Discriminatory Pricing" 1978

AEI Conference on Postal Service Issues
"What Can Markets Control?" 1978

University of Virginia Conference on the Economics of Regulation
"Public Interest Pricing" 1978

DRI Utility Conference
"Marginal Cost Pricing in the Utility Industry: Impact and Analysis" 1978

International Meeting of the Institute of Management Sciences
"The Envelope Theorem" 1977

University of Warwick Workshop on Oligopoly
"Industry Performance Gradient Indexes" 1977

North American Econometric Society Convention
"Intertemporal Sustainability" 1979
"Social Welfare Dominance" 1978
"Economies of Scope, DAIC, and Markets with Joint Production" 1977

Telecommunications Policy Research Conference
"Transition to Competitive Markets" 1986
"InterLATA Capacity Growth, Capped NTS Charges and Long Distance Competition" 1985
"Market Power in The Telecommunications Industry" 1984
"FCC Policy on Local Access Pricing" 1983
"Do We Need a Regulatory Safety Net in Telecommunications?" 1982
"Anticompetitive Vertical Conduct" 1981
"Electronic Mail and Postal Pricing" 1980
"Monopoly, Competition and Efficiency": Chairman 1979

"A Common Carrier Research Agenda" 1978
"Empirical Views of Ramsey Optimal Telephone Pricing" 1977
"Recent Research on Regulated Market Structure" 1976
"Some General Equilibrium Views of Optimal Pricing" 1975

National Bureau of Economic Research Conference on Theoretical Industrial Organization
"Compensating Variation as a Measure of Welfare Change" 1976
Conference on Pricing in Regulated Industries: Theory & Application
"Ramsey Optimal Pricing of Long Distance Telephone Services" 1977

NBER Conference on Public Regulation
"Income Distributional Concerns in Regulatory Policy-Making" 1977

Allied Social Science Associations National Convention
"Merger Guidelines and Economic Theory" 1990
Discussion of "Competitive Rules for Joint Ventures" 1989
"New Schools in Industrial Organization" 1988
"Industry Economic Analysis in the Legal Arena" 1987
"Transportation Deregulation" 1984
Discussion of "Pricing and Costing of Telecommunications Services" 1983
Discussion of "An Exact Welfare Measure" 1982
"Optimal Deregulation of Telephone Services" 1982
"Sector Differentiated Capital Taxes" 1981
"Economies of Scope" 1980
"Social Welfare Dominance" 1980
"The Economic Definition of Predation" 1979
Discussion of "Lifeline Rates, Succor or Snare?" 1979
"Multiproduct Technology and Market Structure" 1978
"The Economic Gradient Method" 1978
"Methods for Public Interest Pricing" 1977
Discussion of "The Welfare Implications of New Financial Instruments" 1976
"Welfare Theory of Concentration Indices" 1976
Discussion of "Developments in Monopolistic Competition Theory" 1976
"Hedonic Price Adjustments" 1975
"Public Good Attributes of Information and its Optimal Pricing" 1975
"Risk Invariance and Ordinally Additive Utility Functions" 1974
"Consumer's Surplus: A Rigorous Cookbook" 1974

University of Chicago Symposium on the Economics of Regulated Public Utilities
"Optimal Prices for Public Purposes" 1976

American Society for Information Science
"The Social Value of Information: An Economist's View" 1975

Institute for Mathematical Studies in the Social Sciences Summer Seminar

"The Sustainability of Natural Monopoly" 1975

U.S.-U.S.S.R. Symposium on Estimating Costs and Benefits of Information Services
"The Evaluation of the Economic Benefits of Productive Information" 1975

NYU-Columbia Symposium on Regulated Industries
"Ramsey Optimal Public Utility Pricing" 1975

Research Seminars:

Bell Communications Research (2)
Bell Laboratories (numerous)
Department of Justice (3)
Electric Power Research Institute
Federal Reserve Board
Federal Trade Commission (4)
Mathematica
Rand
World Bank (3)
Carleton University
Carnegie-Mellon University
Columbia University (4)
Cornell University (2)
Georgetown University
Harvard University (2)
Hebrew University
Johns Hopkins University (2)
M. I. T. (4)
New York University (4)
Northwestern University (2)
Norwegian School of Economics and Business Administration
University of California, San Diego
University of Chicago
University of Delaware
University of Florida
University of Illinois
University of Iowa (2)
Universite Laval
University of Maryland
University of Michigan
University of Minnesota
University of Oslo
University of Pennsylvania (3)
University of Toronto
University of Virginia
University of Wisconsin
University of Wyoming
Vanderbilt University
Yale University (2)
Princeton University (many)
Rice University
Stanford University (5)
S.U.N.Y. Albany