Met-Ed/Penelec/Penn Power/West Penn
Statement No. 1

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

METROPOLITAN EDISON COMPANY
Docket No. P-2017-____________

PENNSYLVANIA ELECTRIC COMPANY
Docket No. P-2017-____________

PENNSYLVANIA POWER COMPANY
Docket No. P-2017-____________

WEST PENN POWER COMPANY
Docket No. P-2017-____________

DEFAULT SERVICE PROGRAMS
June 1, 2019 to May 31, 2023

Direct Testimony
Of-
Kimberlie L. Bortz

List of Topics Addressed
Settlement Commitments from DSP IV
Customer Notice
Plan Term
Rate Design and Cost Recovery
Customer Referral Program
Purchase of Receivables Clawback Charge
Bypassable Retail Market Enhancement Rate Mechanism
Other Related Matters

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DIRECT TESTIMONY
OF
KIMBERLIE L. BORTZ

I. INTRODUCTION AND BACKGROUND

Q Please state your name and business address.

A. My name is Kimberlie L. Bortz, and my business address is 2800 Pottsville Pike, Reading, PA 19605.

Q. By whom are you employed and in what capacity?

A. I am employed by FirstEnergy Service Company as a Rates Advisor - Rates and Regulatory Affairs - Pennsylvania. The Pennsylvania Rates Department provides regulatory support for FirstEnergy Corp.'s ("FirstEnergy") Pennsylvania regulated distribution companies, including Metropolitan Edison Company ("Met-Ed"), Pennsylvania Electric Company ("Penelec"), Pennsylvania Power Company ("Penn Power") and West Penn Power Company ("West Penn") (individually, a "Company" and in any combination, the "Companies"). I am responsible to the Director - Rates and Regulatory Affairs - Pennsylvania for the development, coordination, preparation and presentation of the Companies' accounting and financial data in their rate-related matters before the Pennsylvania Public Utility Commission ("Commission") and New York State Public Service Commission. Also, I am responsible for tariff interpretation, tariff filings, and the design and development of retail electric rates.

Q. What is your educational background?

A. I have a Bachelor of Science degree in Accounting from the University of Maryland, and I am a Certified Public Accountant in Pennsylvania. I have over twenty-four years of experience with FirstEnergy. My educational background and work experience are more fully described in Appendix A to this statement.

Q. On whose behalf are you testifying in this proceeding?

A. I am testifying on behalf of Met-Ed, Penelec, Penn Power and West Penn. My testimony equally applies to all of the Companies, unless otherwise stated.

Q. What is the purpose of your direct testimony?

A. My testimony will describe the following elements of the Default Service Programs ("DSPs") that are the subject of this proceeding: (i) settlement commitments of the last default service proceeding at Docket Nos. P-2015-2511333, P-2015-2511351, P-2015-2511355, and P-2015-2511356 ("DSP IV"); (ii) customer notice; (iii) plan term; (iv) the proposed rate design and cost recovery plans; (v) the Customer Referral Program ("CRP"); (vi) the purchase of receivables ("POR") clawback charge; (vii) the bypassable retail market enhancement rate mechanism; and (viii) other related matters.

Q. Have you prepared any exhibits to accompany your testimony?

A. Yes. Met-Ed/Penelec/Penn Power/West Penn Exhibits KLB-1 through KLB-32 were prepared by me or under my supervision and are described in detail later in my testimony.

II. <u>SETTLEMENT COMMITMENTS</u>

Q. In the Joint Petition for Settlement of Default Service Programs ("DSP IV Settlement") which the Commission approved in the Companies' DSP IV proceeding, the Companies made various commitments. Are the Companies in compliance with those provisions?

A. Yes, they are.

Q. Please describe each of the DSP IV Settlement commitments and explain how the Companies are complying with the provisions.

A. The commitments and the Companies' compliance actions are as follows:

1. The Companies agreed to convene multiple stakeholder collaboratives with the parties to the DSP IV Settlement to explore the establishment of a bypassable retail market enhancement rate mechanism and the scope of shopping available to customers participating in the Companies' customer assistance programs ("CAPs").

The Companies held stakeholder collaboratives with the parties to the DSP IV Settlement to discuss these topics on September 13, 2016; November 30, 2016; May 25, 2017; and October 4, 2017. While no consensus was reached on these topics among the collaborative participants, the Companies are proposing a bypassable retail market enhancement rate mechanism as part of this proceeding. This mechanism will be described in detail later in my testimony. The Companies are not proposing any modifications to the scope of CAP shopping in this proceeding.

2. The Companies agreed to lower the hourly pricing threshold from 400 kW to 100 kW effective June 1, 2019 for any Company where smart meters will be used for hourly pricing billing purposes.

The Companies represent that in compliance with their Revised Smart Meter Deployment Plan, they are collectively on schedule to permit lowering the hourly pricing threshold to 100 kW by June 1, 2019. As such, any customer with demand equal to or greater than 100 kW that is currently part of the Commercial class for default service purposes would receive default service through the Hourly Pricing Default Service ("HP") Rider.[1]

3. The Companies agreed to host an informational meeting with the parties to the DSP IV Settlement to discuss the calculation of non-market based ("NMB") charges under the Companies' Default Service Support ("DSS") Riders including any adjustments to the timing and estimation of NMB charges to reduce potential reconciliation charges. The informational meeting was held on November 30, 2016. Despite these discussions, no proposed adjustments to the timing or estimation of the NMB charges were identified by the participants.

4. The Companies also agreed to enhance the transparency of the Network Integration Transmission Services ("NITS") rates and charges by providing notice to electric generation suppliers ("EGSs") and potential default service providers of any public, docketed Federal Energy Regulatory Commission ("FERC") filings that modify the NITS rate for any transmission company providing service to one of the Companies and to add a page to their Supplier Support website titled "NITS Rate Information."

As such, the Companies are actively providing notice to EGSs and potential default service providers of any public filings which would modify the NITS rate affecting any of the Companies via: emails through their Supplier Support communications process; updating Frequently Asked Questions on their DSP auction website; and posting NITS rates in a

[1] As required by the DSP IV Settlement, the Companies provided updates to the parties regarding their ability to lower the hourly pricing threshold on October 3, 2016, April 3, 2017 and October 2, 2017.

prominent table on both the Supplier Support and DSP auction websites. This information is refreshed as updates become publicly available.

5. The DSP-IV Settlement also required the Companies to modify the CRP scripts for the program administrator and the Companies' customer service representatives ("CSRs"). The scripts for the program administrator and the Companies' CSRs were modified to comply with the script language prescribed within the DSP IV Settlement effective May 15 and May 26, 2017, respectively. Also as a result of the DSP IV Settlement, the Companies reconvened their supplier workshops in order to provide a collaborative forum to discuss CRP operational enhancements that could be implemented as part of the CRP by both the Companies and EGS participants. The Companies hosted a supplier workshop on December 8, 2016 to discuss CRP enhancements, and hosted an informational session on CRP on August 10, 2017.

6. Finally, consistent with the DSP IV Settlement, the Companies implemented as a two-year pilot a POR clawback charge for the twelve-month periods ended August 31, 2016 and August 31, 2017 for EGSs whose write-offs as a percentage of revenues are 200% higher than their peers and whose average price per kilowatt hour ("kWh") is greater than 150% of the average price to compare for the operating company in which the EGS is serving customers. The results of the pilot are reviewed later in my testimony, where I also discuss the Companies' proposal to continue the clawback charge as part of this proceeding.

Q. What were the results of the stakeholder collaborative in October 2017 that discussed: (a) the current procurement plan and market conditions; (b) a bypassable retail market enhancement rate mechanism; (c) the scope of CAP shopping; (d) continuation of the POR clawback charge; and (e) any proposed changes to customer classes as a result of lowering the hourly pricing threshold?

A. No consensus was reached amongst the parties to the collaborative on any of the topics listed. However, pursuant to the DSP IV Settlement, the Companies agreed to make a filing with the Commission regarding the bypassable retail market rate mechanism, the scope of CAP shopping, any proposed continuation of the POR clawback charge, and proposed changes to customer classes no later than January 31, 2018. The DSP IV Settlement also provided that the Companies may make a filing regarding their current procurement plan if the Companies find it necessary to do so following the October 2017 collaborative.

Q. Given that no consensus was reached on the topics discussed at the collaborative, what are the Companies proposing with regard to the filings required by the DSP IV Settlement?

A. Lowering the hourly pricing threshold is a significant change for both customers and default service providers and requires the Companies to: adjust the eligible default service load for the commercial and industrial classes; revise the Companies' tariff definitions, rate schedules and riders; and develop and roll out a comprehensive communication plan to ensure customers are informed and educated on the new hourly pricing threshold. The Companies believe it is in the best interest of their customers to ensure clarity on this and the other collaborative topics. As such, given the number of items to be proposed and the direct nexus several of them have to the Companies' portfolio timing and products, the Companies are filing new DSPs for the period beginning June 1, 2019.

III. CUSTOMER NOTICE

Q. Please describe how the Companies will provide notice to customers of this DSP filing.

A. Pursuant to 52 Pa. Code § 54.188(e)(1), the Companies must provide all customers with notice of the filing of their DSPs in a manner similar to that described in 52 Pa. Code § 53.68. Accordingly, within thirty days of filing the Joint Petition seeking approval of their DSPs, each of the Companies will provide public notice of the filing by publishing a notice in the major newspapers serving their respective service areas. The notice will contain information about the Companies' filings; the Companies' proposed competitive solicitations of generation resources; how the Companies' plans may affect customers; where the filings are being made available for public inspection; how comments or complaints can be filed; and how customers can participate in these proceedings. The Companies' Joint Petition, direct testimony and exhibits are being made available for inspection at Met-Ed's principal office in Reading, Penelec's principal office in Erie, Penn Power's office in Clark, and West Penn's principal office in Greensburg. Additionally, this material will be posted to the Companies' public internet domain, where it will be available electronically for public inspection. Finally, the Companies are providing additional public notice by means of a press release.

In accordance with 52 Pa. Code § 54.185(c), the Companies are also serving copies of the Joint Petition, direct testimony and exhibits on the Pennsylvania Office of Consumer Advocate ("OCA"), the Pennsylvania Office of Small Business Advocate ("OSBA"), the Commission's Bureau of Investigation and Enforcement ("BI&E"), PJM Interconnection

L.L.C. ("PJM"), and all EGSs registered to provide service in the Companies' service territories. As a courtesy, the Companies are also serving copies of the Joint Petition, direct testimony and exhibits on: the Met-Ed Industrial Users Group, the Penelec Industrial Customer Alliance, the Penn Power Users Group, and the West Penn Power Industrial Interveners; the Pennsylvania State University; the Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania; and the Retail Energy Supply Association.

Q. Please describe the proposed customer notices that will be provided for any default service rate changes.

A. The Companies will continue to submit tariff supplements on a quarterly basis to recover the costs reasonably incurred in acquiring electricity at market prices the later of: forty-five days prior to the effective date of each change in their default service rate; seven days after the last supply auction; or more frequently. The tariff supplements will be accompanied by the calculations that translate procurement plan results into retail rates. Written notice of the submission of these tariff supplements will be provided to the OCA, OSBA, BI&E, and other parties included on the service list for this proceeding. The tariff supplements will be posted on the Companies' public internet domain when they are filed with the Commission. In addition, the Companies will continue to post the filed price-to-compare rates for the residential and commercial classes on the Commission's website at www.papowerswitch.com. Also, within one business day of the effective date of the revised price-to-compare for the residential and commercial customer classes, the revised price-to-compare will be posted on the Companies' public internet site.

Consistent with the Companies' current practice, as approved in their current DSPs, customers will be provided notice, via bill message, that new default service rates will take effect for each upcoming default service quarter. The notices will enable customers to analyze how the new rates will affect their bills and provide an opportunity for customers to seek competitive alternatives from EGSs.

IV. PLAN TERM

Q. What is the program term for the Companies' current DSP?

A. The Companies' current DSP is a four-year term with the contract lengths, product percentages and procurement lead times during the initial two-year period (June 1, 2017 through May 31, 2019) replicated for the remaining two years (June 1, 2019 through May 31, 2021). The DSP IV Settlement permits the Companies to file a new DSP following the October collaborative for changes to the procurement and implementation plans, which includes a reduction of the current plan term to two years.

Q. What term are the Companies proposing for this new DSP?

A. The Companies are proposing a firm four-year term for the forty-eight months spanning June 1, 2019 through May 31, 2023.

Q. What are the benefits of a four-year DSP term?

A. The Companies believe a firm four-year term provides certainty for customers and EGSs regarding the terms of the DSP, administrative efficiencies, and cost savings for customers as a result of the Companies not filing a new plan every two years.

V. RATE DESIGN AND COST RECOVERY

Q. Are the Companies proposing any changes to their existing retail customer classifications – residential, commercial and industrial?

A. The Companies will continue to procure default service supplies separately for each of the three retail customer classes. However, the hourly pricing threshold that is currently set at 400 kW is being reduced to 100 kW. Pursuant to the DSP IV Settlement, the Companies agreed to lower the hourly pricing threshold by June 1, 2019 where smart meters will be used for hourly pricing billing.

The Companies will define within their respective Rates GS-Medium (for Met-Ed and Penelec), Rate GM (for Penn Power), and Schedule 30 (for West Penn) which customers will receive default service under the Price to Compare Default Service Rate ("PTC") Rider or the HP Rider with a delineation of "PTC" or "HP". For example, Met-Ed Rate Schedule GS-Medium (PTC) will include customers with a kW demand less than 100 kW, which will be considered part of the commercial class. By contrast, Met-Ed Rate Schedule GS-Medium (HP) will include customers with a kW demand equal to or greater than 100 kW, which will be included in the industrial class.

Q. Why is this change in the hourly pricing threshold necessary?

A. First, as stated previously, this is a commitment made by the Companies that was set forth in the DSP IV Settlement. Second, the Commission's End State Order related to the Retail Market Investigation established the following recommended structure for hourly pricing:

> As to the proposed delineation point of above 100 kW of demand, the Commission acknowledges that the more compelling point of delineation is whether the customer has an interval meter, as no EDC suggested any difficulty creating a subclass for default service. Therefore, at this time, the Commission continues to support the threshold of 100 kW for purposes of determining medium and large C&I customers, but expects EDCs to offer hourly LMP products only to the

> customers above that demand level who have interval meters. We expect the EDCs to continue adding medium C&I customers to the hourly LMP product as interval meters are deployed.[2]

In the Commission's End State Final Order, it was recognized that each electric distribution company ("EDC") should have flexibility in implementing the recommended 100 kW threshold. While the Commission identified this threshold as the ultimate goal, there was an acknowledgment that there are impediments, such as lack of access to hourly usage data, that must first be overcome. Specifically, the Commission held that it is appropriate to provide customers with demand equal to or greater than 100 kW an hourly-priced product once they have an interval meter installed. Because the Companies' Smart Meter Deployment Plan states that smart meters that read interval data will be fully operational by June 1, 2019 and the Companies remain on track with their implementation schedule as of the date of this filing, the Companies are proposing to lower the hourly pricing threshold to 100 kW simultaneous to when smart meters are fully operational and able to read interval data for billing purposes.

Q. How will the Companies communicate this change in the hourly pricing threshold to customers directly affected by the change?

A. The Companies are developing an outreach and educational communication plan to inform shopping and default service customers with demand between 100kW and 400kW of the changes in eligibility for default service in the commercial class through the PTC Rider as compared to default service as part of the industrial class through the HP Rider. Pursuant to the DSP IV Settlement, the communication plan will be circulated to the parties to the

[2] *Investigation of Pennsylvania's Retail Electricity Market: End State of Default Service*, Docket No. I-2011-2237952, p. 29 (Final Order dated February 14, 2013).

DSP IV Settlement for comment at least nine months prior to the effective date of the new hourly pricing threshold, or by September 1, 2018. Additionally, the Companies have committed to notifying customers at least six months before the effective date of the change, or by December 1, 2018.

Q. Which rate schedules will be affected by this change in the hourly pricing threshold?

A. Met-Ed and Penelec rate schedule GS-Medium, Penn Power GM, Penn Power GS-Large, and West Penn Schedule 30 are affected by the change.

Q. Are you sponsoring exhibits that show the proposed revisions to the Companies' tariffs necessary to implement this change in the hourly pricing threshold?

A. Yes. Met-Ed/Penelec/Penn Power/West Penn Exhibits KLB-1 through KLB-5 reflect changes to the tariff definitions in each of the Companies' tariffs; Met-Ed/Penelec/Penn Power/West Penn Exhibits KLB-6 and KLB-7 show revisions to each of Met-Ed and Penelec's Rate GS-Medium; Met-Ed/Penelec/Penn Power/West Penn Exhibit KLB-8 indicates Penn Power Rate GM modifications; Met-Ed/Penelec/Penn Power/West Penn Exhibit KLB-9 presents the changes to West Penn Schedule 30; Met-Ed/Penelec/Penn Power/West Penn Exhibit KLB-10 shows the changes to Penn Power Rate GS-Large; Met-Ed/Penelec/Penn Power/West Penn Exhibits KLB-11 through KLB-14 show the changes to the Companies' PTC Riders; and Met-Ed/Penelec/Penn Power/West Penn Exhibits KLB-15 through KLB-19 present the modifications to the Companies' HP Riders.

Q. Please further describe the revisions to the Default Service Charges in each of the affected rate schedules.

A. The following language will be inserted into the Default Service Charges section of each of the affected rate schedules, using Met-Ed Rate GS-Medium as an example:

DEFAULT SERVICE CHARGES:
For Rate Schedule GS-Medium (PTC) Customers receiving Default Service from the Company, Rider H – Price to Compare Default Service Rate Rider, Commercial Customer Class rate applies unless the Customer elects to receive Default Service from the Company under Rider I – Hourly Pricing Default Service Rider. For Rate Schedule GS-Medium (HP) Customers receiving Default Service from the Company, the Hourly Pricing Default Service Rider rates apply.
DETERMINATION OF RATE SCHEDULE GS-MEDIUM (PTC) AND GS-MEDIUM (HP)
Rate Schedule GS-Medium (PTC): Customers receiving service under this Rate Schedule with a kW demand less than 100 kW.
Rate Schedule GS-Medium (HP): Customers receiving service under this Rate Schedule with a kW demand equal to or greater than 100 kW.

Q. How will the Companies determine which rider a customer will be served under for default service?

A. The Companies will conduct a review each year of the measured demand for the period April 1 of the preceding year to March 31 of the current year for all customers. Based on that review, if the actual measured demand in any of the twelve months is less than 100 kW, then to the extent that customer chooses not to shop, the customer shall receive default service under the provisions of the PTC Rider. Otherwise, the Customer will receive default service under the provisions of the HP Rider. The results of this review will become effective June 1 of every year and the customer will remain on the designated rider for a twelve-month period, or until they elect to shop with an EGS.

Q. How will the reconciliation rate component of the PTC Rider and HP Rider be affected by customers migrating to hourly pricing?

A. The reconciliation rate component for each of these riders will include a one-time adjustment for the pro-rated portion of the reconciliation balance based on kWh sales associated with customers migrating from the PTC Rider to the HP Rider as of June 1, 2019.

Q. Please further describe the tariff revisions to the PTC Rider and HP Rider reconciliation rate component.

A. An additional bullet will be added to the PTC Rider and HP Rider reconciliation rate components as follows, using Met-Ed Rate GS-Medium in this example text:

> PTC Rider DS_{Exp2} and HP Rider $DSHP_{Exp2}$:
> Any reconciliation balance associated with GS-Medium customers with demand equal to or greater than 100 kW migrating from the Price to Compare Default Service Rate Rider to the Hourly Pricing Default Service Rider as of June 1, 2019.

Q. Are there any other rate schedules that will be affected by the 100 kW delineation threshold for hourly pricing?

A. Yes. Customers on Penn Power Rate GS-Large are currently being served under the PTC Rider for default service. In the Companies' 2014 base rate cases, this rate schedule was created and comprised of certain Rate GS-Small and Rate GS-Medium customers who had registered demand of 400 kW or greater in anticipation of transitioning these customers to hourly pricing in the next available default service proceeding. Since that time, the Company has continued to provide default service to these customers under the PTC Rider. These customers now have the proper metering in place and the hourly pricing delineation point within the rate schedule has been clearly defined at 100 kW. Therefore, it makes sense to move Penn Power Rate GS Large customers to the HP Rider at this time. Met-Ed/Penelec/Penn Power/West Penn Exhibit KLB-10 provides the changes to the Default Service Charges section of Penn Power Rate GS-Large to accomplish this migration.

Q. Are the Companies proposing any other changes to the design of the default service rates for each of the customer classes?

A. No. The default service rates for the Companies' residential and commercial customer classes continue to consist of a single flat per kWh energy charge, which changes quarterly.

For the Companies' industrial customer classes, default service rates are based upon the PJM real-time hourly Locational Marginal Price for the Companies' respective PJM-designated delivery zone, plus associated costs incurred to provide hourly-priced service, such as capacity, ancillary services, PJM administrative expenses and costs to comply with Alternative Energy Portfolio Standards ("AEPS") requirements.

Q. What costs would the Companies recover under the default service rates they are proposing in this case?

A. The default service rates would continue to recover: (1) generation costs, certain transmission costs, ancillary service costs, and AEPS compliance costs, as described by Mr. Catanach in Met-Ed/Penelec/Penn Power/West Penn Statement No. 2; (2) supply management and administrative costs, as permitted by 52 Pa. Code § 69.1808; (3) applicable taxes; and (4) a proposed bypassable retail market enhancement rate mechanism which will be discussed later in my testimony.

In addition, the default service rates will continue to include a quarterly reconciliation component, or "E-factor," to recoup or refund, as applicable, under or over-collections from prior periods.

Q. How are default service rates charged to the Companies' residential and commercial default service customers?

A. The default service rates of each of the Companies' residential and commercial customer classes are charged through the PTC Rider as part of each of the Companies' tariffs, which sets forth rates for default service that are then incorporated into and referenced by the applicable rate schedules.

Q. Except for lowering the hourly pricing threshold to 100 kW, are the Companies proposing any other changes to their PTC Riders?

A. Yes. As described later in my testimony the Companies are proposing a bypassable retail market enhancement rate mechanism that will be added to the residential PTC rate calculation.

Q. Do you believe the design of the PTC Rider rates for the residential and commercial customer classes is consistent with the Commission's default service regulations and the Public Utility Code?

A. Yes. The Commission's regulations at Section 54.187(d) state that default service rates may not use a declining block structure. For the residential class, the Public Utility Code at Section 2807(e)(7) and the regulations at Section 54.187(i) provide that rates shall change no more frequently than on a quarterly basis. Consistent with these requirements, the Companies' proposed PTC Rider rates for the residential and commercial customers employ a flat per kWh rate design, with rates that will continue to change quarterly.

Q. How are default service rates charged to non-shopping customers that are part of the Companies' industrial class?

A. The industrial customer class default service rates of each of the Companies are charged through the HP Riders as part of each of the Companies' tariffs.

Q. Except for lowering the hourly pricing threshold to 100 kW, are the Companies proposing any other changes to their HP Riders?

A. No. The Companies are not proposing to change the design or components of their HP Riders as part of their proposed DSPs.

Q. Do you believe the design of the rates set forth in the HP Riders is consistent with the Commission's default service regulations?

A. Yes. For the reasons I previously explained, the hourly-priced service offered under the HP Riders is consistent with Commission precedent, the Commission's regulations at 52 Pa. Code § 54.187(i) and (j), other applicable provisions of those regulations, and the Commission's prior approval of the Companies' customer class definitions and service offerings.

Q. What are the DSS Riders and what costs will be recovered through these riders under this DSP?

A. Each of the Companies has a DSS Rider in its respective tariff, which recovers various categories of costs on a non-bypassable basis. All Companies' DSS Riders recover four categories of costs: (1) the uncollectible accounts expense incurred through the provision of default service and on behalf of EGSs through the POR programs for residential and small commercial customers; (2) retail enhancement costs for the CRP; (3) customer education costs; and (4) NMB Charges.[3] In addition to these four categories, Met-Ed's DSS Rider recovers Non-Utility Generation costs through May 31, 2018 and Penn Power's DSS Rider may also recover any FERC-approved Midcontinent Independent System Operator ("MISO") Transmission Expansion Plan costs, PJM Integration fees, and MISO exit fees associated with Penn Power's move from MISO to PJM.

Q. Are the Companies proposing any changes to the DSS Riders?

A. Yes. The Companies are proposing to add to the DSS Riders a credit refunding the revenues collected through the bypassable retail market enhancement rate being proposed in this proceeding to be charged to non-shopping residential customers through the PTC Riders. The Companies are also proposing to expand the NMB Charges component to include any Federal Energy Regulatory Commission ("FERC")-approved reallocation of PJM Regional Transmission Expansion Plan charges related to Docket No. EL05-121-009. These proposed revisions to the DSS Riders are reflected in Met-Ed/Penelec/Penn Power/West Penn Exhibits KLB-20 through KLB-24.

Q. Will the Solar Photovoltaic Requirements Charge ("SPVRC") Riders remain in place for the upcoming default service term?

A. Yes. Met-Ed, Penelec, and Penn Power are not proposing any changes to their SPVRC Riders and will continue to recover costs attributable to complying with solar AEPS requirements through Rider N, the non-bypassable SPVRC Rider that applies to all delivery

[3] NMB Charges currently include FERC approved costs for: (i) PJM Regional Transmission Expansion Plan ("RTEP") charges; (ii) PJM Expansion Cost Recovery charges ("ECRCs"); (iii) PJM charges for Reliability Must Run ("RMR") generating unit declarations and charges associated with plants deactivated on or after July 24, 2014; (iv) historical tie line, generation, and retail customer meter adjustments; (v) unaccounted for energy ("UFE"); and (vi) any other FERC-approved PJM charges billed by PJM that will not be reconciled through the PTC and/or HP Riders and as approved for recovery under the DSS Riders by the Commission. The Companies are proposing to expand the NMB Charges component of the DSS Riders as part of this filing as more fully described in this testimony.

service customers for those Companies. West Penn does not have an SPVRC Rider and is not proposing one as part of its DSP.

Q. Are any other tariff revisions being proposed as part of this filing?

A. Yes. In addition to the revisions required to the DSS Riders, the Companies' Supplier Tariffs must be revised to clarify responsibility for any FERC-approved reallocation of PJM Regional Transmission Expansion Plan charges related to Docket No. EL05-121-009. Those changes are reflected in Met-Ed/Penelec/Penn Power/West Penn Exhibits KLB-25 through KLB-28.

VI. CUSTOMER REFERRAL PROGRAM

Q. Are the Companies proposing to continue the CRP as part of their DSPs?

A. Yes. The Companies propose to continue the CRP as part of this proceeding through May 31, 2023, the end date of the proposed DSP term.

Q. Are the Companies proposing any modifications to the CRP?

A. Yes. One minor modification is being made to extend the date of the Customer Referral Program Agreement ("CRP Agreement") between the Companies and participating EGSs through May 31, 2023. Met-Ed/Penelec/Penn Power/West Penn Exhibit KLB-29 reflects this change.

Q. What is the CRP Agreement?

A. The CRP Agreement is the contract established between the Company and qualified EGSs that wish to participate in the CRP. The CRP Agreement outlines the terms and conditions to which a supplier must agree and meet in order to qualify to serve load through the CRP.

VII. PURCHASE OF RECEIVABLES PROGRAM CLAWBACK CHARGE

Q. Please describe the POR program included in the Companies' Supplier Tariffs.

A. Consistent with the Commission's Policy Statement at 52 Pa. Code § 69.1814, each of the Companies agreed to provide, and the Commission approved, POR programs for residential and small commercial accounts served by EGSs.[4] Under each of the Companies' existing POR programs, accounts receivable are purchased from participating EGSs at a zero discount rate (meaning the Companies pay the face value of the account receivable regardless of what they are actually able to collect from customers), which eliminates the risk to EGSs of uncollectible accounts expense associated with serving residential and small commercial customers. As such, the POR program offers a significant benefit to participating EGSs.

Q. How do the Companies recover uncollectible accounts expense associated with their POR programs?

A. Adjusted allowances for uncollectible accounts expense were approved in the Companies' most recent base rate cases which split uncollectibles into a portion attributable to base distribution rates and a separate portion attributable to default service and POR rates, with the default service/POR-related portion recovered through the Companies' DSS Riders.

[4] See, *Joint Petition of Metropolitan Edison Company and Pennsylvania Electric Company for Approval of Their Default Service Programs*, Docket Nos. P-2009-2093053 and P-2009-2093054 (Opinion and Order approving settlement entered November 6, 2009) (Met-Ed and Penelec); *Petition of Pennsylvania Power Company for Approval of its Default Service Programs*, Docket No. P-2010-2157862 (Opinion and Order approving settlement entered November 17, 2010) (Penn Power); *Joint Petition of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company and West Penn Power Company for Approval of Their Default Service Programs*, Docket Nos. P-2013-2391368, *et al.* (Opinion and Order approving settlement entered July 24, 2014) (revising West Penn).

The default service/POR-related portion of uncollectible accounts expense for each Company is incurred, in part, as a result of the Companies' POR programs.

Q. Explain the purpose of the POR clawback charge as it relates to the default service/POR-related portion of uncollectible accounts expense.

A. The clawback charge, as approved in the DSP IV Settlement, was designed to collect a portion of uncollectible accounts expense from EGSs; specifically, those EGSs whose practices are driving significantly higher write-offs as a product of the types of offers they make to customers. Because collection is not an issue EGSs must concern themselves with, the Companies believe that those EGSs with a higher percentage of write-offs are unfairly burdening the Companies and their customers, through their pricing practices, with disproportionately higher write-offs than their peers.

Q. Please describe the POR clawback charge calculation.

A. The clawback charge calculation is a two-prong test. The first prong identifies those participating EGSs whose average percentage of write-offs as a percentage of revenues over a twelve-month period exceeds 200% of the average percentage of total EGS write-offs as a percentage of revenues per operating company. The second prong of the test identifies, of those EGSs identified in the first prong of the test, EGSs whose average price charged over the same twelve-month period exceeds 150% of the operating company average PTC for the period. For those EGSs identified by both prongs of the test, the annual clawback charge assessed is the difference between that EGS's actual write-offs and their actual write-off amount calculated at 200% of the average EGS percentage of write-offs per operating company. The charge recovers the amount of EGS write-offs over 200% of the operating company average and is billed to the EGS annually.

Q. What do the Companies do with the amounts collected from EGSs?

A. A Company retains the amount charged to EGSs if that Company's actual uncollectible accounts expense is higher than the amount of uncollectible expense in base rates plus the amount included in the DSS Riders for the twelve-month period ended August 31 of each year. Alternatively, a Company will refund the EGS charge to customers through a reduction to their respective DSS Rider if that Company's actual uncollectible expense is less than the amount of uncollectible expense recovered in base rates and the DSS Rider.

Q. A reconciliation of uncollectible accounts expense is prohibited under provisions of Section 1408 of the Public Utility Code, 66 P.S. § 1408. Is that what you are doing?

A. No. Section 1408 eliminates the possibility of a full reconciliation of all revenues and expenses associated with uncollectible accounts expense. The clawback charge is a supplemental means of cost recovery which relieves customers of having to pay for the uncollectible accounts expense driven by excessive EGS pricing proposals. The uncollectible accounts expense billing procedure and mechanism is clearly not a reconciliation of any type and is thus permissible under the Public Utility Code.

Also, the uncollectible accounts expense cost recovery provides customers with the benefits of any collections obtained from EGSs by passing back a portion of those collections under certain circumstances. In this way, the Companies will collect uncollectible accounts obligations through the three sources of cost recovery available: (1) base distribution rates; (2) DSS Rider rates; and (3) POR clawback billings, if applicable. This provision is designed to serve as a customer protection from EGSs driving uncollectible accounts expense to unreasonable levels.

Q. What were the results of the POR clawback charge over the two-year pilot period and what did the Companies do with the amounts collected?

A. The charge for the twelve months ended August 31, 2016 was assessed to three EGSs for a total of $573,603.23. For this twelve-month period, the Companies' actual uncollectible expense was significantly higher than the amount of uncollectible expense recovered in base rates plus the DSS Riders. Therefore, each Company retained the amount collected to reduce the Company's uncollectible expense. The charge for the twelve months ended August 31, 2017 was invoiced to four EGSs for a total of $254,008.15. Actual uncollectible expense for this twelve-month period was less than the total uncollectible expense recovered in base rates plus the DSS Riders for Met-Ed, Penelec and West Penn. Therefore, the clawback charge will be refunded to customers, once collected from the assessed EGSs, through a new component of the DSS Riders to be effective on June 1, 2018. Penn Power's actual uncollectible expense is higher than the amount of uncollectible expense recovered in rates. Thus, Penn Power will retain the clawback charge of $604.13. Met-Ed/Penelec/Penn Power/West Penn Exhibit KLB-30 provides the clawback charge calculation for each year of the pilot and the uncollectible expense analysis that determined whether the Companies would retain or refund the charge collected from EGSs.

Q. Are the Companies proposing to continue the POR clawback charge?

A. Yes. This charge reduces the Companies' (and thereby, customers') exposure to unreasonable EGS-driven uncollectible accounts expense by providing a fresh source of cost recovery from the EGSs benefiting from the PORs, while at the same time incentivizing EGSs to consider the results of their pricing programs on a customer's ability to pay. In turn, the revenues generated by this mechanism accrue to customers over time by reducing uncollectible accounts expense that would otherwise have to be collected in the Companies' retail rates. The charge has been effective in achieving the Companies' goal of reducing the uncollectibles borne by not only the Companies but by their customers.

Q. Are the Companies proposing any changes to the POR clawback charge calculation?

A. No. The Companies believe the charge is effective as currently designed.

Q. Please explain the customer classes that participate in the POR in light of the customer class modifications being proposed with this filing.

A. The Companies currently identify customers within the residential and commercial classes as participants in the POR program. GS-Medium customers with the (PTC) designation on the rate code will continue to be part of the POR program. However, because the industrial customers do not participate, the customers on the following rate schedule designations will no longer be included in the POR program: Met-Ed – GS-Medium (HP); Penelec – GS-Medium (HP); Penn Power – GM (HP), GS-Large; and West Penn Schedule 30 (HP).

VIII. BYPASSABLE RETAIL MARKET ENHANCEMENT RATE MECHANISM

Q. Are the Companies proposing the establishment of a bypassable retail market enhancement rate mechanism?

A. Yes. Although unanimous agreement on this topic was not achieved through the collaboratives, the Companies are proposing a retail market enhancement rate mechanism as part of this proceeding. The Companies are proposing this mechanism in order to incent residential retail shopping.

Q. What is a bypassable retail market enhancement rate mechanism?

A. A bypassable retail market enhancement rate mechanism ("PTC Adder") is a surcharge added to the utilities' default service rate with the purpose of incentivizing non-shopping customers to participate in the retail market.

Q. Will the PTC Adder apply to all customer classes?

A. No. The Companies propose the PTC Adder be applicable only to the residential customer class, as this class has the lowest level of customer shopping. On average, only about 30%[5] of the Companies' residential customers are shopping. By contrast, commercial and industrial customers are shopping in significantly greater proportion and are generally more aware of their electricity purchasing options. Therefore, it does not appear that commercial and industrial customers require additional incentive to shop for electricity.

Q. What do the Companies intend to do with the revenues collected from this PTC Adder?

A. 95% of the revenues collected will be returned to all customers – shopping and non – through the Companies' nonbypassable DSS Riders. The Companies propose to retain 5% of the revenue collected through the PTC Adder to the PTC Rider to recover expenses associated with administering the PTC Adder. As such, the mechanism is designed to be revenue neutral to the Companies.

Q. How did the Companies calculate the amount of the PTC Adder?

A. The PTC Adder is based on the $30 Customer Referral Program Charge ("CRP Charge") to EGSs for each customer enrolled by the EGS under the CRP. The $30 CRP Charge is

[5] As of October 25, 2017, the following percentages of residential customers are shopping: Met-Ed, 33.8%; Penelec, 29.2%; Penn Power, 26.7%; and West Penn, 27.01%.

divided by an assumed EGS customer retention period of twenty-four months. This results in a charge of $1.25 per residential default service customer per month. The CRP Charge of $30 has been in place since August 1, 2013; therefore, it appears reasonable to use this amount as a proxy for the retail market enhancement rate mechanism. The $1.25 per month charge is then divided by the average residential usage for the four Companies to arrive at a per kWh charge which will be a component of the PTC Rider rate calculation. This charge will remain constant for the four-year DSP term.

Q. **How did the Companies determine that twenty-four months was an appropriate customer retention period?**

A. The CRP term is twelve months, so the Companies are assuming that customers are staying with an EGS on average for twenty-four months. However, the Companies have no direct knowledge of the EGS actual average retention period as this information is considered proprietary EGS information and the Companies have no access to data from which to make a more informed calculation.

Q. **What is the impact of the PTC Adder on the PTC Rider rates?**

A**.** The calculation of the proposed PTC Adder is shown in Met-Ed/Penelec/Penn Power/West Penn Exhibit KLB-31. When the Companies divided the monthly CRP charge per customer of $1.25 by the Companies' average monthly residential usage of 869 kWh for the twelve-month period ended August 31, 2017, the calculation resulted in a PTC Adder of $0.00144 per kWh for the June 1, 2019 through May 31, 2023 DSP term.

Q. What is the impact of the PTC Adder on the Companies' DSS Rider rates?

A. The DSS Rider rates to be effective on June 1, 2020 will include the refund of 95% of the PTC Adder collected from residential default service customers in the PTC Rider between June 1, 2019 and March 31, 2020. The refund will occur on a lag to ensure the DSS Rider is correctly refunding 95% of the actual PTC Adder revenue collected from customers. Thereafter, the DSS Rider rate effective annually on June 1 will continue to include the refund until 95% of all funds collected are returned to customers.

Q. Are there any tariff changes required for the inclusion of the PTC Adder?

A. Yes. Met-Ed/Penelec/Penn Power/West Penn Exhibits KLB-11 through KLB-14 reflect the revisions to the Companies' bypassable PTC Riders to incorporate the proposed PTC Adder. Met-Ed/Penelec/Penn Power/West Penn Exhibits KLB-20 through KLB-23 show the changes to the Companies' non-bypassable DSS Riders necessary for refunding 95% of the revenue collected through the PTC Adder back to all residential customers.

IX. OTHER RELATED MATTERS

Q. Do the Companies have any generation contracts to provide retail customers with service in their respective service territories?

A. No, they do not.

Q. Do the Companies have time-of-use rates available for residential customers, as required by Act 129?

A. Yes. As approved by the Commission in the Companies' previous default service proceedings (for Penn Power and West Penn) and recent base rate cases (for Met-Ed and Penelec), each Companies' tariff now includes a Rider K, Time-of-Use Default Service

Rider, which offers residential customers time-of-use rates. The Companies are not proposing any changes to those Riders as part of their DSPs.

Q. What is the proposed effective date of the tariff changes described in your testimony?

A. Changes to the Companies' retail tariff are proposed to become effective on June 1, 2019, which is the start of the delivery period for the proposed default service term.

Q. Are there administrative or general expenses associated with the proposed DSP that the Companies intend to recover in their PTC and HP Riders?

A. Yes. Met-Ed/Penelec/Penn Power/West Penn Exhibit KLB-32 lists the estimated expenses by category for the proposed DSP. The total estimated expenses were allocated to each Company using forecasted kWh for the March 2017 to February 2018 period. Each Company's estimated expenses were then allocated by customer class using the kWh for the same period to determine the estimated amount to be recovered in the PTC and HP Riders.

X. CONCLUSION

Q. Does this complete your direct testimony?

A. Yes, it does.

Appendix A
Resume: Education and Experience of Kimberlie L. Bortz

Education:

Bachelor of Science Degree in Accounting - University of Maryland

Professional Certification:

Certified Public Accountant - Pennsylvania

Experience:

1989 – 1992	Senior Accountant - Deloitte & Touche
1992 – 1994	Senior Auditor - GPU Service Corporation
1994 – 1996	Financial Analyst - Metropolitan Edison Company
1996 – 1997	Sales and Marketing Team Lead - GPU Energy
1997 – 1999	Accounting Team Lead - GPU Advanced Resources
1999 – 2001	Comptroller - GPU Advanced Resources
2001 – 2004	Manager, Met-Ed Region Business Services - FirstEnergy Service Company
2004 – 2007	Manager, Customer Service Business Services - FirstEnergy Service Company
2007 – 2012	Director, PA Business Services - FirstEnergy Service Company
2012 – 2014	Accounting Lead, Financial Transformation Project - FirstEnergy Service Company
2014 – Present	Rates Advisor, Pennsylvania Rates and Regulatory Affairs - FirstEnergy Service Company

Prepared and presented testimony in the following rate-related cases:

PA P.U.C. Cases:

Docket Nos.	*Case Name*
R-2014-2428745	Metropolitan Edison Company – General Base Rate Filing
R-2014-2428743	Pennsylvania Electric Company – General Base Rate Filing
R-2014-2428744	Pennsylvania Power Company – General Base Rate Filing
R-2014-2428742	West Penn Power Company – General Base Rate Filing
P-2015-2511333	Joint Petition of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company and West Penn Power Company for Approval of their Default Service Programs
P-2015-2511351	Joint Petition of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company and West Penn Power Company for Approval of their Default Service Programs
P-2015-2511355	Joint Petition of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company and West Penn Power Company for Approval of their Default Service Programs
P-2015-2511356	Joint Petition of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company and West Penn Power Company for Approval of their Default Service Programs

Assisted in development and preparation in the following proceedings:

PA P.U.C. Cases:

Docket Nos.	*Case Name*
R-2016-2537349	Metropolitan Edison Company – General Base Rate Filing
R-2016-2537352	Pennsylvania Electric Company – General Base Rate Filing
R-2016-2537355	Pennsylvania Power Company – General Base Rate Filing
R-2016-2537359	West Penn Power Company – General Base Rate Filing

NY P.S.C. Cases

Case Nos.	*Case Name*
Case 17-E-0685	Waverly Base Rate Filing

Met-Ed/Penelec/Penn Power/West Penn
Statement No. 2

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

METROPOLITAN EDISON COMPANY
DOCKET NO. P-2017-____________

PENNSYLVANIA ELECTRIC COMPANY
DOCKET NO. P-2017-____________

PENNSYLVANIA POWER COMPANY
DOCKET NO. P-2017-____________

WEST PENN POWER COMPANY
DOCKET NO. P-2017-____________

DEFAULT SERVICE PROGRAMS

For the Period
June 1, 2019 to May 31, 2023

Direct Testimony
of
James H. Catanach

<u>List of Topics Addressed</u>
Procurement Plan Product Definitions
Procurement Process and Schedule
Default Service Supplier Master Agreement
Alternative Energy Portfolio Standards Act Requirements
Contingency Plans

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DIRECT TESTIMONY
OF
JAMES H. CATANACH

I. INTRODUCTION AND PURPOSE

Q. Please state your name and business address.

A. My name is James H. Catanach. My business address is 2800 Pottsville Pike, Reading, Pennsylvania 19605.

Q. By whom are you employed and in what capacity?

A. I am employed by FirstEnergy Service Company as Manager for the Regulated Commodity Sourcing Department ("RCS"). RCS is primarily responsible for procuring power and power related products for all of FirstEnergy Corp.'s ("FirstEnergy") regulated utilities.[1]

Q. Please describe your educational background and professional experience.

A. I am a graduate of the University of Rhode Island with a Bachelor of Science degree in Mechanical Engineering and a Masters of Business Administration from the Pennsylvania State University. I also have a Professional Engineering License in the Commonwealth of Pennsylvania. I have over thirty-five years of experience in the electric industry and have experience in both physical and financial power supply. My professional experience is more fully detailed in Appendix A.

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[1] Jersey Central Power & Light Company, Metropolitan Edison Company ("Met-Ed"), Monongahela Power Company, Ohio Edison Company, Pennsylvania Electric Company ("Penelec"), Pennsylvania Power Company ("Penn Power"), The Potomac Edison Company, The Cleveland Electric Illuminating Company, Toledo Edison Company and West Penn Power Company ("West Penn").

Q. Please describe your responsibilities as Manager, RCS.

A. I am primarily responsible for the procurement and management of the regulated energy supply and renewable energy portfolio that FirstEnergy's electric distribution utilities are required to maintain as load serving entities ("LSEs") to serve their Pennsylvania and New Jersey retail electric customers. I have either directed or participated in fifteen competitive power and renewable energy credit procurements in Pennsylvania and New Jersey utilizing both auction and request for proposal ("RFP") formats. As a result, I am very familiar with the attributes of these procurement processes, which are tailored for the specific markets in which the solicitations are conducted. One of the primary functions of RCS is to provide oversight in the implementation of these power procurement processes, including, but not limited to, supporting the procurement plans of the FirstEnergy utilities in regulatory proceedings; developing both solicitation and contract materials; interacting with independent evaluators; executing contracts; and handling many of the operational aspects of these solicitations requiring interface with regional transmission organizations such as PJM Interconnection, L.L.C. ("PJM").

Q. On whose behalf are you testifying in this proceeding?

A. I am testifying on behalf of Met-Ed, Penelec, Penn Power and West Penn (each of which may be referred to as a "Company" and, in any combination, as the "Companies").

Q. Please describe the purpose of your testimony.

A. The purpose of my testimony is to describe: (i) the proposed products to be procured under each Company's Default Service Program ("DSP") for the period June 1, 2019 through May 31, 2023; (ii) the proposed procurement process and schedule of the multiple procurements by the Companies; (iii) the proposed Supplier Master Agreement ("SMA") for execution between the Companies and winning suppliers; (iv) compliance with Pennsylvania's Alternative Energy Portfolio Standards Act ("AEPS" or the "AEPS Act"); and (v) the Companies' contingency plans in the event of default service supplier default or unfilled solicitations due to lack of bids or the Commission's rejection of bids.

Q. Have you prepared any exhibits to accompany your testimony?

A. Yes. Met-Ed/Penelec/Penn Power/West Penn Exhibits JHC-1 through JHC-5 were prepared by me or under my supervision and are described in detail later in my testimony.

II. PROCUREMENT PLAN PRODUCT DEFINITIONS

Q. Please provide an overview of the Companies' DSPs.

A. The term of the Companies' DSPs will be for the forty-eight months spanning June 1, 2019 through May 31, 2023. The proposed DSPs will procure the required power supply in the wholesale marketplace, by Company and rate class, through multiple solicitations. Power to serve the non-shopping loads of each of the Companies will be procured in tranches of approximately 50 megawatts ("MW") each for the residential and commercial rate classes and in tranches of approximately 100 MW each for the industrial rate class.

The DSPs are designed to offer non-shopping customers power through a prudent mix of variable priced products for industrial customers, a blend of 5% variable priced products and 95% fixed-price 12 and 24-month products for residential customers, and a blend of fixed-price 3, 12 and 24-month products for commercial customers. Default service suppliers who are successful bidders in the competitive procurement process will be responsible for satisfying the AEPS Act requirements, with the exception of 100% of the solar photovoltaic alternative energy credit ("SPAEC") requirements for Met-Ed, Penelec and Penn Power, which the Companies will continue to procure through market-based purchases.[2]

Q. What are the benefits of the DSPs?

A. Under the DSPs, customers will be served by products reflecting market-based generation rates, which will provide opportunities for electric generation suppliers ("EGSs") to offer competitive alternatives in accordance with the provisions of the Electricity Generation Customer Choice and Competition Act and the Commission's default service regulations. The DSPs will continue to offer fixed generation rates that change on a quarterly basis, and will be synchronized with the PJM energy year beginning June 1 for residential and commercial customers, and continue to make hourly pricing available to industrial customers. The DSPs will enable the Companies to procure their generation supplies through multiple solicitations, providing price diversity to the DSP rates while protecting residential customers from short-term price variations due to anomalies in the marketplace for generation supply. The 24-month term fixed product will provide assured, stable pricing for residential customers while the five percent variable priced product for residential, 3-month product for commercial, and the 12-month product for residential and commercial will refresh the default service rate to make it more reflective of current market trends over the term of the DSPs. At the same time, the 12-month products will reduce residential customers' exposure to significant price volatility associated with shorter term products (*e.g.*, variable and 3-month) due to short-term market anomalies as experienced during the 2014 Polar Vortex and the 2015 Siberian Express. The DSPs also provide bidding flexibility in that the Companies will simultaneously procure their generation

[2] As discussed later in my testimony, a limited number of Tier I alternative energy credits ("AECs") and SPAECs will be assigned to West Penn's default service suppliers as a result of existing, long-term purchases by West Penn.

supplies through a descending price clock auction ("DCA") process, a feature which is expected to increase the number of bidders and, thereby, the competitiveness of the procurement process. In fact, based on the five DSP-IV auctions conducted through October 30, 2017, the average number of register bidders and winning suppliers has been thirteen and eight, respectively, per auction. In total, the Companies' DSPs are designed to yield market-reflective rates through a prudent mix of products acquired at the least cost over time, which is a key requirement Pennslvania's Act 129 of October 15, 2008 ("Act 129"). The Programs' compliance with the least cost over time standard is futher described in the testimony of Witness James D. Reitzes found in Met-Ed/Penelec/Penn Power/West Penn Statement No. 3.

Q. What is the nature of the products the Companies seek to obtain under the DSPs?

A. The proposed products are full-requirements, load-following energy and energy-related services for the customers of Met-Ed, Penelec, Penn Power and West Penn who have not chosen an EGS or whose EGS fails to provide service. Each Company's non-shopping load will be segregated into customer classes, each with its own product specifications. The load of each class will be divided into tranches, with each tranche representing a fixed percentage of the Company's non-shopping load. Procurement winners will be responsible for fulfilling all obligations of a PJM LSE and, as such, will be required to provide energy, capacity, and transmission service, as well as all PJM administrative expenses and any other services or fees as required by PJM of an LSE, with some limited exceptions. Specifically, winning bidders will not be responsible for the following charges: Regional Transmission Expansion Plan charges ("RTEP"); Expansion Cost Recovery Charges ("ECRC"); Reliability Must Run/generation deactivation charges ("RMR") associated with generating plants for which specific RMR charges that began after July 24, 2014; historical out of market tie line, generation and retail customer meter adjustments; unaccounted for energy ("UFE"); and any FERC-approved reallocation of PJM Regional Transmission Expansion Plan charges related to Docket No. EL05-121-009 (collectively referred to as "non-market based charges," or "NMB charges").

Default service suppliers in the Met-Ed, Penelec and Penn Power service territories will also be responsible for meeting 100% of the non-solar Tier I and Tier II AEPS Act requirements. Met-Ed, Penelec and Penn Power will procure all necessary solar photovoltaic requirements on behalf of both default service suppliers and EGSs that serve load in their respective service areas. In the West Penn service territory, default service suppliers will be responsible for all Tier I and Tier II AEPS Act requirements (including solar photovoltaic requirements) less any Tier I AECs or SPAECs that are allocated to the default service suppliers from existing long-term purchases made by West Penn. The requirements to comply with the AEPS Act are further defined in Section V.

Consistent with Commission Orders and existing practice, the NMB charges will be paid by the Companies on behalf of all customers and recovered from all customers through the Default Service Support ("DSS") Rider in the respective Company tariffs. Witness Kimberlie L. Bortz discusses these costs and their proposed recovery in Met-Ed/Penelec/Penn Power/West Penn Statement No. 1.

Q. What are the customer classes being proposed by the Companies?

A. The Companies propose to segregate load into the same three classes that they have traditionally used for default service purposes: a residential class, a commercial class and an industrial class. Witness Kimberlie L. Bortz discusses the customer classes and changes in the commercial and industrial rate classes in Met-Ed/Penelec/Penn Power/West Penn Statement No. 1.

Q. How many and what size customer class tranches are being proposed by the Companies?

A. The Companies propose to bid out a total of seventy-nine residential class tranches of approximately 50 MW each; a total of fifty commercial class tranches of approximately 50 MW each; and thirty-one tranches of approximately 100 MW each of an hourly pricing service for their industrial customers. A tranche represents a defined percentage of the load of a particular customer class that the default service supplier must serve, including the provision of energy, capacity, ancillary services, transmission services and Network Integration Transmission Service ("NITS") (but excluding NMB charges).

Q. You mentioned that the Companies will hold simultaneous procurement processes. Will residential, commercial and industrial class products be offered simultaneously using the same type of procurement process as well?

A. Yes. There will be procurement processes for the Companies' fixed-price residential and commercial products and the hourly-priced service for industrial customers that occur on the same day, each using a DCA process run by CRA International, Inc. d/b/a Charles River Associates ("CRA"), the independent auction manager (i.e., independent evaluator) that has also been used by the Companies under their most recent DSPs.

Q. What are the residential class products proposed by the Companies?

A. Each residential class tranche is 95% fixed-price, load-following full requirements product, with either a 12-month or 24-month term. The remaining 5% is the real time hourly load locational marginal price ("LMP") for the Delivery Point plus a fixed adder of $20.00 per megawatt hour (“MWh”). This additional adder is intended to capture an estimate of costs of other supply components associated with meeting this full-requirements obligation, including capacity, ancillary services, NITS, AEPS compliance, and other costs. All required residential tranches will be secured over twelve procurement dates.

Q. What are the commercial class products proposed by the Companies?

A. The commercial class product is a fixed-price, load-following full requirements product, with either a 3-month, 12-month or 24-month term, and with all tranches secured over eighteen procurement dates.

Q. What are the industrial class products proposed by the Companies?

A. The Companies are not proposing any changes to the products offered to their industrial classes under today’s programs. That is, the Companies propose to continue to secure power supply for the industrial class utilizing a service referred to as the hourly pricing service ("HPS"). Contracts for HPS will be for 12-month terms beginning June 1 in 2019, 2020, 2021 and 2022. The HPS is not a fixed-price service, but a variable hourly service that is priced to the PJM real-time hourly total LMP for each Company’s PJM delivery point. Default service suppliers will be bidding for the right to serve a portion of a Company's HPS load – for a total of thirty-one tranches across all the Companies. Customers on HPS will pay, and winning default service suppliers will receive: 1) the winning price bid by the winning default service supplier in the hourly-priced auction; 2) the applicable PJM zonal real-time hourly LMP; and 3) a fixed adder of $4/MWh. This additional adder is intended to capture an estimate of costs of other supply components associated with meeting this full-requirements obligation, including capacity, ancillary services, NITS, AEPS compliance, and other costs.

Q. **Are there any changes as to what customers are classified as industrial?**

A. Yes. Beginning June 1, 2019, customers classified as commercial that have demand at or above 100 kilowatts will be moved from the commercial to industrial classification. This will be discussed more fully in Witness Kimberlie L. Bortz's testimony in Met-Ed/Penelec/Penn Power/West Penn Statement No. 1.

Q. Do you believe the residential 5% variable priced and 95% fixed-price 12 and 24-month tranche products and the commercial fixed-price 3, 12 and 24-month tranche products paired with the Companies' proposed continuation of industrial HPS are consistent with Act 129 of 2008 and the Commission's default service regulations and policy statement?

A. Yes. The proposed product mix, along with previously procured long-term alternative energy portfolio standard credit agreements, meets the current legislative standard under Act 129 and the Commission's default service regulations and policy statement, which require a default service procurement plan to include a prudent mix of variable market purchases, short-term contracts and long-term purchase contracts, informed by recent activity in the wholesale and retail markets, that provides adequate and reliable service and is designed to ensure least cost to customers over time.[3] This is supported by the fact that the Commission approved a similar product mix as part of the Companies' current and past several DSPs.

[3] *See* 66 Pa.C.S. § 2807(e); 52 Pa. Code § 54.186; 52 Pa. Code § 69.1805.

Q. Please describe the general obligations of default service suppliers with respect to PJM requirements.

A. Winning default service suppliers will schedule delivery to the applicable PJM delivery point of the Company which they have bid successfully to supply. It is mandatory that winning default service suppliers be members of PJM and be cognizant of and compliant with all regulations, business rules, scheduling protocols and all other aspects of doing business within PJM, including the introduction of new billing line items that are not otherwise specified as the responsibility of the Companies. All operational supply risk to perform under this procurement process will be borne by the winning default service suppliers.

Q. Are the Companies proposing any modifications to the procurement process?

A. No.

Q. What is a load cap?

A. Load caps are a restriction on the amount of supply any one bidder can win in an auction. Load caps, which have the potential to attract additional bidders, especially to a novice procurement process, are generally used in competitive solicitations to encourage supplier diversity and mitigate the impact of a supplier default on retail customers.

Q. What is the current load cap and are the Companies proposing to change it?

A. The current load cap is currently 75%. The Companies are not proposing to change the load cap percentage.

Q. Have the Companies experienced a default by any of their default service suppliers?

A. No. The Companies have not experienced a default by any of their default service suppliers since the inception of their default service programs. While a default remains a possibility and should be planned for, the Companies believe the likelihood of a default is very low. In the event of a supplier default, contingency plans are outlined in Section VI below.

III. PROCUREMENT PROCESS AND SCHEDULE

Q. Are there any changes in the months the auctions are currently held?

A**.** Yes. The Companies will conduct each fall auction between October 20 and November 20 in order to allow participants in the fall auction to have access to any applicable proposed formula NITS rate changes for the upcoming calender year for several weeks prior to the auction. This should benefit default service customers by reducing any risk premium that might be added by bidders associated with uncertainty over upcoming NITs rate changes. Throughout my testimony and in Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-1, "Oct/Nov" refers to the timeframe from October 20 to November 20.

Q. What are the procurement dates and terms proposed by the Companies?

A. The Companies are proposing a procurement plan for all customer classes using eighteen separate procurement dates. As shown in Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-1, the Companies propose procurements occurring in Oct/Nov 2018, 2019, 2020, 2021, and 2022; January 2019, 2020, 2021, 2022 and 2023; April 2019, 2020, 2021, and 2022; and June 2019, 2020, 2021 and 2022.

For the residential 12-month product the auctions will be held: Oct/Nov 2018, 2019, 2020 and 2021; January 2019, 2020, 2021 and 2022; April 2019, 2020, 2021 and 2022.

For the residential 24-month product the auctions will be held: Oct/Nov 2018 and 2020; January 2019, 2020 and 2021; April 2019, 2020 and 2021.

For the commercial 3-month product the auctions will be held: Oct/Nov 2019, 2020, 2021 and 2022; January 2020, 2021, 2022 and 2023; April 2019, 2020, 2021 and 2022; June 2019, 2020, 2021 and 2022.

For the commercial 12-month product the auctions will be held: Oct/Nov 2018, 2019, 2020 and 2021; January 2019, 2020, 2021 and 2022; April 2019, 2020, 2021 and 2022.

For the commercial 24-month product the auctions will be held: Oct/Nov 2018 and 2020; January 2019 and 2021; April 2019, 2020 and 2021.

The total industrial class load will be procured through four separate auctions to be held in January 2019, January 2020, January 2021 and January 2022 for 12-month agreement terms beginning June 1 of the auction year.

Q. What auction design will be used for the default service auctions?

A. The Companies propose to continue their current approach of using a version of the simultaneous, multiple-round, DCA format to procure default service supplies. This auction platform is commonly used for multiple commodity types and has been successfully used in numerous electricity procurements in Pennsylvania and across various states since the late 1990s.

The bidding format is simultaneous in that multiple products and/or multiple tranches are bid on simultaneously. Bidding takes place online using web-based software in a series of bidding rounds, with pre-specified starting and ending times for each round. Prior to the start of each round, the announced price for each product is disclosed to bidders. The announced price is the same for each tranche for a product, but may differ across products. The announced round 1 starting price for each product is set sufficiently high enough so as to encourage bidder participation. At the end of each round, the bidding software (with oversight of CRA) determines which products are over-subscribed and which products are under-subscribed. A product is over-subscribed if suppliers bid to supply more tranches than the number of tranches needed of that product. Likewise, a product is under-subscribed if fewer tranches were bid on it than needed. If a product is over-subscribed, the announced price for that product will be reduced by a decrement for the next round. If a product is not over-subscribed, its announced price will not change for the next round. The bidding process continues in this manner, with prices tending to tick down like a countdown clock. As prices change across the products, bidders are allowed to change the number of tranches they bid, subject to certain restrictions. Subject to these restrictions, in each round, a bidder simply specifies the number of tranches that it is willing and able to supply for each product at the announced price for each product. There is no pre-determined number of rounds before the auction closes. The auction closes after the first round in which no product is over-subscribed. The clearing price for a product is the lowest price at which the product is not under-subscribed. Winning tranches for the product are tranches that were bid at a price no higher than the clearing price. Winning bidders are those bidders who bid the winning tranches. Throughout the auction, the pricing for each product is know to the suppliers, which provides price transparency.

This price transparency allows the bidders flexibility to switch products throughout the auction, as is described in the testimony of Witness James D. Reitzes.

The Bidding Rules and appendices for the default service procurement auctions are attached as Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-2 and provide a more detailed description of the bidding process.

Q. How are prospective bidders qualified for participation in the DSP auctions?

A. Prospective bidders will be required to satisfy financial and non-financial requirements through a two-part application process designed to demonstrate their ability and commitment to meet the requirements of participation in the auction process and the requirements of being a default service supplier. The Part 1 Application and Part 2 Application forms, as well as pre-bid credit documents, are attached as Appendices 1 and 2 to Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-2 and will be available through the CRA web-based data room, as in past auctions. If a prospective bidder is interested in participating in the 95% fixed-priced and 5% variable priced residential, fixed-price commercial, or the hourly-priced industrial auctions, it will need to complete and submit one Part 1 Application and, subsequent to that, one Part 2 Application. As much as possible, the application process will be conducted electronically via the CRA web-based data room using protocols CRA has used successfully in other similar auction processes including the current DSPs. The CRA process is designed to be secure and to make it easier and less time consuming for applicants to submit application materials. The process further provides: (i) for the review and assessment of the applications; (ii) timely feedback to applicants; (iii) the ability of applicants to easily check on the status of their applications; and (iv) the ability of applicants to cure any deficiencies.

Q. Are the bid rules reflected in Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-2 and the associated Appendices consistent with those that are being used by the Companies in their current DSPs?

A. Yes. The bid rules and associated Appendices are consistent between the proposed DSPs and the current DSPs, with mostly minor updates to dates and addresses. In particular, the Part 1 Application and Part 2 Application processes to qualify and register bidders, the web-based data room, the frequently asked question process, the communications protocol, the bidding format and the post-auction process will all be the same as under the Companies' current DSPs. The sole substantive modification is to account for the expansion of NMB charges to include any FERC-approved reallocation of PJM Regional Transmission Expansion Plan charges related to Docket No. EL05-121-009 in order to assign responsibility for this item, to the extent implemented, to the Companies. This matches the responsibility assigned for purposes of rate design and retail supply as explained by Witness Bortz in Met-Ed/Penelec/Penn Power/West Penn Statement No. 1.

Q. When will the Companies and the independent evaluator hold information sessions for interested participants?

A. A bidder information session will be held generally at least a month before each auction. The purpose of these sessions will be to describe the bid rules, the two-part qualification process, the Supplier Master Agreement, and the procurement information website and its contents, as well as other pertinent information bidders will need to evaluate this procurement opportunity.

Q. How can prospective default service suppliers learn more about the load characteristics of the Companies' default service products?

A. Prospective default service suppliers will have access to the web-based data room administered by CRA as part of the auction information website which will be operational prior to the start of the procurement process. The data room will include hourly historical load characteristics of each product and the most current customer shopping statistics by customer class by Company, which is updated monthly. This will afford prospective default service suppliers an opportunity to view product load volatility through time to help gauge volume risk. Furthermore, participants will have the opportunity to ask questions about any of the default service products in the procurement process at an information session or via a frequently asked question feature via the CRA web-based data room.

Q. Please describe the process following the close of the default service auctions.

A. After the last round of the auction, bidders who remained active in the auction will see preliminary auction results on the bidding website. The bidders will see the clearing price for each product and the number of tranches the bidder tentatively won for each product. CRA will also provide to the Companies the identities of the winning bidders, the number of tranches each winning bidder has won for each product, and the associated clearing prices, which results are subject to Commission approval.

After the close of the auction, CRA will provide a confidential report to the Commission that will include, among other things, the list of winning bidders and the clearing price for each product. The Commission will have one business day after receiving the CRA auction report to approve the results of the auction.

Upon approval by the Commission, the winning bidders and the Companies will execute a SMA, the form of which is attached as Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-3. Pre-bid security will be returned to all bidders upon execution of the SMA on or before the third business day after the Commission has rendered its decision on the auction results. Pre-bid security may be held for any bidder that violated any of the rules or certifications of the auction process.

Q. Do you believe that the use of a DCA is the appropriate auction design for the default service auctions?

A. Yes. As previously mentioned, the Companies' proposed DCA process is identical to the auction process used under the Companies' current and past DSPs, as well as similar to auction processes used in other jurisdictions to successfully procure electric power service. It is a process that default service suppliers and other stakeholders accept and are experienced with. Further, its design encourages participation because it is fair, open, transparent, and non-discriminatory, and provides low barriers to participation for a variety of prospective bidders. The tranche sizes and the range of contract durations appeal to various bidders because they are consistent with products available in energy markets. With the simultaneous bidding on products that are related in value (the residential and commercial products across the Companies, and the industrial products across the Companies), bidders are able to switch their bid quantities across the Companies' products and bid simultaneously on substitutable and/or complementary products in response to changes in pricing. Because these factors encourage active participation and allow participants to bid efficiently, the auctions are designed to yield competitive outcomes.

IV. DEFAULT SERVICE SUPPLIER MASTER AGREEMENT

Q. What is the Supplier Master Agreement ("SMA")?

A. The default service SMA is the agreement executed by each Company and each successful bidder that governs specific duties, rights and obligations in connection with the sale and purchase of default service supply to serve the Companies' retail default service customers.

Q. How was the Companies' proposed form SMA developed?

A. In its Order entered on February 15, 2013 in *Investigation of Pennsylvania's Retail Electricity Market: End State of Default Service* at Docket No. I-2011-2237952, the Commission directed its Office of Competitive Market Oversight ("OCMO") to create a procurement collaboration working group, which was tasked with formulating, among other things, a uniform SMA. The Companies participated actively in the working group's development of the uniform SMA to be used on a statewide basis. The resulting OCMO collaborative SMA, with minor modifications, was adopted by the Companies and is currently in use under the Companies' current DSPs. The Companies are proposing a similar form SMA for use under the proposed DSPs, subject to minor modifications as discussed below. The proposed form SMA is attached as Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-3.

Q. Does each Company propose to have a unique SMA?

A. No. All the Companies will use the uniform SMA template. However, they will adjust the SMA Appendices to their individual needs based on the product mix, pricing, and other terms specific to each Company and each customer class.

Q. How are suppliers to be paid under the proposed form SMA?

A. It depends largely upon the class being served. For residential products, default service suppliers will be paid a 95% fixed and 5% variable price. The fixed price, in dollars per megawatt-hour ("MWh"), will be for 95% of the delivered supply each hour, will be established through the Companies' competitive procurement process, and will be included in Exhibit 1 to the SMAs when known. The fixed price will cover all cost components associated with meeting the full-requirements default service supply including capacity, ancillary services, NITS, AEPS compliance, and all PJM administrative expenses and any other services or fees as required by PJM of an LSE, but will exclude the NMB charges as previously discussed herein. The variable price, in dollars per MWh, will be for 5% of the delivery supply each hour, and will be the real-time hourly total LMP for the delivery point, plus a fixed adder of $20.00/MWh. The applicable delivery point will be included in Exhibit 1 to the SMAs when known.

For commercial products, default service suppliers will be paid a fixed price. The fixed price, in dollars per MWh, will be for 100% of the delivered supply each hour, which will be established through the Companies' competitive procurement process and included in Exhibit 1 to the SMAs when known. The fixed price will cover all cost components associated with meeting the full-requirements default service supply including capacity, ancillary services, NITS, AEPS compliance, and all PJM administrative expenses and any other services or fees as required by PJM of an LSE, but will exclude the NMB charges as previously discussed herein.

For industrial products, default service suppliers will be paid a variable price for each hour during the applicable period equal to the delivered supply multiplied by the sum of the real-time hourly LMP for the applicable PJM delivery point, plus the winning price for the winning default service suppliers in the hourly-priced auction, plus an additional $4/MWh to capture an estimate of costs of other supply components associated with meeting this full-requirements obligation, including capacity, ancillary services, NITS, AEPS compliance, and all PJM administrative expenses and any other services or fees as required by PJM of an LSE, but excluding the NMB charges.

Q. Will payments to a supplier for default service load for residential and commercial customers vary seasonally?

A. No. Residential and commercial SMAs will no longer contain provisions that adjust the price paid to default service suppliers for each MWh of load by a seasonal billing factor, representing anticipated seasonal differences in energy prices. Because non-summer month volatility has been much more pronounced in recent years, there is no longer a need to "summer-weight" prices paid to suppliers. For example, the seasonal billing factor under the Companies' current DSPs is currently 1.0, meaning there is no summer weighting. As was the case in prior DSPs, the seasonal billing factors do not apply to the industrial SMAs because the price paid for energy under the industrial product is based upon a real-time, hourly LMP.

Q. Please explain how the credit requirements work in the uniform SMA.

A. An unsecured credit matrix was developed by the Companies to allow each Pennsylvania utility to have a tailored unsecured credit table based on its own credit policy. A supplier's credit exposure ("Total Exposure Amount") is based upon a fixed amount corresponding to the total default service load the supplier is obligated to serve. The maximum unsecured credit will be based on Appendix A of the uniform SMA and will be determined as the lesser of the percentage of tangible net worth ("TNW")[4] or the Credit Limit Cap. The credit matrix will define the maximum amounts to be used for these metrics based on the default service supplier's average credit ratings by Standard & Poor's Rating Service, Moody's Investor Service, Inc., and/or Fitch Investor Service, Inc.

If a default service supplier's Total Exposure Amount exceeds the default service supplier's maximum unsecured credit limit, the default service supplier will have to furnish either cash or an acceptable letter of credit equal to the excess amount. The standard form for the letter of credit is provided in Appendix F of the uniform SMA.

Q. Are the Companies proposing any modifications to the SMA?

A. Yes.

Q. What modifications are the Companies proposing?

A. The changes are limited to the appendices of the SMA. In Appendix C, DS Supplier Specifications, the DS Customer Groups were updated to reflect the new rate schedules developed for commercial customers impacted by the move to hourly pricing as discussed by Witness Kimberlie L. Bortz in her testimony in Met-Ed/Penelec/Penn Power/West Penn Statement No. 1. In Appendix D, Responsibilities for PJM Billing Line Items as Defined in Applicable PJM Agreement or Manual, the table was updated to reflect new PJM Billing Line Items that have either been approved or are pending approval by FERC, including any FERC-approved reallocation of PJM Regional Transmission Expansion Plan charges related to Docket No. EL05-121-009.

In Appendix F, Letter of Credit Documentation, cleanup modifications have been made to remove the use of Annex 3 and Annex 5, as these two mechanisms are obsolete and are not

[4] TNW is defined as total assets less intangible assets and total liabilities.

used. In particular, Annex 3 - Availability Certificate, is no longer used due to the fact that banks typically revise or reissue letters of credit rather than using availability certificates. Similarly, Annex 5 is no longer used due to the fact that letters of credit typically renew as a matter of course rather than requiring a manual request for and grant of extension. These edits are reflected in markup within Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-3.

Q. Will bidders be permitted to propose additional modifications to the SMA once approved?

A. No. The Companies intend to treat all bidders uniformly, which requires that each bidder have the same rights and obligations under the SMA. Moreover, a standardized contract permits bidders to be selected on the sole criterion of price. The uniform SMA proposed by the Companies contains provisions that were developed as part of the working group process and are already well-understood by bidders. Additionally, the OCMO working group that developed the uniform SMA provided ample opportunity for input from the wholesale supplier community during the development process. Also, the Companies have, over time, identified various updates based on practical experience with historical auctions or through input from parties to past DSP proceedings.

V. ALTERNATIVE ENERGY PORTFOLIO STANDARDS ACT REQUIREMENTS

Q. What are the AEPS Act requirements for the Companies?

A. The AEPS Act requires the Companies and other electric distribution companies (“EDCs”), as well as EGSs, to obtain an increasing percentage of electricity sold to Pennsylvania retail customers from certain alternative energy sources, such as wind, solar energy and biomass. Compliance is measured through alternative energy credits or “AECs,” which are equal to one MWh of energy from approved "Tier I" or "Tier II" alternative energy sources. The AEPS Act also includes a solar "set-aside," which mandates that a specific portion of the Companies' Tier I requirements be satisfied through AECs derived from solar photovoltaic energy. The AEPS Act defines Tier I and Tier II alternative energy sources and the dates and percentages of supply required for compliance.[5] The Tier I, Tier II and SPAEC percentage requirements during the proposed DSPs are more fully described in Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-4.

Q. Are winning default service suppliers responsible for all of the AEPS Act requirements described in Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-4?

A. Default service suppliers in the Met-Ed, Penelec and Penn Power service territories will be responsible for meeting 100% of the non-solar Tier I and Tier II AEPS Act requirements. Met-Ed, Penelec and Penn Power will procure all necessary solar photovoltaic requirements on behalf of default service suppliers and EGSs that serve load in their respective service areas. In the West Penn service territory, default service suppliers will be responsible for all Tier I and Tier II AEPS Act requirements (including solar photovoltaic requirements) less any Tier I AECs or SPAECs that are allocated to the default service suppliers from existing long-term purchases made by West Penn.

Q. How will the 100% of Solar Photovoltaic AEPS Act requirements described in Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-4 be met for Met-Ed, Penelec and Penn Power?

A. The Companies plan to continue using The Brattle Group as the independent third-party evaluator for the procurement of SPAECs. The Brattle Group has considerable expertise

[5] 73 P.S. §§ 1648.2 and 1648.3.

in competitive energy matters and has been involved in several RFP design and management processes, including the procurement of electric power and renewable energy supplies under long-term contracts. The Brattle Group has served as the independent evaluator in past SPAEC procurements held by the Companies. Just as under their current DSPs, Met-Ed, Penelec and Penn Power will procure SPAECs for 100% of their shopping and non-shopping load. Those Companies will conduct two RFPs for two-year SPAEC products in each of March 2019 and March 2021 to procure the estimated additional SPAEC requirements for the new DSP term beginning June 1, 2019, after adjusting for the SPAECs already purchased through the 10-year SPAEC RFPs conducted under previously approved DSPs. The estimated volumes under the RFP will be determined based upon the most recent load forecast for the Companies at the time of the RFP. At the end of the 2019/2020, 2020/2021, 2021/2022 or 2022/2023 AEPS compliance period, if necessary for compliance purposes, the Companies will conduct short-term SPAEC procurements at market prices.[6] Copies of the Companies' SPAEC Request for Proposals Rules, SPAEC Purchase and Sale Agreement ("SPAECPSA") and additional applicable RFP documentation are attached as Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-5.

Q. Are the Companies proposing any modifications to the RFP Rules, accompanying documents, or SPAECPSA?

A. Yes. The substantive changes are limited to proposed are certain edits to the SPAECPSA (specifically, within Appendix B) comparable to the edits to Appendix F of the SMA discussed earlier in this testimony. These edits are reflected in markup within Met-

[6] In the event the Companies hold excess SPAECs at the end of a compliance period, the excess SPAECs will be banked for future compliance periods unless such SPAECs are set to expire at the end of the current compliance period. In that instance, the expiring SPAECs will be sold and revenues collected from such sales will be credited back through the Companies' Solar Photovoltaic Requirements Charge Riders.

Ed/Penelec/Penn Power/West Penn Exhibit JHC-5, Appendix 1. The bid rules and additional documentation found in Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-5 have not been modified from those approved as part of the Companies' current DSPs, except for non-substantive cleanup changes and updates.

Q. You mentioned that West Penn default service suppliers are responsible for all AEPS Act requirements less any Tier I AECs or SPAECs that are allocated to the suppliers from existing long-term purchases made by West Penn. Please explain.

A. Consistent with the Commission's Final Order approving West Penn's current default service plan at Docket No. P-2015-2511356, West Penn will continue to require each default service supplier to provide Tier I AECs and SPAECs associated with the load served by the default service supplier. However, Tier I AECs and SPAECs that West Penn procured under existing long-term contracts previously approved by the Commission will be used to reduce the number of Tier I AECs and SPAECs that those default service suppliers would otherwise be obligated to transfer to West Penn under the SMAs. These Tier I AECs and SPAECs will be allocated on a pro rata basis in accordance with the percentage of default service load served by default service suppliers, and default service suppliers will be informed through the frequently asked question feature, prior to the first auction, of the exact amount of Tier I AECs and SPAECs that will be allocated in each procurement of default service supply so that the reduction in Tier I AEC and SPAEC obligations may be factored into default service supplier bids.

Q. Are winning default service suppliers responsible for any additional Tier I and/or Tier II AEPS requirements imposed prior to the effective date of the SMA?

A. Yes. Winning default service suppliers are responsible for additional Tier I and/or Tier II AEPS requirements imposed prior to the execution of the SMA. For example, Act 129 provides that "the commission shall at least quarterly increase the percentage share of Tier I alternative energy sources required to be sold by an EDC or electric generation supplier under Section 3(b)(l) of the Alternative Energy Portfolio Standards Act to reflect any new biomass energy or low-impact hydropower resources that qualify as a Tier I alternative energy source under this Section." 66 Pa.C.S. § 2814(c). Winning default service suppliers will be responsible for compliance with the Tier I percentage increases resulting from that provision of Act 129.

Q. Are winning default service suppliers responsible for any additional AEPS requirements resulting from legislative or administrative changes implemented following the effective date of the SMA?

A. No. The Companies recognize that having winning default service suppliers bear the risk of additional future legislative or administrative changes to the AEPS requirements following the effective date of an executed SMA may cause these default service suppliers to add an additional risk premium into their bids. To alleviate this uncertainty and the risk premium associated with it, the Companies propose that the Companies themselves be responsible for any incremental AEPS compliance requirements to ensure these additional requirements are met through procurements at market prices. The costs associated with any incremental AEPS compliance requirements and/or potential penalties will be recovered from default service customers through the reconciliation process and added to the weighted average cost of default service supply.

Q. What is the procedure the Companies will use to verify that winning default service suppliers have complied with the AEPS Act?

A. The Companies will continue to only accept AECs from Tier I and Tier II sources approved by the Commission's AEPS Program Administrator and generated through PJM Environmental Information Services Inc.'s Generation Attributes Tracking System ("GATS"), which the Commission has designated under the AEPS Act as the "registry" for issuance of AECs. It will be incumbent on the winning default service supplier to open and maintain, at its own expense, a GATS account in order to satisfy the AEPS Act requirements. This process is currently and successfully being used for compliance with the AEPS Act requirements by the Companies.

Q. What happens if a portion of the default service supplier-sourced AECS are found by the Commission to be non-compliant with the AEPS Act requirements and a penalty is levied against the Companies?

A. The default service supplier that failed to acquire the necessary AECs during the compliance periods will be identified by the Companies and will be assessed a penalty.[7] Customers will not be at risk for default service supplier non-compliance.

Q. Is the Companies' plan to meet AEPS Act obligations consistent with Act 129 and the Commission's default service regulations?

A. Yes. Act 129's requirement that EDCs procure power through a competitive process also applies to the Companies' procurement of SPAECs or AECs to satisfy AEPS Act

[7] The default service supplier that failed to acquire the necessary AECs during the compliance periods will be identified by the Companies and will be assessed any alternative compliance payment or other penalty imposed by the Commission for the AEPS non-compliance.

obligations.[8] Further, the Commission's AEPS regulations state that a default service provider "shall demonstrate compliance" with the AEPS regulations and default service regulations "by identifying a competitive procurement process for acquiring alternative energy credits" in its default service plan.[9] The Companies propose to use competitive processes to fulfill their AEPS obligations through the default service procurement and a separate RFP for SPAECs for Met-Ed, Penelec and Penn Power, consistent with the Companies' current Commission-approved DSPs.

Q. Are the Companies making any other proposals relative to the procurement of short-term market AECs?

A. Yes. As discussed above, if necessary for compliance purposes, the Companies conduct short-term AEC procurements at market prices to fulfill any shortfalls for compliance. This currently includes bilateral purchases from Commission-approved AEC providers/facilities or transactions conducted through AEC brokers. Under the proposed DSPs, the Companies will continue to address potential shortfalls through market purchases. However, the Companies are seeking continued approval for the additional ability to make market-priced sales and purchases of excess AECs produced by non-utility generators ("NUGs") which currently sell these AECs as part of their total output to Penelec under existing Commission-approved NUG contracts as they are permitted to do today under their current DSPs.

[8] 66 Pa.C.S. § 2807(e)(3.5).
[9] 52 Pa. Code § 75.67(b).

Q. Why is this approval required?

A. Under Docket No. P-2009-2093054, Penelec received approval to sell the output of the NUGs, including all associated AECs, into the PJM-administered markets, the revenues from which would be credited back to customers through the Company's NUG Charge Rider. At the time this approval was granted, sales from Penelec to its affiliates were not contemplated. However, the AECs Penelec receives from the NUGs qualify as Tier II resources in Pennsylvania. The Pennsylvania Tier II AEC market historically has been and continues to be significantly oversupplied. Thus, Penelec has not been able to sell all Tier II AECs it has received from the NUGs. Meanwhile, the other Companies have been forced to separately purchase Tier II AECs from other vendors in order to meet their AEPS Act obligations. The continuation of the process approved in the Companies' current DSPs will allow Penelec to sell more of the Tier II AECs that it cannot otherwise dispose of, thereby creating revenue for the benefit of its retail customers while helping its Pennsylvania affiliate EDCs fulfill their own AEC shortfalls.

Q. What affiliates would be eligible to purchase these excess AECs under the Companies' proposal?

A. Should Penelec find itself holding excess credits, Met-Ed, Penn Power or West Penn would be eligible buyers to fill their own shortfalls.

Q. How would the Companies ensure that purchases amongst one another would be conducted at market prices?

A. On the date of transaction, market quotes will be obtained from three AEC brokers through their published broker sheets. The offer portion of the quote for the applicable AES product from the three AEC brokers would be averaged to determine a representative market price for the affiliate transaction.

Q. What happens to the money paid for any AECs purchased under this proposal?

A. Monies received by Penelec would be returned to retail customers through Penelec's Non-Utility Generation Charge Rider in the same manner as revenues associated with such AECs are today.

VI. CONTINGENCY PLANS

Q. What default service supply contingencies do the Companies propose to address in their DSPs?

A. While not every contingency can be anticipated, the Companies have identified the following possible scenarios for which contingency plans have been developed:

(a) The Companies' competitive solicitations for full requirements load-following tranche products or SPAECs are not fully subscribed due to lack of bids or rejection of bids by the Commission; or

(b) A default by any of the winning suppliers prior to the start of the delivery period or at any time during the delivery period.

Q. What is the contingency plan if the Companies' competitive solicitation for full requirements, load-following products is not fully subscribed due to lack of bids or rejection of bids by the Commission?

A. In the event that a scheduled solicitation is not fully subscribed following the initial proposed procurement due to a lack of bids or due to rejection of bids by the Commission, the Companies will rebid the unfilled tranches from that solicitation in the next scheduled procurement for which there is sufficient calendar time to include the tranches. For any unfilled tranches still remaining, the Companies acting as the LSE will purchase the necessary physical supply through PJM-administered markets. The Companies' procurements will be made at real-time zonal variable market prices, plus other supply costs including capacity, NITS, ancillary services and AEPS Act compliance. The Companies will not enter into hedging transactions to attempt to mitigate the associated price or volume risks to serve these tranches. The Companies will also propose to satisfy AEPS compliance requirements for unfilled tranches at market prices. At the next quarterly rate adjustment, the Companies will include an estimate of these costs in the weighted cost of the default service supply calculation and utilize the reconciliation process to recover from default service customers the difference between the estimated and actual costs that the Companies incur as a result of purchasing the necessary supply and AEPS requirements.

Q. What is the contingency plan if a winning bidder of a full service load-following tranche product were to default prior to the start of or during the Companies' delivery periods?

A. If a winning bidder defaults prior to the start of or during the delivery period, the Companies will offer the unfilled tranches to the other registered bidders who participated in the most recent solicitation. The Companies may enter into an agreement with the registered bidder or bidders offering the best terms for the unfilled tranches resulting from the default, provided the prices offered by such bidder or bidders are consistent with the original prices under which the unfilled tranches were procured adjusted for changes in market conditions from the time when the original tranches were procured. If the Companies are not able to enter into such an agreement and a minimum of thirty calendar days exists prior to the start of the delivery period, the Companies will seek to bid the defaulted tranches in a separate supplemental competitive solicitation. As with other unfilled tranches described above, if insufficient time exists to conduct an additional competitive solicitation, or if the supplemental solicitation is unsuccessful, the Companies will supply the tranches using PJM-administered markets with recovery and reconciliation of estimated and actual costs as described previously.

Q. Please describe the Companies' contingency plan in case the RFP to solicit bids for SPAECS is not fully subscribed due to lack of bids or rejection of the bids by the Commission, or in the case of a winning SPAEC supplier default before or during the delivery period.

A. If any SPAEC tranches remain unfilled due to a lack of bids or rejection of bids by the Commission, or if a winning SPAEC supplier defaults before or during the delivery period, the Companies will conduct short-term procurements at market prices to ensure compliance with all solar photovoltaic AEPS requirements until such time as the Commission approves an alternative mechanism.

Q. Does this conclude your direct testimony?

A. Yes, it does.

EDUCUCATION AND PROFESSIONAL BACKGROUND

My name is James H. Catanach and my business address is 2800 Pottsville Pike, Reading, PA 19605. I am employed by FirstEnergy Service Company ("FirstEnergy") as Manager of the Regulated Commodity Sourcing Department. This position is primarily responsible for the procurement and management of the regulated energy supply portfolio, including compliance with renewable energy / alternative energy portfolio standard requirements, that FirstEnergy's electric utilities are required to maintain as load serving entities to serve their West Virginia, Ohio, Pennsylvania, New Jersey and Maryland retail electric customers.

I am a graduate of the University of Rhode Island with a Bachelor of Science degree in Mechanical Engineering and a Masters of Business Administration from the Pennsylvania State University. I also have a Professional Engineering License in the Commonwealth of Pennsylvania. I have been employed in the energy field since 1982 with General Public Utilities and FirstEnergy. My professional experience has primarily been in the Regional Operation at FirstEnergy: Customer Service, Meter Reading, Meter Engineering, Planning and Protection, Line Design and Maintenance, Asset and Project Management, Revenue Protection, Business Office Operations. While in Operations I have held several Manager positions: Easton/Stroudsburg Line and Business Office Operations, Cleveland Electric Illuminating Engineering Department, Customer Support, Meter Reading and Engineering, and Asset Strategy. Since December 2015, I have been a Manager in the Regulated Commodity Sourcing Department.

I have prepared supporting case materials in various jurisdictions including the Pennsylvania Public Utility Commission and the New Jersey Board of Public Utilities. Such cases include but are not limited to:

State & General Description	**Case / Docket #**
Pennsylvania	
Joint Petition of Metropolitan Edison Company,	P-2015-2511333
Pennsylvania Electric Company,	P-2015-2511351
Pennsylvania Power Company	P-2015-2511355
and West Penn Power Company	P-2015-2511356
For Approval of Their Default Service Programs	
New Jersey	
In the Matter of the Provision of Basic Generation Service	ER16040337
For the Period Beginning June 1, 2017	
In the Matter of the Provision of Basic Generation Service	ER17040335
For the Period Beginning June 1, 2018	

Met-Ed/Penelec/Penn Power/West Penn
Statement No. 3

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

METROPOLITAN EDISON COMPANY
Docket No. P-2017-_____________

PENNSYLVANIA ELECTRIC COMPANY
Docket No. P-2017-_____________

PENNSYLVANIA POWER COMPANY
Docket No. P-2017-_____________

WEST PENN POWER COMPANY
Docket No. P-2017-_____________

DEFAULT SERVICE PROGRAMS

For the Period
June 1, 2019 to May 31, 2023

Direct Testimony
of
James D. Reitzes

<u>List of Topics Addressed</u>

Analysis of Default Service Supply Plans

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DIRECT TESTIMONY
OF
JAMES D. REITZES

I. INTRODUCTION AND PURPOSE OF TESTIMONY

Q. Please state your name, title, business address, and for whom you are testifying.

A. I am James D. Reitzes, Principal of The Brattle Group ("Brattle"), located at 1800 M Street NW, Suite 700 North, Washington, District of Columbia. I am testifying on behalf of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, and West Penn Power Company ("Met-Ed," "Penelec," "Penn Power," and "West Penn," respectively, or collectively, the "Companies").

Q. What is your educational and professional background?

A. I hold a Ph.D. in economics from the University of Wisconsin and a B.A. in economics and history from Stanford University. My areas of specialization within economics are industrial organization, which includes the examination of firm behavior under various market conditions, and international trade. I also have completed field courses in finance. I have been involved in competition and regulatory matters for over twenty-five years, including five years while working at the Federal Trade Commission and more than twenty years in private consulting practice. Appendix A provides further detail as to my professional and educational experience.

Q. Please summarize your prior professional experience with respect to electric power matters.

A. For nearly twenty years, I have participated in a variety of regulatory and competition matters involving the electric power industry. I have provided testimony at the Federal Energy Regulatory Commission and in state regulatory proceedings addressing such issues as the competitive implications of mergers and acquisitions and assessing whether energy, transmission rights, renewable energy credits, or other assets were purchased or sold at the best possible price. On several occasions, I have been involved in the design of procurement processes to satisfy default service program ("DSP") obligations (also known as standard offer service ("SOS"), provider of last resort ("POLR"), and other names), including the analysis of costs and risks associated with full-requirements auction-based procurements and portfolio procurement strategies. I have submitted testimony on these issues to state public utility commissions, including previously to the Pennsylvania Public Utility Commission ("Commission").

My past experience also includes the design and management of auctions and request for proposals ("RFP") to purchase or sell various energy-related products, including energy, transmission rights, renewable energy credits, and other products. This includes participating in a working group that evaluated the design of a full-requirements, descending-clock bidding process to procure power supplies for standard-offer service customers in New Jersey. I have authored several articles concerning price determination and competition in general, as well as in electric power markets specifically, which have been published in economics journals and trade journals for the energy sector.

Q. Have you submitted testimony previously to the Commission on behalf of the Companies?

A. Yes, I submitted testimony on behalf of Met-Ed and Penelec regarding their Default Service Programs and procurement of Solar Photovoltaic Alternative Energy Credits ("SPAECs") in Docket Nos. P-2009-2093053 and P-2009-2093054 ("DSPI").

My testimony examined least-cost methods of procuring power for default service customers and purchasing SPAECs for meeting requirements under Pennsylvania's Alternative Energy Portfolio Standards ("AEPS") Act. In addition, I submitted rebuttal testimony on behalf of Penn Power regarding its Interim Default Service Program in Docket No. P-00072305.

More recently, I submitted testimony on behalf of Met-Ed, Penelec, Penn Power, and West Penn in Docket Nos. P-2011-2273650, P-2011-2273668, P-2011-2273669, and P-2011-2273670 ("DSPII"); in Docket Nos. P-2013-2391368, P-2013-2391372, P-2013-2391375, and P-2013-2391378 ("DSPIII"); and in Docket Nos. P-2015-2511333, P-2015-2511351, P-2015-2511355, and P-2015-2511356 ("DSPIV"). Among other topics, my testimony again examined least-cost methods of obtaining power for default service customers.

Q. Have you prepared any exhibits to accompany your testimony?

A. Yes, I prepared Met-Ed/Penelec/Penn Power/West Penn Exhibit JDR-1, which I will discuss later in this testimony.

Q. What is the purpose of your testimony?

A. My testimony analyzes the proposed procurement of residential full requirements service, commercial full requirements service, and hourly priced service by Met-Ed, Penelec, Penn Power and West Penn, as further described in the testimony of Witness James H. Catanach. I explain why the nature of the products being procured, as well as the procurement method itself, will produce the "least cost over time" and satisfy other applicable provisions of Pennsylvania's Act 129 of October 15, 2008 ("Act 129"). In so doing, I explain why the proposed procurement should be approved by the Commission.

Q. Is Brattle an independent third party?

A. Yes. Brattle is not owned, managed, controlled, or directed by any of the Companies or their affiliates. Brattle has no ownership in or control over the Companies or any of the FirstEnergy Corp. ("FirstEnergy") affiliates. Neither the Companies nor any other FirstEnergy affiliate has any ownership in or control over Brattle. We have performed consulting work on a contract basis for the Companies and other regulated affiliates of FirstEnergy in the past, but we have not performed work on behalf of any of its unregulated affiliates.

II. THE DESIGN OF THE SUPPLY PLAN FOR DEFAULT SERVICE CUSTOMERS CONFORMS WITH THE REQUIREMENTS OF ACT 129, SUCH THAT IT WILL RESULT IN THE LEAST COST OVER TIME FOR THOSE CUSTOMERS

Q. Have you reviewed the description of the Default Service Programs for the Companies, provided by Witness Catanach?[1]

A. Yes, I have.

Q. Can you provide an overview of the "highlights" of the Default Service Programs?

A. Yes, I can. The Companies propose to acquire full-requirements, load-following generation service for residential and commercial default service customers through descending-clock auctions for the service period beginning June 2019 and ending May 2023. Residential default service load will be priced based on an almost even mix of 12-month and 24-month full-requirement fixed-price purchases that account for 95% of load; spot-priced purchases account for the remaining 5% of load. As a result, at any point in time during the default service period, roughly 49.5% of the load obligation will

[1] *See* Met-Ed/Penelec/Penn Power/West Penn Statement No. 2.

effectively be priced based on one-year purchases, while another 45.5% of load will be priced based on two-year purchases. Spot-priced purchases make up the remainder.

The pricing of commercial default service load will differ slightly in that some share (roughly 32%) will be based on 3-month full-requirements fixed-price purchases, though the majority (roughly 68%) will be based on 12-month and 24-month full-requirements fixed-price purchases. The pricing of industrial default service load will be based on 100% spot market purchases.

Under the Companies' proposal, the auction participants will make offers to supply "tranches," where each tranche represents the full-requirements, load-following generation service obligation for a defined slice (*i.e.*, percentage) of load for a particular default service customer class. Each tranche for the residential class will consist of 5% spot-priced energy (plus a $20/MWh fixed adder intended to offset other cost components of the full-requirements obligation associated with the spot-priced default service load, including capacity, ancillary services, Network Integration Transmission Service ("NITS") costs, AEPS Act compliance, and other costs). The remaining 95% of the residential class and all of the commercial class energy requirements will be supplied at a fixed price per megawatt hour ("MWh") as bid by the winning auction participants. The customers receiving default service will be billed at a fixed price per kilowatt hour that will change quarterly, with the quarters synchronized to PJM Interconnection, LLC's ("PJM") energy year (that begins on June 1 and lasts through May 31).

There will be separate default service products for each electric distribution company ("EDC") and for commercial and residential customer classes, but these products will be procured simultaneously in the same auction. Auctions will be held every

October/November, January, April, and June. The mix of tranches offered in each auction will vary.

Tranches with a 12-month generation service supply obligation will be auctioned every October/November, January, and April, beginning in October/November 2018 and ending in April 2022. Tranches with a 24-month generation service supply obligation will be auctioned in October/November of 2018 and 2020, as well as in January and April of 2019, 2020 and 2021. Tranches with a 3-month generation service supply obligation will be offered in every auction beginning in April 2019 and ending in January 2023; the 3-month commercial tranches will be the only tranches available in the June auctions. Met-Ed/Penelec/Penn Power/West Penn Exhibit JHC-1 provides a timeline showing the auction procurement schedule by load type and the duration of the supply obligation.

The winning bidders for the full-requirements, load-following procurements for the residential, commercial, and industrial classes will be responsible for energy, capacity, ancillary services, relevant PJM fees and administrative expenses, and certain transmission costs associated with their share of default service load (including congestion costs and marginal transmission losses, and NITS costs). They will not be responsible for: Regional Transmission Expansion Plan charges; Expansion Cost Recovery Charges; Reliability Must Run/generation deactivation charges; historical out-of-market adjustments related to tie lines, generation, and retail customer metering costs; unaccounted-for energy costs; or any Federal Energy Regulatory Commission-approved reallocation of PJM Regional Transmission Expansion Plan charges related to Docket No. EL05-121-009 (collectively referred to as "non-market-based charges," or "NMB charges"). The costs associated with NMB charges will be charged to customers directly through a non-bypassable tariff rider (*i.e.*, the Companies' Default Service Support Riders).

For the industrial class, 100 percent of load will be acquired through an auction process in which suppliers bid on a full requirements, load-following product whose energy price is set at the PJM real-time price. In addition to a fixed adder of $4/MWh intended to cover capacity, ancillary services, NITS, AEPS Act compliance, and other costs associated with meeting this full-requirements obligation, suppliers may bid an additional adder over the PJM real-time price to cover any remaining costs or provide a potential profit margin. Industrial class auctions for each EDC will be held every January from 2019 to 2022, and these procurements will occur at the same time as the auctions for the residential and commercial classes.

In addition to the above areas of responsibility, suppliers of the full requirements, load-following tranches will bear the costs of complying with AEPS Act requirements. In particular, default service suppliers in the Met-Ed, Penelec, and Penn Power service territories will be responsible for meeting 100% of the non-solar Tier I and Tier II AEPS Act requirements. Met-Ed, Penelec, and Penn Power will procure all necessary SPAEC requirements on behalf of default service suppliers and competitive electric generation suppliers that serve load in their respective service areas. In the West Penn service territory, default service suppliers will be responsible for all Tier I and Tier II AEPS Act requirements (including SPAECs), less any Tier I alternative energy credits ("AECs") and SPAECs that are allocated to the default service suppliers from existing long-term purchases made by West Penn.

Q. In your opinion, does the term length of the procured products satisfy the requirements of Section 3.2 of Act 129, which specifies that the procured electric power for default service customers include a prudent mix of spot market purchases, short-term contracts and long-term purchase contracts?

A. Yes. The procurement design comprises a prudent mix of spot purchases, short-term contracts, and long-term purchases as required by the statute. The use of 12-month and 24-month purchases should provide some measure of cost stability, which is a desired attribute in procuring generation supply for default service.[2] The 5 percent of residential load that is priced according to the PJM real-time market, and the 32% of commercial load that is priced based on quarterly purchases, provides customers some exposure to short-term price signals. The risk associated with purchasing SPAECs, which have exhibited substantial price movements in past years (and have been the subject of recent legislation that changes the definition of solar facilities eligible to produce SPAECs), is partially offset through past long-term purchases (*e.g.*, 10 years) that have delivery obligations running through the default service period.

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[2] The Commission's Final Order in Docket No. L-2009-2095604 (Implementation of Act 129 of October 15, 2008; Default Service And Retail Electric Markets) recognizes that relative cost stability is an objective in procuring default service supply:

> As stated earlier in this Order, the "least cost over time" standard should not be confused with the presumption that default prices will always equal the lowest cost price for power at any particular point in time. In implementing default service standards, the Commission must be concerned about rate stability as well as other considerations such as ensuring a "prudent mix" of supply and ensuring safe and reliable service. In our view, a default service plan that meets the "least cost over time" standard should not have, as its singular focus, the achievement of the absolute lowest cost over the default service plan time frame but rather a cost for power that is both relatively stable and also economical relative to other options (p. 40).

Q. Do you believe that the Companies' Default Service Programs are consistent with the requirement in Section 3.4 of Act 129 that they be designed to ensure "the least cost to customers over time"?[3]

A. Yes, I do. As I have explained in prior testimony,[4] the use of a competitive process to procure a full-requirements product is designed to induce aggressive bidding among suppliers who can manage portfolios of energy, transmission, and capacity products to meet the load obligations of a given class of customers. The competitiveness of the bidding process, coupled with the nature of the product that is being procured, will result in an outcome where the suppliers who can manage those portfolios at the least cost over time (or who believe that they can obtain the components of their portfolios at the lowest prices over time) are the winning bidders.

Q. How does the reliance upon a full-requirements product contribute to a procurement strategy that is designed to ensure "the least cost to customers over time" as required under Act 129?

A. A full-requirements product, known as a "tranche," is a clearly defined product. It represents a defined percentage of the load of a particular customer class that the default service supplier must serve, including the provision of energy, capacity, ancillary services, transmission services and NITS (but excluding NMB charges). Default service suppliers also are responsible for fulfilling some requirements of the AEPS Act, as I described earlier in my testimony. With a clear product definition established in this fashion, all bidders will bid to supply an identical product, so that winning bidders are

[3] 66 Pa.C.S. § 2807(e)(3.4).

[4] *See* DSPI, Met-Ed/Penelec Statement No. 8; DSPII, Met-Ed/Penelec/Penn Power/West Penn Statement No. 6; DSPIII, Met-Ed/Penelec/Penn Power/West Penn Statement No. 3; and DSPIV, Met-Ed/Penelec/Penn Power/West Penn Statement No. 2.

chosen purely on the basis of their price offers. This will lead to a transparent and efficient bidding process.

By bidding on a full-requirements product that must be supplied at a fixed price per MWh, the suppliers assume various risks, such as those relating to price uncertainty and volumetric uncertainty due to variations in weather, customer shopping behavior, fuel prices facing generators, and other market factors. Those suppliers who consider themselves to be the most adept portfolio managers (or who are the most optimistic portfolio managers) in terms of handling these risks will place the lowest bids in the procurement. Thus, the procurement process is intended to rely on the skills of the best electric power portfolio managers to achieve the least cost over time for default service customers while maintaining a certain degree of rate stability.

The Commission appears to accept this viewpoint as well, as stated in its discussion of full-requirements procurements in the Final Rulemaking Order in Docket No. L-2009-2095604[5]:

> The major benefit associated with the FR [full-requirements] approach is that the procurement function is delegated to the electric supplier which is presumably better equipped with the necessary personnel and infrastructure to perform the activities associated with acquiring electric supplies in the complex and ever changing wholesale market environment. The FR process insulates default supply customers from the volatility associated with wholesale market conditions with the supplier bearing the risks of factors such as customer migration, weather, load variation and economic activity (p. 54).

[5] *Implementation of Act 129 of October 15, 2008; Default Service and Retail Electric Markets*; Docket No. L-2009-2095604 (Final Rulemaking Order dated Oct. 4, 2011) ("2011 Final Rulemaking Order"). The Commission's Tentative Order and Final Order in *Investigation of Pennsylvania's Retail Electricity Market: End State of Default Service*, Docket No. I-2011-2237952, also support the use of full-requirements procurements to serve default service customers. *See* pp. 16-18 in the Tentative Order and p. 41 in the Final Order.

Q. How does the reliance upon full-requirements products compare to the alternative where the EDC instead uses a managed portfolio approach?

A. In comparing the merits of a full-requirements approach versus a managed portfolio approach to procuring generation supply for default service customers, the Commission has previously expressed concern that the managed portfolio approach could produce higher costs and greater pricing risk for consumers if the EDC does not prove to be an adept portfolio manager.

For example, the Commission has previously stated as follows:

> On balance, we are not persuaded that the MP [managed portfolio] approach is superior to the FR approach in achieving the "least cost to customers" while also achieving the other objectives of "prudent mix" of products and price stability. The MP approach has clear advantages to the retail markets and the retail customer <u>provided</u> the EDC is capable of performing the full range of portfolio management functions….Our principal concerns are that EDCs do not currently possess the requisite expertise and infrastructure to perform these portfolio management duties and the risks to retail customers from EDC inexperience in performing these functions is too great. We are also mindful of the fact that the current default supply process, with the EDC acting as the default supplier and distribution entity purchasing its supply from electric suppliers knowledgeable about the workings of the wholesale electric market, is a product of the Competition Act, which created the market structure we now operate within.[6]

Not only is the full-requirements approach intended to conform with the principles of least-cost procurement, the winning bidders are supplying a product that is designed to provide adequate and reliable service. The default service suppliers themselves will not be expected to have difficulty providing such a product, given that its components (*e.g.*, energy, capacity, ancillary services) can readily be acquired through the PJM market.

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6 2011 Final Rulemaking Order, pp. 55-56.

Moreover, the use of 12-month and 24-month full-requirements purchases for residential and commercial customers should provide some measure of cost stability for those customers.

Q. Have previous full requirements default service procurements resulted in substantial participation?

A. Yes, there has been substantial participation, based on recent experience with competitive procurements of full-requirements supplies for default service customers in Pennsylvania. For example, the number of bidders in default service supply auctions for Met-Ed, Penelec, Penn Power, and West Penn has ranged from nine to fourteen for procurements that have taken place through October 2017.[7]

Q. Have the Companies' previous default service auctions resulted in reasonable prices that reflected expected wholesale market conditions?

A. Yes, they have. My analysis of the prices resulting from recent default service auctions conducted for residential and commercial customers of Met-Ed, Penelec, Penn Power, and West Penn shows that these prices were only slightly above the combined wholesale energy, capacity, ancillary service, and NITS costs that were projected at the time of each auction for the corresponding delivery periods.[8] This analysis is shown in Met-Ed/Penelec/Penn Power/West Penn Exhibit JDR-1.

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[7] Data for the number of participating bidders for Met-Ed, Penelec, Penn Power and West Penn default service auctions under DSP IV were provided by the Companies. The reported range reflects the number of bidders who bid on at least one product in the five procurements held under DSP IV thus far.

[8] I did not include costs associated with alternative energy credits needed to satisfy AEPS requirements, or PJM RTEP and ECRC costs that were included in default service supplier obligations for auctions with delivery periods falling between June 1, 2011 and May 31, 2013. Given the exclusion of these costs, my estimates of implied risk premiums in providing default service may be somewhat overstated.

I first estimated the expected wholesale energy costs to serve retail loads of residential and commercial customers. For this calculation, I have used PJM West forward prices, which I adjusted for the delivery location by using the difference in spot energy prices between the PJM West hub and the corresponding zonal price (METED, PENELEC, PENN POWER, or APS).[9] I then adjusted these flat prices by the load shape factor of residential and commercial non-shopping customers to reflect the fact that the retail load of these customer classes is, on average, higher during hours with higher prices. The resulting energy prices were in the range of $29-$54/MWh for Met-Ed, $31-$47/MWh for Penelec, $32-$48/MWh for Penn Power, and $32-$42/MWh for West Penn.

To calculate the capacity cost component of serving residential and commercial customers, I relied on the PJM Base Residual Auction ("BRA") prices (and the Fixed Resource Requirement Integration Auction prices for Penn Power before Penn Power joined the PJM BRA) for the appropriate delivery periods. Then I converted these capacity prices expressed in dollars per megawatt day ("$/MW-day") into levelized capacity costs (expressed in $/MWh) by using the ratio of peak to average load for each customer class.[10] The resulting levelized capacity prices were in the range of $10-$25/MWh for Met-Ed, $9-$26/MWh for Penelec, $2-$33/MWh for Penn Power, and $4-$15/MWh for West Penn.

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[9] For this "basis" adjustment, I used 2010 as my reference year for default service auctions that occurred during 2010 and 2011, 2012 as my reference year for default service auctions that occurred in 2012 and 2013, and 2014 as my reference year for default service auctions that occurred in 2014 and 2015. METED, PENELEC, and APS zonal prices are used for the respective Met-Ed, Penelec, and West Penn basis adjustments. The APS zonal price is used for Penn Power's 2010 and 2011 basis adjustments. The PENN POWER aggregate nodal price reported by PJM is used for Penn Power's adjustments in subsequent years (as Penn Power became part of PJM in mid-2011).

[10] For this capacity price adjustment, I used 2010 load data for default service auctions that occurred during 2010 and 2011, 2012 load data for default service auctions that occurred in 2012 and 2013, and 2014 load data for default service auctions that occurred in 2014 and 2015.

For ancillary service costs, I used the actual 2010 (2012, 2014, 2016) costs of $1.94 ($1.92, $2.41, $0.97) for default service auctions that occurred in 2010-11 (2012-13, 2014-15, 2016-17).

For NITS costs, I used costs expressed in $/MW-day as provided by the Companies starting when NITS became the default service supplier's responsibility in June 2013. As I did with the capacity prices, I converted NITS costs into levelized costs (expressed in $/MWh) by using the ratio of peak to average load for each customer class.[11] The resulting levelized NITS costs were in the range of $3-$6/MWh for Met-Ed, $3-$6/MWh for Penelec, $6-$12/MWh for Penn Power, and $4-$6/MWh for West Penn.

Finally, I added together the energy, capacity, ancillary service, and NITS costs to estimate the expected wholesale market cost of serving the residential and commercial customers. This represents my estimate of the expected cost of serving retail customers without accounting for any potential risk premium that default service suppliers may include in their bid prices to reflect volumetric and price uncertainty. I refer to this estimated cost as the "Estimated No-Risk Price", as shown in Met-Ed/Penelec/Penn Power/West Penn Exhibit JDR-1.

My estimated cost of serving retail customers is conservative as it does not include the costs of alternative energy credits needed to meet AEPS requirements, as well as any other costs not described above that are incurred by suppliers of default service. Therefore, the "risk premium" referenced in Met-Ed/Penelec/Penn Power/West Penn Exhibit JDR-1, which is calculated as the difference between the auction price and the sum of the expected cost of serving the customer (*i.e.*, the sum of energy, capacity,

[11] I used the same load data for the NITS cost adjustment as for the capacity price adjustment.

ancillary services, and NITS costs), may be larger than the "true" risk-premium to the extent that any material costs have been omitted.

In spite of the conservatism of my cost calculations, the average difference between the auction price and expected cost is relatively modest. The average risk premiums expressed in $/MWh were $3.72/MWh for Met-Ed, $2.71/MWh for Penelec, $2.53/MWh for Penn Power, and $2.88/MWh for West Penn. Expressed as a percentage of the Estimated No-Risk Price, the risk premiums were, on average, 6.97% for Met-Ed, 5.06% for Penelec, 3.92% for Penn Power, and 5.28% for West Penn. My results are summarized in Table 1, and further detail is provided in Met-Ed/Penelec/Penn Power/West Penn Exhibit JDR-1.

Table 1: Average Estimated Risk Premium in Default Service Full-Requirements Auctions (2010-2017)

EDC	Risk Premium ($/MWh)	Risk Premium (% of No-Risk Price)
Met-Ed	3.72	6.97%
Penelec	2.71	5.06%
Penn Power	2.53	3.92%
West Penn Power	2.88	5.28%

Source: The Brattle Group.

Q. What are the advantages of conducting a simultaneous procurement for Met-Ed, Penelec, Penn Power, and West Penn?

A. By conducting a simultaneous procurement for the Companies for all classes, more potential bidders can be attracted to the procurement process. Transaction costs for both bidders and those soliciting supply also can be reduced through a simultaneous procurement. When the procurement mechanism is a simultaneous, multi-round, descending-clock procurement, bidders can switch from one utility's product to another in response to price differences that they believe are not reflective of underlying supply cost differences. This behavior leads to a potentially more economically efficient outcome and contributes to pricing that is more consistent among the four Companies.

By procuring in this fashion, the prices of default service for Met-Ed, Penelec, Penn Power and West Penn customers are more closely related to each other (*i.e.*, one is not low-priced or high-priced relative to the others simply because it was procured at a different point in time). This provides the added benefit of simplifying administration and regulatory oversight.

By contrast, even if the auctions occur only days apart, a sequential default service auction process among the different Companies could lead to price disparities that do not reflect actual differences in generation supply costs across the EDCs. Under a sequential auction process, generation suppliers for default service customers must make strategic decisions on how much supply to offer and what price to accept in one EDC's auction, based on their expectations of the results of subsequent EDCs' auctions. With a simultaneous auction process, a generation supplier can determine how much supply to offer to a given EDC based on the current auction prices for that EDC and all other Companies.

Q. Do the proposed procurement formats conform with the requirements of Section 3.1 of Act 129?

A. Yes, they do. Section 3.1 specifies that:

> "…the default service provider shall provide electric generation supply to that customer pursuant to a commission-approved competitive procurement plan. The electric power acquired shall be procured through

> competitive procurement processes and shall include one or more of the following:
>
> (i) auctions;
>
> (ii) requests for proposal;
>
> (iii) bilateral agreements entered into at the sole discretion of the default service provider…."[12]

The procurement format proposed by the Companies is a descending-clock auction process, as explicitly permitted by Section 3.1(i).

Q. Is the proposed procurement format designed to achieve a competitive result, which would be essential to achieving the least cost to customers over time?

A. Yes, the auctions are designed to produce competitive outcomes as they are nondiscriminatory, fair, and open. An auction mechanism encourages supplier participation and is therefore aimed at achieving the least cost by selecting the lowest-priced bids.

The descending-clock auction format is nondiscriminatory because any party can participate as long as it satisfies the criteria used in the application process. This procurement format is fair and transparent, because suppliers clearly understand how the final solicitation prices are determined and how to compete for a winning position.

In a descending-clock auction, each of the bidders can observe the prevailing price during each round of the auction. Each bidder can then determine whether it is in their economic interest to continue supplying the desired product at the current price as the price falls from one round to the next. The auction ends when prices have decreased to

[12] 66 Pa.C.S. § 2807(e)(3.1).

the point where enough bidders have dropped out, such that the amount of power that remaining active bidders are willing to supply equals the amount of power needed.

The rules of the descending-clock auction are pre-specified in a way that can be thoroughly replicated and verified. Because bidders are pre-qualified, the evaluation of bids is on a price-only basis, which is intended to produce a fair, least-cost result.

The openness and transparency of the auction format encourages participation in the bidding process. With a procurement format that encourages supplier participation, the winning bidders are those that offer to supply full-requirements service at the lowest prices (*i.e.*, the least cost). This process is consistent with achieving a competitive outcome.

Q. Why is it that the superior portfolio managers will place the lowest bids in these full-requirements procurements?

A. To serve default service customers, a prospective supplier must assemble a portfolio comprised of competitively priced wholesale products, such as fixed-price, fixed-quantity forward energy purchases and long-term energy contracts. Prospective suppliers are likely to pay similar prices for forward energy purchases, implying that differences in their auction bids are principally related to perceived differences in the cost of satisfying uncertain customer load, as well as perceived differences in the cost of bearing other sources of risk.

The suppliers submitting the lowest bids will be those that are the most efficient portfolio managers (or otherwise require the least compensation for bearing pricing and volumetric risk) or those that are most optimistic about the possibility of relatively low spot and forward prices over the course of the delivery period. In this fashion, the Companies' default service programs are designed to achieve the least cost to customers over time.

Q. Doesn't the competitiveness of the auction procurement process depend on the competitiveness of the underlying wholesale market?

A. Taking the competitiveness of the wholesale market as given, the auction process, by itself, can be competitive if it has sufficient participation. A concern might arise, however, that the wholesale market is not competitive, leading to insufficient auction participation and a less than fully competitive outcome because prospective suppliers are not confident in their ability to obtain physical power supplies at reasonable prices.

However, there is ample reason to believe that the wholesale market is sufficiently competitive to support a competitive pricing outcome for the Companies' default service auction process. The PJM wholesale market, including the forward and spot markets that are relevant to supplying Met-Ed, Penelec, Penn Power and West Penn, has numerous potential suppliers.

PJM's markets have an active market monitor, and the PJM day-ahead and real-time markets have procedures in place to mitigate abuses of market power. Specifically, PJM has stringent *ex ante* mitigation processes that impose cost-based restrictions on the bids of wholesale suppliers in its day-ahead and real-time markets whenever structural conditions exist that may lead to potential exercises of market power. This mitigation indirectly constrains longer-term forward prices as well, given that forward prices are representative of expected future spot prices and that energy purchasers can substitute between products of different durations. Besides its energy markets, PJM also has market power mitigation processes in its capacity markets.

As mentioned above, participation in the Companies' default service supply auctions would likely be hindered if prospective participants were concerned that PJM's wholesale markets were not competitive, or that energy trading in PJM was not sufficiently robust to avoid incurring substantial transactions costs. However, past results suggest that this is not the case, as there have historically been anywhere from nine to fourteen bidders in recent full-requirements procurements for Met-Ed, Penelec, Penn Power, and West Penn.

Q. Are there contingency plans in place for alternative procurement strategies if any given auction appears to attract limited interest or if a winning supplier subsequently defaults on its obligation before or during a delivery period?

A. Yes. As described in detail by Mr. Catanach, the Companies are proposing to continue the contingency plans that were previously approved by the Commission as part of their current default service programs.

Q. Do you think that the plan to obtain SPAECs for Met-Ed, Penelec, and Penn Power through additional two-year purchases made through a competitive process is also consistent with the requirement to produce "the least cost to customers over time"?

A. Yes, as I mentioned previously, Pennsylvania SPAEC prices have shown substantial volatility historically. While the market for SPAECs in Pennsylvania appears somewhat oversaturated at the current time, given that available capacity to supply SPAECs is well in excess of current RPS requirements, the ramp-up of RPS requirements over time will cause the market to naturally tighten (absent further construction of solar facilities).

Moreover, the amendment to the AEPS Act contained in the recently approved Act 40 of 2017[13] has the potential to significantly tighten the market in the next few years (particularly, if existing PA-certified facilities located outside of the state are not "grandfathered in"). For that reason, the fixed-term SPAEC purchases made via a competitive process that are part of the default service plan, as described in the testimony of Witness Catanach, are desirable for their ability to increase cost stability for default service customers.

III. CONCLUSION

Q. Can you summarize how the proposed plan to procure full-requirements service for default service customers leads to the "least cost to customers over time" in the provision of default service supply?

A. Yes. Under the proposed plan, the Companies will use an auction process to acquire generation to satisfy 95% of the residential and 100% of the commercial default service load through full-requirements load-following procurements of 3-month (for commercial customers), 12-month, and 24-month durations. The remaining 5% of residential load will be from the PJM spot market (where a $20/MWh adder is also applied). All load obligations will be priced based on the results of these fixed-priced procurements of differing duration.

Industrial default service load will be priced based on the PJM real-time market, plus a $4/MWh adder. Suppliers will compete for this load through an auction process where they will bid an additional adder to cover any costs (or profit margin requirements) that

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[13] For the full text, refer to the following: http://www.legis.state.pa.us/cfdocs/billinfo/bill_history.cfm?syear=2017&sind=0&body=H&type=B&bn=118

remain after the $4/MWh adder, which is intended to defray a portion of the capacity, ancillary services, NITS, AEPS Act, and other costs that are part of the full-requirements obligation.

The winners of the fixed-price full-requirements, load-following auctions must function as portfolio managers by procuring a combination of energy, capacity, ancillary services, and certain transmission products needed to ensure adequate and reliable service to default service customers in the face of load and price uncertainty. Because the winners in these auctions will be the ones that offer default service supply at the lowest reasonable prices, the proposed descending clock auctions necessarily choose as winning bidders those suppliers that can provide this portfolio of products at the least cost over time (or that believe that they can provide this portfolio at the least cost). As a result, the proposed supply plan produces the least cost over time relative to other procurement methods, assuming that the procurements themselves are competitive.

The procurement format (a descending-clock auction) is designed to be open, fair, and transparent. Supplier participation is encouraged as bidders are pre-qualified through an open, transparent application process, where relevant information about the procurement is posted to a public website. By accounting for any non-price factors such as bidder creditworthiness in the qualification requirements, the bids are evaluated on a price-only basis, which leads to a lowest price outcome. In this fashion, the procurement process and the supply plan work together to achieve the least cost to customers over time.

Q. Does this conclude your direct testimony?

A. Yes, it does.

James David Reitzes
Principal

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Dr. James D. Reitzes received his B.A. in economics and history from Stanford University, and his Ph.D. in economics from the University of Wisconsin. He specializes in providing economic analyses and expert testimony pursuant to regulatory proceedings and strategy work in the energy and transportation sectors and litigation in the areas of antitrust and competition.

Dr. Reitzes has provided expert analysis and testimony in energy-related competition and regulatory matters before the Federal Energy Regulatory Commission, state public utility commissions, and federal antitrust agencies. In the transportation sector, he has offered expert analysis and testimony in proceedings involving the U.S. Department of Transportation, U.S. Department of Justice, the European Commission, the European Court of First Instance, and national antitrust authorities. He also has provided economic consulting services to clients in the United States, Canada, the European Union, South America, and Africa.

Since joining The Brattle Group as a Principal in April 1998, Dr. Reitzes has been involved in energy regulatory, strategy, and litigation matters for utilities, RTOs, cooperatives, municipal power providers, and industrial customers. Most recently, Dr. Reitzes has been involved in formulating and managing auction and RFP processes for procuring and selling electric power supplies (including renewable power and renewable energy credits), assessing the competitive impact and efficiencies arising from integration and consolidation in natural gas transport markets, valuing investments in specified electric generation assets as well as purchases of energy and capacity (in comparison to other generation or procurement alternatives), analyzing the value and risks associated with particular features of power purchase agreements and EPC contracts, designing energy procurement strategies to support standard-offer service obligations, critiquing market-monitoring policies and market design features of electric power markets, assessing the competitive implications of mergers and acquisitions in power markets, providing analyses of alleged market manipulation and exercises of market power in the energy sector, and designing transitional regulation strategies.

Dr. Reitzes has authored several articles on firm strategies with respect to pricing, quality, R&D investment, and merger behavior, published in leading economics and legal journals. He also is an author of a book that assesses the domestic impact of U.S. international trade policies.

REPRESENTATIVE ENERGY SECTOR EXPERIENCE

Procurement (Auction) Management, Design, and Bidding Strategy

- For three utilities in Pennsylvania, designed and managed the procurement of solar photovoltaic alternative energy credits (SPAECs) on multiple occasions and submitted testimony describing the procurement process and benchmarking the results against expected market prices. Responsibilities included: (i) designing the auction rules and bid forms; (ii) overseeing the provision of auction-related information on the procurement website; (iii) corresponding with interested bidders; (iv) interacting with company personnel regarding bidder credit issues; (v) hosting bidder information sessions; (vi) evaluating bid materials; (vii) building a financial model to determine the likely value of the solar energy credits; (viii) providing a benchmarking study to determine if the bids were reflective of market fundamentals; and (ix) drafting a report to the Pennsylvania Public Utility Commission to secure approval of the procurements.

- For utilities in Ohio, submitted testimony that described the design, management, and implementation of an auction process to serve standard service offer customers. Also participated in the development of software to implement the auction process and identify the winning bidders.

- For an owner of a merchant transmission line connecting PJM with NYISO, designed and managed an RFP process to sell transmission scheduling rights on multiple occasions. Responsibilities included: (i) designing the auction, its rules, and the bid forms; (ii) developing marketing materials and conducting various types of market analyses to assist bidders in understanding the value proposition offered by the transmission rights; (iii) identifying potentially interested bidders; (iv) assisting in the development of other auction materials including bidder participation agreements and purchase and sale contract provisions; (v) hosting a website and overseeing the provision of auction-related information through the website; (vi) communicating with potential bidders; (vii) responding to bidder questions and posting answers to those questions on the auction website; (viii) interacting with the client regarding a variety of bidder-related issues; (ix) selecting the winning bidders; and (x) preparing a report describing the auction process that was submitted to the Federal Energy Regulatory Commission.

- For an owner of another merchant transmission line connecting PJM with NYISO, designed and managed an RFP process to sell transmission scheduling rights. Responsibilities included: (i) designing the auction, its rules, and the bid forms; (ii) identifying potentially interested bidders; (iii) providing analyses to describe the value proposition offered to holders of transmission rights for the line; (iv) developing other marketing materials; (v) assisting in the development of other auction materials such as bidder qualification forms and purchase and sale agreements; (vi) hosting a website and overseeing the provision of auction-related information through the website; (vii) communicating with potential bidders; (viii) responding to bidder inquiries;

(ix) interacting with the client regarding a variety of bidder-related issues; (x) selecting the winning bidders; and (xi) assisting in the preparation of a report submitted to the Federal Energy Regulatory Commission describing the auction process.

- For a municipal power provider that was a partial owner of a power plant in Illinois, designed and managed an RFP process to either sell the ownership stake in the plant or alternatively sell the output entitlement through a long-term PPA agreement. Responsibilities included: (i) developing target sale structures; (ii) formulating a schedule for completing the sale; (iii) developing the RFP documents and bid process tools; (iv) soliciting interest for the sale; (v) managing the RFP bid process; (vi) qualifying the bids; (vii) evaluating final bids and assisting in the negotiation of final terms; and (viii) preparing a report summarizing the RFP process.
- For an unregulated trading affiliate of a regulated utility, provided strategic bidding advice and financial analysis in a multi-round ascending clock auction to acquire PPAs for virtually divested generation assets. Assisted in the development of financial models to value the various PPAs, and in formulating between-round bidding strategies, including helping with algorithms to estimate the remaining amount of eligibility of competing bidders.
- Have been part of the Brattle team serving as the Independent Auction Monitor (IAM) for the Southern Company energy auction. Southern Company must supply its excess power resources under specified terms and conditions into a day-ahead and hour-ahead energy auction that is overseen by an external monitor. Our role is to: (i) verify Southern's calculations of available capacity to offer into the auctions; (ii) confirm that any transmission service necessary to accommodate a purchase under the auction is not unreasonably withheld; (iii) verify that the auction has cleared properly; (iv) ensure that internal data control restrictions are maintained to protect bidder information; (v) report complaints to the FERC; and (vi) independently file reports with the FERC regarding the auction.
- For industrial customers and municipalities in Texas in a stranded cost proceeding, submitted testimony to the Public Utility Commission of Texas that analyzed auction design issues pertaining to the sale of generation assets, including the potential impact on sale prices of conducting an auction when an outside entity has a right-of-first-refusal (ROFR) to purchase the assets at the winning auction price.

Retail Market Design and Power Procurement for Standard-Offer Service Customers

- For a utility in Pennsylvania, submitted testimony that analyzed cost and risk differences associated with full-requirements versus block-and-spot procurements of power supplies for default service customers. Analysis included estimates of the implied price premium for covering volumetric and pricing risk that was associated with past procurements of full-requirements power supplies, showing that this premium was relatively modest in size.
- For a utility in Pennsylvania, submitted testimony that estimated the expected level and variance in procurement costs associated with different portfolio strategies for providing electric power to default service customers. Analysis showed how different portfolio combinations of spot and forward purchases were likely to perform under different assumptions regarding the timing and frequency of forward purchases.
- For a utility in Maryland, submitted testimony that assessed differences in the expected cost and risk profile of different portfolio strategies for procuring power supplies for standard offer service customers. Analyzed how the use of a fixed-price default service product without switching restrictions provides customers with a potentially valuable option that may significantly increase the cost of supplying default service customers with full-requirements power. Assessed how load uncertainty affects the cost and risk of providing default service.
- For a utility in Pennsylvania, submitted testimony that assessed methods of supplying default service customers and the relationship between various facets of default service policy and the development of increased shopping by retail, residential, and commercial customers. Testimony analyzed the impact on customer shopping rates (and the competitive retail electric market) arising from the imposition of an "adder" to the price-to-compare, as well as from holding a retail opt-in auction subsequent to the purchase of power supplies for default service customers. Testimony also analyzed the magnitude of the "risk premium" embedded in the prices of past auctions to acquire full-requirements power supplies for default service customers.
- For a utility in Ohio, assessed a utility's proposed rate plan for self-supplying generation service to standard service offer customers, and compared its costs against the costs of procuring power from market sources under full-requirements contracts.

Asset Valuation

- For the City of San Antonio, performed a valuation of a nuclear power plant, and compared its value against alternative technologies including gas-fired, wind, and solar powered generation. Our analysis included a risk assessment of how the plant's value could be affected by changes in natural gas prices, environmental policy, and construction costs. Historical volatilities and implied volatilities derived from options were used to derive a distribution of potential valuation outcomes. Our results were submitted in a public report and hearing, as well as in briefings to the Mayor, City Manager, City Council, and the public.
- For a major overseas utility and investor in generation assets, performed a valuation of a proposed nuclear power plant in ERCOT and estimated the values of different types of PPAs associated with the output of the power plant. Made recommendations as to various structures for potential PPA agreements, and performed valuations associated with changes in individual PPA features. Identified potentially interested counterparties for PPA agreements. Also, performed a valuation analysis for the power plant for the "residual" period beyond the expiration of the PPA agreements. This analysis required predicting the expected level and variance of future power prices under differing outcomes regarding the price of natural gas and greenhouse gas policy.
- For a group of municipal power providers and industrial customers, performed a valuation of various power plants for a stranded cost proceeding. Built a financial model to estimate the assets' values at the time as sale, as well as analyzed comparable transactions to form an alternative valuation estimate.
- Built financial model to perform valuation analysis of renewable energy credits. This model was used to evaluate the results of several procurements of solar renewable energy credits conducted by Pennsylvania utilities, and the results of the model were presented to the Pennsylvania Public Utility Commission.
- On several occasions for utilities in the Mid-Atlantic and Midwest regions, have used multi-factor risk models to estimate the expected cost and cost distribution associated with different portfolio strategies for procuring power supplies for default service customers.

Competition Analysis

- For a merger of two major utilities in the western United States, estimated the pricing impacts associated with alternative generation divestiture scenarios through the use of a Cournot oligopoly simulation model. Assisted in the drafting of testimony related to the merger's impact on competition and other issues.
- For an independent power producer, submitted testimony to FERC assessing the competitive impacts of a high-profile merger involving two major utilities and generation owners within PJM, as well as the competitive effects associated with specific proposed market power mitigation measures.
- For a group of municipal power companies, analyzed a proposed merger involving two major utilities with generation supplies in the mid-atlantic and midwest regions. Reviewed the Delivered Price Test (DPT) analysis conducted on behalf of the merger applicants, and analyzed the sensitivity of applicants' results to changes in assumptions regarding power prices, gas prices, and available suppliers of imported power into the geographic area of interest.
- For two merging utilities in New York, analyzed vertical market power issues related to the merged entities' ownership of both transmission and generation assets, including the strategic use of transmission outages and other forms of transmission withholding to induce increases in power prices. Examined potential pricing impacts with the aid of security-constrained, least-cost dispatch generation model.
- For PJM, served as the lead author of a Brattle study that analyzed PJM's protocols for mitigating market power, comparing those protocols to the ones used in other major RTO markets and internationally (e.g., the United Kingdom, Australia, and Nordpool). Made recommendations for potential changes to PJM's market power mitigation practices, and presented findings to various PJM member committees.
- For two merging electric and gas utilities with overlapping service territories in New England, analyzed the competitive impacts of their merger, specifically as it related to market power concerns arising from the supply of gas to dual-fuel industrial customers, interconnection policy with respect to industrial customers, and vertical market power issues related to supplying gas to competitive generation suppliers. Presented analysis to Federal Trade Commission attorneys and economists.

- For two merging electric and gas utilities in North Carolina, analyzed the competitive impact of the merger on gas transport markets and the price of delivered gas to North Carolina customers, including competing generation suppliers. Submitted analysis to the North Carolina Utilities Commission along with an expert report.
- For an owner and operator of natural gas pipelines, provided a white paper to the competition authorities that presented a framework for analyzing the cost and benefits of further consolidation of pipeline ownership, and assessed the efficiencies that have arisen from prior consolidations of complementary pipeline assets.
- For the U.S. government, analyzed the pricing impacts arising from an alleged cornering of a major commodity market for an oil and gas derivative product. Formulated and estimated an econometric model to identify whether an "artificial price" had resulted from the alleged behavior consistent with the exercise of significant market power. Also provided estimates of damages attributable to the price overcharges stemming from the alleged manipulation.

PUBLICATIONS

Journals

"Domestic Versus International Capital Mobility: Some Empirical Evidence," with Donald J. Rousslang, *Canadian Journal of Economics*, Vol. 21, No. 2 (May 1988): 312-323.

"The Impact of Quotas and Tariffs on Strategic R&D Behavior," *International Economic Review*, Vol. 32, No. 4 (November 1991): 985-1007.

"Anticompetitive Effects of Mergers in Markets with Localized Competition," with David T. Levy, *Journal of Law, Economics, and Organization*, Vol. 8, No. 2 (April 1992): 427-440.

"Quality Choice, Trade Policy, and Firm Incentives," *International Economic Review*, Vol. 33, No. 4 (November 1992): 817-835.

"Basing-Point Pricing and Incomplete Collusion," with David T. Levy, *Journal of Regional Science*, Vol. 33. No. 1 (February 1993): 27-35.

"Ocean Shipping Economics: Comment," *Contemporary Policy Issues*, Vol. 11, No. 3 (July 1993): 81-85.

"Product Differentiation and the Ability to Collude: Where Being Different Can Be an Advantage," with David T. Levy, *Antitrust Bulletin*, Vol. 38, No. 2 (Summer 1993): 349-368.

"Antidumping Policy," *International Economic Review*, Vol. 34, No. 4 (November 1993): 745-763 [reprinted in Douglas R. Nelson and Hylke Vandenbussche editors, *The WTO and Anti-Dumping: Volume 1* (Cheltenham, UK: Edward Elgar Publishers, 2005): 392-410].

"The Importance of Localized Competition in the 1992 Merger Guidelines: How Closely Do Merging Firms Compete?" with David T. Levy, *ABA Antitrust Law Journal*, Vol. 62, No. 3 (Spring 1994): 695-716.

"Market-Share Quotas," with Oliver R. Grawe, *Journal of International Economics*, Vol. 36, No. 3/4 (May 1994): 431-447.

"Price Discrimination and Mergers," with David T. Levy, *Canadian Journal of Economics*, Vol. 28, No. 2 (May 1995): 427-436.

"In the Matter of Weyerhaeuser Company: The Use of the Hold-Separate Order in a Merger with Horizontal and Vertical Effects," with Robert P. Rogers and Laurence Schumann, *Journal of Regulatory Economics*, Vol. 11, No. 3 (May 1997): 271-289.

"Market Power and Collusion in the Ocean Shipping Industry: Is a Bigger Cartel a Better Cartel?" with Paul S. Clyde, *Economic Inquiry*, Vol. 36, No. 2 (April 1998): 292-304.

"Is it Efficient to Impose Costs on Small-Volume Equity Traders?" with Paul S. Clyde, *International Journal of the Economics of Business*, Vol. 6, No. 1 (April 1999): 81-92.

"Lessons from the First Year of Competition in the California Electricity Markets," with Robert Earle, Philip Hanser, and Weldon Johnson, *The Electricity Journal*, Vol. 12, No. 8 (October 1999): 57-76.

"Entry Policy and Entry Subsidies," with Oliver R. Grawe, *Review of International Economics,* Vol. 7, No. 4 (November 1999): 715-731.

"Deregulation and Monitoring of Electric Power Markets," with Robert L. Earle and Philip Q Hanser, *The Electricity Journal*, Vol. 13, No. 8 (October 2000): 11-25.

"Strategic Pricing When Electricity Is Storable," with Alfredo Garcia and Ennio Stachetti, *Journal of Regulatory Economics*, Vol. 20, No. 3 (November 2001): 223-247.

"Rolling Seas in Liner Shipping," with Kelli L. Sheran, *Review of Industrial Organization*, Vol. 20, No. 1 (February 2002): 51-59.

"Regional Interactions in Electricity Prices in the Eastern United States," with Gregory R. Leonard, Adam C. Schumacher, and James G. Bohn, in Michael A. Crew and Joseph C. Schuh editors, *Markets, Pricing, and Deregulation of Utilitie*s (Boston: Kluwer Academic Publishers, 2002): 109-142.

"Designing Standard-Offer Service to Facilitate Electric Retail Restructuring," with Lisa V. Wood, J. Arnold Quinn, and Kelli L. Sheran, *The Electricity Journal*, Vol. 15, No. 9 (November 2002): 34-51.

“Can Mergers to Monopoly, Price Fixing, and Market-Division Agreements Raise Welfare?” with Paul S. Clyde, *International Journal of the Economics of Business*, Vol. 11, No. 1 (February 2004): 69-90.

“Forward and Spot Prices in Electricity and Gas Markets: Does ‘Storability’ Matter?” with J. Arnold Quinn and Adam C. Schumacher, in Michael A. Crew and Menahem Spiegel editors, *Obtaining the Best from Regulation and Competition* (Boston: Kluwer Academic Publishers, 2005): 109-135.

“Incentive Contracts for Infrastructure, Litigation and Weak Institutions,” with Alfredo Garcia and Juan Benavides, *Journal of Regulatory Economics*, Vol. 27, No. 1 (January 2005): 5-24.

“Dynamic Pricing & Learning in Electricity Markets,” with Alfredo Garcia and Enrique Campos, *Operations Research*, Vol. 53, No. 2 (March-April 2005): 231-241.

“Estimating the Economic ‘Trade’ Value of Increased Transmission Capability,” with Andrew N. Kleit, *The Electricity Journal*, Vol. 19, No. 2 (March 2006): 69-78.

“International Perspectives on Electricity Market Monitoring and Market Power Mitigation,” with Jose A. Garcia, *Review of Network Economics*, Vol. 6, No. 3 (September 2007): 397-424.

“Downstream Price-Cap Regulation and Upstream Market Power,” *Journal of Regulatory Economics*, Vol. 33, No. 2 (April 2008): 179-200.

“Airline Alliances and Systems Competition,” with Diana Moss, *Houston Law Review*, Vol. 45, No. 2 (Summer 2008): 293-332.

“The Effectiveness of FERC’s Transmission Policy: Is Transmission Used Efficiently and When Is It Scarce?” with Andrew N. Kleit, *Journal of Regulatory Economics*, Vol. 34, No. 1 (August 2008): 1-26.

“Competition for Exclusive Customers: Comparing Equilibrium and Welfare under One-Part and Two-Part Pricing,” with Glenn A. Woroch, *Canadian Journal of Economics*, Vol. 41, No. 3 (August 2008): 1046-1086.

“Competitive Effects of Exchanges or Sales of Airport Landing Slots,” with Brendan McVeigh, Nicholas Powers, and Samuel Moy, *Review of Industrial Organization*, Vol. 46, No. 2 (March 2015): 95-125.

Books

The Regional Welfare Effects of U.S. Import Restraints on Apparel, Petroleum, Steel and Textiles, with Randi Boorstein, Michael Metzger, and Morris Morkre, Avebury Press, 1996.

Completed Studies

"Case Studies of the Price Effects of Horizontal Mergers," *Staff Report of the Federal Trade Commission,* April 1992, with coauthors.

"The Effectiveness of Collusion under Antitrust Immunity - The Case of Liner Shipping Conferences," *Staff Report of the Federal Trade Commission*, December 1995, with coauthor.

"The Effectiveness of Dutch Airport Transport Policy," study prepared for the Dutch Ministry of Transport, December 2002, with coauthors.

"The Economic Impact of an EU-US Open Aviation Area," study prepared for the European Commission - Directorate-General for Energy and Transport, December 2002, with coauthors.

"Study to Assess the Potential Impact of Proposed Amendments to Council Regulation 2299/89 with regard to Computerised Reservation Systems," study prepared for the European Commission - Directorate-General for Energy and Transport, October 2003, with coauthors.

PRESENTATIONS

"Genco Pricing & Genco Asset Values under Deregulation," presented to the Center for Business Intelligence Conference, Chicago, IL, September 18, 1998.

"Ancillary Services: New Business Opportunities in Competitive Ancillary Services Markets," presented at Electric Utility Consultants Workshop on Strategies for Pricing and Selling Ancillary Services, Denver, CO, September 9, 1999.

"Profit-Maximizing Strategies and Gaming: Market Power and Power Markets," presented to the Center for Business Intelligence Conference on Pricing Power Products and Services, Chicago, IL, October 14, 1999.

"Strategic Behavior and Power Market Prices," presented to the EPRI Asset &Risk Management Group, Washington, DC, June 23, 2000.

"Regional Interactions in Electricity Prices in the United States," presented to the CRRI Research Seminar, Newark, NJ, May 3, 2002.

"Standard-Offer Service and Retail Restructuring of Electric Markets," presented to the CRRI Eastern Conference, Newport, RI, May 23, 2002.

"The Economic Impact of an EU-US Open Aviation Area," presented to the U.S. Department of State, the European Commission (US office), and the Heritage Foundation, Washington, DC in 2002 and 2003 , and the Association of European Airlines, Brussels, Belgium, 2003.

“Transactions Costs Across Electricity Markets: Does Restructuring Matter?” presented to the CRRI Eastern Conference, Skytop, PA, May 22, 2003.

“Identifying the Relationship between Spot and Futures Prices for Electricity and Natural Gas,” presented to the Center for Research in Regulated Industries (CRRI) Research Seminar, Newark, NJ, May 7, 2004, and the CRRI Eastern Conference, Skytop, PA, May 21, 2004.

“Geographic Integration, Transmission Constraints, and Electricity Restructuring,” presented to the Federal Energy Regulatory Commission, Federal Trade Commission, Energy Information Administration, in Washington, DC, in 2004 and 2005, and the 10th Annual POWER Research Conference on Electricity Industry Restructuring of the University of California Energy Institute, Berkeley, CA, March 18, 2005.

TESTIMONY/EXPERT REPORTS

Testimony before the Advisory Commission on Conferences in Ocean Shipping, 1991, relating to an econometric analysis of the determinants of ocean freight rates, and the conclusions of that study with respect to the existence of market power in ocean shipping.

Expert Submission - Appendix J, Volume 1, Prehearing Brief on Behalf of Petitioner, Certain Flat Rolled Carbon Steel Products, June 21, 1993, U.S. International Trade Commission Investigation Nos. 701-TA-319-332, 334, 336-342, 344, and 347-353 (final); 731-TA-573-579, 581-592, 594-597, 599-609, and 612-619 (final). Analysis included a critique of methods used to evaluate domestic injury in trade cases. Also authored part of submission for post-hearing brief.

Expert Report Submitted to the European Court of First Instance on Behalf of the European Commission relating to the Petition of the Transatlantic Agreement to Annul the Commission's Decision of October 19, 1994, including a rebuttal of the expert economic analysis offered by the members of the Transatlantic Agreement in support of their collective restrictions on capacity utilization and their coordinated activity in setting certain types of freight rates.

Testimony in the Matter of Henry H. Godfrey v. Benjamin F. Hofheimer, III, *et. al.*, 1995, on behalf of defendant relating to the appropriate calculation of damages in a breach-of-contract dispute.

Expert Report Submitted to the Environmental Protection Agency, 2000, on behalf of a trade group of aluminum smelters assessing the economic costs of revised land-disposal restriction standards for spent aluminum potliners (K088), 2000.

Two Expert Reports Submitted to the U.S. District Court for the District of Maryland, 2001, in the matter of Charles River Associates Inc. v. Hale Trans, Inc., assessing the quality and cost effectiveness of economic expertise provided in a predatory-pricing matter.

Expert Report Submitted to the U.S. District Court for the District of Columbia in the Matter of DAG Enterprises Inc. v. Exxon Mobil Corporation, 2003, regarding the suitability of a prospective purchaser as an acquirer of Mobil assets under the antitrust standards used by the Federal Trade Commission.

Expert Report Submitted to the Federal Energy Regulatory Commission (Docket No. EC05-43-000) 2005 on behalf of Midwest Generation, regarding the competitive impact of the proposed merger of Exelon Corporation and Public Service Enterprise Group and the mitigation measures offered by the parties.

Expert Reports submitted to the U.S. Department of Transportation (Docket No. OST-2004-19214), 2005, on behalf of American Airlines, regarding the competitive impact of the proposed application for antitrust immunity of an airline alliance consisting of Delta, Northwest, KLM, Air France, Alitalia, and Czech Airlines.

Expert Report and Testimony before the Public Utility Commission of Texas (Docket No. 31056), 2005, on behalf of the Cities served by AEP Texas Central Company, the Texas Industrial Energy Consumers, and the Alliance for Valley Healthcare, regarding the competitiveness of an auction held to sell an ownership share in a nuclear power plant and the commercial reasonableness of the actions taken by the seller.

Expert Reports submitted to the U.S. Department of Transportation (Docket No. OST-2005-22922), 2006, on behalf of American Airlines, regarding the competitive impact of the proposed Star Alliance expansion to include LOT and Swiss airlines and expand antitrust immunity between Air Canada and United Airlines.

Expert Report and Testimony before the Public Service Commission of Maryland, (Case No. 9117, Phase 1), 2007 on behalf of Potomac Electric Power Company and Delmarva Power & Light Company, regarding the risks and costs associated with portfolio procurement of electric power supplies as opposed to relying on a full-requirements auction-based procurement method.

Expert Report submitted to the Pennsylvania Public Utility Commission (Docket No. P-0072305), 2008, on behalf of Pennsylvania Power Company, regarding the risks and costs associated with different procurement methods for obtaining electric power supplies to serve default-service customers.

Expert Report and Testimony before the Public Utility Commission of Ohio (Case No. 08-936-EL-SSO), 2008, on behalf of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company, regarding the rationale for using an auction process to procure full-requirements electric power supplies for standard-service-offer customers, as well as a description of the responsibilities undertaken by myself and The Brattle Group as manager of that procurement.

Expert Report submitted to the Pennsylvania Public Utility Commission (Docket Nos. P-2009-2093053 and P-2009-2093054), 2009, on behalf of Metropolitan Edison Company and Pennsylvania Electric Company, describing the design of an RFP process for procuring solar photovoltaic alternative energy credits and the management of that process by myself and The Brattle Group, as well as an analysis of the desirability of meeting default service obligations through the auction-based procurement of full-requirements power supplies.

Various Expert Reports submitted between 2008 and 2010 to the U.S. Department of Transportation (Docket No. OST-2008-0252) and the European Commission describing the competitive impact of the proposal by the oneworld alliance to receive antitrust immunity, including various assessments of the impact on non-stop and connecting passengers that relied on econometric analysis of airline fare data and other empirical methods.

Reports submitted to the Pennsylvania Public Utility Commission, 2010, 2011, 2012, and 2013 as the Independent Procurement Manager for the procurement of Solar Photovoltaic Alternative Energy Credits by Metropolitan Edison Company, Pennsylvania Electric Company, and Pennsylvania Power Company including a description of the RFP process, a benchmarking of procurement prices against both current short-term prices and expected long-term prices for solar credits (based on a proprietary financial model), and the conformity of the procurement to the standards of least-cost procurement provided under Pennsylvania law.

Expert Reports (and Deposition) submitted to the U.S. District Court for the Middle District of Tennessee, 2012, in the matter of Watson Carpet & Floor Covering Inc. v. Mohawk Industries Inc., regarding the competitive effects of a carpet manufacturer's alleged refusal to sell its products to a carpet dealer serving production homebuilders in Nashville and surrounding counties.

Expert Reports and Testimony before the Pennsylvania Public Utility Commission (Docket Nos. P 2011-2273650, P-2011-2273668, P-2011-2273669, and P-2011-2273670), 2011 and 2012, on behalf of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, and West Penn Power Company, analyzing the Companies' procurement strategies for supplying default service customers, describing the design of an RFP process for procuring solar photovoltaic alternative energy credits (and the management of that process by myself and The Brattle Group), proposing an auction process for outsourcing the provision of generation service for time-of-use customers, describing an "opt-in" auction process to promote the switching of default service customers to competitive retail supply, and describing a customer referral program that is also designed to promote retail competition.

Expert Reports before the Pennsylvania Public Utility Commission (Docket Nos. P-2013-2391368, P-2013-2391372, P-2013-2391375, P-2013-2391378), 2013 and 2014, on behalf of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, and West Penn Power Company, analyzing the Companies' procurement strategies for supplying default service customers.

Report submitted and Testimony provided to the Canadian Radio-television and Telecommunications Commission (CRTC Docket No. 2014-76-1), 2014, on behalf of the Canadian Competition Bureau analyzing market power in the wireless market, including an analysis of industry profitability, an assessment of the impact on prices, market shares, profits, consumer surplus, and market penetration arising from the entry of an additional nationwide carrier, and an analysis of the cost impact for incumbent carriers arising from changes in spectrum availability used to accommodate additional entry.

Expert Reports before the Pennsylvania Public Utility Commission (Docket Nos. P-2015-2511333, P-2015-2511351, P-2015-2511355, and P-2015-2511356), 2015, on behalf of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, and West Penn Power Company, analyzing the Companies' procurement strategies for supplying default service customers and the competitiveness of the proposed procurement process, and estimating the pricing and volumetric risk premium associated with past procurements.

Expert Report before the North Carolina Utilities Commission (Docket. Nos. E-2 Sub 1095, E-7 Sub 1100, and G-9 Sub 682), 2016, on behalf of Duke Energy, relating to an analysis of potential market power issues and the potential for competitive harm associated with the acquisition by Duke Energy of Piedmont Natural Gas, as it applies to the combination of electric and retail gas activities and the transport and delivery of natural gas.

PROFESSIONAL ACTIVITIES

Consultant to the *World Bank* on the formation of regional trading blocs, the *European Community* (DG IV) on antitrust and transportation issues, and the *Government of Canada* (Competition Bureau) on antitrust and transportation issues.

Advisory Board Member of the Center for Research in Regulated Industries

Member of the Atlantic Energy Group

Referee for the following journals: *American Economic Review, Canadian Journal of Economics, Contemporary Policy Issues, European Economic Review, International Economic Review, International Journal of the Economics of Business, Journal of Economics, Journal of Economics and Business, Journal of Economic Integration, Journal of Industrial Economics, Journal of International Economics, Journal of Regulatory Economics, Oxford Economic Papers, and Review of International Economics*.

Teaching Experience: Introductory Macroeconomics; Introductory Microeconomics

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