

COMMONWEALTH OF PENNSYLVANIA



OFFICE OF CONSUMER ADVOCATE

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February 12, 2021

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Re: Joint Petition for Consolidation of Proceedings and
Approval of the Phase IV Energy Efficiency and
Conservation Plan of Metropolitan Edison Company,
Pennsylvania Electric Company, Pennsylvania Power
Company, and West Penn Power Company
Docket Nos. M-2020-3020820
M-2020-3020821
M-2020-3020822
M-2020-3020823

Dear Secretary Chiavetta:

Pursuant to 52 Pa. Code § 5.412 and the attached Interim Order Confirming Admitted Evidence in the above-referenced proceeding, enclosed, please find copies of the Office of Consumer Advocate's (OCA) admitted evidence, including:

- OCA Statement 1 Direct Testimony of Geoffrey C. Crandall
 - Exhibits GCC-1 through GCC-4
 - Verification of Geoffrey C. Crandall

- OCA Statement 1-Supplemental Direct Testimony of Geoffrey C. Crandall
 - Schedule GCC-Supp-1
 - Schedule GCC-Supp-2
 - Verification of Geoffrey C. Crandall

- February 9, 2021 Interim Order Adopting Joint Stipulation for Admission of Evidence and Admitting Evidence into the Record

Rosemary Chiavetta, Secretary

February 12, 2021

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Please note that the above-listed documents were admitted into the hearing on February 5, 2021 before the Honorable Mark A. Hoyer and the Honorable Emily I. DeVoe.

Copies have been served per the attached Certificate of Service.

Respectfully submitted,

/s/ Christy M. Appleby

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Assistant Consumer Advocate

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Enclosures:

cc: The Honorable Mark A. Hoyer (**email only**)

The Honorable Emily I. DeVoe (**email only**)

Certificate of Service

*303950

CERTIFICATE OF SERVICE

Re: Joint Petition for Consolidation of Proceedings : Docket Nos. M-2020-3020820
and Approval of the Phase IV Energy Efficiency : M-2020-3020821
and Conservation Plan of Metropolitan Edison : M-2020-3020822
Company, Pennsylvania Electric Company, : M-2020-3020823
Pennsylvania Power Company, and West Penn :
Power Company :

I hereby certify that I have this day served a true copy of the following document, the Office of Consumer Advocate's § 5.412a filing of Admitted Evidence, upon parties of record in this proceeding in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant), in the manner and upon the persons listed below:

Dated this 12th day of February 2021.

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Dated: February 12, 2021
*303951

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

METROPOLITAN EDISON COMPANY
Docket No. M-2020-3020820

PENNSYLVANIA ELECTRIC COMPANY
Docket No. M-2020-3020821

PENNSYLVANIA POWER COMPANY
Docket No. M-2020-3020822

WEST PENN POWER COMPANY
Docket No. M-2020-3020823

PHASE IV ENERGY EFFICIENCY AND
CONSERVATION PLAN

DIRECT TESTIMONY
OF
GEOFFREY C. CRANDALL

ON BEHALF OF
PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE

January 13, 2021

I. QUALIFICATIONS

1 **Q. What is your name and business address?**

2 A. My name is Geoffrey C. Crandall. My business address is MSB Energy Associates, Inc.,
3 6907 University Avenue #162, Middleton, Wisconsin 53562.

4

5 **Q. On whose behalf are you testifying today?**

6 A. I am testifying on behalf of the Office of Consumer Advocate (“OCA”).

7

8 **Q. Please describe your background and experience in the field of gas and electric**
9 **utility regulation.**

10 A. I am a principal and the Vice President of MSB Energy Associates, Inc. I have over 45
11 years of experience in utility regulatory issues, including resource planning, restructuring,
12 mergers, fuel, purchase power and gas cost recovery and planning analysis, energy
13 efficiency, conservation and load management impacts, program design and other issues.
14 I have provided expert testimony before more than a dozen public utility regulatory
15 bodies throughout the United States. I have provided expert testimony before the United
16 States Congress on several occasions and have previously filed testimony in over a half-
17 dozen cases before the Pennsylvania Public Utility Commission.

18 My experience includes over 15 years of service on the Staff of the Michigan Public
19 Service Commission. In my tenure at the Michigan Public Service Commission, I served

1 as an analyst in the Electric Division (Rates and Tariff section) involving rate as well as
2 fuel and purchase power cases. I also served as the Technical Assistant to the Chief of
3 Staff, supervisor of the energy conservation section (involving residential and
4 commercial energy efficiency programs). I also served as the Division Director of the
5 Industrial, Commercial and Institutional Division. In that capacity, I was Director of the
6 Division that had responsibility for the energy efficiency and conservation program
7 design, funding, and implementation of Michigan utility and DOE-funded private
8 company implemented programs and initiatives involving Industrial, Commercial and
9 Institutional gas and electric customers throughout Michigan.

10 In 1990, I became employed by MSB Energy Associates, Inc. and have served clients
11 throughout the United States on numerous projects related to system planning, energy
12 efficiency and load management program development, transmission need and siting,
13 fuel, purchase power and gas cost recovery assessments, , electric restructuring, customer
14 impact analyses, and other issues. My vita is attached as Schedule GCC-1.

16 **II. DIRECT TESTIMONY**

17 **Q. What is the purpose of your testimony in this case?**

18 **A.** The purpose of my testimony is to assess the reasonableness of the proposed Act 129
19 Energy Efficiency and Conservation Plans that were included in the following First
20 Energy (FE) Dockets: METROPOLITAN EDISON COMPANY Docket No. M-2020-
21 3020820, PENNSYLVANIA ELECTRIC COMPANY Docket No. M-2020-3020821,

1 PENNSYLVANIA POWER COMPANY, Docket No. M-2020-3020822, WEST PENN
2 POWER COMPANY Docket No. M-2020-3020823 (referred to collectively as the
3 “Companies”). I address a number of components of the proposed Act 129 Phase IV plan
4 including program and portfolio development, cost recovery, cost effectiveness,
5 consistency with Commission Orders issued on June 18, 2020 in Docket No. M-2020-
6 3015228, implementation strategy, savings projections and other aspects of the proposed
7 energy efficiency and conservation plans. I offer specific suggestions regarding the
8 appropriateness of various aspects of the Companies proposed Phase IV plans.

9
10 **Q. Please identify key issues that you believe should be brought to the attention of the**
11 **Commission in this proceeding.**

12 **A.** Key concerns and issues that I have with the Companies’ proposed Act 129 Phase IV
13 energy efficiency and conservation plans include:

- 14 ○ The Companies’ Phase IV Plans are not consistent with the Commission Order
15 issued in Docket No. M-2020-3015228 as a result of the Companies’ proposal to
16 rely on behavioral modification subprograms as a resource acquisition strategy.
- 17 ○ The Companies’ proposed application of Rider F, cost recovery mechanism and
18 application of the cost recovery procedure is flawed, erroneous and is not
19 consistent with the Commission’s guidance that was provided to the Companies
20 in Docket No. M-2020-3015228.

EDC NAME	Phase IV MWh	Phase IV MW
Met-Ed	463,215	76
Penelec	437,676	80
Penn Power	128,909	20
West Penn Power	504,951	86

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2 **Q. What are the Companies proposing to offer their residential and commercial**
3 **customers in the energy efficiency and conservation programs beginning in 2021?**

4 A. FE proposes to offer the following programs in Phase IV:

- 5 ○ The Energy Efficient Products Program
- 6 ○ The Energy Efficient Homes Program
- 7 ○ The Low-Income Energy Efficiency Program
- 8 ○ The C&I Energy Solutions for Business Program-Small
- 9 ○ The C&I Energy Solutions for Business Program-Large

10 **Q. How are the Companies proposing to recover the costs of the Phase IV energy**
11 **efficiency and conservation programs?**

12 A. FE is proposing to collect program revenues via Rider F and spend the following amounts
13 over the five-year Plan for each of the individual Companies:

1

EDC NAME	Phase IV Budget
Met-Ed	\$124,334,470
Penelec	\$114,873,710
Penn Power	\$33,298,945
West Penn Power	\$117,813,010
Total	\$390,320,135

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Concerns About Existing Energy Efficiency and Conservation Programs

4

Q. Do you have concerns related to behavioral energy efficiency and conservation programs?

5

6

A. Yes, I do have concerns related to the behavioral elements in several of the residential programs. The Commission, on page 91 of its M-2020-3015228 Order, directed the Companies to “**develop plans to achieve the most lifetime energy savings per expenditure**”. In response to the Commission’s directives in the above-mentioned Order, the Companies put forward their Phase IV plan and proposed that energy savings be accomplished, in part, by several behavioral modification subprograms. Those subprograms are identified in the program description as being a component of the residential sector programs including the Energy Efficient Homes Program and the Low-Income Energy Efficiency Program. The programs are commonly referred to as the Home Energy Report (HER) Programs which FE proposes to offer to its residential customers. The EMV team, using the Pennsylvania Technical Reference Manual (TRM), typically derives quantifiable values to estimate the impact of the program. The EMV

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1 team would determine the actual savings compared to the projected impact resulting from
 2 these programs. The programs are designed to generate energy savings by providing
 3 residential customers (both low income and non-low-income customers) information on
 4 their energy use and energy saved. Program participants will receive information
 5 (typically done quarterly) in the form of home energy reports that give customers various
 6 types of information such as.

- 7 • Assessment of how their recent energy use compared to their own energy use in the
 8 past
- 9 • Tips on how to reduce energy consumption, some of which were tailored to the
 10 customer’s circumstances.
- 11 • Information on how customer’s energy use compared to that of neighbors with similar
 12 homes.

13 **Q. What are the costs, MWh energy and MW demand savings estimated for the**
 14 **behavioral programs in the Low-Income Energy Efficiency Program and the**
 15 **Energy Efficiency Homes program in FE’s Phase IV Plan?**

16 A. FE indicated in Appendix C of its Phase IV Plan that the costs and savings from the
 17 behavioral programs are expected to be as follows:

EDC	% of Budget ¹	kWh % of Savings ²	MW % of Savings
Met-Ed	3.2%	6.2%	6.2%
Penelec	3.0%	3.8%	3.8%
Penn Power	4.8%	8.0%	7.6%
West Penn Power	4.3%	6.7%	6.4%

19
 20 **Q. What concerns do you have with the behavioral programs as a component of FE’s**
 21 **energy efficiency plan?**

¹ Cost based on Residential and Low-Income Behavior programs Appendix C, Table 1-1 - 1-5

² kWh and kW based on Residential and Low-Income Behavior programs Appendix C, Table 2

1 A. Home Energy Report Programs in the United States have been shown to save energy;
2 however, the savings are not long-lived. Some evaluations have recognized the useful
3 life with the savings being produced for customers who were receiving treatment.
4 Savings have been accomplished in the 1-2% range. However, the Pennsylvania
5 Technical Reference Manual (TRM) allows for recognition of savings beyond one year
6 for the treatment group. The PA TRM gives credit for energy saved during the first-year
7 treatment period and also allows for a recognition of savings offset by a “decay of
8 savings.” The decay in savings recognizes a lower annual savings in period 2 and a
9 lesser amount in period three (For customers having only received treatment for the first
10 annual period). I also note that FE indicated in its Phase IV Plan that the Companies
11 intended to use a behavioral program element for small and large commercial and
12 industrial customers. However, at the informal discovery meeting held with FE on
13 January 8, 2021, FE indicated that a HER program was not going to be used with their
14 commercial or industrial customers. Rather, they are intending to provide these
15 commercial and industrial customers with technical information, tips and energy
16 efficiency information to help customers reduce energy costs. The HER program is not
17 intended, nor is it being planned, to be used with the Companies’ commercial or
18 industrial programs.

19
20 **Q. How do the FE Phase IV programs comply with the Commission Order language**
21 **requiring it to “develop plans to achieve the most lifetime energy savings per**
22 **expenditure”?**

23
24 A. The Companies have included a behavioral element for its residential customers which
25 accounts for approximately 4% of its budget. Since the Commission expected the
26 Companies to “develop plans to achieve the most lifetime energy savings per
27 expenditure” it appears that the Companies’ plan will come up short of achieving this
28 expectation. I recommend scaling back the behavior modification programs and
29 allocating those funds to the weatherization subprogram within the Low-Income Energy
30 Efficiency Program or the Energy Efficient Products Program. These programs are

1 greatly needed and includes long-lived and efficient measures such as refrigerators and
2 building shell measures.

3
4 **Rider F – Phase IV Cost Recovery**

5
6 **Q. Please briefly describe Rider F, the cost recovery and reconciliation mechanism for**
7 **Phase IV EE&C costs.**

8 A. Rider F describes the derivation of the rate the Companies have proposed to recover the
9 costs associated with the Phase IV EE&C Plan. The Companies' witness Anthony
10 Woytko presents Rider F in Exhibit AJW-1 for Met-Ed, Exhibit AJW-2 for Penelec,
11 AJW-3 for Penn Power, AJW-4 for West Penn Power and AJW-5 for West Penn Power
12 Tariff No. 38. Although the numerical values for the rates by customer class for the June
13 1, 2021 through May 31, 2022 time period vary, the underlying formula for the rates is
14 the same. I've included an excerpt from the Companies' Riders presenting the formula
15 and defining terms in Schedule GCC-2. The formula for the rates presented by the
16 Companies is:

$$17 \quad \text{EE\&C-C} = [(\text{EEC}_C - E - E^2) / S] \times [1 / (1 - T)]$$

$$18 \quad \text{EEC}_C = \text{EEC}_{\text{Exp1}} + \text{EEC}_{\text{Exp2}} + \text{EEC}_{\text{Exp3}}$$

19
20 First Energy's proposed terms are defined in Schedule GCC-2.

21
22 **Q. Please describe the rate calculation for Rider F.**

23 A. The rate for a customer class (EE&C-C) equals the rider revenue requirement for the
24 customer class divided by the sales volume (S) for that customer class and adjusted for
25 the gross receipts tax (T). I am focusing on the rider revenue requirement ($\text{EEC}_C - E -$
26 E^2), and particularly on the costs of the Phase IV EE&C Programs (EEC_C).

27
28 E and E^2 are reconciliation terms. E reconciles the actual costs and actual revenues of the
29 Phase IV Programs for that customer class, while E^2 addresses the final reconciliation of
30 the Phase III Programs for that customer class.

1 **Q. Are you recommending changes to Rider F?**

2 A. Yes. I am recommending modifications to the following terms in the rider revenue
3 requirement:

- 4 • Modify EEC_{exp1} , the direct costs and allocated common costs of the Phase IV EE&C
5 Programs by customer class, to remove the PJM net revenues and clarify the basis for
6 allocating indirect costs from.
- 7 • Clarify the basis for allocating startup costs in EEC_{exp2} , the allocated portion by
8 customer class of the startup costs through May 31, 2021 to design, create, and obtain
9 Commission approval for Phase IV EE&C Programs.
- 10 • Clarify the basis for allocating SWE costs in EEC_{exp3} , the allocated portion by
11 customer class of the SWE costs.
- 12 • Add a term to the reconciliation portion of the rider revenue requirements to reflect
13 PJM revenues (R_{PJM}) and PJM costs (C_{PJM}) and revise the basis for allocating PJM
14 net revenues.

15
16 **Q. How did you change the formulas and terms for Rider F?**

17 A. Schedule GCC-3 shows the changes I made to the Companies' Rider F. Schedule GCC-3
18 replaces the portions of the Companies' Rider F displayed in Schedule GCC-2. The
19 formula I'm recommending is:

$$EE\&C-C = [(EECC - E + \{R_{PJM} - C_{PJM}\} - E^2) / S] \times [1 / (1 - T)]$$

$$EECC = EEC_{Exp1} + EEC_{Exp2} + EEC_{Exp3}$$

22 My proposed terms are defined in Schedule GCC-3.

23
24 The term $\{R_{PJM} - C_{PJM}\}$ is the difference between the revenues from PJM for cleared
25 resources nominated from Phase IV EE&C programs and the cost of participating in the
26 PJM capacity market, including penalties for failing to deliver the cleared capacity. It is
27 the PJM revenues net of costs.

28
29 **Q. Why did you remove the PJM net revenues from the EEC_{Exp1} term?**

30 A. There are two reasons:

31

1 First, the EEC_{Exp1} term is the EE&C program budget for each customer class. Summing
2 across the customer classes is the portfolio-wide budget, which is established by the
3 Commission and capped at 2%. PJM revenues do not increase the EE&C budget; rather
4 the net PJM revenues are flowed back to ratepayers by reducing the amounts of EE&C
5 expenditures collected through Rider F³. The expenditures are limited to 2%, some of
6 which is paid by PJM revenues and the rest is collected from ratepayers through Rider F.
7 Mixing in the PJM revenues and costs, which are not subject to the 2% cap, obscures the
8 capped amounts.

9
10 Second, including the PJM net revenues in the EEC_{Exp1} term is not compliant with the
11 Commission's Implementation Order.

12
13 **Q. Why is the Companies' method of addressing PJM net revenues not compliant with**
14 **the Commission's Implementation Order?**

15 A. The Commission's June 18 Phase IV Implementation Order stated that proceeds from
16 PJM are to be "used to reduce Act 129 surcharges and collections for customer classes
17 from which the savings were acquired, *via the reconciliation for over-under collection*
18 *process.*" (Page 138, emphasis added). The EEC_{Exp1} term sets the actual and projected
19 costs initially to be recovered through the rider. It is not the reconciliation term which is
20 E for Phase IV and E² for Phase III.

21
22 In addition, the Commission's June 18 Phase IV Implementation Order stated that the
23 "reconciliation statement should clearly identify PJM FCM⁴ proceeds as cost reductions
24 and PJM FCM deficiency charges as cost increases." (Page 142). The Companies'
25 proposed Rider F rolls the net PJM revenue into the EE&C cost, not the reconciliation

³ The Commission stated "Like our position that FCM proceeds should not act as a de facto increase in EDC budgets, the Commission clarifies that FCM penalties should not be treated as a de facto reduction in EDC budget. To summarize, the 2% spending cap is a limit on EE&C Plan expenditures. To the extent that those expenditures generate proceeds or penalties, those proceeds or penalties should be reflected in cost recovery, but the 2% spending cap is unaffected." Energy Efficiency and Conservation Program Implementation Order, Docket No. M-2020-3015228, June 18, 2020, page 141.

⁴ FCM – Forward Capacity Market as used in Commission's Implementation Order, page 5.

1 statement, and does not clearly identify the PJM proceeds as cost reductions nor PJM
2 charges as cost increases.

3
4 **Q. What method of allocating common costs to customer classes did the Companies
5 propose in their Rider F?**

6 A. The Companies' Rider F allocates common costs to each customer class based on the
7 ratio of class-specific approved budgeted program costs to total approved budgeted
8 program costs. Rider F specifically uses that method to:

- 9 a. Allocate to customer classes the PJM revenues net of associated costs in EEC_{Exp1}.
10 b. Allocate to customer classes the indirect costs associated with all of the Company's
11 Phase IV EE&C Programs in EEC_{Exp1}.
12 c. Allocate to customer classes the incremental administrative startup costs prior to May
13 31, 2021 associated with the Company's design, creation and obtaining approval for
14 Phase IV EE&C Programs in EEC_{Exp2}.
15 d. Allocate to customer classes each utility's share of the costs to fund the
16 Commission's statewide evaluator in EEC_{Exp3}.

17
18 **Q. Is it appropriate to allocate PJM revenues and associated costs to each customer
19 class based on the ratio of class-specific approved budgeted program costs to total
20 approved budgeted program costs?**

21 A. No. The class specific budgets are to implement class-specific Phase IV EE&C
22 programs. According to the EE&C Plans, Section 1.6 (attached as Schedule GCC-4),
23 many of those programs are not eligible to be PJM capacity resources, and thus cannot be
24 nominated. These include online audits, appliance recycling, smart thermostats,
25 behavioral programs and education programs among others. It would not be proper to
26 allocate PJM revenues and costs based on the customer class ratios of the budgets, which
27 include many measures that aren't eligible and many others which may not be nominated
28 because they are too risky or costly to nominate. When the nominations are made and
29 resources cleared, the allocations of the PJM revenues and costs are appropriately made
30 using the proportion of the energy efficiency peak reduction supplied by each customer
31 class.

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In addition, the Companies’ proposal to allocate PJM revenues and costs to customer classes Phase IV program budgets is not in compliance with the Commission’s Implementation Order. The Implementation Order stated that proceeds from PJM are to be “used to reduce Act 129 surcharges and collections for *customer classes from which the savings were acquired*, via the reconciliation for over-under collection process.” (Page 138, emphasis added)

Q. Is it appropriate to allocate the other above-mentioned common costs to each customer class based on the ratio of class-specific approved budgeted program costs to total approved budgeted program costs?

A. Yes. Since the indirect costs in EEC_{Exp1} , the Phase IV incremental startup costs in EEC_{Exp2} , and statewide evaluator costs in EEC_{Exp3} are each tied to the overall EE&C plan, it would be reasonable to allocate each Company’s common costs among the customer classes in proportion to the budget for each customer class.

Q. Are the Companies actually using the proposed ratio of class-specific approved budgeted program costs to total approved budgeted program costs to allocate the common costs among the customer classes?

A. That is unclear. Given the compact timelines for considering the Companies’ EE&C Plans, OCA participated in an informal verbal discovery session on Friday, January 8, to address OCA’s potential questions and issues. During that discussion, FirstEnergy indicated that it actually has been allocating the common costs based on the ratio of each customer classes’ CSP Delivery Fees plus Marketing costs to the Companies’ total CSP Delivery Fees plus Marketing costs. The Companies indicated that they would assess the discrepancy between actual practice and the proposed Rider and provide an explanation. As of this time, OCA has not received the explanation.

Q. Does the choice of allocation mechanism affect the costs allocated to residential customers?

1 A. Yes. Using the method the Companies verbally stated they actually use allocates more of
 2 the common costs to the residential ratepayers than the method spelled out in the
 3 Companies' proposed Rider F. Using Appendix B, Tables 10-1 through 10-3 to derive
 4 the class factors to allocate the common costs in Appendix B, Table 12, I derived the
 5 allocation factors for the residential classes.
 6

Residential Allocation Factors for Common Costs Associated with Phase IV EE&C		
	Rider F as Proposed	Actual Approach
MetEd	41.6%	41.8%
Penn Power	40.8%	42.8%
Penelec	46.4%	50.1%
West Penn	46.7%	50.0%

7

8 **Q. Did the Companies provide any reasons for preferring the allocation of common**
 9 **costs based on the CSP delivery fees and marketing costs rather than the total**
 10 **program costs proposed in Rider F?**

11 A. No. I recommend that the Commission use the allocation method as proposed in Rider F
 12 and as contained in Schedule GCC-3.
 13

14 **Q. How did you address PJM revenues from and associated costs of participating in**
 15 **PJM's Capacity Market?**

16 A. I added the terms $\{R_{PJM} - C_{PJM}\}$ to the reconciliation process to explicitly list PJM
 17 revenues as reducing costs for the EE&C programs borne by the ratepayers and PJM
 18 costs as increasing the ratepayer costs. Effectively, the EE&C program costs are subject
 19 to the 2% limit, but those costs are recovered from PJM revenues and the balance from
 20 ratepayers through the Rider. These changes make it easier to track the actual revenues
 21 and costs associated with selling energy efficiency peak demand reduction resources to
 22 PJM. These changes are also necessary to comply with the Commission's
 23 Implementation Order, that the proceeds or penalties should be reflected in cost recovery
 24 but not affect the 2% spending cap (page 141) and that the reconciliation statement
 25 clearly identify PJM FCM proceeds and charges (page 142).

1
2 I also changed how the Companies were proposing in the Rider to allocate the PJM
3 revenues and costs. The Companies' Rider F allocated them proportional to the customer
4 class budgets. I am proposing to allocate the PJM revenues and associated costs in
5 proportion to the customer class share of peak demand reduction nominated and cleared.
6 It is logical to share the benefits (and costs, i.e., net benefits) in proportion to the classes
7 from which the benefits were derived. This approach is also consistent with the
8 Commission's Implementation Order.
9

10 **Q. Are the Companies actually using the method of allocating PJM revenues and costs**
11 **that they proposed in the Riders?**

12 A. That is unclear. In the informal verbal discovery session on Friday, January 8,
13 FirstEnergy indicated that it actually has been allocating the net PJM revenues to
14 customer classes based on the proportion of total MWs of nominated and cleared
15 resources attributed to each customer class. That is the same approach I am
16 recommending, and is compliant with the Commission's Implementation Order, but it is
17 not what is proposed in the Rider. The Companies indicated that they would assess the
18 discrepancy between actual practice and the Rider and provide an explanation. As of this
19 time, OCA has not received the explanation.
20

21 **Participating in the PJM Forward Capacity Market**

22

23 **Q. Referring to page 138 of the Implementation Order, the Commission directed that**
24 **EDCs "carefully consider their nomination levels and adopt a conservative bidding**
25 **strategy to limit the likelihood of deficiency charges or nominated resources not**
26 **clearing." Are you convinced that the EE&C Plan as proposed by the Companies**
27 **complies with the Commission's directive?**

28 A. No. The Companies have provided only general guides regarding how they will
29 determine the amount of energy efficiency peak reduction from its Phase IV EE&C plan
30 to nominate. The EE&C Plan provided those guidelines in Section 1.6. (See Schedule
31 GCC-4) In addition to removing the measures contained in the EE&C Plan that would

1 not be eligible to offer into PJM's Forward Capacity Market, the Companies indicated
2 that the primary measures offered would be lighting, HVAC equipment, refrigeration,
3 water heating and custom programs. The Companies did not specify which elements of
4 which programs they would nominate, nor how much of these measures were built into
5 the various programs offered under Phase IV. This is consistent with the Commission's
6 Implementation Order which concluded:

7 We find the suggestion made by FirstEnergy persuasive and will not require
8 detailed breakdowns by measure, program, customer class, and year. Instead, as
9 suggested by FirstEnergy, EDCs may limit EE&C Plan content to a description of
10 the strategy and approach of offering resources into the PJM capacity market.
11 However, we note that nomination of peak demand savings to PJM will require
12 EDCs to develop specific projections (e.g. bids) so the description should include
13 an estimated number of MW and a trajectory of that MW total over time. (page
14 140)
15

16 Using Met-Ed as an example, Met-Ed expects to be able to nominate between 2.4 and 4.2
17 MWs per program year (Appendix C, Table 3). Met-Ed anticipates the peak demand
18 reduction due to the Phase IV EE&C plan is 16.76 MW per program year (Appendix C,
19 Table 2). For the EE&C Plan, the peak demand reduction is based on summer peak.
20 However, of the 16.76 MW summer peak reduction attributable to the Phase IV EE&C
21 Plan, some is not eligible under PJM rules. Some is eligible, but according to the
22 Companies, PJM rules limit the nominated amount to the lesser of the summer peak
23 reduction and the winter peak reduction. While a measure may be responsible for a large
24 summer peak reduction, it may have little or no winter peak reduction, and thus would
25 result in a smaller or no nomination. The Companies also stated that they ruled out some
26 potential resources because it would be too expensive to conduct the evaluations
27 necessary to certify to PJM that the resource was provided.
28

29 The Companies did not document which of its Phase IV measures they would nominate
30 or the offer price. While the amount they expect to nominate is a small fraction (14% to
31 25%) of the total summer peak demand reduction projected for the Phase IV EE&C Plan,
32 the Companies did not indicate or document the fraction of the maximum demand
33 reduction they could nominate that is represented by the 2.4-4.2 MWs. The 2.4-4.2 MW
34 range lacks context. If that range represents 100% of what the Companies could

1 nominate, it would be a risky proposition because it would leave no room for capacity
2 deficiency when the resource is evaluated to meet PJM requirements, and the Companies
3 could face penalties. If that range represents 50% of what the Companies could
4 nominate, there would be a cushion for potential capacity deficiency, and it would be
5 much less risky for ratepayers.

6
7 **Q. How should the Commission proceed regarding nominating energy efficiency-based**
8 **capacity resources to PJM?**

9 A. Cautiously. As the Commission pointed out in its Implementation Order, the Companies
10 are to adopt a conservative bidding strategy (page 138). The Companies have not
11 provided information that would enable the Commission to assess how conservative their
12 bidding strategy is.

13
14 I recommend that the Commission direct the Companies to develop a more transparent
15 way to evaluate the amount of its Phase IV demand reduction that could be nominated
16 into the PJM FCM and to evaluate the risk-reward relationship for their nomination
17 strategies. I recommend the following approach to provide more context and connection
18 between the EE&C Plan peak reductions and the amounts the Companies expect to
19 nominate into the PJM capacity markets. Each step in this approach would be reported at
20 the plan level, not by measure.

- 21 1. The EE&C Plan summer peak reduction (currently provided).
- 22 2. The summer peak reduction of those measures that are eligible to nominate to
23 PJM.
- 24 3. The winter peak reduction of those measures that are eligible to nominate to PJM.
- 25 4. The maximum permissible bid amount (lesser of summer and winter peak demand
26 reductions).
- 27 5. Adjustments to the maximum permissible bid amount (to reflect practical
28 consideration, such as the size of the resource relative to the cost of certifying it,
29 and other adjustments the EDC believes appropriate)
- 30 6. The bid range (potential nomination range currently provided).

31

1 Each step removes another layer of energy efficiency resources identified in the EE&C
2 Plan that is not viable as a PJM capacity nomination. The context needed to assess the
3 conservatism of the nomination range the Companies are required to provide is derived
4 by comparing Step 6 to Step 4 (how much of the maximum the Companies could bid are
5 the Companies intending to bid).

6
7 I also recommend closely monitoring and reporting on the results of the Companies'
8 nomination and pricing strategies with the intent of modifying those strategies to
9 optimize the probable net PJM revenues to reduce ratepayer cost for the Phase IV EE&C
10 programs. The monitoring and reporting should include the following information:

- 11 • The amount nominated.
- 12 • The measures nominated, including the amount by measure, program and
13 customer class.
- 14 • The bid price.
- 15 • Whether the nomination cleared.
- 16 • The costs incurred to participate in the market.
- 17 • For cleared nominations, a comparison of the certified demand reduction
18 compared to the forecasted amount.
- 19 • The revenues generated.
- 20 • The penalties incurred.
- 21 • The net revenues.

22
23 **Review of Program Elements included in the Proposed Energy Efficiency and**
24 **Conservation Programs**

25 **Q. In addition to the concerns noted above, are the energy efficiency programs FE is**
26 **proposing cost-effective?**

27
28 A. According to the Companies filing the TRC values are all in excess of 1.0 and range
29 between 1.3 and up to 1.5 for the benefit cost ratio. West Penn is 1.3, Penelec 1.5, Penn

1 Power 1.3 and Met-Ed 1.5. See Met-Ed/Penelec/Penn Power/West Penn Power, St. No. 2
2 of Edward C. Miller, page 20.

3
4 **Q. Does the energy efficiency program FE is proposing for Low-Income customers**
5 **meet the criteria the Commission set forward?**

6 A. Yes, it appears that it does. However, coordination will be necessary with the LIURP
7 program as well as the Weatherization Assistance Program.

8
9 **Q. In addition to the concerns noted above, are the energy efficiency programs the**
10 **Companies have developed consistent with the Commission directives on budgets?**

11 A. Yes, the total budget has a five-year cap of \$390,320,135 and the requirement that over
12 50% of the budget be targeted to direct incentives. The proposed budget and allocation
13 of direct incentives appears to be consistent with Commission guidance and directives.
14 FE's savings targets are as follows:

EDC NAME	Phase IV MWh	Phase IV MW
Met-Ed	463,215	76
Penelec	437,676	80
Penn Power	128,909	20
West Penn Power	504,951	86

15
16 **Q. What should the Commission do in response to your recommendations?**

17 A. The Commission should specifically address the following recommendations:

- 18 ○ The Commission should require the Companies to revise its portfolio by scaling
19 back the behavior modification programs and replace them with programs that

1 offer long lived measures that will save energy for many years to come such as
2 the Weatherization subprogram or the Energy Efficient Products Program.

3 ○ The Companies should coordinate their low-income energy efficiency programs
4 with other programs in service territory. In particular, the Commission should
5 instruct the Companies ensure that the low-income energy efficiency program be
6 well coordinated with the LIURP and Weatherization Assistance Program.

7
8 ○ The Companies should comply with Rider F and credit PJM net revenues from
9 PJM FCM revenue producing transactions consistent with Exhibit GCC-2.

10
11 ○ The Companies should allocate PJM revenues and costs to customer class Phase
12 IV program budgets in compliance with the Commissions implementation Order
13 M-2020-3015228.

14
15 ○ The Companies need to provide sufficient information to allow the parties and the
16 Commission to understand and assess the risk of participating in the PJM FCM
17 process.

18
19 **Q. Does that conclude your testimony?**

20 A. Yes.

Exhibits GCC – 1 through GCC -- 4

**Résumé of
Geoffrey C. Crandall
Vice President and Principal**

EDUCATION

B.S. in Business and Pre-Law, Western Michigan University, 1974.

Mr. Crandall has also completed courses at Michigan State University Graduate School, the University of Wisconsin-Madison and Wayne State University, in areas of federal taxation, accounting, management and the economics of utility regulation. Mr. Crandall also completed the examination for the National Conference of States on Building Codes and Standards Energy Auditor.

EXPERIENCE

Mr. Crandall joined MSB in January 1990. Mr. Crandall has addressed issues related to fuel and purchase power, natural gas, re-regulation, planning, regulatory issues, residential and low-income issues, energy efficiency and impacts of utility restructuring on customers in California, New York, Colorado, Iowa, and Michigan. He has analyzed and/or designed energy efficiency programs for residential customers in Michigan, Georgia, Wisconsin, Arizona, and New Orleans, and has conducted workshops on system planning, energy efficiency, low-income restructuring and energy efficiency issues in over 20 states, including Washington, Hawaii, Nevada, Kansas, Michigan, Rhode Island, California, Virginia, and New Orleans. Mr. Crandall has analyzed integrated resource plan and or energy efficiency programs in the states of Arizona, Georgia, Hawaii, Illinois, Maine, Michigan, Minnesota, North Carolina, Ohio, Pennsylvania, Utah, Washington State, California, Iowa, Montana, Colorado, Missouri, Virginia, Wisconsin, and Washington D.C.

Prior to joining MSB, Mr. Crandall was employed by the Michigan Public Service Commission from 1974 through 1989, where he served in several capacities including analyst in the rates and tariff section, Technical Assistant to the Chief of Staff, and as the Director of the Demand-Side Management Division. He had responsibilities that included rate and tariff review, rate cases, utilities uncollectible and bad debts, integrated resource planning, the development, implementation and monitoring of government- and utility-sponsored demand-side management, energy-efficiency and load response policies and programs. These activities involved customers in the residential, commercial, industrial and institutional sectors.

Mr. Crandall has dealt with a wide variety of regulatory issues beyond energy efficiency, including utility diversification, incentive regulation, utility billing practices, utility power plant maintenance and management of plant outages.

Mr. Crandall served as Chair of the NARUC Energy Conservation Staff Subcommittee from 1986-1989. He has lectured and made presentations to many groups on demand-side programs and least-cost planning, including two NARUC-sponsored least-cost planning conferences; the 1990 NARUC Regional Workshops on Least-Cost Utility Planning in Newport, Rhode Island and Little Rock, Arkansas; the Wisconsin Public Service Commission's Integrated Resource Planning Workshop; the 1988, 1989, and 1990 Michigan State University Graduate School of Public Utilities and the U.S. Department of Energy.

Mr. Crandall has testified before the: United States Congress, Michigan Legislature, Michigan Public Service Commission, North Carolina Utilities Commission, Public Service Commission of the District of Columbia, Illinois Commerce Commission, Maine Public Utilities Commission, Massachusetts Department of Public Utilities, Public Service Commission of Hawaii, Minnesota Public Service Commission, Iowa Public Service Commission, Georgia Public Service Commission, Public Utility Commission of Ohio, Virginia Public Service Commission, Wisconsin Public Service Commission, and the City Council of the City of New Orleans, Louisiana.

Mr. Crandall has written several articles published in the Public Utilities Fortnightly and Electricity Journal, Natural Gas Magazine, and a number of proceedings for the Biennial Regulatory Information Conference and the American Council for an Energy-Efficient Economy.

TESTIMONY

Case No. U-5531, (8/77), Consumers' Power Company electric rate increase application. Mr. Crandall served as the Staff Witness and recommended that the Applicant initiate the Residential Electric Customers' Information program.

Case No. U-6743, (3/81), Michigan Consolidated Gas Company. Mr. Crandall served as the Staff policy witness and recommended that the Commission approve a surcharge to cover all reasonable and prudent costs associated with Applicant's implementation of the Michigan Residential Conservation Services Program.

Case No. U-6819, (6/81), Michigan Power Company-Gas. Mr. Crandall served as the Staff policy witness and described the basis for the program and the expected level of activity, recommending that the Commission approve a surcharge to cover all reasonable and prudent costs associated with Applicant's implementation of the Michigan Residential Conservation Service Program.

Case No. U-6787, (6/81), Michigan Gas Utilities Company. Served as the Staff policy witness and described the basis for the program and the expected level of activity, recommending that the Commission approve a surcharge to cover all reasonable and prudent costs associated with the implementation of the Michigan Residential Conservation Service Program.

Case No. U-6820, (6/81), Michigan Power Company-Electric. Served as the Staff policy witness and reviewed the Applicant's request to operate the Michigan Residential Conservation Service Program. Although not mandated by federal law, Applicant chose to operate the program in conjunction with its other services offered to residential gas customers. Recommended the establishment of a surcharge to cover all reasonable and prudent costs associated with the operation of that program.

Case No. U-5451-R, (10/82), Michigan Consolidated Gas Company. Served as the Staff policy witness and described the Staff's position regarding Applicant's proposed adjustment of surcharge level. Recommended that the eligibility criteria for customers be adjusted to more accurately reflect proper fuel consumption and to include customers who would be likely to realize a seven-year return on their investment by installing flue-modification devices in conjunction with Applicant's financing program.

Case No. U-6743-R, (10/82), Michigan Consolidated Gas Company. Served as the Staff policy witness regarding the Applicant's proposed expenses and revenues, as well as the reasonableness of activity and expense levels in the company's projected period.

Case No. U-7341, (12/84), Detroit Edison Company, Request for Authority for Certain Non-Utility Business Activities. Represented the Staff's position during settlement discussions and sponsored the settlement agreement.

Case No. U-6787-R, (3/84), Michigan Gas Utilities Company. Served as the Staff witness regarding the Applicant's proposed expenses and revenues. This also included a review of the company's future expenses associated with the Energy Assurance Program, the Specialized Unemployed Energy Analyses, and the Michigan Business Energy Efficiency Program expenses.

Case No. U-8528, (3/87), Commission's Own Motion on the Costs, Benefits, Goals and Objectives of Michigan's Utility Conservation Programs. Represented the Staff on the costs and savings of conservation programs and the other benefits of existing programs and described alternative actions available to the Commission relative to future energy-conservation programs and services and other conservation policy matters.

Case No. U-8871, et al., (4/88), Midland Cogeneration Venture Limited Partnership. For approval of capacity charges contained in a power-purchase agreement with Consumers' Power Company. Served as the Staff witness on Michigan conservation potential and reasonably achievable programs that could be operated by Consumers' Power Company and testified to

the potential impact of these conservation programs on the Company's request for use of its converted nuclear plant cogeneration project. Also recommended levels of demand-side management potential for the commercial, industrial and institutional sectors in Consumers' Power service territory.

Case No. U-9172, (1/89), Consumers' Power Company, Power-Supply Cost-Recovery Plan and Authorization of Monthly Power-Supply Cost-Recovery Factors for 1989. Served as Staff witness on the conservation potential and reasonably achievable programs that could be operated by Consumers' Power Company. Testified to the potential impact of these conservation programs on the Company's fuel and purchase practices, its five-year forecast and the fuel factor. Recommended levels of demand-side management potential for the commercial, industrial and institutional sectors in Consumers' Power service territory as an offset to its more-expensive outside and internally generated power. Suggested that CPCO vigorously pursue conservation, demand-side management research, and planning and program implementation.

Case No. U-9263, (4/89), Consumers' Power Company Request to Amend its Gas Rate Schedule to Modify its Rule on Central Metering. Served as a Staff witness on the conservation effect of converting from individual metered apartments to a master meter. Suggested that the Commission continue its moratorium on the master meters, due to the adverse energy-conservation and efficiency impact.

Case No. E-100, (1/90), North Carolina Public Service Commission proceeding on review of the Duke Power Company's least-cost utility plan. Testified on behalf of the North Carolina Consumers' Council regarding utility energy-efficiency and demand-side management programs and the concept of profitability and implementation of demand-side management programs.

Case No. 889, (1/90), Public Service Commission of the District of Columbia. Testified on behalf of the Government of the District of Columbia in the Potomac Electric Power Company's application for an increase in its retail rates (general rate case). Sponsored testimony regarding the design and implementation and overall appropriateness of PEPCO's existing and proposed energy-efficiency and conservation programs.

Case No. 889, (4/90), Public Service Commission of the District of Columbia. Provided supplemental direct testimony and testified on behalf of the Government of the District of Columbia in the Potomac Electric Power Company's application for an increase in its retail rates (general rate case). Offered supplemental testimony regarding a more detailed review of PEPCO's existing pilot and full-scale energy-efficiency and conservation programs. Offered suggestions and recommendations for a future direction for PEPCO to pursue in order to implement more cost-effective and higher-impact energy-efficiency and conservation programs.

Case No. ICC Docket 90-004 and 90-0041, (6/90), Illinois Commerce Commission proceeding to adopt an electric-energy plan for Central Illinois Light Company (CILCO). Testified on behalf of the State of Illinois, Office of Public Counsel and the Small-Business Utility Advocate. Reviewed the CILCO electric least-cost plan filing and the conservation and load-management programs proposed in its filing. Sponsored testimony regarding my analysis of the proposed programs and offered alternative programs for the Company's and the Commission's consideration.

Case No. D.P.U. 90-55, (6/90), Commonwealth of Massachusetts Department of Public Utilities. Testified on behalf of the Commonwealth of Massachusetts, Division of Energy Resources. Reviewed and analyzed Boston Gas' proposed energy-conservation programs that were submitted for pre-approval in its main rate case. In addition, suggested that it might consider implementation of other natural-gas energy- efficiency programs, and not award an economic incentive for energy-efficiency and conservation programs until minimum program-implementation standards are satisfied.

Case No. U-9346, (6/90), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency Association. Reviewed and analyzed the Consumers' Power Company rate-case filing related to energy-efficiency and demand-side management programs. Proposed alternative energy-efficiency programs and recommended program budgets and a cost-recovery mechanism.

Case No. 89-193; 89-194; 89-195; and 90-001, (6/90), Maine Public Utilities Commission. Testified on behalf of the Maine Public Advocate's Office. Reviewed the appropriateness of Bangor Hydro-Electric Company's existing energy-efficiency and demand-side management programs in the context of BHE's main rate case and request for approval to construct the Basin Mills Hydro-Electric dam. Reviewed the overall resource plan and suggested alternative programs to strengthen the energy-efficiency and demand-side management resource efforts.

Case No. 6617, (4/91), Hawaii Public Utility Commission. Testified on behalf of the Hawaii Division of Consumer Advocacy. Described what demand-side management resources are, why they should be included in the integrated resource planning process and proposed the implementation of several pilot projects in Hawaii along with guidelines for the pilot programs.

Case No. E002/GR-91-001, (5/91), Minnesota Public Utilities Commission. Testified on behalf of Minnesotans for an Energy Efficient Economy. Assessed the DSM programs being operated or proposed by Northern States Power Company and made recommendations as to ways in which NSP could improve its DSM efforts.

Case No. 905, (6/91), Public Service Commission of the District of Columbia. Testified on behalf of the District of Columbia Energy Office. Responded to the energy-efficiency and load management aspects of Potomac Electric Company's filing and made several recommendations for DC-PSC action.

Case No. 6690-UR-106, (9/91), Public Service Commission of Wisconsin. Testified on behalf of The Citizens' Utility Board of Wisconsin. Assessed the DSM programs being operated or proposed by the Wisconsin Public Service Corporation, made recommendations as to the WPSCO energy efficiency programs, and suggested ways the company could improve its DSM efforts.

Case No. E002/CN-91-19, (12/91), Minnesota Public Utilities Commission. Testified on behalf of Minnesota Department of Public Service. Assessed the DSM potential and programs being operated or proposed by Northern States Power Company and made recommendations as to the potential for energy efficiency in the NSP service territory and ways in which NSP could improve its DSM efforts.

Case No. 912, (4/92), Public Service Commission of the District of Columbia. Testified on behalf of the Government of the District of Columbia in the Potomac Electric Power Company's application for an increase in its retail rates for the sale of electric energy. Testified regarding the reasonableness of DSM and EUM policy changes, the cost allocation of the DSM and EUM expenses, an examination of the prudence of management regarding the energy-efficiency programs, and an examination of the appropriateness of the costs associated with energy-efficiency programs.

Case No. PUE 910050, (5/92), Virginia State Corporation Commission. Testified on behalf of the Citizens for the Preservation of Craig County regarding the need for the Wyoming-Cloverdale 765 kV transmission line. Specifically, addressed the adequacy of the DSM planning of Appalachian Power Company and Virginia Power/North Carolina Power. Made recommendations as to APCO and VEPCO's energy efficiency programs, and suggested ways the company could improve its DSM efforts.

Case No. EEP-91-8, (5/92), Iowa Utilities Board. Testified on behalf of the Izaak Walton League concerning the adequacy of Iowa Public Service Company's Energy Efficiency Plan. Reviewed the plan and suggested modifications to it.

Case No. 4131-U and 4134-U, (5/92), Georgia Public Service Commission. Testified on behalf of the Georgia Public Service Commission staff regarding the demand-side management portions of Georgia Power Company's and Savannah Electric and Power Company's Integrated Resource Plans. Testimony demonstrated that it is reasonable for the Commission to expect that the utilities can successfully secure substantial amounts of demand-side management resources by working effectively with customers.

Case No. 917, (8/92), Public Service Commission of the District of Columbia. Testified on behalf of the District of Columbia Energy Office in hearings on Potomac Electric Power Company's Integrated Resource Planning process. Addressed a number of program-specific issues related to PEPCO's demand-side management efforts.

Case No. 4132-U, 4133-U, 4135-U, 4136-U, (10/92), Georgia Public Service Commission. Testified on behalf of the Staff Adversary IRP Team of the Georgia PSC. Provided a critique of Georgia Power Company's and Savannah Electric and Power Company's proposed residential and small commercial DSM programs.

Case No. 4135-U, (3/93), Georgia Public Service Commission. Testified on behalf of the Staff Adversary IRP Team of the Georgia PSC. Provided a critique of Savannah Electric and Power Company's proposed Commercial and Industrial DSM programs.

Case No. R-0000-93-052, (12/93), Arizona Corporation Commission. Testified on behalf of the Arizona Community Action Association. Critiqued and made recommendations regarding the integrated resource plans and demand-side management programs of Arizona Public Service Company and Tucson Electric Power Company.

Case No. 934, (4/94), Public Service Commission of the District of Columbia. Filed testimony on behalf of the District of Columbia Energy Office in hearings concerning the Washington Gas Light Company (WGL) general rate case application to increase existing rates and charges for gas service. Testimony involved critiquing and reviewing WGL's least cost planning efforts and integration of DSM, marketing and gas supply efforts.

Case No. U-10640, (10/94), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency Association concerning the need to integrate DSM and load promotion analysis into MichCon's GCR planning process.

Case No. 05-EP-7, (3/95), Wisconsin Public Service Commission. Testified on behalf of the Citizens' Utility Board on level of utility DSM and program designs and strategies.

Case No. 05-EP-7, (3/95), Wisconsin Public Service Commission. Testified on behalf of the Wisconsin Community Action Program Association on low-income customers and utility DSM programs.

Case No. TVA 2020-IRP, (9/95), Tennessee Valley Authority. Testified on behalf of the Tennessee Valley Energy Reform Coalition. Assessed, critiqued and made recommendations regarding the integrated resource plans and demand-side management programs proposed by the Tennessee Valley Authority.

Case No. R-96-1, (10/95), Alaska Public Utilities Commission. Testified on behalf of the Alaska Weatherization Directors Association regarding the proposed standards and guidelines for integrated resource planning and energy efficiency initiatives under consideration in Alaska.

Case No. D95.9.128, (2/96), Montana Public Service Commission. Testified on behalf of the District XI Human Resources Council concerning the low-income energy efficiency programs offered by the Montana Power Company.

Case No. DPSC Docket No. 95-172, (5/96), Delaware Public Service Commission. Prepared draft testimony on behalf of the Low-Income Energy Consumer Interest Group regarding Delmarva Power & Light Company's application to revise its demand-side programs. The case was settled, with LIECIG obtaining funding for low-income energy efficiency programs, prior to testimony.

Case No. U-11076, (8/96), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Michigan Jobs Commission's recommendations regarding electric and gas reform. Discussed the implications of utility restructuring and the needs of residential and low-income households, and proposed regulatory and industry solutions.

Case No. 96-E-0897, (3/97), New York Public Service Commission. Prepared draft testimony for New York's Association for Energy Affordability regarding the impact of proposed utility restructuring plans on low-income customers. The case was settled in Spring 1997.

Case No. R-00973954, (7/97), Pennsylvania Public Utilities Commission. Testified on behalf of the Commission on Economic Opportunity regarding the economics of demand-side measures and programs proposed for implementation by Pennsylvania Power & Light Company.

Case No. 98-07-037, (7/98), California Public Utilities Commission. Testified on the California Alternative Rates for Energy and the Low-Income Energy Efficiency programs regarding the implementation and adoption of revisions to these programs necessitated by the AB 1890 and the Low-Income Governing Board.

Case No. U-12613, (3/01), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Wisconsin Public Service Corporation application to implement PA 141 the electricity deregulation law. I reviewed the portions of the filing related to their provision of electric energy efficiency and load management.

Case No. U-12649, (3/01), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Wisconsin Electric Power Company and the Edison Sault Electric Company application to implement PA 141 Michigan's electricity deregulation law. I reviewed the portions of the filing related to their provision of electric energy efficiency and load management.

Case No. U-12651, (3/01), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Northern States Power Company – Wisconsin application to implement PA 141 the electricity deregulation law. I reviewed the portions of the filing related to their provision of electric energy efficiency and load management.

Case No. U-12652. (3/01), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Indiana Michigan Power Company d/b/a American Electric Power application to implement PA 141 the electricity deregulation law. I reviewed the portions of the filing related to their provision of electric energy efficiency and load management.

Case No. U-12725, (4/01), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Wisconsin Electric Power Company and the Edison Sault Electric Company application to increase its residential rates. I reviewed the portions of the filing related to their provision of electric energy efficiency and load management and recommended a significant increase in these activities.

Case No. U-13060, (12/01), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Michigan Consolidated Gas Company application for Approval of their Gas Cost Recovery Plan and Five-Year gas Forecast. I reviewed the filing and recommended the Commission reject the proposed GCR factor and suggested continuation of the existing GCR factor or adopt an adjusted MCAA sponsored GCR factor. I also suggested a set-aside allocation be designated for low-income customers to ensure access to alternative gas providers under the applicant's customer choice program.

Case No. 6690-UR-114, (9/02), Wisconsin Public Service Commission. Testified on behalf of the Citizens Utility Board regarding the Wisconsin Public Service Corporation application to increase its electric and natural gas rates. I reviewed the portions of the filing related to their low-income assistance/weatherization and the proposed executive compensation incentive plan.

Case No. U-14401, (04/05), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Michigan Consolidated Gas Company application for Approval of their Gas Cost Recovery Plan and Five-Year gas Forecast. I reviewed the filing and recommended the Commission reject the proposed plan and suggested initiation of strategies that would lower the need to acquire expensive and unnecessary gas supplies.

Case No. U-14401-R, (10/05), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Michigan Consolidated Gas Company application re-opener Approval of their Gas Cost Recovery Plan and Five-Year gas Forecast. I reviewed the filing and recommended the Commission reject the proposed plan and suggested initiation of strategies that would lower the need to acquire expensive and unnecessary gas supplies.

Case No. U-14701, (02/06), Michigan Public Service Commission. Testified on behalf of the Michigan Environmental Council and The Public Interest Group In Michigan regarding the Consumers Energy Company application for Approval of a Power Supply Cost Recovery Plan and for Authorization of Monthly Power Supply Cost Recovery Factors for calendar year 2006. I reviewed the filing including the application, testimony, exhibits, discovery responses and submitted testimony recommending that the Commission not approve the five-year PSCR plan as filed due to the impacts related to the Palisades sale and the absence of alternative resources in the projected five-year resource portfolio.

Case No. U-14702, (02/06), Michigan Public Service Commission. Testified on behalf of the Michigan Environmental Council and The Public Interest Group In Michigan regarding The Detroit Edison Company application for authority to implement a Power Supply Cost Recovery Plan in its rate schedules for 2006-metered jurisdictional sales of electricity. I reviewed the application; testimony, exhibits and submitted testimony that recommended that the Commission not approve the proposed five-year PSCR plan as filed due because it was deficient in its selection of alternative resources in the projected five-year resource portfolio.

Case No. U-14992, (12/06), Michigan Public Service Commission. Testified on behalf of the Michigan Environmental Council and The Public Interest Group In Michigan regarding The Consumers Energy Company application for approval of the proposed Power Purchase Agreement in connection with the sale of the Palisades Nuclear Power Plant and other assets. The purpose of my testimony was to address the overall soundness of this application and proposal. I reviewed the application, testimony, exhibits and submitted testimony that recommended that the Commission not approve the proposed purchase power agreement and transfer the ownership of the nuclear plant and other assets.

Case No. 06-0800, (3/07), Illinois Commerce Commission. Provided testimony on behalf of the Illinois Citizens Utility Board regarding the Illinois electricity resource auction process. I

assessed the existing resource/power supply auction-based bidding process and recommended modifications and improvements to the Illinois resource acquisition mechanism.

Case No. 24505-U, (5/07), Georgia Public Service Commission. Testified on behalf of the Georgia Public Service Commission Advocacy staff regarding the demand-side management portions of Georgia Power Company's Integrated Resource Plans. Testimony demonstrated that it is reasonable for the Commission to approve the five proposed DSM programs and expect that Georgia Power can successfully secure considerably more demand-side management resources by working effectively with its customers.

Case No. U-14992, (11/07), Michigan Public Service Commission. Testified on behalf of the Michigan Environmental Council and The Public Interest Group In Michigan regarding The Consumers Energy Company rate application for approval of a rate increase and the recovery of energy efficiency programs and certain costs in connection with the sale of the Palisades Nuclear Power Plant and other assets. I reviewed the application, testimony, exhibits and submitted testimony that recommended that the Commission not approve the recovery of transaction costs involving the transfer the ownership of the nuclear plant and other assets and on various aspects of its proposed energy efficiency programs and proposed incentives.

Case No. 07-0540, (12/07), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the Commonwealth Edison Company application for approval of its proposed Energy Efficiency and Demand Response Plan. I assessed the proposed energy efficiency and demand response plan and recommended modifications and improvements to the proposed plan filing.

Case No. 07-0539, (12/07), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the Central Illinois Light Company d/b/a and Ameren CIPS CENTRAL ILLINOIS PUBLIC SERVICE COMPANY and Ameren CIPS ILLINOIS POWER COMPANY d/b/a Ameren IP application for approval of its proposed Energy Efficiency and Demand Response Plan. I assessed the proposed energy efficiency and demand response plan and recommended modifications and improvements to the proposed plan filing.

Case No. U-15415, (2/08), Michigan Public Service Commission. Testified on behalf of the American Association of Retired People regarding The Consumers Power Company application for approval for authority to implement a Purchase Power recovery plan, 5-year forecast, and monthly PSCR factors for the 12-month period calendar year 2008.

I reviewed the application, testimony, exhibits and submitted testimony that recommended that the Commission adopt a more effective and less expensive resource acquisition procedure to help keep the cost of energy down in Michigan.

Case No. U-15417, (4/08), Michigan Public Service Commission. Provided testimony on behalf of the American Association of Retired People regarding The Detroit Edison Company for Authority to Implement a Power Supply Cost Recovery Plan in its Rate Schedule for 2008 Metered Jurisdictional Sales of Electricity. I reviewed the application, testimony, exhibits and submitted testimony that recommended that the Commission adopt a more effective and less expensive resource acquisition procedure to help keep the cost of energy down in Michigan.

Case No. U-15244, (7/08), Michigan Public Service Commission. Provided testimony on behalf of the Michigan Environmental Council and The Public Interest Group In Michigan regarding The Detroit Edison Company request for Authority to increase rates, amend its rate schedules and rules governing the distribution and supply of electric energy, and for miscellaneous accounting authority. I reviewed the application, testimony, and exhibits and submitted testimony that recommended that the Commission direct DECO to make modifications to its Integrate Resource Planning analysis.

Case No. EEP-08-2, (7-08), Iowa Public Utilities Board. Provided testimony on behalf of the environmental interveners regarding the request of the Mid-American Energy Company for approval of an Energy Efficiency Plan. I made an assessment of the proposed energy efficiency and demand response plan and recommended modifications and improvements to the implementation strategy and proposed programs.

Case No. EEP-08-1, (8-08), Iowa Public Utilities Board. Provided testimony on behalf of the environmental interveners regarding the Interstate Power and Light Company request for approval of an Energy Efficiency Plan. I made an assessment of the proposed energy efficiency and demand response plan and recommended modifications and improvements to the proposed programs and implementation strategy.

Case No. 137-CE-147, (2-09), Public Service Commission of Wisconsin. Provided testimony on behalf of PRESERVE OUR RURAL LANDS regarding the Application of American Transmission Company, as an Electric Public Utility, to Construct a new 345 kV Line from the Rockdale Substation to the West Middleton Substation, Dane County, Wisconsin. I suggested modifications of the proposal and rejection of the approval of the line.

Case No. M2009-2093218, (8-09), Pennsylvania Public Utility Commission. Provided testimony on behalf of The Office Of Consumer Advocate regarding the West Penn Power Company d/b/a Allegheny Power Energy Efficiency and Conservation Plan request for plan approval. I analyzed the proposed plan and made an assessment of the proposed energy efficiency and demand response and cost recovery plan. I suggested modifications and improvements to the proposed programs as well as the proposed implementation strategy.

Case No. 09-1947-EL-POR, 09-1948-EL-POR, 09-1949-EL-POR, 09-1942-EL-EEC, 09-1943-EL-EEC, 09-1944-EL-EEC, POR, 09-580-EL-EEC, 09-580-EL-EEC, 09-580-EL-EEC, Public Utilities Commission of Ohio. Provided testimony on behalf of The Office Of The Environmental Law and Policy Center regarding the Ohio Edison Company, The Cleveland Electric Illuminating Company and the Toledo Edison Company for approval of their energy efficiency and peak demand reduction program portfolio and associated cost recovery mechanism and approval of their initial benchmark reports and in the matter of the energy efficiency and peak demand reduction programs. I reviewed, analyzed and assessed the appropriateness of the proposed plans, benchmark reports and proposed peak reduction program portfolio. I suggested modifications and improvements to the proposed programs. I also made recommendations regarding the proposed implementation strategy as well as accounting and program cost tracking.

Case No. U-16412, (10/10), Michigan Public Service Commission. Provided testimony on behalf of the Natural Resources Defense Council, Michigan Environmental Council and The Environmental Law and Policy Center regarding the Consumers Energy Company request to Amend its natural gas & energy efficiency Energy Optimization Plan. I reviewed the application, testimony, exhibits, discovery responses and submitted testimony that recommended modifications to the proposed Energy Optimization Plan.

Case No. 10-0570, (11/10), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the Commonwealth Edison Company application for approval of its proposed Energy Efficiency and Demand Response Plan. Assessed the proposed energy efficiency and demand response plan and recommended modifications and improvements to the proposed plan filing.

Case No. 10-0568, (11/10), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the Central Illinois Light Company d/b/a and Ameren CIPS CENTRAL ILLINOIS PUBLIC SERVICE COMPANY and Ameren CIPS ILLINOIS POWER COMPANY d/b/a Ameren IP application for approval of its proposed Energy Efficiency and Demand Response Plan. Assessed the proposed energy efficiency and demand response plan and recommended modifications and improvements to the proposed plan filing.

Case No. 10-0564, (11/10), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the People's Gas Light and Coke Company and

North Shore Gas Company request for approval of its proposed Energy Efficiency Plan. Assessed the proposed energy efficiency and demand response plan and recommended modifications and improvements to the proposed plan filing.

Case No. 10-0567, (11/10), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the Northern Illinois Gas Company application for approval of its proposed Energy Efficiency Plan and approval of Rider 30, Energy Efficiency Plan Cost recovery and related changes to Nicor tariffs. Assessed the proposed energy efficiency and demand response plan and recommended modifications and improvements to the proposed plan filing.

Case No. M-2010-2210316, (3/11), Pennsylvania Public Utility Commission. I provided testimony on behalf of The Office Of Consumer Advocate regarding the UGI Utilities, Inc. Electric Division (UGI-Electric) request for Efficiency and Conservation Plan approval. I analyzed the proposed plan and made an assessment of the proposed energy efficiency and demand response and cost recovery plan. I suggested modifications and improvements to the proposed programs and implementation strategy.

Case No. 11-07026 and 11-07027, (11/11), Public Utilities Commission of Nevada. I provided testimony on behalf of the Bureau of Consumer Protection regarding both the Sierra Pacific Power Company and Nevada Power Company 2011 Annual Demand Side Management Update reports. I reviewed the filings and made recommendations regarding various aspects of demand response resources and demand side management portfolios.

Case No., U-16671 (01/12), Michigan Public Service Commission. I provided testimony on behalf of the Environmental Law and Policy Center regarding the reasonableness of the Detroit Edison Company's filing and assertions made by a witness regarding a net-to-gross factor relative to the 2010 and 2011 energy efficiency programs implemented in response to Public Act 295 of 2008.

Case Nos. P-2012-2320468, P-2012-2320480, P-2012-2320484, P-2012-2320450, (10/12), Pennsylvania Public Utility Commission. I provided testimony on behalf of The Office Of the Consumer Advocate regarding the application of Metropolitan Edison Company, Pennsylvania Electric Company, West Penn Power, Pennsylvania Power Company on the Energy Efficiency regarding the benchmarks established for the period June 1, 2013 through May 31, 2016. I analyzed the proposed adjustments of Phase II Energy Efficiency and Conservation target levels and energy efficiency acquisition costs.

Case No. Case Nos. 12-2190-EL-POR, 12-2191-EL-POR, 12-2192-EL-POR, (10/12) Application of Ohio Edison Company, The Cleveland Electric Illuminating Company and the Toledo Edison Company for Approval of their energy efficiency and peak demand reduction program portfolio plan for 2013-2015. I provided testimony on behalf of Ohio Environmental Council and The Environmental Law and Policy Center regarding the Ohio Edison Company, The Cleveland Electric Illuminating Company and the Toledo Edison Company for approval of their 2013-2015 energy efficiency and peak demand reduction program portfolio. I reviewed, analyzed and assessed the appropriateness of the proposed plans, benchmark reports and proposed peak reduction program portfolio. I suggested modifications and improvements to the proposed programs and made recommendations and proposed new approaches to the proposed implementation strategy.

Case No., 12-06052 and 12-06053 (10/12), Public Utilities Commission of Nevada, I provided testimony on behalf of the Attorney General of the State of Nevada, Bureau of Consumer Protection regarding both the Sierra Pacific Power Company and Nevada Power Company 2013-2015 Triennial Integrated Resource Plan covering the period 2013-2032 and Approval of its Energy Supply Plan for the period 2013-2015. I reviewed, analyzed and assessed the appropriateness of the proposed plans and proposed peak reduction portfolio. I suggested modifications and improvements to the proposed programs and made recommendations and proposed new approaches to the implementation strategy.

Case No. U-16434-R, (10/12), Michigan Public Service Commission. Provided testimony on behalf of the Michigan Community Action Agency Association regarding The Detroit Edison Company for Reconciliation of its Power Supply Cost Recovery Plan for 12-month Period Ending December 31, 2011. I reviewed the application, testimony, exhibits and submitted testimony that recommended that the Commission adopt a remedy in regard to several aspects of the Reduced Emission Fuels projects that Detroit Edison was involved in.

Case No. Docket No. M-2012-2334388 (12/12), Pennsylvania Public Utility Commission. I provided testimony on behalf of The Office of the Consumer Advocate regarding the Petition of PPL Electric Utilities Corporation for Approval of an Energy Efficiency and Conservation Plan. I analyzed the proposed plan and made an assessment of the proposed energy efficiency and demand response and cost recovery plan. I suggested modifications to the proposed programs and implementation strategy to enhance its effectiveness.

Case No. U-17097, (03/13) Michigan Public Service Commission. Provided testimony on behalf of the Michigan Community Action Agency Association regarding The Detroit Edison Company filing for Reconciliation of its Power Supply Cost Recovery Plan for 12-month Period Ending December 31, 2013. I reviewed the application, testimony, exhibits and submitted testimony recommending that the Commission adopt a remedy regarding the Reduced Emission Fuels projects that Detroit Edison was participating in.

Case No. U-17095, (04/13) Michigan Public Service Commission. Provided testimony on behalf of the Michigan Community Action Agency Association regarding The Consumers Electric Company Application for Approval of A Power Supply Cost Recovery Plan and for Authorization of Monthly Power Supply Cost Recovery Factors for 2013. I reviewed the application, testimony, and exhibits and submitted testimony recommending that the Commission reject the proposed five-year resource plan. I also recommend that the Commission prohibit CECO from collecting capital related investments for a pipeline in Zeeland, Michigan. I also recommended that CECO demonstrate to the Commission that the Palisades and MCV generation plants purchase power agreements are cost-effective, being complied with and are in the public interest.

Case No. EEP-2012-0001, (4-13), Iowa Public Utilities Board. Provided testimony on behalf of the environmental interveners regarding the Interstate Power and Light Company 2014-2018 Energy Efficiency Plan. I made an assessment of IPL's proposed resource planning as well their energy efficiency, renewable energy and demand response resources. I recommended modifications and improvements to the proposed programs, implementation and resource measurement strategy.

Case No. U-17131, (04/13), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Michigan Consolidated Gas Company application for Approval of their Gas Cost Recovery Plan and Five-Year gas Forecast and approval to implement a reservation charge. I reviewed the filing and recommended the Commission require MichCon to initiate procurement strategies that would reduce the heavy reliance that is being placed on the 75% VCA gas procurement strategy.

Case No. U-17133, (04/13), Michigan Public Service Commission. Testified on behalf of the Michigan Community Action Agency regarding the Consumers Energy Company application for approval of its gas cost recovery plan and authorization of a gas cost recovery factor from April 2013- March 2014. I reviewed the filing and made recommendations regarding the Quartile Fixed Price Purchases Gas purchasing strategy used by CECO.

Case No. EEP-2012-0002, (6/13), Iowa Public Utilities Board. Provided testimony on behalf of the environmental interveners regarding the Mid-American Energy Company 2014-2018 Energy Efficiency Plan. I made an assessment of MidAm's proposed resource planning as well their energy efficiency, renewable energy and demand response resources. I recommended modifications and improvements to the proposed programs, implementation and resource measurement strategy.

Case No. 13-0431-EL-POR (08/13), Public Utility Commission of Ohio. Provided testimony regarding the Application of Duke Energy Ohio, Inc. for Approval of its Energy Efficiency and Peak Demand Reduction Portfolio of Programs.

The testimony was provided on behalf of Ohio Environmental Council and The Environmental Law and Policy Center. Duke Energy Ohio, Inc. was seeking approval of their revised energy efficiency and peak demand reduction program portfolio. I analyzed and reviewed the appropriateness of the revised plan and proposed peak reduction program portfolio. I suggested significant additions and modifications to the proposed programs. I offered specific program recommendations and new elements be added to their programs and implementation strategy.

Case No. 13-0498, (10/13), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the request by Ameren Illinois for approval of its proposed Energy Efficiency and Demand Response Plan 3. Assessed the proposed energy efficiency and demand response plan and recommended modifications and improvements to the proposed plan filing.

Case No. 13-0499 (10/13), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the request by The Illinois Department of Commerce and Economic Opportunity for approval of its proposed Energy Efficiency Plan 3. Assessed the proposed energy efficiency plan and recommended modifications and improvements to the proposed plan filing.

Case No. 13-0495 (11/13), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the request by Commonwealth Edison application for approval of its proposed third Energy Efficiency Plan. I assessed the proposed energy efficiency plan and recommended modifications and enhancements to the proposed plan.

Case No. 13-0550 (12/13), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the request by North Shore Gas Company and The Peoples Gas Light and Coke Company for approval of its proposed second Energy Efficiency Plan. I assessed the proposed energy efficiency plan and recommended modifications and enhancements to the proposed plan.

Case No. 13-0549, (01/14), Illinois Commerce Commission. Provided testimony on behalf of the Environmental Law and Policy Center regarding the Northern Illinois Gas Company D/b/a/ Nicor for approval of its proposed second Energy Efficiency Plan, Cost recovery and related changes to Nicor tariffs. I assessed the proposed energy efficiency plan and recommended modifications and improvements to the proposed plan filing.

Case No. U-17319, (06/14), Michigan Public Service Commission. Provided testimony on behalf of the Great Lakes Renewable Energy Association regarding the DTE Electric Company application for approval of its PSCR Plan 2014 - 2018. I reviewed the filing and made recommendations regarding the PSCR five-year forecast and plan.

Case No. U-17317, (08/14), Michigan Public Service Commission. Provided testimony on behalf of the Great Lakes Renewable Energy Association regarding the Consumers Energy Company application for approval of its PSCR Plan 2014 - March 2018. I reviewed the filing and made recommendations regarding the PSCR five-year forecast and plan.

Case No. U-17680, (03/15), Michigan Public Service Commission. Provided testimony on behalf of the Great Lakes Renewable Energy Association regarding the DTE Electric Company application for approval of its PSCR Plan 2015 - 2019. I reviewed the filing and made recommendations regarding the PSCR five-year forecast and plan.

Case No. U-17678, (04/15), Michigan Public Service Commission. Provided testimony on behalf of the Great Lakes Renewable Energy Association regarding the Consumers Energy Company application for approval of its 2015 – 2019 PSCR Plan. I reviewed the application, filing and related documents and offered suggestions to improve the proposed five-year PSCR forecast and plan.

Case No. U-17735, (04/15), Michigan Public Service Commission. Provided testimony on behalf of the Michelle Rison and the Residential Consumer Group regarding aspects of the Consumers Energy Company general rate case application for authority to increase its rates for the generation and distribution of electricity and other relief. I reviewed the general rate case application, filing and related documents regarding CECO's reliance on and implementation of an Advanced Metering Infrastructure to deliver services to its customers. I offered specific recommendations regarding tariffs and policies related to Advanced metering infrastructure.

Case No. U-17767, (05/15), Michigan Public Service Commission. Provided testimony on behalf of a number of residential customers of DTE Electric under the nomenclature of Dominic and Lillian Cusumano and the Residential Customer Group. I provided testimony regarding DTE Electric's general rate case application for authority to increase its rates for the generation and distribution of electricity and other relief. I reviewed the general rate case filing and issues related to DTE Electric's reliance on and implementation of an Advanced Metering Infrastructure. I offered specific suggestions to improve DTE Electric's tariffs, policies and procedures related to implementation of an advanced metering infrastructure.

Case No. Docket No. P-2014-2459362 (06/15), Pennsylvania Public Utility Commission. I provided testimony on behalf of The Office of the Consumer Advocate regarding the Petition of Philadelphia Gas Works for Approval of Demand-Side Management Plan for FY 2016-2020; and Philadelphia Gas Works Universal Service and Energy Conservation Plan for 2014-2016 52 Pa Code Section 62.4- Request for Waivers. I analyzed the proposed five-year DSM plan and made an assessment of the proposed plan emphasizing the proposed conservation adjustment mechanism and the proposed performance incentives mechanisms. I suggested extensive modifications to the proposed Plan.

Case No. U-17792 (08/15), Michigan Public Service Commission. Provided testimony on behalf of the Great Lakes Renewable Energy Association. I provided testimony and exhibits regarding Consumers Energy Company proposed 2015 Biennial Renewable Energy Plan. I reviewed the Biennial Renewable Energy Plan, testimony, exhibits and supporting information related to Consumers Energy Company renewable resource strategy resulting from the enabling statute (Public Act 295 of 2008). I offered my opinion and assessment of the reasonableness of the proposed plan as well as specific recommendations to improve the 2015 Biennial Renewable Energy Plan as well as Consumers Energy Company's electric resource planning procedures.

Case No. U-17793 (08/15), Michigan Public Service Commission. Provided testimony on behalf of the Great Lakes Renewable Energy Association. I provided testimony and exhibits regarding the proposed DTE Electric Company 2015 Biennial Renewable Energy Plan. I reviewed the proposed Biennial Renewable Energy Plan, testimony, exhibits and supporting information related to the DTE Electric Company renewable resource strategy resulting from Public Act 295 of 2008. I offered my opinion and assessment of the reasonableness of the proposed plan and made specific recommendations for improvement of the 2015 Biennial Renewable Energy Plan as well as DTE Electric Company's annual PSCR plan development and electric resource planning procedures.

Case No. M-2015-2514767 (01/16). I provided testimony on behalf of The Office of the Consumer Advocate regarding the joint Petition of the First Energy Companies serving customers in Pennsylvania. I reviewed the proposed five-year Energy Efficiency and Conservation Plan and offered suggestions to modify and improve various programs proposed for the 2016-2020 Plans.

Case No. M-2015-2515691 (01/16). I provided testimony on behalf of The Office of the Consumer Advocate regarding the joint Petition of the PECO Energy Company serving customers in Pennsylvania. I reviewed the proposed five-year Energy Efficiency and Conservation Plan and offered suggestions to modify and improve various programs proposed for the Act 129 related Energy Efficiency and Conservation Plan for 2016 – 2020.

Case No. U-17920, (03/16), Michigan Public Service Commission. Provided testimony on behalf of the Great Lakes Renewable Energy Association regarding the DTE Electric Company application for approval of its PSCR Plan 2016 – 2020. I reviewed the filing and made recommendations regarding the PSCR five-year forecast and plan.

Case No. U-17918, (03/16), Michigan Public Service Commission. Provided testimony on behalf of the Great Lakes Renewable Energy Association regarding the Consumers Energy Company application for approval of its PSCR Plan 2016 – 2020. I reviewed the application, filing and supporting materials and made recommendations regarding the PSCR five-year forecast and plan.

Case No. U-18014, (07/16), Michigan Public Service Commission. Provided testimony on behalf of the Great Lakes Renewable Energy Association regarding the DTE Electric Company general rate case application for approval to raise rates. I reviewed the filing and made recommendations regarding inclusion of a corporate tax deferred debit, policies and tariffs related to smart meters and DTE's transition to an automated meter infrastructure.

Case No. U-17087 (Remand), (08/16), Michigan Public Service Commission. Provided testimony on behalf of the Residential Consumer Group regarding the Consumers Energy Company application to increase its rates for the generation and distribution of electricity. I reviewed the filing regarding the support and substantiation for the opt-out tariff that is included and approved for Consumers Energy Company. I made a series of specific recommendations regarding the lack of substantiation for the up-front and monthly charges (both existing and proposed) contained within the non-transmitting meter tariff (among other tariffs) and policies related to smart meters and DTE's transition to an automated meter infrastructure.

Case No. U-18111, (08/16), Michigan Public Service Commission. The purpose of my testimony was to address the reasonableness of Detroit Edison Company's (DTE) requested changes to its Biennial Renewable Energy Plan which had been previously approved in Case No. U-17793. I also recommended procedural changes in an effort to enhance the review, assessment and ultimately the integration of additional renewable resources into DTE's provision of electricity to its customers in the future.

Case No. U-18090, (10/16), Michigan Public Service Commission. Provided testimony on behalf of the Great Lakes Renewable Energy Association regarding the Consumers Energy response to the Commission's own Motion to establish a method and avoided cost for comply with the Public Utilities Regulatory Policy Act of 1978, 16 USC 2601 et seq. I reviewed the filing including Consumers Energy proposal for their preferred avoid cost methodology and made recommendations as to an appropriate approach and methodology for deriving avoided costs to be relied upon by Qualifying Facilities in Michigan.

Case No. U-18402 (04/18), I provided testimony on behalf of the Great Lakes Renewable Energy Association regarding Consumers Energy Company PSCR application, 2018-2022 five-year plan and filing materials. Based on my review I offered suggestions and recommendations regarding the PSCR level, impacts of residential, commercial and industrial customer owned renewable resources in its 2018-2022 PSCR resource mix.

Case No. M-2017-2640306 (04/18), The Pennsylvania Office of Consumer Advocate regarding a Peoples Natural Gas Company proposed the Energy Efficiency and Conservation Plan. I reviewed the proposed five-year Combined Heat and Power, Energy Efficiency and Conservation Plan proposed by Peoples Natural Gas Company. I sponsored direct, rebuttal and surrebuttal testimony, which addressed the design of the programs due to the deficiencies that were embodied in the proposed Plan.

Case No. U-18403 (04/18), I provided testimony on behalf of the Great Lakes Renewable Energy Association regarding the Application of DTE Electric Company for authority to Implement a Power Supply Cost Recovery Plan in its Rate Schedules For 2018 Metered Jurisdictional Sales of Electricity. Based on my review I offered recommendations regarding the reasonableness of its PSCR factor level and resource mix proposed for its 2018-2022 PSCR resource mix.

Case No. U-18231 (04/18), I provided testimony on behalf of the Great Lakes Renewable Energy Association regarding Consumers Energy Company Renewable Energy Plan application. I reviewed the proposed renewable energy plan and related filing materials. Based on my review I offered suggestions and recommendations regarding to improve the REP Plan development process. I recommended that the REP Plan development process be coordinated with Act 304 as well as Integrated Resource Planning processes and general rate proceedings to result in a more beneficial resource mix to better serve CECO ratepayers.

Case No. U-18232 (07/18), I provided testimony on behalf of the Great Lakes Renewable Energy Association regarding The Detroit Edison Company Biennial Renewable Energy Plan application. I reviewed the proposed renewable energy plan and related filing materials. Based on my review I offered suggestions and recommendations regarding to improve the REP Plan development process. I recommended that the REP Plan development process be coordinated with Act 304 as well as Integrated Resource Planning processes and general rate proceedings to result in a more beneficial resource mix which would benefit Detroit Edison Company ratepayers.

Case No. M-2017-2640306 (09/18), The Pennsylvania Office of Consumer Advocate regarding a Peoples Natural Gas Company proposed the Energy Efficiency and Conservation Plan. I reviewed the proposed five-year Combined Heat and Power, Energy Efficiency and Conservation Plan proposed by Peoples Natural Gas Company. I offered Supplemental Surrebuttal testimony with suggestions for energy efficiency program and plan improvements.

Case No. M-2017-2640195 (09/18), The Pennsylvania Office of Consumer Advocate regarding an Application of Transource Pennsylvania, LLC for approval of the Siting and Construction of the

230 kV Transmission Line Associated with the Independence Energy Connection - East and West Projects in portions of York and Franklin Counties, Pennsylvania. I reviewed the proposed transmission project and plan. I offered suggestions for utilization of energy efficiency programs and improvements to the transmission plan.

Case No. U-20219 (05/19), Michigan Public Service Commission. Provided testimony on behalf of the Michelle Rison and the Residential Consumer Group regarding aspects of the Consumers Energy Company PSCR Plan application seeking authorization to increase its rates for the generation and distribution of electricity and other relief. I reviewed the PSCR Plan application, filing and related documents. I reviewed, assessed and offered suggestions to improve the PSCR Plan and 5-year forecast that Consumers Energy Company (CECO) provided and to made recommendations to improve the PSCR Plan. I pointed out concerns regarding lack of benefits emanating from the Tax Cut and Jobs Act of 2017 (TCJA), leasing the Zeeland plant interconnection pipeline, and the gas management services contract terms for acquisition of natural gas at its Zeeland, Jackson and Karn plants.

Case No. U-20561 (11/19), Michigan Public Service Commission. Provided testimony on behalf of Michelle Rison and the Residential Consumer Group regarding aspects of THE DTE ELECTRIC COMPANY rate case seeking authority to increase its rates, amend its rate schedules and rules governing the distribution and supply of electric energy, and for miscellaneous accounting authority. I reviewed the application, supporting testimony, exhibits and work papers and related documents. I addressed the issue of the appropriateness of a projected test period compared to a historic test period. In addition, I addressed the issue of the initiation and modification of DTE's advanced metering infrastructure .

Case No. U-20209 (03/20) Michigan Public Service Commission. Provided testimony on behalf of Michelle Rison and the Residential Consumer Group regarding aspects of the application of CONSUMERS ENERGY COMPANY reconciliation portion of the case dealing with implementation of its approved gas cost recovery plan for the 12-month period of April 1, 2018 through March 31, 2019. I reviewed the filing including the application, testimony, exhibits, work papers and other supporting documentation. I highlighted several concerns regarding the lack of GCR customer benefits that should have been derived from implementation of the Tax Cut and Jobs Act of 2017, leasing arrangements regarding an interconnection pipeline, and failure to identify or quantify GCR customer benefits resulting from the gas management services that CECO subcontracted out for its Zeeland, Jackson and Karn plants.

Case No. U-20525 (06/20) Michigan Public Service Commission. Provided testimony on behalf of Michelle Rison and the Residential Customer Group regarding the application of CONSUMERS ENERGY COMPANY for approval of a power Supply cost Recovery Plan for the 12 months ending December 31, 2020. I reviewed the filing including the application, testimony,

exhibits, work papers and supporting documents. I highlighted several concerns regarding the lack of GCR customer benefits that should have been derived from implementation of the Tax Cut and Jobs Act of 2017, leasing arrangements regarding an interconnection pipeline, and failure to identify or quantify GCR customer benefits resulting from the gas management services that CECO subcontracted out relative to the Zeeland, Jackson and Karn facilities.

Docket No. R-2020-3018929 (12/20), The Pennsylvania Office of Consumer Advocate regarding an Application of PECO Energy Company - Gas Division. I reviewed the natural gas energy efficiency and conservation plan that was proposed in conjunction with the PECO Energy Company general rate case. I reviewed the proposed energy efficiency plan and programs. I offered suggestions for modifications to their energy efficiency programs.

Case No. U-20220 (12/20) Michigan Public Service Commission. Provided testimony on behalf of Michelle Rison and the Residential Customer Group regarding the application of CONSUMERS ENERGY COMPANY for reconciliation of its power Supply cost Recovery Plan for the 12 months ending December 31, 2019. I reviewed the case filing including the application, testimony, exhibits, work papers and supporting documents. I identified and defended several concerns regarding the deficiency of GCR customer benefits regarding the implementation of the Tax Cut and Jobs Act of 2017, leasing arrangements regarding an interconnection pipeline as well as the failure to identify or quantify GCR customer benefits resulting from the gas management services that CECO subcontracted out.

In addition, I have served the following public sector clients since 1990.

Client	Nature of Service
Alaska Housing Finance Corporation	Analysis of energy efficiency, system planning and applicability of Energy Policy Act standards to Alaska resource selection process.
California Low Income Governing Board	In conjunction with AB 1890 the state’s restructuring statute provided analyses of options to deliver energy efficiency and assistance programs to low-income households in a restructured utility environment. Assisted the CPUC and Low-Income Governing Board in de low-income energy assistance and energy efficiency programs, implementation methods and procedures under interim utility administration.
Conservation Law Foundation of New England	Provided technical support to the collaborative working groups with Boston Edison, United Illuminating, Eastern

	Utilities Association, and Nantucket Electric regarding system planning approaches, energy efficiency programs and resource screening.
District of Columbia Public Service Commission	Testimony regarding demand-side management, least cost planning principles.
Germantown Settlement, Philadelphia	Analysis and technical support regarding business structure and market to aggregate load and/or provide energy efficiency and energy assistance services to low-income households.
City of New Orleans	Developed least cost planning rules, guided a public working group to develop demand-side programs, and developed a low income, senior citizens energy efficiency program.
Oak Ridge National Laboratory	Prepared an economic analysis of the customer impact from various electricity restructuring configurations for the State of Ohio
Ohio Office of Consumer Council	Analyzed two utilities' long-range plans and energy efficiency resource options. Analyzed the Dominion East Gas Company application to be relieved of the merchant function.
Ontario Energy Board	Developed demand-side management programs and evaluated need for natural gas integrated resource planning rules.
U.S. Environmental Protection Agency	Developed handbook, "Energy Efficiency and Renewable Energy: Opportunities from Title IV of the Clean Air Act", which focuses on how energy efficiency and renewables relate to acid rain compliance strategies.
U.S. Environmental Protection Agency and U.S. Department of Energy	Analyzed and compared utility supply- and demand-side resource selection for Clean Air Act compliance on the Pennsylvania-New Jersey-Maryland (PJM) interconnection.
Washington State Weatherization Directors	Natural Gas energy conservation program design involving Cascade Natural Gas Company

Excerpt from Met-Ed/Penelec/Penn Power/West Penn Power EEC Plan Exhibit
AJW-1

RIDERS

The Phase IV EE&C-C rates by Customer Class shall be calculated in accordance with the formula set forth below:

$$EE\&C-C = [(EEC_C - E - E^2) / S] \times [1 / (1 - T)]$$

$$EEC_C = EEC_{Exp1} + EEC_{Exp2} + EEC_{Exp3} \text{ Where:}$$

EE&C-C = The charge in cents or dollar per Billing Unit by Customer Class as defined by this rider applied to each Billing Unit for the Rate Schedules identified in this rider.

EEC_C = The Energy Efficiency and Conservation Costs by Customer Class incurred and projected to be incurred by the Company for the EE&C-C Computational Period calculated in accordance with the formula shown above.

EEC_{Exp1} = Costs incurred and projected to be incurred associated with the Customer Class specific Phase IV EE&C Programs as approved by the Commission for the Phase IV EE&C-C Computational Period by Customer Class. These costs also include an allocated portion of any indirect costs incurred associated with all the Company's Phase IV EE&C Programs for the Phase IV EE&C-C Computational Period. EEC_{Exp1} costs will be offset by a credit for any PJM capacity market revenues (net of the costs associated with auction participation and including replacing capacity charges), capacity deficiency charges and any unavoidable PJM charges. Such costs shall be allocated to each customer class based on the ratio of class- specific approved budgeted program costs to total approved budgeted program costs.

EEC_{Exp2} = An allocated portion of incremental administrative start-up costs incurred by the Company through May 31, 2021 in connection with the development of the Company's Phase IV EE&C Programs in response to the Commission's order and guidance at Docket No. M-2020-3015228. These costs to design, create, and obtain Commission approval for the Company's Phase IV EE&C Programs include, but are not limited to, consultant costs, legal fees, and other direct and indirect costs associated with the development and implementation of the Company's Phase IV EE&C Programs in compliance with Commission directives. Such costs shall be allocated to each customer class based on the ratio

of class-specific approved budgeted program costs to total approved budgeted program costs.

- EEC_{Exp3} = An allocated portion of the costs the Company incurs and projects to incur to fund the Commission's statewide evaluator contract which shall be excluded in the final determination of the Act 129 limitation on the Company's Phase IV EE&C Program costs. Such costs shall be allocated to each customer class based on the ratio of class-specific approved budgeted program costs to total approved budgeted program costs.
- E = The cumulative over or under-collection of Phase IV EE&C costs by Customer Class that results from the billing of the Phase IV EE&C-C rates (an over-collection is denoted by a positive E and an under- collection by a negative E).
- E^2 = Phase III EE&C final reconciliation over or under-collection of EEC costs by Customer Class that results from the billing of the Phase III EE&C-C rates through March 31, 2021 (an over- collection is denoted by a positive E and an under-collection by a negative E), and any expenses to finalize any measures installed and commercially operable on or before May 31, 2021; expenses to finalize any contracts; other Phase III administrative obligations; and any remaining Phase III EE&C revenues after March 31, 2021.
- S = The Company's projected Billing Units (kWh sales delivered to all Customers in the specific customer class or kW PLC demand for the Industrial Customer Class).
- T = The Pennsylvania gross receipts tax rate in effect during the billing month expressed in decimal form as reflected in the Company's base rates.

All capitalized terms not otherwise defined in this rider shall have the definitions specified in the Definitions of Terms section of this Tariff. For the purpose of this rider, the following additional definitions shall apply:

1. Phase IV EE&C-C Computational Period – The 12-month period from June 1 through May 31.
2. Phase IV EE&C-C Initial Reconciliation Period – June 1, 2021 through March 31, 2022 for the initial period of the rider.
3. Phase IV EE&C-C Reconciliation Period – The 12-month period ending March 31 each year thereafter, except for the Initial Reconciliation Period, for the duration of this rider.
4. Peak Load Contribution ("PLC") – A Customer's contribution to the Company's transmission zone normalized summer peak load, as estimated by the Company in accordance with PJM rules and requirements.
5. Phase III EE&C – The energy efficiency plan that terminates on May 31, 2021. Revenues and EE&C Costs will continue to accrue past the termination date. A final reconciliation of the remaining balance will be included in the June 1, 2022 Phase IV EE&C-C rate calculation as a separate line item.

The Company will submit to the Commission by May 1 of each year starting May 1, 2022: (1) a reconciliation between actual Phase IV EE&C-C revenues and actual Phase IV EE&C-C costs for the Phase IV EE&C-C Reconciliation Period, except for the Phase IV EE&C- C Initial Reconciliation Period, as adjusted for removal of gross receipts tax; (2) any adjustment to the forecasted Phase IV EE&C-C revenues anticipated to be billed during April through May of that year, as adjusted for removal of gross receipts tax; (3) the Phase IV EE&C program cost estimate for the forthcoming Phase IV EE&C-C Computational Period by Customer Class; and (4) Phase III EE&C final reconciliation over or under-collection of EEC costs by Customer Class that results from the billing of the Phase III EE&C-C rates and remaining Phase III EEC costs. There shall also be a final reconciliation of amounts to be collected or refunded after May 31, 2026.

Upon determination that the Phase IV EE&C-C rates, if left unchanged, would result in material over or under-collection of all recoverable costs incurred or expected to be incurred by customer class, the Company may request that the Commission approve one or more interim revisions to the Phase IV EE&C-C rates to become effective thirty (30) days from the date of filing, unless otherwise ordered by the Commission.

The Company shall file an annual report of collections under this rider by April 30th of each year starting April 30, 2022 until the conclusion of this rider.

At the conclusion of the duration of this rider, the Company is authorized to recover or refund any remaining amounts not reconciled at that time under such mechanism as approved by the Commission.

Application of the Phase IV EE&C-C rates shall be subject to annual review and audit by the Commission.

Proposed Revision to Met-Ed/Penelec/Penn Power/West Penn Power EEC Plan Riders in Exhibit AJW-1

RIDERS

The Phase IV EE&C-C rates by Customer Class shall be calculated in accordance with the formula set forth below:

$$EE\&C-C = [(EEC_C - E + \{R_{PJM} - C_{PJM}\} - E^2) / S] \times [1 / (1 - T)]$$

$$EEC_C = EEC_{Exp1} + EEC_{Exp2} + EEC_{Exp3}$$

Where:

EE&C-C = The charge in cents or dollar per Billing Unit by Customer Class as defined by this rider applied to each Billing Unit for the Rate Schedules identified in this rider.

EEC_C = The Energy Efficiency and Conservation Costs by Customer Class incurred and projected to be incurred by the Company for the EE&C-C Computational Period calculated in accordance with the formula shown above.

EEC_{Exp1} = Costs incurred and projected to be incurred associated with the Customer Class specific Phase IV EE&C Programs as approved by the Commission for the Phase IV EE&C-C Computational Period by Customer Class. These costs also include an allocated portion of any indirect costs incurred associated with all the Company's Phase IV EE&C Programs for the Phase IV EE&C-C Computational Period. Such costs shall be allocated to each customer class based on the ratio of class-specific approved budgeted program costs to total approved budgeted program costs.

EEC_{Exp2} = An allocated portion of incremental administrative start-up costs incurred by the Company through May 31, 2021 in connection with the development of the Company's Phase IV EE&C Programs in response to the Commission's order and guidance at Docket No. M-2020-3015228. These costs to design, create, and obtain Commission approval for the Company's Phase IV EE&C Programs include, but are not limited to, consultant costs, legal fees, and other direct and indirect costs associated with the development and implementation of the Company's Phase IV EE&C Programs in compliance with Commission directives. Such costs shall be allocated to each customer class based on the ratio of class-specific approved budgeted program costs to total approved budgeted program costs.

- EEC_{Exp3} = An allocated portion of the costs the Company incurs and projects to incur to fund the Commission's statewide evaluator contract which shall be excluded in the final determination of the Act 129 limitation on the Company's Phase IV EE&C Program costs. Such costs shall be allocated to each customer class based on the ratio of class-specific approved budgeted program costs to total approved budgeted program costs.
- E = The cumulative over or under-collection of Phase IV EE&C costs by Customer Class that results from the billing of the Phase IV EE&C-C rates (an over-collection is denoted by a positive E and an under- collection by a negative E).
- R_{PJM} = The allocated portion of any PJM capacity market revenues. The PJM capacity market revenues shall be allocated to each customer class in proportion to the cleared nominations by customer class. The term $\{R_{PJM} - C_{PJM}\}$ is the net PJM revenue by customer class – positive net PJM revenues are a credit to the customer class and reduce the reconciliation component of the rider.
- C_{PJM} = The allocated portion of any PJM capacity market costs associated with auction participation and including replacing capacity charges, capacity deficiency charges and any unavoidable PJM charges. The PJM capacity market costs shall be allocated to each customer class in proportion to the cleared nominations by customer class. The term $\{R_{PJM} - C_{PJM}\}$ is the net PJM revenue by customer class – negative net PJM revenues are a cost to the customer class and increase the reconciliation component of the rider.
- E^2 = Phase III EE&C final reconciliation over or under-collection of EEC costs by Customer Class that results from the billing of the Phase III EE&C-C rates through March 31, 2021 (an over- collection is denoted by a positive E and an under-collection by a negative E), and any expenses to finalize any measures installed and commercially operable on or before May 31, 2021; expenses to finalize any contracts; other Phase III administrative obligations; and any remaining Phase III EE&C revenues after March 31, 2021.
- S = The Company's projected Billing Units (kWh sales delivered to all Customers in the specific customer class or kW PLC demand for the Industrial Customer Class).
- T = The Pennsylvania gross receipts tax rate in effect during the billing month expressed in decimal form as reflected in the Company's base rates.

All capitalized terms not otherwise defined in this rider shall have the definitions specified in the Definitions of Terms section of this Tariff. For the purpose of this rider, the following additional definitions shall apply:

6. Phase IV EE&C-C Computational Period – The 12-month period from June 1 through May 31.

7. Phase IV EE&C-C Initial Reconciliation Period – June 1, 2021 through March 31, 2022 for the initial period of the rider.
8. Phase IV EE&C-C Reconciliation Period – The 12-month period ending March 31 each year thereafter, except for the Initial Reconciliation Period, for the duration of this rider.
9. Peak Load Contribution (“PLC”) – A Customer’s contribution to the Company’s transmission zone normalized summer peak load, as estimated by the Company in accordance with PJM rules and requirements.
10. Phase III EE&C – The energy efficiency plan that terminates on May 31, 2021. Revenues and EE&C Costs will continue to accrue past the termination date. A final reconciliation of the remaining balance will be included in the June 1, 2022 Phase IV EE&C-C rate calculation as a separate line item.

The Company will submit to the Commission by May 1 of each year starting May 1, 2022: (1) a reconciliation between actual Phase IV EE&C-C revenues and actual Phase IV EE&C-C costs for the Phase IV EE&C-C Reconciliation Period, except for the Phase IV EE&C-C Initial Reconciliation Period, as adjusted for removal of gross receipts tax; (2) any adjustment to the forecasted Phase IV EE&C-C revenues anticipated to be billed during April through May of that year, as adjusted for removal of gross receipts tax; (3) the Phase IV EE&C program cost estimate for the forthcoming Phase IV EE&C-C Computational Period by Customer Class; and (4) Phase III EE&C final reconciliation over or under-collection of EEC costs by Customer Class that results from the billing of the Phase III EE&C-C rates and remaining Phase III EEC costs. There shall also be a final reconciliation of amounts to be collected or refunded after May 31, 2026.

Upon determination that the Phase IV EE&C-C rates, if left unchanged, would result in material over or under-collection of all recoverable costs incurred or expected to be incurred by customer class, the Company may request that the Commission approve one or more interim revisions to the Phase IV EE&C-C rates to become effective thirty (30) days from the date of filing, unless otherwise ordered by the Commission.

The Company shall file an annual report of collections under this rider by April 30th of each year starting April 30, 2022 until the conclusion of this rider.

At the conclusion of the duration of this rider, the Company is authorized to recover or refund any remaining amounts not reconciled at that time under such mechanism as approved by the Commission.

Application of the Phase IV EE&C-C rates shall be subject to annual review and audit by the Commission.

EXCERPT FROM FIRSTENERGY
PHASE IV ENERGY EFFICIENCY AND CONSERVATION PLAN
Section 1.6

1.6. *Summary description of the programs or measure categories from which the EDC intends to nominate peak demand reductions (PDR) into PJM's Forward Capacity Market (FCM) along with a projected range of MW totals to be bid by year.*

The Companies plan to offer a portion of the peak demand reductions from its Phase IV Plan into PJM's Forward Capacity Market from the portfolio of programs and measures that are eligible for PJM. The Companies will base their actual offer values on their experience evaluating programs for PJM capacity market participation, taking into account capacity ownership rights, EM&V results and costs, changing PJM market rules, and other variables to balance the risk and cost of capacity market participation with the anticipated revenue.

The Companies anticipate measures being offered from primarily lighting, HVAC equipment, refrigeration, water heating and custom project programs. See Sections 3.2, 3.3 and 3.4 for the Companies' program and measure offerings from which resources will be considered in determining its offers into PJM's Forward Capacity Market. The Companies provided estimated ranges of the PJM Summer and Winter MW EE potential for each PJM delivery year as shown in Appendix C, Table C-3 based on the MWh savings as projected in the EE&C Plan, with the following assumptions and modifications:

- Identified and removed energy savings of all measures not eligible for PJM including:
 - online audits;
 - appliance recycling;
 - building lighting controls and occupancy sensors;
 - smart thermostats, energy management systems or smart homes;
 - behavioral programs;
 - educational programs;
- Assumed utilities retain all Phase IV Plan program Capacity Rights to support their offered EE resources and to ensure no double counting of EE resources by third parties;
- Assigned an initial savings load shape to each PJM eligible EE measure;
- Estimated the potential kW savings values for each measure for the PJM defined Summer and Winter periods using the appropriate load shape curve; and
- Included T & D line losses to adjust retail kW values to wholesale kW values.

The Companies anticipate participation of Phase IV Plan resources installed starting June 1, 2021 in the 2023/24 Base Residual Auction ("BRA"). All EE sell offer values and buy bids shall remain confidential because they are considered market sensitive information; however, they can be provided to Commission Staff via confidential submission and after

the applicable auction results are available. The Companies' considerations and processes to further evaluate the potential values provided in Appendix C, Table C-3 for their participation in the PJM Capacity Auctions also include, but are not limited to, the following:

- Adjustment of the PJM kW estimates for any Point of Sales (POS), Mid-Stream, and Up-Stream Programs. Measures from these programs require additional PJM EM&V and annual persistence studies to ensure offered EE measures are initially installed in the applicable PJM zone and remain in service during each applicable delivery year.
- The Initial PJM EM&V Plan values are based on many assumptions including adoption/installation rates, more generic or composite measure savings curve shapes, initial incentives or rebate levels, line losses and current measure baselines. Adjustments to each must be considered for actual EE offers.
- Adjustments to recognize that EE resources have a limited offer duration of four years with additional installation period limitations and PJM auction parameter changes which will require true-up of market positions.
- Consideration of Capacity Market rule changes like the pending PJM Minimum Offer Price Rules (MOPR) and FERC Order 2222 - DER Aggregation which includes Energy Efficiency Resources.

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Joint Petition for Consolidation of Proceedings	:	Docket Nos. M-2020-3020820
and Approval of the Phase IV Energy Efficiency	:	M-2020-3020821
and Conservation Plan of Metropolitan Edison	:	M-2020-3020822
Company, Pennsylvania Electric Company,	:	M-2020-3020823
Pennsylvania Power Company, and West Penn	:	
Power Company	:	

VERIFICATION

I, Geoffrey C. Crandall, hereby state that the facts set forth in my Direct Testimony, OCA Statement 1, are true and correct (or are true and correct to the best of my knowledge, information, and belief) and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

DATED: January 13, 2021
*302286

Signature:



Geoffrey C. Crandall

Consultant Address: MSB Energy Associates, Inc.
6907 University Ave # 162
Middleton, WI 53562

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

**METROPOLITAN EDISON COMPANY
Docket No. M-2020-3020820**

**PENNSYLVANIA ELECTRIC COMPANY
Docket No. M-2020-3020821**

**PENNSYLVANIA POWER COMPANY
Docket No. M-2020-3020822**

**WEST PENN POWER COMPANY
Docket No. M-2020-3020823**

**PHASE IV ENERGY EFFICIENCY AND
CONSERVATION PLAN**

**SUPPLEMENTAL DIRECT TESTIMONY
OF
GEOFFREY C. CRANDALL**

**ON BEHALF OF
PENNSYLVANIA OFFICE OF CONSUMER ADVOCATE**

January 25, 2021

1 **Q. What is your name and business address?**

2 A My name is Geoffrey C. Crandall. My business address is MSB Energy Associates, Inc.
3 6907 University Avenue # 162, Middleton, WI 53562

4
5 **Q. Are you the same Geoffrey Crandall that provided Direct Testimony in this Docket?**

6 A. Yes.

7
8 **Q. What is the purpose of your Supplemental Direct Testimony?**

9 A. The primary purpose is to provide information pertinent to two issues raised in my Direct
10 Testimony that the Companies provided subsequent to the filing of my Direct Testimony.
11 As described on page 13 my Direct Testimony, OCA participated in an informal verbal
12 discovery session on Friday, January 8, 2021. During that session, OCA identified two
13 issues in which there was an inconsistency between the provisions of Rider F and the
14 verbal description of what the Companies actually do or propose to do. The Companies
15 agreed to investigate the inconsistencies and provide the resolution to OCA. When my
16 Direct Testimony was filed on January 13, 2021, the Companies had not yet provided
17 responses. The Companies provided a response on January 14 and further amended it on
18 January 21, 2021. Excerpts from the Companies' email responses are attached as
19 Schedule GCC-1-Supp.

20

1 **Q. What are the issues affected by the inconsistencies?**

2 A. One issue, raised on page 13 of my Direct Testimony, is how the common costs
3 associated with the EE&C portfolio are allocated to each customer class. Rider F as
4 proposed by the Companies allocates the common costs (indirect program costs,
5 incremental Phase IV startup/development costs, and statewide evaluator costs) to each
6 customer class in proportion to the budget for each customer class. The Companies
7 indicated during the January 8 informal discovery session that the common costs are
8 actually allocated based on the ratio of each customer classes' CSP Delivery Fees plus
9 Marketing costs to the Companies' total CSP Delivery Fees plus Marketing costs.

10 The other issue, discussed on page 15 of my Direct Testimony, is the allocation of the
11 PJM revenues and costs associated with the Companies' nomination of energy efficiency
12 peak demand reductions into the PJM capacity market. Rider F as proposed by the
13 Companies allocates the PJM revenues and costs to each customer class in proportion to
14 the budget for each customer class. During the January 8 informal discovery session, the
15 Companies indicated that the PJM revenues net of costs are assigned to the customer
16 class associated with the kW values of EE&C measures that cleared in PJM's Forward
17 Capacity Market.

18 **Q. Has the PJM net revenue allocation issue been resolved?**

19 A. According to the January 14 email from the Companies (See Schedule GCC-1-Supp), the
20 Companies assign PJM revenues net of PJM costs to the specific customer class that was
21 the source of the EE&C peak reductions that cleared in the PJM Forward Capacity
22 Market and indicated that Rider F would be revised. On January 21, the Companies

1 reaffirmed the PJM net revenues allocation method and proposed further changes to
2 move the PJM net revenues from the EEC_{Exp1} term to the E term. The Companies further
3 indicated that the revised Rider F would be addressed in more detail by Mr. Woytko in
4 the Companies Rebuttal Testimony.

5 The Companies' proposed revisions to Rider F are consistent with the recommendation in
6 my Direct Testimony. Because the Companies will not provide a Revised Rider F, or
7 address it in more detail, until their January 25 Rebuttal Testimony, I am not able to
8 verify that all of my recommended changes to Rider F will be made or functionally met
9 by the Companies' revised Rider F. For example, while the Companies propose to
10 remove the erroneous allocation language from Rider F, it appears from the emails that
11 the Companies' Revised Rider F will not state how the net revenues are to be allocated.

12 It remains my recommendation that the Commission approve Rider F as contained in my
13 proposed Revisions to Rider F (Direct Testimony Schedule GCC-3), or language that is
14 functionally the same.

15 **Q. Has the issue about allocating common costs among customer classes been resolved?**

16 A. That remains unclear. In a January 14 email (Schedule GCC-1-Supp), the Companies
17 state that "all indirect and common cost are allocated to the customer classes based on the
18 percentage of program budgets." In the answer part d, the Companies say that the "costs
19 are allocated to the customer classes based on the percentage of total program budgets."
20 This suggests that the language in the Rider is correct. My recommendation was to
21 allocate the common costs in that manner.

1 In a January 21 email (Schedule GCC-1-Supp) confuses the issue by stating “the
2 allocation of the indirect, common, and administrative start-up costs were not correctly
3 defined in the EE&C Riders. These costs are allocated to the customer classes based on
4 the percentage of total plan-specific administrative program budgets.” While it doesn’t
5 explicitly say so, it suggests that these costs will be allocated according to the proportion
6 of CSP delivery fees and marketing costs associated with each customer class. Because
7 the Companies have not yet provided a Revised Rider F, or will address this in more
8 detail, until their January 25, 2021 Rebuttal Testimony, I am not able determine on what
9 basis the Companies propose to allocate common costs.

10 **Q. On what basis did the Companies allocate projected common costs in the Phase IV**
11 **EE&C Plan?**

12 A. The Phase IV EE&C Plan customer class allocations are based on the proportion of CSP
13 Delivery and Marketing costs. Appendix B, Table 12 of the EE&C Plan filing shows the
14 common costs by customer class. Dividing each sector common cost by the total
15 common cost yields the percentage of the common costs allocated to each customer class.

16 Appendix B, Tables 10-1 through 10-3 contains the total program-specific costs as well
17 as the CSP Delivery fees and Marketing costs by program and customer class. Dividing
18 each customer class’ program-specific costs by the total Company program-specific costs
19 yields the percentage allocator based on total program-specific costs. Dividing each
20 customer class’ Conservation Service Provider (CSP) delivery fees and marketing costs
21 by the total Company CSP delivery fees and marketing costs yields the percentage
22 allocator based on CSP delivery fees and marketing costs.

1 The percentage allocators based on CSP Delivery fees plus marketing costs match the
2 allocation percentages from Appendix B, Table 12. See Schedule GCC-2-Supp. Thus, I
3 have concluded that the Companies actually used the CSP Delivery plus marketing costs
4 to allocate the common costs. They did not use the percentage of program budgets as
5 indicated in Rider F.

6 **Q. How does this new information affect your recommendations regarding Rider F?**

7 A. The Companies appear to be rewriting Rider F to allocate costs based on the percentage
8 of total plan-specific administrative program budgets. This will mean more of the
9 common cost will be allocated to the residential (including low income) customers. The
10 Companies did not provide any justification for using the percentage of total plan-specific
11 administrative program budgets to allocate common costs.

12 I reaffirm my recommendation that the common cost be allocated to the customer classes
13 based on the percentage of program budgets.

14

15 **Q. Please address your suggestion to improve the Companies' proposed portfolio as**
16 **you identified in your Direct Testimony.**

17 A. On page 19 (Lines 16-19) of my Direct Testimony I recommend that the Commission
18 require the Companies to scale back their proposed behavior modification programs. In
19 addition, I suggested that the Companies replace them with long lived energy efficiency
20 measures.

1 **Q. Do you have further clarification or more specificity to offer regarding this**
2 **recommendation?**

3 A. Yes. I suggest that the Companies reduce their budget for the Behavior modification
4 programs by 50% or more and re-direct those funds to the Weatherization subprogram or
5 the Energy Efficient Products Program to fund long lived energy efficiency measures.

6 **Q. Does that complete your Supplemental Direct Testimony?**

7 A. Yes, pending the receipt of the corrected and revised Rider F and supporting document
8 related thereto.

9

10

From January 21, 2021 E-mail*

The Companies are modifying their response to informal discovery request No. 15 regarding PJM revenues and costs. In compliance with the Phase IV Implementation Order, the Companies now realize that this sentence should be removed from EECexp1 and be treated as a separate line item in the rate calculation. The net PJM revenues/costs should be treated as an offset to the E-Factor. Also, the allocation of the indirect, common, and administrative start-up costs were not correctly defined in the EE&C Riders. These costs are allocated to the customer classes based on the percentage of total plan-specific administrative program budgets. These issues will be addressed in more detail in the Companies' Rebuttal Testimony of Anthony J. Woytko.

From January 14, 2021 E-mail*

As a follow-up from our discussion last Friday, below is the Companies' response to Number 15 of the OCA's informal discovery requests:

Q. See Direct Testimony of Mr. Woytko, Page 11, line 23 - EECexp1 include an allocated portion of indirect costs such as EEC&P Marketing.

- a. How are the indirect and common program costs allocated to customer classes?
- b. How are the allocations determined?
- c. EECexp1 also includes PJM capacity market revenues and costs. Are those allocated based on the rate classes which are the sources of the reductions.
- d. The Direct Testimony of Mr. Woytko, page 12 line 5 - EECexp2 includes an allocated portion admin and start-up costs. How are the allocations determined? How are EECexp3 costs (supporting SWE) allocated?

A. a. & b. All indirect and common program costs are allocated to the customer classes based on the percentage of program budgets. The Direct Testimony of Mr. Woytko at page 11, line 23 was intended to communicate that each Companies' Plan program budgets upon which EECexp1 are calculated include allocated indirect and common program costs.

c. PJM revenues net of PJM costs are assigned to the specific customer class associated with the kW values of the EE&C programs and measures that cleared in the PJM Forward Capacity Market for each delivery period. The sentence of EECexp1 regarding PJM revenues and costs should be moved to the last sentence of EECexp1 as the costs are not allocated.

d. Admin and start-up costs are allocated to the customer classes based on the percentage of total program budgets. EECexp3 costs are also allocated based on the percentage of total program budgets.

* *The emails were sent to OCA by Devin Ryan, Principal, Post & Schell, P.C. on behalf of the Companies in response to OCA's informal discovery requests. On January 25, 2021, OCA received authorization from the Companies to quote directly from the counsel's e-mail.*

PERCENTAGE ALLOCATION OF EE&C PLAN COMMON COSTS			
Met Ed	Residential	Small C&I	Large C&I
Allocated Results Appendix B Table 12	42%	25%	33%
Allocation Factor CSP Delivery & Marketing	42%	25%	33%
Allocation Factor Total Program Budgets	42%	29%	29%
Penelec	Residential	Small C&I	Large C&I
Allocated Results Appendix B Table 12	43%	31%	26%
Allocation Factor CSP Delivery & Marketing	43%	31%	26%
Allocation Factor Total Program Budgets	41%	34%	25%
Penn Power	Residential	Small C&I	Large C&I
Allocated Results Appendix B Table 12	50%	27%	23%
Allocation Factor CSP Delivery & Marketing	50%	27%	23%
Allocation Factor Total Program Budgets	46%	30%	23%
West Penn	Residential	Small C&I	Large C&I
Allocated Results Appendix B Table 12	50%	26%	24%
Allocation Factor CSP Delivery & Marketing	50%	26%	24%
Allocation Factor Total Program Budgets	47%	30%	24%

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

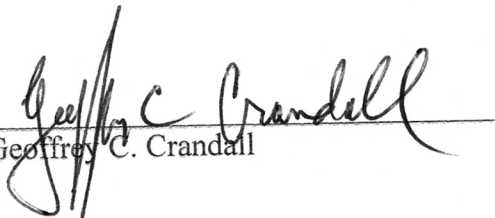
Joint Petition for Consolidation of Proceedings	:	Docket Nos. M-2020-3020820
and Approval of the Phase IV Energy Efficiency	:	M-2020-3020821
and Conservation Plan of Metropolitan Edison	:	M-2020-3020822
Company, Pennsylvania Electric Company,	:	M-2020-3020823
Pennsylvania Power Company, and West Penn	:	
Power Company	:	

VERIFICATION

I, Geoffrey C. Crandall, hereby state that the facts set forth in my Supplemental Direct Testimony, OCA Statement 1-SUPP., are true and correct (or are true and correct to the best of my knowledge, information, and belief) and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

DATED: January 25, 2021
*302945

Signature:


Geoffrey C. Crandall

Consultant Address: MSB Energy Associates, Inc.
6907 University Ave # 162
Middleton, WI 53562

Via electronic service only due to Emergency Order at Docket No. M-2020-3019262

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petitions of Metropolitan Edison Company,	:	M-2020-3020820
Pennsylvania Electric Company, Pennsylvania	:	M-2020-3020821
Power Company, and West Penn Power	:	M-2020-3020822
Company for Approval of their Act 129	:	M-2020-3020823
Phase IV Energy Efficiency and Conservation	:	
Plans	:	

**INTERIM ORDER
CONFIRMING ADMITTED EVIDENCE**

An evidentiary hearing in this matter was held on February 5, 2021.

During the hearing, the following evidence was admitted into the record:

PARTY	NUMBER	DESCRIPTION	ASSOCIATED EXHIBITS
FIRST ENERGY COMPANIES	STMT 1	Direct Testimony of Kurt E. Turosky	
	STMT 2	Direct Testimony of Edward C. Miller	
	STMT 3	Direct Testimony of Anthony J. Woytko	AJW-1 through AJW-5
	STMT 2-R	Rebuttal Testimony of Edward C. Miller	ECM-1R
	STMT 3-R	Rebuttal Testimony of Anthony J. Woytko	AJW-1R through AJW-5R
	STMT 2-R (Supp)	Supplemental Rebuttal Testimony of Edward C. Miller	
	STMT 3-R (Supp)	Supplemental Rebuttal Testimony of Anthony J. Woytko	

OCA	STMT 1	Direct Testimony of Geoffrey C. Crandall	Schedules GCC-1 through GCC-4 and his Verification
	STMT 1-SUPP	Supplemental Direct Testimony of Geoffrey C. Crandall	Schedules GCC-Supp-1 and GCC-Supp-2 and his Verification
	Hearing Exhibit #1	OCA's answer to FE to OCA Set I, No. 3.	
CAUSE-PA	STMT 1	Direct Testimony of Jim Grevatt	Attachment A and his Verification
CAAP	STMT 1-R	Rebuttal Testimony of Susan A. Moore	Her Verification
INDUSTRIAL USERS GROUPS	HEARING EXHIBIT #1	FirstEnergy Companies' answers to MEIUG/PICA/WPPII to FE Set I, Nos. 5, 10, 15, and 16.	
PENN STATE	STMT 1	Direct Testimony of James L. Crist	His Verification
	STMT 1-R	Rebuttal Testimony of James L. Crist	

The Company's statements were admitted subject to the Company filing verifications by Monday, February 8, 2021. The Company timely filed the verifications. Therefore, the PPL statements are considered admitted.

THEREFORE,

IT IS ORDERED:

1. That, by **4:00 p.m. on February 12, 2021**, the parties shall file the admitted evidence, with appropriate verifications, with the Commission's Secretary's Bureau pursuant to 52 Pa.Code § 5.412a.

**M-2020-3020820, M-2020-3020821, M-2020-3020822, M-2020-3020823 JOINT
PETITION FOR CONSOLIDATION AND APPROVAL OF THE ACT 129 PHASE IV
ENERGY EFFICIENCY AND CONSERVATION PLAN OF METROPOLITAN EDISON
COMPANY, PENNSYLVANIA ELECTRIC COMPANY, PENNSYLVANIA POWER
COMPANY, AND WEST PENN POWER COMPANY**

Revised 1/19/21

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