

OCA STATEMENT NO. 1

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

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. :

Docket No. A-2017-2640195
Docket No. A-2017-2640200

Petition of Transource Pennsylvania, LLC for a :
finding that a building to shelter control :
equipment at the Rice Substation in Franklin :
County, Pennsylvania is reasonably necessary :
for the convenience or welfare of the public. :

P-2018-3001878

Petition of Transource Pennsylvania, LLC for a :
finding that a building to shelter control :
equipment at the Furnace Run Substation in :
York County, Pennsylvania is reasonably :
necessary for the convenience or welfare of the :
public. :

P-2018-3001883

Application of Transource Pennsylvania, LLC for :
approval to acquire a certain portion of the lands :
of various landowners in York and Franklin :
Counties, Pennsylvania for the siting and :
construction of the 230 kV Transmission Line :
associated with the Independence Energy :
Connection – East and West Projects as necessary :
or proper for the service, accommodation, :
convenience or safety of the public. :

A-2018-3001881, *et al.*

**DIRECT TESTIMONY OF
SCOTT J. RUBIN**

**ON BEHALF OF
THE OFFICE OF CONSUMER ADVOCATE**

SEPTEMBER 25, 2018

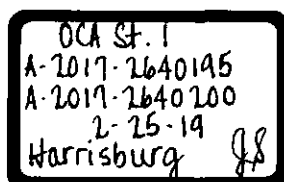


Table of Contents

Introduction.....	1
Summary.....	3
Overview of the PJM Planning Process	6
Pennsylvania’s High-Voltage Transmission Review Process.....	12
Effect of Recent Pennsylvania Legal Actions on the Review Process	13
High-Level Review of Transource’s Application	16
Overview of the IEC Project.....	18
Benefit-Cost Analysis of the IEC Project as a Whole	23
Costs and Benefits of the IEC Project to Pennsylvania.....	38
Meaning of PJM Project Selection	42
Economic Need for the IEC Project	44
Conclusion	45

Introduction

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

Q. Please state your name and business address.

A. My name is Scott J. Rubin. My business address is 333 Oak Lane, Bloomsburg, PA.

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

A. I am an independent consultant and an attorney. My practice is limited to matters affecting the public utility industry.

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

A. I have been asked by the Office of Consumer Advocate ("OCA") to review the Applications filed by Transource Pennsylvania LLC ("Transource" or "Company") and provide an expert opinion concerning the regulatory policy issues raised by the Applications. In addition, I have been asked to provide an overall summary of the OCA's recommendations, taking into account the recommendations and conclusions made by OCA experts who have reviewed technical aspects of the Applications.

Q. What are your qualifications to provide this testimony in this case?

A. I have testified as an expert witness before utility commissions or courts in the District of Columbia; the province of Nova Scotia; and the states of Alaska, Arizona, California, Connecticut, Delaware, Illinois, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Mississippi, New Hampshire, New Jersey, New York, North Dakota, Ohio, Pennsylvania, South Carolina, and West Virginia. I also have testified as an expert witness before various federal, state, and local legislative committees. I also have served as a consultant to the staffs of four state utility commissions, as well as to several national utility trade associations, and state and local governments throughout the country. Prior to

1 establishing my own consulting and law practice, I was employed by the OCA from 1983
2 through January 1994 in increasingly responsible positions. From 1990 until I left state
3 government, I was one of two senior attorneys at the OCA. Among my other
4 responsibilities in that position, I had a major role in setting its policy positions on water
5 and electric matters. In addition, I was responsible for supervising the office's technical
6 staff. During that time, I also testified as an expert witness for the OCA on rate design
7 and other policy matters.

8 Throughout my career, I developed substantial expertise in matters relating to the
9 economic regulation of public utilities. I have published articles, contributed to books,
10 written speeches, and delivered numerous presentations, on both the national and state
11 level, relating to regulatory issues. I have attended numerous continuing education
12 courses involving the utility industry. I also have participated as a faculty member in
13 utility-related educational programs for the Institute for Public Utilities at Michigan State
14 University, the American Water Works Association ("AWWA"), and the Pennsylvania
15 Bar Institute. A copy of my curriculum vitae is attached as Appendix A.

16 Q. Do you have any experience that is particularly relevant to the issues in this case?

17 A. Yes, I do. I have testified on numerous occasions as an expert on numerous types of
18 public policy issues in utility cases. I also have a strong analytical background, such as
19 significant coursework in economics, including a graduate course in natural resource
20 economics that had an emphasis on cost-benefit analysis, as well as conducting numerous
21 economic and statistical analyses. As an example, earlier this year I testified as an expert
22 witness before the Nova Scotia Utility and Review Board concerning the costs and
23 benefits associated with a proposed long-term natural gas pipeline contract. My work in

1 that case included reviewing, replicating, and modifying a statistical simulation model to
2 estimate the likely costs and benefits of the project under various scenarios and
3 assumptions, and making policy recommendations to the Board concerning actions that
4 could enhance the net benefits from the project for consumers. I am also the co-author of
5 a paper published in the *Journal of Benefit-Cost Analysis*, and I recently served as a peer
6 reviewer for that journal.

7 **Summary**

8 Q. Please introduce the OCA's presentation of expert evidence in these cases.

9 A. The OCA has retained three expert witnesses to review Transource's proposed
10 Independence Energy Connection Project ("the IEC Project") and offer recommendations,
11 opinions, and conclusions concerning the need for and siting of the IEC Project. In
12 addition, I am advised by counsel that the OCA may rely on evidence from other parties
13 in the case, including testimony and other evidence presented at the public hearings and
14 site visits. Following is a brief introduction to the OCA's testimony that is being
15 presented by its expert witnesses:

- 16 • OCA Statement 1 is my direct testimony. I provide an overview of the
17 IEC Project and the Commission review process. In addition, I review and
18 critique the benefit-cost analyses prepared by Transource and offer an
19 opinion concerning the economic need for the IEC Project. I also offer an
20 opinion, based on my analysis and the expert opinions of OCA's other
21 witnesses, concerning whether the Commission should grant or deny the
22 Applications and Petitions filed by the Company.
- 23 • OCA Statement 2 is the direct testimony of Peter LanzaLotta, a power-
24 systems engineer with more than four decades of experience in the
25 planning and operation of electric utility systems. Mr. LanzaLotta reviews
26 the need for the IEC Project, the planning process of PJM Interconnection
27 LLC ("PJM") that resulted in the selection of the IEC Project, the IEC

Project's economics, engineering alternatives to the IEC Project, and related matters.

- OCA Statement 3 is the direct testimony of Geoffrey Crandall, a former analyst with the Michigan Public Service Commission with more than 40 years of experience in utility planning, energy efficiency, and demand-response programs. Mr. Crandall reviews non-transmission alternatives to the IEC Project and evaluates the potential impact on the congestion the IEC Project attempts to remedy.

Q. Please summarize your conclusions and recommendations.

A. I summarize my conclusions and recommendations as follows:

- Transource's filings in this case do not consider the effects of recent changes in Pennsylvania law that should affect the Commission's review and analysis of the proposed projects.
- Transource's East and West Applications each identify only one reasonable alternative route to its selected routes. The route selection process apparently failed to consider other routes that would be likely to result in lower cost and lessened environmental impacts.
- PJM's so-called "benefit-cost" analysis for non-reliability projects like the IEC Project does not properly evaluate the benefits of a proposed project. The analysis completely ignores increases in costs that would be incurred by zones outside of the region benefiting from a project. That is, the economic analysis used by PJM and Transource completely ignores the fact that the lower-cost power that would flow into certain regions is already being used elsewhere.
- While the IEC Project would reduce costs in portions of PJM, the overall effect on PJM would be that the costs of the IEC Project would greatly exceed the project's benefits. Indeed, accepting all of Transource's assumptions shows that every dollar invested in the IEC Project would produce less than three cents of benefits for PJM.
- The effects on Pennsylvania consumers would be even more severe than the impact on PJM. Over a 15-year period, consumers in Central and Eastern Pennsylvania would incur increased power costs of more than \$340 million while consumers in Western Pennsylvania would receive lower-cost electricity valued at only \$2 million.
- I conclude, therefore, that Transource has failed to demonstrate that there is an economic need for the IEC Project. In fact, PJM in general and

1 Pennsylvania consumers in particular would save millions of dollars each
2 year if the IEC Project is not built.

3 Q. Considering your conclusions and recommendations along with the conclusions and
4 recommendations of the OCA's other expert witnesses, what is your ultimate
5 recommendation to the Commission?

6 A. The OCA's other expert witnesses conclude that the IEC Project is not needed to provide
7 safe and reliable service to the public. Transource has failed to demonstrate a need for
8 the IEC Project from either an economic or engineering perspective. If there is a need to
9 address economic congestion or to lower the cost of electricity in Maryland, District of
10 Columbia, and Virginia, there are much more cost-effective means to do so, such as
11 through the use of existing transmission rights-of-way and through the enhanced use of
12 distributed generation and energy efficiency projects.

13 When all facts are considered, construction and operation of the IEC Project
14 would result in significant net harm to the Commonwealth, its residents, and its
15 electricity consumers. I conclude, therefore, that the IEC Project is not necessary or
16 proper for the service, accommodation, safety, or convenience of the public. In my
17 opinion, therefore, the IEC Project does not meet the requirements of Pennsylvania's law
18 and regulations for (1) siting a high-voltage transmission line, (2) over-riding municipal
19 requirements for building construction, or (3) using the power of eminent domain.

20 Q. Do you have any other preliminary matters to address?

21 A. Yes. A portion of my testimony deals with regulatory policy issues. Given the nature of
22 public utility regulation, much of the public policy in this field is contained in decisions
23 by regulatory agencies and courts; or in statutes, ordinances, or regulations. I will be

1 citing to these types of sources. This should not be taken as a legal opinion (though I am
2 qualified to provide expert testimony as a regulatory attorney in Pennsylvania), but rather
3 as sources supporting my expert opinion concerning appropriate public policy and
4 regulatory practice.

5 **Overview of the PJM Planning Process**

6 Q. What type of project is the IEC Project, according to PJM's planning process?

7 A. The IEC Project is a "market efficiency" project. This means that the project is not being
8 proposed to enhance the reliability of service; nor does it solve any existing reliability
9 concerns. Rather, market efficiency projects are proposed to provide an economic
10 benefit to some PJM member utilities; that is, to reduce bulk power costs.

11 Q. Please describe your general understanding of the PJM planning process for a market
12 efficiency project like the IEC Project.

13 A. PJM conducts a process to identify transmission projects that might enhance the
14 economic efficiency of the bulk power market. The market efficiency selection process
15 is based on project-specific analyses performed as part of PJM's Regional Transmission
16 Expansion Plan ("RTEP") process.

17 PJM describes the market efficiency portion of the RTEP process as follows:

18 PJM's Regional Transmission Expansion Plan (RTEP) Process includes a
19 market efficiency analysis, the goal of which is to accomplish the
20 following objectives:

21 1. Determine which reliability-based enhancements have economic
22 benefit if accelerated.

23 2. Identify new transmission enhancements that may realize
24 economic benefit.

1 3. Identify economic benefits associated with modification to
2 reliability-based enhancements already included in RTEP that
3 when modified would relieve one or more economic constraints.
4 Such enhancements, originally identified to resolve reliability
5 criteria violations, may be designed in a more robust manner to
6 provide economic benefits as well.

7 Economic benefits of proposed transmission projects can be created by
8 mitigating congestion within production cost simulations of PJM's
9 transmission and generation dispatch systems. The benefit metrics are
10 determined by comparing future year simulation results of PJM's system,
11 both without and with the proposed transmission enhancement. The set of
12 metrics utilized and the methods involved with benefit determination are
13 further described in Manual 14B Section 2.6 and Schedule 6 Section 1.5.7
14 of the PJM Operating Agreement.

15 Interaction between PJM staff and PJM membership concerning Market
16 Efficiency Analysis is accomplished through the Transmission Expansion
17 Advisory Committee (TEAC). It is within the TEAC charter that the
18 committee will provide comments and recommendations concerning the
19 assumptions, scope, and analysis of results to PJM staff and where
20 appropriate to the PJM Board. The PJM Board will consider market
21 efficiency study assumptions and approve proposed transmission projects
22 and cost responsibility that is derived from a recommended project.¹

23 Q. How does PJM evaluate a proposed "market efficiency" project?

24 A. According to PJM's training materials for market efficiency projects,² the evaluation
25 process differs depending on the voltage level of the proposed project. If the voltage
26 level is 500,000 volts (500 kV) or higher, the project is considered a "regional" project.
27 Regional projects are evaluated based on an average of (a) the savings in energy costs
28 (known as the Net Load Payment, or NLP) in the zones that would see reduced costs and
29 (b) production cost savings throughout PJM.

¹ PJM, PJM Market Efficiency Modeling Practices (Feb. 2, 2017), available at:
<https://www.pjm.com/-/media/planning/rtep-dev/market-efficiency/pjm-market-efficiency-modeling-practices.ashx>,
last accessed Sept. 10, 2018.

² PJM, Market Efficiency Study Process and Project Evaluation Training (Dec. 22, 2014), available at:
<https://www.pjm.com/-/media/committees-groups/committees/teac/20140417-market/20140417-2014-market-efficiency-training.ashx>, last accessed Sept. 10, 2018.

1 Projects with voltage levels less than 500 kV, such as the IEC Project, have their
2 benefits evaluated solely based on the NLP savings in zones that would see reduced
3 energy costs.

4 The savings are estimated for each zone within PJM for a 15-year period
5 beginning with the in-service date of the proposed project, which is usually four years
6 into the future. Detailed production cost simulations are prepared for four years: (1) four
7 years prior to the first year in service (known as the RTEP year) which is the base case
8 (current) condition; (2) the RTEP year, (3) RTEP year plus 3, and (4) RTEP year plus 6.
9 The estimated savings for each of the other 12 years is interpolated from the results of the
10 three future-year simulations (RTEP, RTEP+3 and RTEP+6).

11 Q. Can you provide an example?

12 A. Yes. The PJM training materials I cited above give an example with an RTEP year (that
13 is, a project in-service date) of 2019. The study period is 15 years from the in-service
14 (RTEP) date. In this example, the analysis would cover the period from 2019 to 2033. In
15 that example, the four simulations would be for 2015 (RTEP-4), 2019 (RTEP), 2022
16 (RTEP+3), and 2025 (RTEP+6). The remaining years would be estimated using a simple
17 linear trend. For example, if the savings from the 2019 model run is \$100 and the
18 savings from the 2022 run is \$190, then the estimates for 2020 and 2021 would be \$130
19 and \$160, respectively.

20 Q. How are the results for each year used in determining the overall benefits from a project?

21 A. The change in NLP (which I abbreviate Δ NLP, delta (Δ) being the mathematical symbol
22 for change) for each zone is calculated for each of the 15 years. Those annual values for

1 each zone are then discounted to a present value as of the RTEP year. In the example
2 above, the net present value would be expressed as of 2019. PJM determines the
3 discount rate to be used based on the weighted average cost of capital of all PJM
4 transmission owners. The rate changes over time. For example, in 2014 the discount rate
5 was 7.8%. In the 2017 planning cycle (RTEP year 2021), the discount rate was 7.4%.³

6 Q. What does the discount rate mean?

7 A. The discount rate is designed to answer a question like: How much would you give me
8 today if I promised to give you \$100 one year from now (or two years from now, etc.)?
9 The discount rate is a measure of the time-value of money.

10 Using the above examples for the 2015 planning process (RTEP year 2019), if the
11 savings in 2019, 2020, and 2021 were \$100, \$130, and \$160, a discount rate allows us to
12 estimate how much that is worth in 2019. The 2019 savings (\$100) would not be
13 discounted at all. The savings of \$130 in 2020, however, would be worth 7.8% less
14 (using PJM's 2014 discount rate) in 2019, or \$119.86. (In effect, you would be willing to
15 pay \$119.86 today for the promise of \$130 a year from now.) And the savings two years
16 away, in 2021, would be worth 7.8% ^{less} each year, or \$136.01.⁴ The further removed you
17 are from the first year, the less you would pay for the promise of a future benefit. For
18 example, at a 7.8% discount rate, a promise of \$100 in 10 years is worth only about \$44
19 today.

³ PJM, 2017 RTEP Process Scope and Input Assumptions (Aug. 3, 2017), available at: <https://www.pjm.com/-/media/library/reports-notices/2017-rtep/20170731-rtep-input-assumptions-and-scope-whitepaper.ashx?la=en>, last accessed Sept. 10, 2018.

⁴ $\$160 \times (1 - 0.078) \times (1 - 0.078) = \136.01 .

1 Q. How does PJM's analysis use the discounted change in NLP for each zone?

2 A. If a zone has a positive ΔNLP – that is, its power costs increase over the 15-year study
3 period – the zone is dropped from the calculation. Only zones whose discounted sum of
4 ΔNLP is negative – that is, power costs decreased over the 15-year period – are included
5 in the benefits calculation.

6 Q. Can you provide an example?

7 A. For this example, I will assume a very simplified system with only three zones. The 15-
8 year NPV of ΔNLP shows the following: Zone 1 has a benefit (lower ΔNLP) of \$100;
9 Zone 2 has a benefit of \$50; and Zone 3 has a detriment (higher ΔNLP) of -\$110. Overall
10 the three zones experience net savings of \$40 (\$100 + \$50 - \$110). For purposes of
11 PJM's analysis, however, Zone 3 would be dropped from the calculation and the project
12 would have a "benefit" of \$150.

13 Q. How is the cost side of the benefit-cost analysis determined?

14 A. PJM's RTEP process determines the cost of a project based on the carrying charge for the
15 capital cost of the project, discounted over 15 years. The carrying charge calculation
16 assumes a project has a 45-year life (so a depreciation rate of slightly more than 2% per
17 year) and a cost of capital (including taxes) based on the weighted average of PJM
18 transmission owners' cost of capital.⁵ For example, in 2014 the carrying cost rate was
19 16.2%; by 2017 it had declined to 15.3%. The annual carrying cost is calculated and then
20 discounted for 15 years using the same discount rate that is used for determining the NPV

⁵ PJM, 2017 RTEP Process Scope and Input Assumptions (Aug. 3, 2017), available at: <https://www.pjm.com/-/media/library/reports-notices/2017-rtep/20170731-rtep-input-assumptions-and-scope-whitepaper.ashx?la=en>, last accessed Sept. 10, 2018.

of project benefits. The result is a present value of revenue requirements ("PVR") for the first 15 years.

Q. Can you provide an example?

A. Yes. Assume a project has a construction cost of \$100, the carrying charge rate is 16.2%, and the discount rate is 7.8%. That would mean that the annual cost of the project is \$16.20. The value of that in the first year is \$16.20. The second year's carrying cost of \$16.20 would be worth only \$14.94 ($\$16.20 \times (1 - 0.078)$). The third year's cost would be worth only \$13.77 in the first year, and so on. The sum of those discounted annual carrying charges for 15 years would be the PVR of the project in the year the project goes into service.

Q. How is the benefit-cost ratio for a project determined by PJM?

A. The benefit-cost ratio is the discounted benefit (NPV of Δ NLP for 15 years) divided by the discounted cost (PVR calculated over 15 years).

Q. Does PJM have a minimum benefit-cost threshold that a project must meet?

A. Yes. PJM requires a project to have a benefit-cost ratio of at least 1.25 in order to be selected for construction. Remember, though, that the calculation excludes consideration of all zones where the project would cause a detriment (an increase in power costs), as I discuss in more detail later in my testimony.

Q. Once a project is selected by PJM, is the project re-evaluated?

A. Yes. PJM conducts a periodic re-evaluation of selected projects to ensure that they remain cost-effective.

Pennsylvania's High-Voltage Transmission Review Process

Q. Are you generally familiar with the process in Pennsylvania for Commission review of a new high-voltage transmission line and substation?

A. Yes. I am familiar with some of the statutes, Commission regulations, and Commission policy statements addressing the siting of high-voltage transmission lines and substations.

In particular, I am familiar with the following:

- 66 Pa. C.S. § 1501 that gives the Commission authority to review a utility's facilities and determine whether changes are needed to provide safe, adequate, and reliable service to the public;
- 15 Pa. C.S. § 1511 that gives public utilities the power of eminent domain if the Commission finds that the proposed taking is needed for the service, accommodation, convenience, or safety of the public;
- 53 P.S. § 10619 that gives the Commission the authority to override local zoning and land-use requirements for the construction of buildings needed for the provision of utility service;
- 52 Pa. Code §§ 57.71 to 57.77, the Commission's regulations for high-voltage power line siting applications;
- 52 Pa. Code § 69.1101, the Commission's policy statement concerning the effect of its decisions on local zoning and land-use planning requirements; and
- 52 Pa. Code §§ 69.3101-69.3107, the Commission's policy statement concerning additional information and coordination for transmission line siting applications.

Q. What is your general understanding of the Commission's review process?

A. Very generally, the Commission seeks to determine whether a high-voltage transmission line is needed to serve the public given the available alternatives, that the route selected for the line is reasonable, and that the utility has minimized environmental and societal harm from the project. The Commission also will seek to minimize any incursion into local zoning and land-use requirements from substation buildings. The Commission also

1 will require certain set-backs from residences and other protected properties. Finally, the
2 Commission attempts to meet these responsibilities in a process that is open to the
3 affected public, including landowners, utility customers, other utilities, and local
4 governments.

5 **Effect of Recent Pennsylvania Legal Actions on the Review Process**

6 Q. Are there any recent legal actions in Pennsylvania that are not yet reflected in the
7 Commission's regulations and policy statements?

8 A. Yes, in my opinion there are two recent legal actions in Pennsylvania that are not yet
9 reflected in the Commission's regulations and policy statements: (1) the Pennsylvania
10 Supreme Court's decision in *Pennsylvania Environmental Defense Foundation v.*
11 *Commonwealth*⁶ ("PEDF") on June 20, 2017, and (2) Act 45 of 2018 signed by
12 Governor Wolf on June 24, 2018, and effective immediately.

13 Q. As a matter of public policy, and not as a legal opinion, why do you think the *PEDF* case
14 affects the Commission's review of high-voltage transmission lines and related facilities?

15 A. The Commission's siting regulations initially were put in place to implement the
16 Commonwealth Court's decision in *Payne v. Kassab* and some related cases that applied
17 the same standard specifically to the Commission. Very briefly, those decisions allowed
18 Commonwealth agencies, including the Commission, to take actions that could affect the
19 natural environment so long as the agencies ensured that environmental effects were
20 mitigated to the extent practical, given the nature of the project.

⁶ 161 A.3d 911 (2017).

1 The Supreme Court's *PEDF* decision expressly overturns *Payne v. Kassab* and
2 establishes a new test. As I understand it, the Court rejected any type of balancing or
3 mitigation analysis, and instead requires the Commonwealth to fulfill its obligations
4 under the Constitution as a "trustee" of natural resources. Specifically, the Court stated:
5 "[T]he Commonwealth has a duty to prohibit the degradation, diminution, and depletion
6 of our public natural resources, whether these harms might result from direct state action
7 or from the actions of private parties." *PEDF* at 933 (citation omitted).

8 In my opinion, this duty of protection goes beyond the balancing test and
9 mitigation analysis that were contained in the now-rejected *Payne v. Kassab* test that was
10 the basis for the Commission's siting regulations. Many transmission line projects,
11 including this one, involve the potential to degrade "public natural resources" (such as
12 waterways and public lands) and it appears to me that the Court is stating that the Pa.
13 Constitution requires the Commission to only permit degradation of those resources when
14 there is no reasonable alternative.

15 Q. What is Act 45 and how might it affect transmission line siting cases?

16 A. Act 45 amends the Eminent Domain Code to provide special protection to land that is
17 subject to agricultural conservation easements. These are properties where the owners
18 have taken specific legal action to limit the use of the property to agricultural production,
19 specifically agreeing to forego development of the property. These types of properties
20 include a payment from a county or the Commonwealth to partially compensate the
21 owner for the value lost by foregoing development of agricultural property.

As I understand it, Act 45 requires a special procedure if a local government or public utility attempts to take a portion of preserved property by eminent domain. Briefly, for public utilities to take preserved property, the new law requires this Commission to “review and ratify” “the necessity for ... and environmental effects of” the proposed use of the property. Section 2 of the Act, adding section 208 to the Eminent Domain Code.

I am not certain, but I believe this may be the only instance where the Commission is specifically required by law to review the environmental effects of proposed utility facilities.

Q. Do you know what “environmental effects” are under Act 45?

A. It appears to me that the term “environmental effects” refers to the definition of “open space benefits” in the Act, which are defined to include the following:

(1) the protection and conservation of water resources and watersheds, by appropriate means, including, but not limited to, preserving the natural cover, preventing floods and soil erosion, protecting water quality and replenishing surface and ground water supplies;

(2) the protection and conservation of forests and land being used to produce timber crops;

(3) the protection and conservation of farmland;

(4) the protection of existing or planned park, recreation or conservation sites;

(5) the protection and conservation of natural or scenic resources, including, but not limited to, soils, beaches, streams, flood plains, steep slopes or marshes;

(6) the protection of scenic areas for public visual enjoyment from public rights of way;

(7) the preservation of sites of historic, geologic or botanic interest; and

(8) the promotion of sound, cohesive and efficient land development by preserving open spaces between communities.

High-Level Review of Transource's Application

Q. Have you reviewed Transource's Applications and substation Petitions?

A. Yes, I have reviewed the Applications and Petitions, as well as many of the attachments and accompanying testimony.

Q. From your review, does Transource address the effect of the *PEDF* decision on the siting of the transmission lines and substations?

A. No. Transource's filings appear to proceed as if the *PEDF* decision did not exist, or at least that it did not change anything in the Commission's review process. Transource made its initial filings in this case on December 27, 2017, which was six months after the Supreme Court's decision was issued.

Q. From your review and understanding of this case, has Transource addressed the effect of Act 45 on these dockets?

A. No. Act 45 became effective on June 24, 2018, about six months after Transource filed its initial Applications, so it could not have addressed Act 45 in its initial filings.

Q. From your review of Transource's Applications, did it fully comply with the Commission's existing regulations for high-voltage transmission line applications?

A. From my review, there appears to be a significant deficiency in Transource's Applications. Specifically, the Commission's regulation at 52 Pa. Code § 57.72(c)(10) requires an application to contain "a general description of reasonable alternative routes

to the proposed HV line, including a description of the corridor planning methodology, a comparison of the merits and detriments of each route, and a statement of the reasons for selecting the proposed HV line route.” From my review, the Applications do not contain the required information for “reasonable alternative routes.”

Q. Why do you reach that conclusion?

A. I reach that conclusion for two reasons. First, the Commission’s regulations define an “alternative route” as “a reasonable right-of-way which includes not more than 25% of the right-of-way of the applicant’s proposed route.” 52 Pa. Code § 57.1. The Transource East Application has three so-called alternative routes, labeled D, E, and F, with E being the chosen route. There is, however, significant overlap between Routes E and F. Route E is 15.8 miles long and I estimate (from the route descriptions and map on pages 21-26 of the Siting Study) that Routes E and F have approximately 5.9 miles in common, or about a 37% overlap. Thus, Route F would not qualify as an “alternative route” under the Commission’s requirements. In effect, then, the Company presents only two route options in its East Application.

Similarly, the Transource West Application identifies three so-called alternate routes: A, B, and C, with C being the selected route. There is a significant overlap between Routes B and C. Route C is 28.8 miles long and I estimate (from the route descriptions and map on pages 22-29 of the West Siting Study) that Routes B and C have approximately 16.5 miles in common, or about a 57% overlap. Thus, Route B does not qualify as an “alternative route” under the regulations. As was true in its East Application, the Company’s West Application presents only two route options.

1 Q. What is the second reason you conclude the Company did not identify reasonable
2 alternative routes?

3 A. The Company did not adequately evaluate project paths that include the use of existing
4 transmission rights-of-way and/or existing infrastructure. I note that the Commission's
5 Policy Statement requires applicants to consider "relevant existing rights of way" for
6 each alternative route. 52 Pa. Code § 69.3105(3)(iii). Mr. LanzaIotta discusses this issue
7 in his direct testimony where he concludes that such paths would be reasonable and
8 would be likely to result in lower costs and much less significant environmental harm
9 than the selected routes.

10 Overview of the IEC Project

11 Q. Please describe your understanding of the project proposed in the Applications.

12 A. In general terms, the IEC Project is designed to enhance the economical flow of power
13 within a portion of the PJM Interconnection, the network for the transmission of
14 electricity at high voltages in a multistate region. In particular, the IEC Project is not
15 proposed to address any reliability concerns. Rather, the IEC Project is designed to
16 relieve economic congestion in portions of Maryland, the District of Columbia, and
17 Virginia ("MD-DC-VA"), so that power can flow into the region more frequently from
18 other parts of PJM including central and eastern Pennsylvania.

19 Q. Before you continue with your understanding of the IEC Project, what do you mean by
20 "enhancing the economical flow of power" and "relieving economic congestion"?

21 A. As Mr. LanzaIotta describes in more detail, these terms indicate that the IEC Project is
22 not needed to enhance the reliability of electricity service. Rather, the IEC Project is

1 being undertaken solely to reduce the cost of electricity flowing into the affected area.

2 Stated differently, there is no reliability concern with the supply of electricity to the
3 region; but the transmission grid can be made more efficient to reduce the cost of the
4 power that flows into certain parts of the region.

5 To over-simplify a bit, the IEC Project will lessen the alleged electrical barriers
6 (congestion) and enable lower-cost electricity to reach the higher cost areas of MD-DC-
7 VA. To be clear, MD-DC-VA have plenty of power, so the IEC Project has no reliability
8 benefit; but costs to those areas can be reduced if additional power can be imported cost-
9 effectively from lower-cost areas.

10 Q. Do you have an understanding of the physical construction that will be necessary to
11 complete the IEC Project?

12 A. My knowledge of the physical and engineering aspects of the IEC Project is limited to
13 what I have read in the Company's Applications. I understand generally that it involves
14 the construction by Transource of two new substations and approximately 45 miles of
15 double-circuit, 230,000-volt transmission lines and supporting structures. Both
16 substations and approximately 37 miles of the transmission line are to be located in
17 Pennsylvania. In addition, PECO and MAIT would be required to upgrade certain
18 portions of their Pennsylvania transmission networks. Any details concerning the
19 construction or configuration of the IEC Project will be addressed by Mr. Lanzalotta.

1 Q. Do you have an understanding of the economic costs and benefits from the IEC Project,
2 as claimed by the Company?

3 A. Yes. When a version of the IEC Project was originally proposed in February 2015,
4 Transource estimated the construction cost to be \$269 million, resulting in a 15-year
5 estimated present value of revenue requirements ("PVRR") of \$391.8 million. At that
6 time, Transource estimated the IEC Project's benefits over the first 15 years to be
7 \$2,768.2 million, for a benefit-cost ratio in excess of 7.0.⁷

8 By the time the project was refined and selected by PJM in September 2016, the
9 IEC Project's capital cost had increased to \$340.6 million, resulting in a PVRR of \$478
10 million. The Project's benefits (the savings in energy payments) had declined to
11 approximately \$1,188 million.⁸ When all factors were considered, the IEC Project's 15-
12 year benefit-cost ratio had declined to 2.5.⁹

13 In September 2017, the TEAC reviewed a re-evaluation of the economics of the
14 IEC Project. The total construction cost was not re-estimated at that time, so it remained
15 at \$340.6 million, though the PVRR factors changed slightly resulting in a 15-year PVRR
16 of \$462.7 million. The Project's benefits, however, had declined to only \$611.48 million
17 over 15 years, resulting in the IEC Project having a claimed benefit-cost ratio of only

⁷ Project proposal, public version available at: <https://www.pjm.com/-/media/planning/rtep-dev/expand-plan-process/ferc-order-1000/rtep-proposal-windows/redacted-public-proposals/201415-1-9a-dominion-high-voltage-transource-public-redacted-version-southern-pa.ashx?la=en>; confidential version provided as Attachment to OCA XI-1 (all figures cited are public).

⁸ See PJM Transmission Expansion Advisory Committee ("TEAC") Recommendations to the PJM Board (Aug. 2016), available at: <https://www.pjm.com/-/media/committees-groups/committees/teac/20160811/20160811-board-whitepaper-august-2016.ashx>; attachment to OCA II-14; and OCA II-16.

⁹ See PJM TEAC Market Efficiency Update (Sept. 14, 2017), available at: <https://www.pjm.com/-/media/committees-groups/committees/teac/20170914/20170914-market-efficiency-update.ashx>.

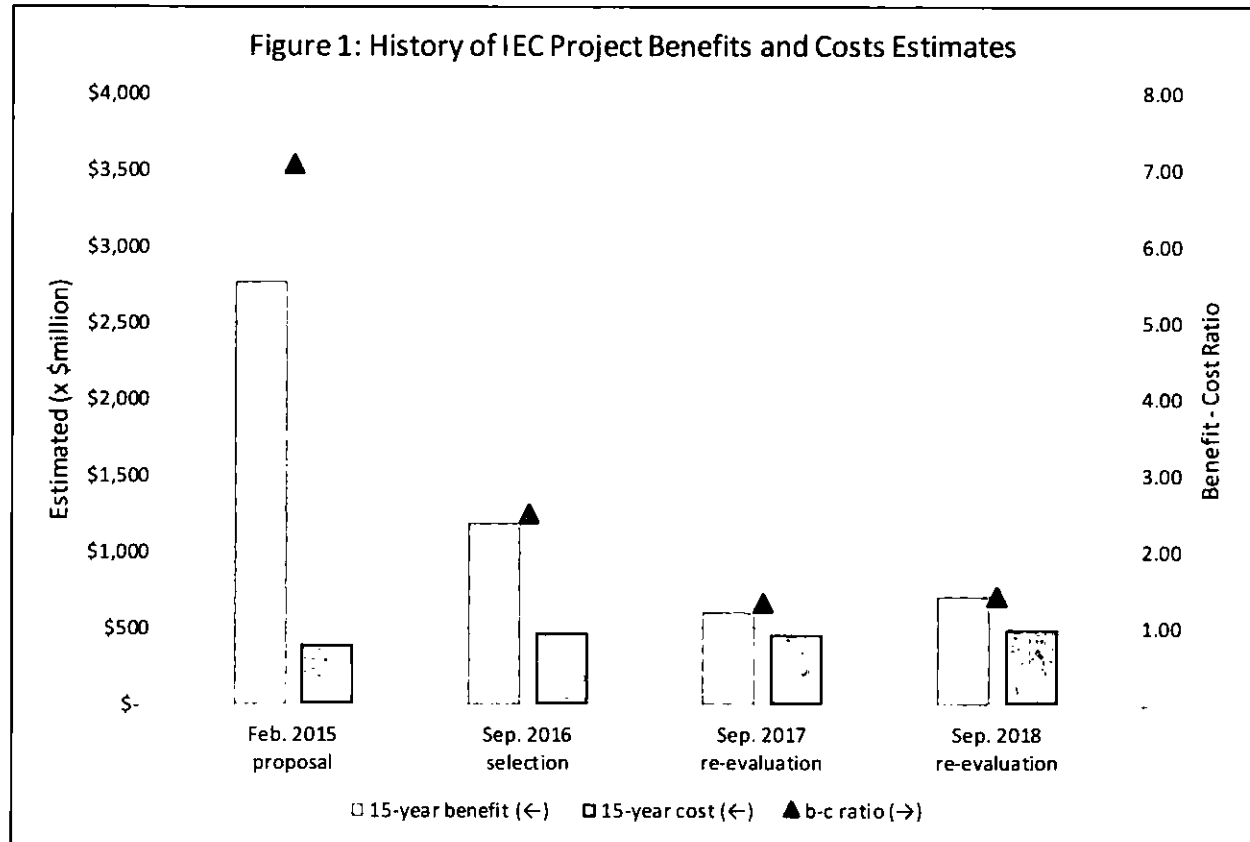
1 1.3.¹⁰ As stated above, PJM has a minimum requirement of a benefit-cost ratio of 1.25,
2 so the IEC Project minimally passed PJM's test in September 2017.

3 On September 13, 2018, the PJM TEAC again re-evaluated the IEC Project. Its
4 latest findings are that the project's capital costs have increased to \$366.17 million
5 resulting in a 15-year PVRR of \$498 million and the IEC Project's benefits have
6 increased to \$707.3 million, for a benefit-cost ratio of 1.42.¹¹

7 Figure 1 summarizes the history of increasing costs and declining benefits for the
8 IEC Project.

¹⁰ See *id.*, and attachment to OCA VI-2.

¹¹ PJM TEAC Transource AP-South (2014/15_9A) Project Reevaluation (Sept. 13, 2018), available at:
<https://www.pjm.com/-/media/committees-groups/committees/teac/20180913/20180913-ap-south-9a-project-reevaluation-sept-2018.ashx>.



Q. Are either the costs or benefits from the IEC Project certain?

A. No. Transource has not proposed, and PJM has not required, any type of cost cap or limiter for the project. Moreover, as I summarized above, the benefits from the IEC Project are far from certain. As Mr. Lanzalotta and Mr. Crandall discuss, other transmission projects, generation changes (such as plant retirements and the installation of distributed generation), and demand-side management programs can dramatically change the benefits from the project.

Benefit-Cost Analysis of the IEC Project as a Whole

Q. What is the purpose of conducting a benefit-cost analysis?

A. The purpose of a benefit-cost analysis is to attempt to capture the likely consequences of an activity, and to express those consequences in the same units (dollars, in this case) so that they can be compared.

In about 1980, I took a graduate course in natural resource economics and we spent a good deal of time analyzing benefit-cost analyses. I still have one of the texts I purchased at that time: *Cost-Benefit Analysis* by E.J. Mishan, (the second edition published in 1976). In the introduction to that book, Professor Mishan, then a professor at the London School of Economics, provides an excellent definition of cost-benefit analysis, as follows:

The general question that a cost-benefit analysis sets out to answer is whether a number of investment projects ... should be undertaken and, if investible funds are limited, which one, or two, or more among these specific projects ... should be selected. ... What is wrong with deciding whether or not to undertake any specific investment, or to choose among a number of specific investment opportunities, guided simply by proper accounting practices and, therefore, guided ultimately by reference to profitability? The answer is provided by the familiar thesis that what counts as a benefit or a loss to one part of the economy – to one or more persons or groups – does not necessarily count as a benefit or loss to the economy as a whole. And in cost-benefit analysis we are concerned with the economy as a whole, with the welfare of a defined society, and not any smaller part of it.

Id., p. x.¹²

¹² The text is now in its fifth edition, published in 2007. Essentially the identical paragraph appears on pages 3–4 of the fifth edition, with an added clarification that a cost-benefit analysis may be limited to a specific region or portion of the economy.

1 In other words, it is important to capture not only the specific benefits and costs to
2 those undertaking the project, but also the benefits and costs to those who might be
3 directly or indirectly affected by the project.

4 Q. Does the so-called benefit-cost methodology required by PJM and used by Transource
5 meet the requirements of a benefit-cost analysis?

6 A. No. The PJM methodology used by Transource fails to capture all of the benefits and
7 costs associated with the IEC Project.

8 Q. How did you reach that conclusion?

9 A. I reached that conclusion by reviewing the electronic spreadsheet model used by
10 Transource to estimate the costs and benefits of the IEC Project, provided in response to
11 OCA VI-2, as well as the Company's answers to other interrogatories. As I explain in
12 more detail below, reviewing that information leaves no doubt that the PJM methodology
13 ignores the negative consequences to utilities (and their customers) outside the region to
14 be benefited. That is, when calculating the benefits of the IEC Project, Transource
15 calculated the reduced power costs (primarily in MD-DC-VA) from being able to import
16 lower-cost power into that region; but it failed to subtract from those benefits the higher
17 costs that would result in other regions (including Pennsylvania) because they would no
18 longer have the benefit of that same lower-cost power.

19 Q. Is it possible from the PJM methodology used by Transource to determine the increased
20 costs in the non-benefiting regions?

21 A. Yes. The spreadsheet model includes a calculation of the net benefit or cost for each
22 control area within PJM. Incredibly, though, when it comes time to determine a project's

1 “benefits” only those regions that would experience reduced costs are included in the
2 calculation. All regions whose costs would increase as a result of a project are simply
3 ignored.

4 Q. Can you be more specific about the impact of this approach for the IEC Project?

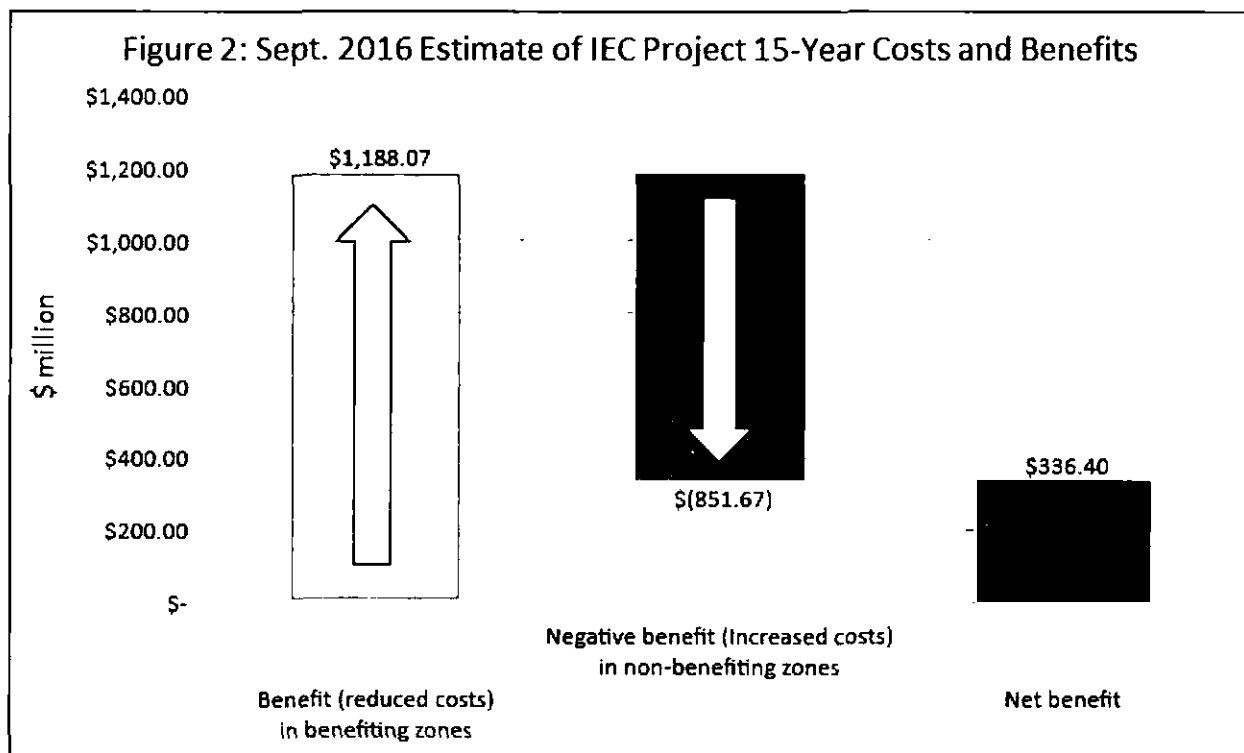
5 A. When PJM first reviewed the IEC Project, it found Project benefits of \$1,188 million, as
6 shown on the attachment to OCA II-14 (attached as Schedule SJR-1). This represents the
7 present value of 15 years of savings in Net Load Payments (“NLP”) (that is, energy
8 costs). The Schedule shows, however, that this figure completely ignores the zones
9 where energy costs would increase as a result of the IEC Project.

10 Q. Please explain the information shown in Schedule SJR-1.

11 A. In the table provided by Transource, a positive number represents an increase in power
12 costs (that is a net cost or detriment from the IEC Project) and a negative number
13 represents lower power costs from the IEC Project (a net benefit). Take the first row as
14 an example. AECO is the Atlantic Electric zone within PJM (the greater Atlantic City,
15 NJ, area). This shows that over the first 15 years with the IEC Project in service, power
16 costs would increase by \$33.55 million for Atlantic City area customers if the IEC
17 Project is completed. Simply, this means that AECO currently is able to use slightly
18 more of the lower-cost power than is economically optimal because of constraints that
19 keep some of that power from flowing into MD-DC-VA.

20 The Company’s presentation in 2016 made it appear that the IEC Project would
21 lower the cost of energy delivery within PJM by more than \$1 billion over a 15-year
22 period. In fact, though, the increase in efficiency would be just \$336 million over that

period when accounting for the rising costs in other PJM transmission zones as a result of the IEC Project. I illustrate this, using the data from Schedule SJR-1, in Figure 2, below.



Q. Why is it important to include the net efficiency gains of the IEC Project in a benefit-cost analysis?

A. The net efficiency gains are the only true measure of the IEC Project's benefit. The approach used by the Company assumes that the lower-cost power that flows into MD-DC-VA would not otherwise confer any economic benefit but for the construction of the IEC Project. In reality, though, that lower-cost power is being used in other regions of PJM (primarily Pennsylvania and New Jersey).

Thus, the benefits from the IEC Project should be measured as the reduction in power costs in MD-DC-VA, offset by the increase in power costs in regions like parts of Pennsylvania where power costs will increase.

Q. How are the benefits and detriments from the IEC Project distributed among the PJM zones?

A. Figure 3 illustrates the distribution of benefits and detriments, by zone, from the IEC Project. This figure uses the data from the September 2016 estimate that is summarized in Schedule SJR-1, sorted from the zone with the greatest benefit (Dominion) to the zone with the greatest detriment (PECO).

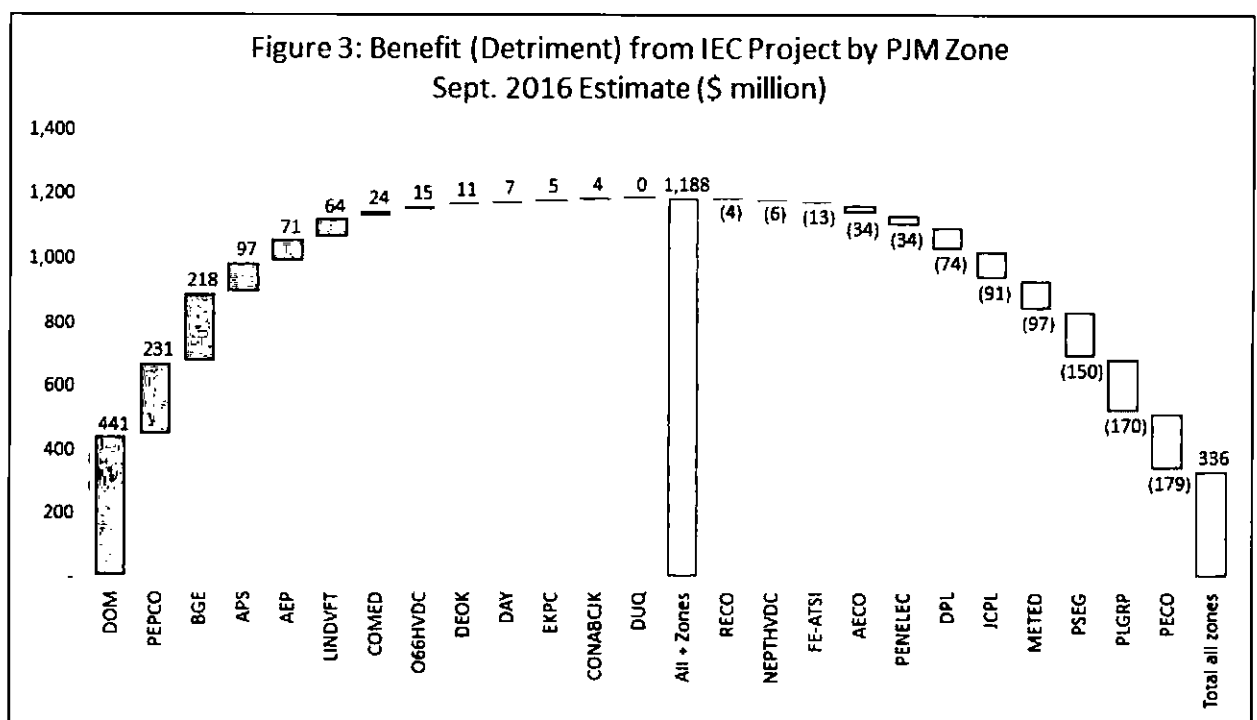


Figure 3 shows that four zones (Dominion, PEPCO, and BG&E in parts of MD-DC-VA, and Allegheny Power System (APS) in parts of Pennsylvania, West Virginia, Maryland, and Virginia) would receive more than \$980 million in benefits from the IEC

1 Project. The remaining \$200 million in benefits would be spread among nine other
2 zones. The detriments from the IEC Project are primarily incurred by five zones (PECO
3 in Pennsylvania, the combined PPL-UGI zone (PLGRP) in Pennsylvania, Public Service
4 Electric & Gas in New Jersey, Met Ed in Pennsylvania, and Jersey Central Power &
5 Light in New Jersey) whose losses would total more than \$680 million if the IEC Project
6 were completed. The remaining six zones would experience losses totaling \$165 million.

7 Q. Using data from the September 2016 study, do you dispute that the IEC Project would
8 help to alleviate some economic inefficiencies in the regional power grid?

9 A. No. The information in Schedule SJR-1 and Figures 2 and 3 show that, as of the 2016
10 analysis, the IEC Project would produce benefits totaling \$336 million over 15 years, or
11 approximately \$21 million per year. My dispute is with the Company's focus solely on
12 the zones that benefit from the IEC Project, while ignoring the zones that would incur
13 higher costs from the IEC Project.

14 Q. Have the data in Schedule SJR-1 and Figures 2 and 3 been updated by Transource?

15 A. Yes, there have been two updates. In response to OCA VI-2, Transource provided an
16 updated benefit-cost analysis prepared in late 2017 and reviewed by PJM in February
17 2018. In that more recent analysis, Transource's claimed benefits from the IEC Project
18 have been reduced by almost 50% to \$611 million over 15 years. That figure, however,
19 still represents only the lower NLP (power costs) experienced in benefiting zones,
20 primarily in MD-DC-VA. Once again, that alleged benefit ignores the higher power
21 costs experienced in parts of Pennsylvania and other areas outside the benefiting region.
22 The details of the calculation are provided in the Company's spreadsheet model. I have
23 copied the results of the Company's model to Schedule SJR-2.

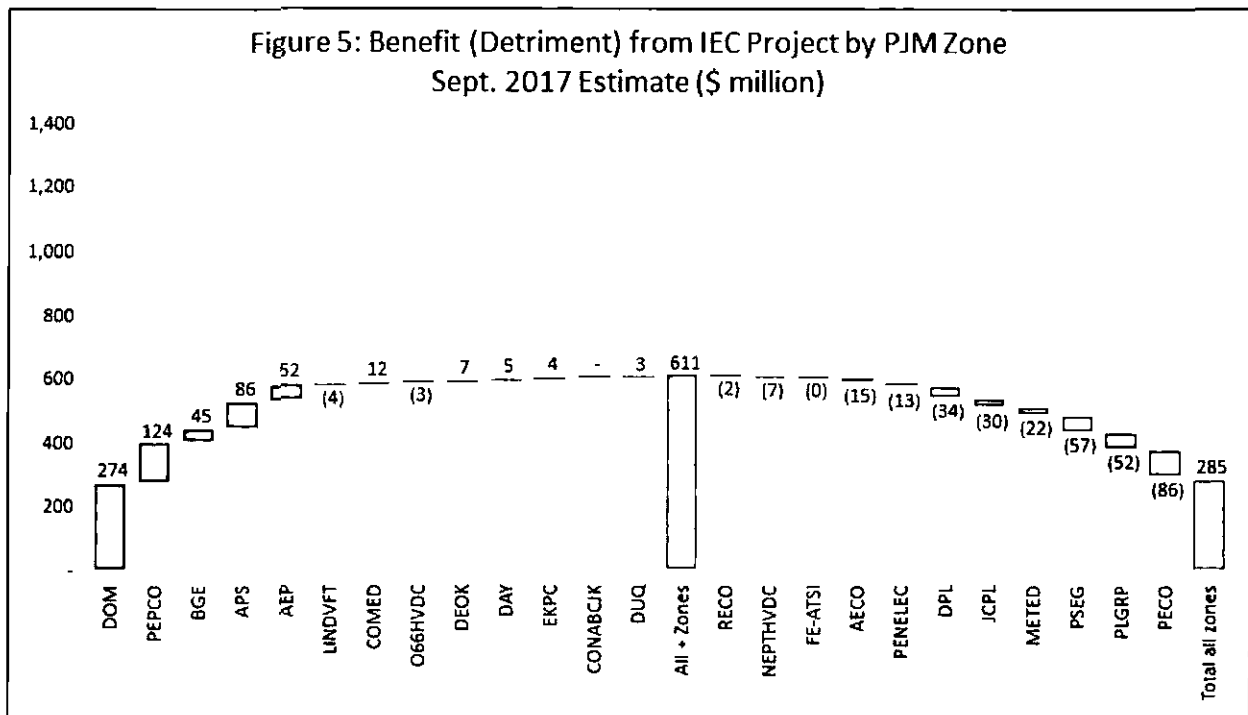
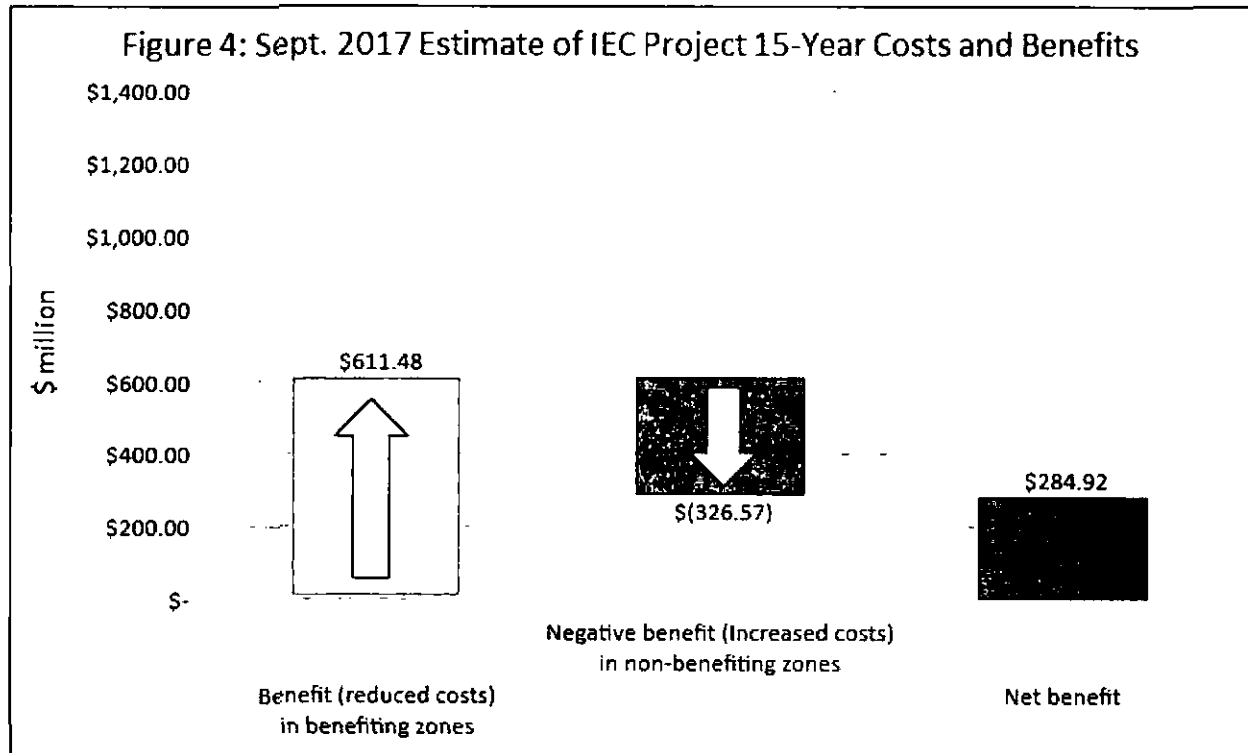
1 Q. Please describe the information shown in Schedule SJR-2.

2 A. Schedule SJR-2 shows the present value of the change in NLP – that is, the change in
3 bulk power costs – for 15 years.

4 Schedule SJR-2 shows the winners and losers from the IEC Project. The major
5 beneficiaries of the IEC Project (those with the largest negative numbers) are zones DOM
6 (Dominion Power in Virginia) and PEPCO (Potomac Electric serving D.C. and portions
7 of Maryland and Virginia). Together those two zones capture almost \$400 million in
8 benefits from the IEC Project.

9 Q. Have you prepared graphs similar to Figures 2 and 3 using data from the late 2017 / early
10 2018 re-evaluation of the IEC Project?

11 A. Yes. Figures 4 and 5 illustrate the distribution of benefits and detriments from the IEC
12 Project, as those benefits and detriments were revised in late 2017. I prepared these
13 figures using the same scale as Figures 2 and 3 so that the figures can be compared side-
14 by-side, if desired. I also kept the zones in the same order (sorted from highest benefit to
15 greatest detriment) that they appear in Figure 3.



Q. Which zones are the biggest losers from the IEC Project according to the Company's late 2017 / early 2018 analysis?

A. The biggest losers from the IEC Project are zones PECO (in Pennsylvania), PSEG (Public Service Electric & Gas in New Jersey), and PLGRP (PPL and UGI in Pennsylvania). Together, those three zones would see their bulk power costs increase by more than \$190 million over the first 15 years of the IEC Project.

Q. According to the data in Schedule SJR-2, what is the net benefit from the IEC Project?

A. The net benefit from the IEC Project over its first 15 years is \$284.92 million. This means that the IEC Project would reduce the overall cost of electricity in PJM by \$285 million over 15 years, or roughly \$19 million per year.

Q. Is \$284.92 million the amount the Company used as the "benefits" from the IEC Project?

A. No. The Company's calculation of Project benefits includes only those zones that would have lower power costs if the IEC Project were completed, as I explained above. The Company eliminated zones where power costs increased. As I show on Schedule SJR-2, the sum of benefits in zones where power costs would be lower is \$611.48 million, and that is the figure that Transource consistently reports as the IEC Project's benefits.

Q. Is \$611.48 million an accurate reflection of the economic efficiency gains from the IEC Project?

A. No. This figure ignores the \$326.57 million in increased power costs that would be experienced by other zones. Simply stated, the IEC Project would result in somewhat lower power costs in PJM, but not nearly to the extent presented by the Company. The

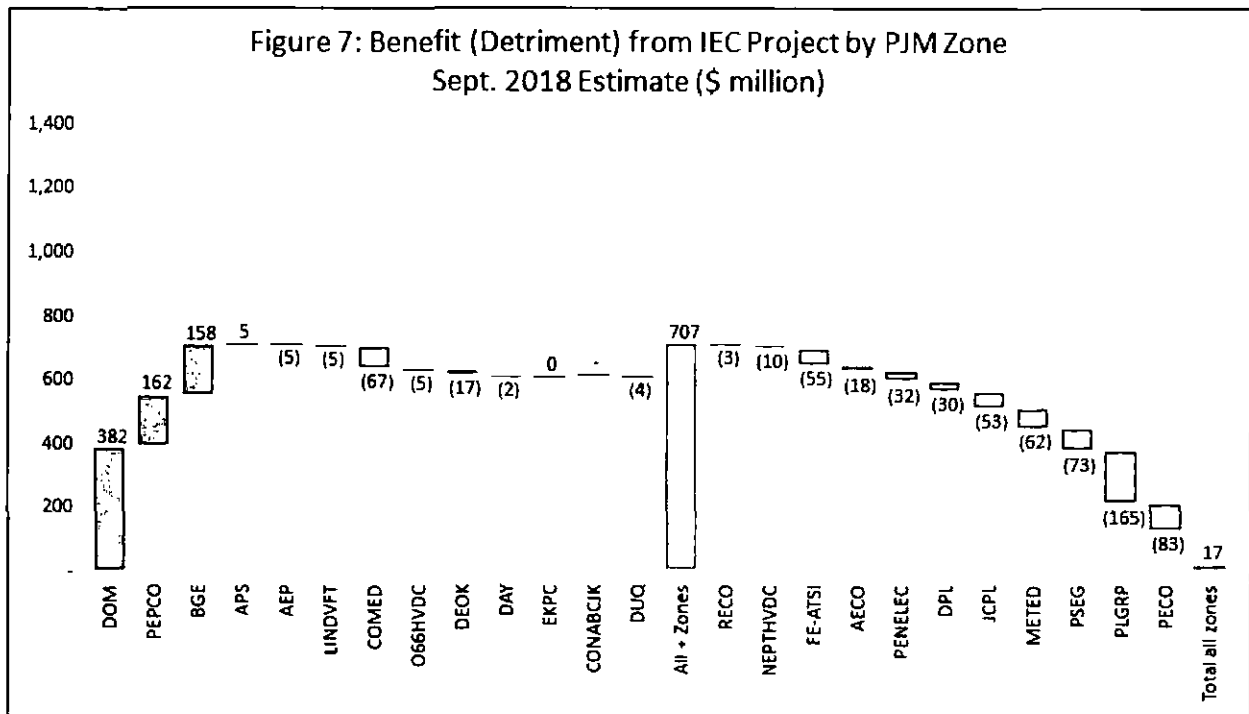
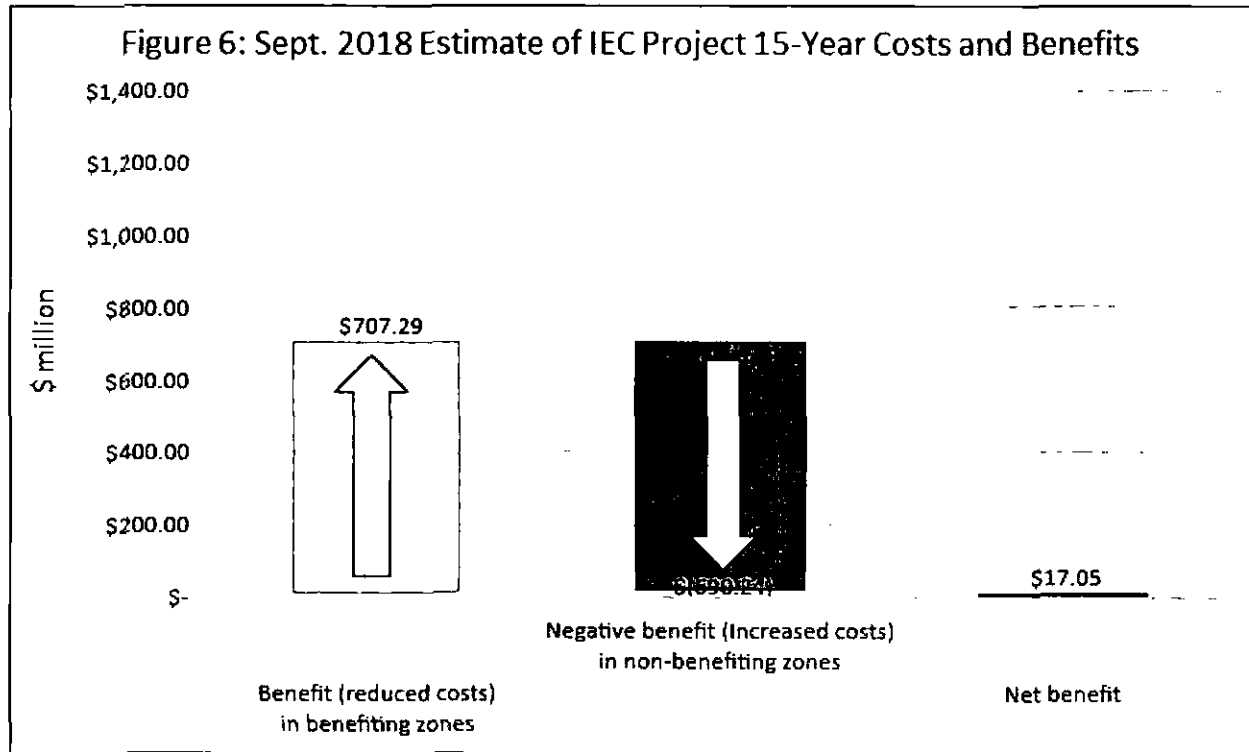
bottom line under the late 2017 analysis is that the IEC Project would reduce power costs within PJM by approximately \$285 million over 15 years.

Q. Do you have comparable figures from the TEAC's September 2018 re-evaluation of the IEC Project?

A. Yes. On September 19, 2018, Transource provided comparable information from PJM's September 2018 re-evaluation of the IEC Project. Attached as Schedule SJR-3 is the summary of benefits (negative numbers) and detriments (positive numbers) by PJM zone.

Q. Have you prepared graphs similar to Figures 2 and 3 using data from the September 2018 re-evaluation of the IEC Project?

A. Yes. Figures 6 and 7 illustrate the distribution of benefits and detriments from the IEC Project, as those benefits and detriments were revised in September 2018. I prepared these figures using the same scale as Figures 2 and 3 so that the figures can be compared side-by-side, if desired. I also kept the zones in the same order (sorted from highest benefit to greatest detriment) that they appear in Figure 3.



1 Q. Which zones are the biggest losers from the IEC Project according to the September 2018
2 analysis?

3 A. The biggest losers from the IEC Project are zones PLGRP (PPL and UGI in
4 Pennsylvania), PECO (in Pennsylvania), PSEG (Public Service Electric & Gas in New
5 Jersey), COMED (Commonwealth Edison in Illinois), and METED (Metropolitan Edison
6 in Pennsylvania). Each of these five zones would experience losses of more than \$60
7 million, with the combined PPL/UGI zone experiencing a loss of \$165 million. Together,
8 those five zones would see their bulk power costs increase by more than \$450 million
9 over the first 15 years of the IEC Project.

10 Q. According to the data in Schedule SJR-3, what is the net benefit from the IEC Project?

11 A. The net benefit from the IEC Project over its first 15 years is down to just \$17 million.
12 This means that the IEC Project would reduce the overall cost of electricity in PJM by
13 \$17 million over 15 years, or roughly \$1 million per year.

14 Q. Is \$17 million the amount PJM and the Company used as the “benefits” from the IEC
15 Project?

16 A. No. The September 2018 re-evaluation calculation of Project benefits includes only
17 those zones that would have lower power costs if the IEC Project were completed, as I
18 explained above. Zones where power costs increased were eliminated from the benefit-
19 cost calculation. As I show on Schedule SJR-3, the sum of benefits in zones where
20 power costs would be lower is \$707.29 million and that is the figure PJM used in its latest
21 re-evaluation.

1 Q. Is \$707.29 million an accurate reflection of the economic efficiency gains from the IEC
2 Project?

3 A. No. This figure ignores the \$690.24 million in increased power costs that would be
4 experienced by other zones. Simply stated, the IEC Project would result in almost no
5 change in total power costs in PJM. The bottom line under the September 2018 analysis
6 is that the IEC Project would reduce power costs within PJM by just \$17 million over 15
7 years.

8 Q. If the IEC Project provides net benefits of \$17 million over 15 years, should it be
9 constructed?

10 A. No. As of September 2018, the estimated construction cost is \$366 million, resulting in
11 an estimated 15-year cost (PVRR) of \$498 million. Thus, the IEC Project would cost
12 significantly more than the benefits it would provide, resulting in a benefit-cost ratio of
13 only 0.03. That is, for every dollar spent on the IEC Project, it would provide only three
14 cents worth of benefits. Because the IEC Project is being built solely to reduce power
15 costs, and not to provide any reliability benefits, the IEC Project is not economical and
16 should not be built.

17 Q. You testified that the project cost estimate is now \$366.17 million. Do you know how
18 the \$366 million cost estimate was derived?

19 A. PJM's most recent, detailed cost update was published in March 2018, so it does not
20 exactly match the September figures. On Schedule SJR-4, I show the March 2018 cost
21 estimates for each component of the IEC Project. That schedule also summarizes the
22 results for each transmission owner. It can be seen that more than one-third of the cost
23 would be incurred by utilities other than Transource.

1 Q. Are these cost estimates different than the original cost estimates in 2016?

2 A. Yes. The original cost estimate had a Transource cost of \$230 million and other utilities'
3 costs of \$91 million. As of September 2018, Transource is still projecting a cost of \$230
4 million, but the other affected utilities have increased their cost estimate by
5 approximately 50% to \$136 million.¹³

6 Q. For the sake of clarity, in reaching your conclusions, did you change any of the
7 Company's assumptions about the IEC Project?

8 A. No. I used the Company's results without making any changes in assumptions or
9 underlying calculations. My conclusions are based solely on doing what I learned about
10 cost-benefit analysis almost 40 years ago: you must count all of the benefits and costs;
11 you cannot just cherry-pick those few areas that would be winners while ignoring all the
12 losers.

13 Q. Under PJM's rules, who would pay the costs of the IEC Project?

14 A. Under PJM's rules, the IEC Project costs would be paid by the zones that benefit from
15 the IEC Project, in proportion to the benefits. The cost responsibility for the project is
16 determined when the project is approved.¹⁴

¹³ PJM TEAC Recommendations to the PJM Board (Staff Whitepaper) (Aug. 2, 2016), available at: <https://www.pjm.com/~media/committees-groups/committees/teac/20160811/20160811-board-whitepaper-august-2016.ashx>, shows the project cost as \$320.9 million (less Transource's cost of \$230 million equals other utility costs of \$90.9 million). The September 2018 re-evaluation cited above (PJM TEAC Transource AP-South (2014/15_9A) Project Reevaluation (Sept. 13, 2018)) shows the project cost as \$366.17 million (less Transource's cost of \$230 million equals other utility costs of \$136.17 million).

¹⁴ PJM TEAC Recommendations to the PJM Board (Staff Whitepaper) (Aug. 2, 2016), Attachment B, available at: <https://www.pjm.com/~media/committees-groups/committees/teac/20160811/20160811-board-whitepaper-august-2016.ashx>.

1 Q. Does that affect your conclusion that it would not be economical to construct the IEC
2 Project?

3 A. No. On Schedule SJR-5, I show how the costs of the IEC Project would be distributed
4 among the PJM zones. The Project costs are expressed as the PVRR over 15 years.
5 Again, I would emphasize that this is the Company's calculation. I did not change any
6 assumptions or calculations.

7 I show on the Schedule that the zones that benefit from the IEC Project (primarily
8 MD-DC-VA) would see benefits of \$611 million and pay costs of \$498 million, for a net
9 gain of \$113 million. Interestingly, because the benefits and detriments of the project
10 have changed so dramatically since 2016, there are zones that appear to be required to
11 pay for the project but are no longer receiving a benefit from the project. For example,
12 Duquesne originally was projected to receive a minor benefit from the project, so it was
13 allocated 0.01% of project costs. But the latest re-evaluation of the project shows that
14 Duquesne's costs actually would increase by more than \$4 million over the 15-year
15 period evaluated. The biggest swing occurs for Commonwealth Edison in Illinois, which
16 originally was projected to receive a benefit of \$11.7 million from the project (and so was
17 allocated 2% of project costs) but is now projected to see its power costs increase by
18 more than \$67 million.

19 Q. To summarize, using the September 2018 detailed estimates, what do you conclude about
20 the overall costs and benefits of the IEC Project?

21 A. I conclude that the IEC Project would not reduce total costs within PJM. In fact, the
22 project would lower power costs by only \$17 million over 15 years (about \$1 million per
23 year) but it would cost \$498 million over 15 years (more than \$33 million per year) to

1 achieve those savings. Let me say that again: The IEC project would cost \$498 million
2 over 15 years, but it would lower power costs by only \$17 million, resulting in a net loss
3 to PJM utilities of more than \$480 million. Thus, PJM as a whole would experience a net
4 loss of \$32 million per year for each of the first 15 years of the IEC Project. The Project
5 is not economical for PJM's utilities (and the consumers who purchase electricity from
6 those utilities) and should not be constructed.

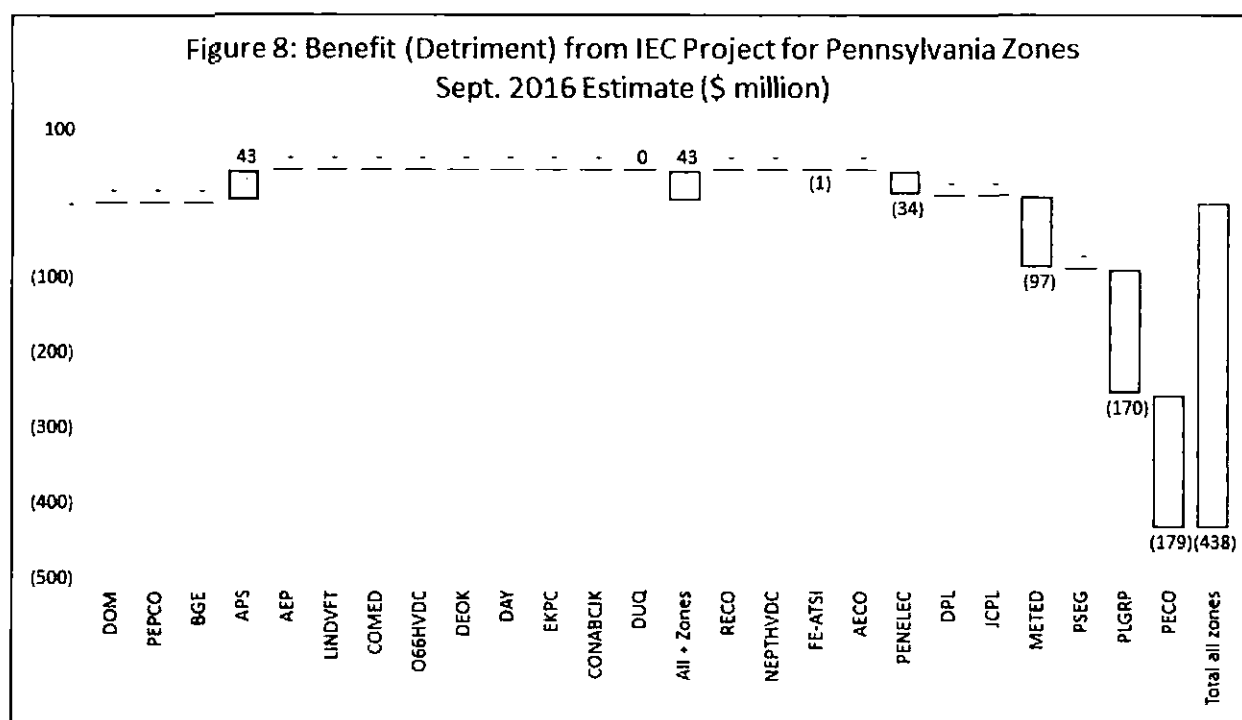
7 **Costs and Benefits of the IEC Project to Pennsylvania**

8 Q. Have you evaluated the costs and benefits associated with the IEC Project solely for
9 Pennsylvania?

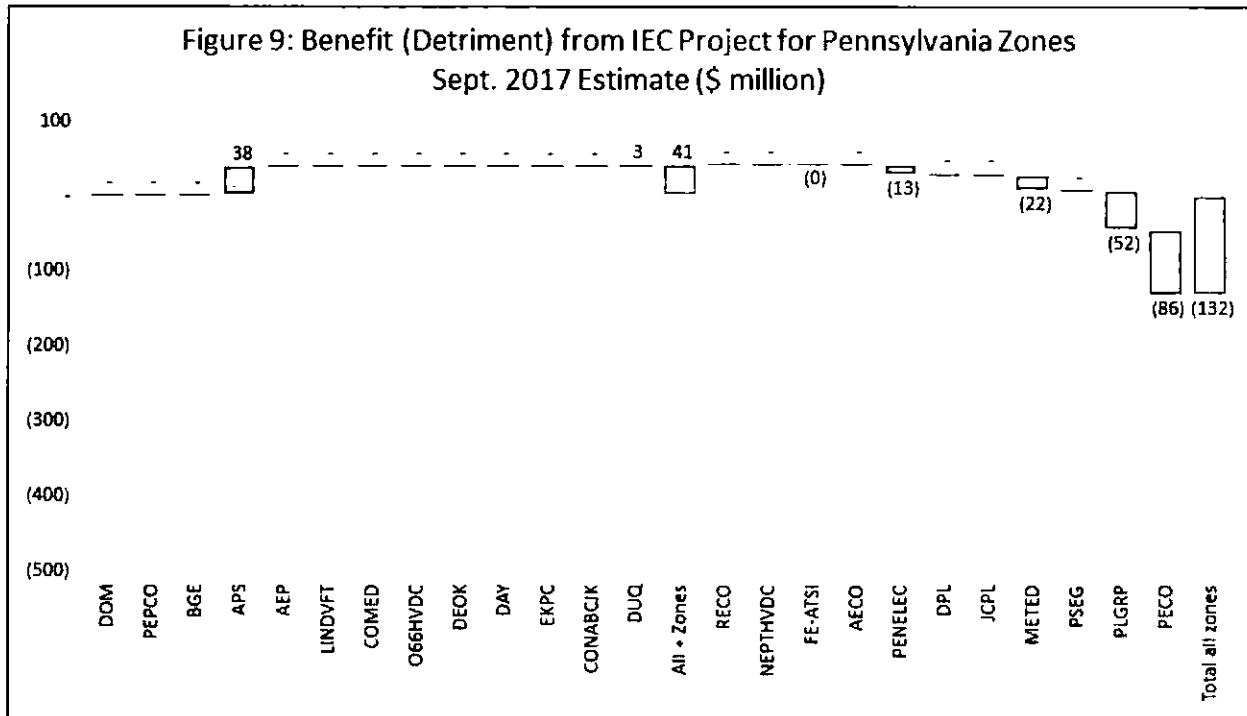
10 A. Yes, I have. Schedule SJR-6 reproduces Schedules SJR-1 (the September 2016
11 estimate), SJR-2 (the September 2017 estimate), and SJR-3 (the September 2018
12 estimate) but adds columns to calculate the portion of the costs and benefits that would be
13 paid or received by customers of Pennsylvania's utilities. That information is then
14 summarized on the first page of the Schedule. As I show on Schedule SJR-6, the PJM
15 zones within Pennsylvania are APS (West Penn Power represents about 45% of this
16 zone), DUQ (Duquesne), FE-ATSI (Penn Power is about 7% of this zone), METED,
17 PECO, PENELEC, and PLGRP (PPL and UGI Electric, both of which are wholly within
18 Pennsylvania).

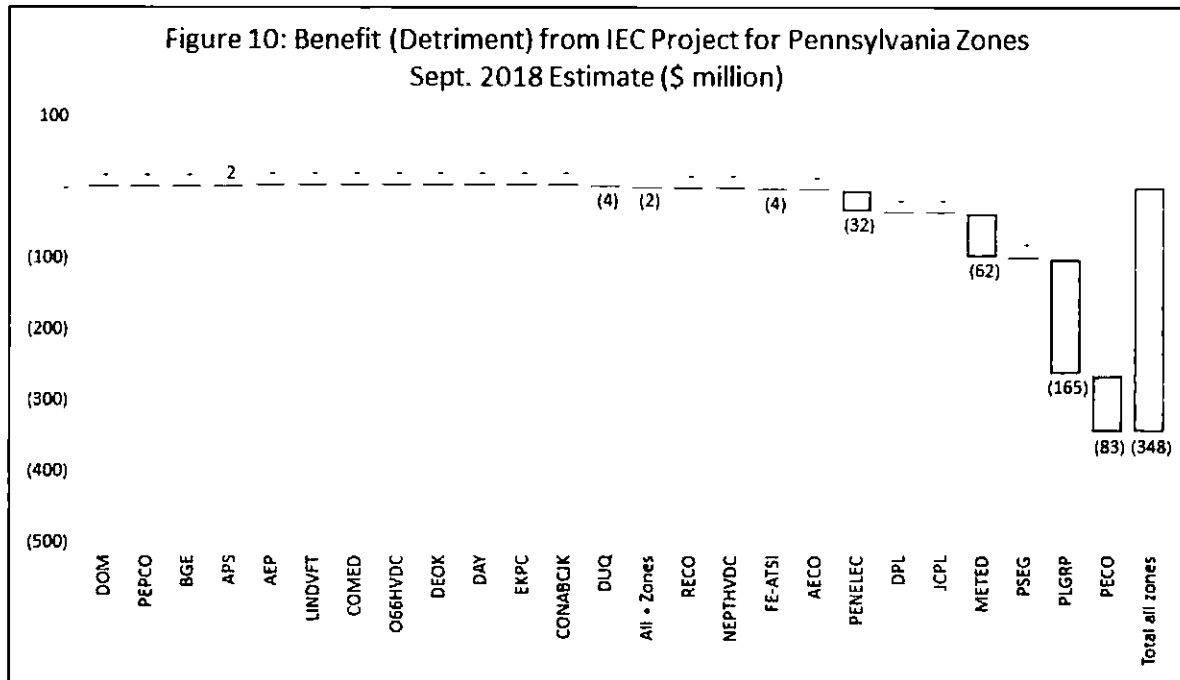
Q. From the information in Schedule SJR-6, can you determine the estimated benefits or detriments for Pennsylvania's utilities, and their customers, if the IEC Project were completed?

A. Yes. First, using the September 2016 estimates, I produced Figure 8. This graph reproduces Figure 3 but zeroes out the non-Pennsylvania utilities. For the two interstate utility zones that include parts of Pennsylvania, Allegheny Power System (APS) and First Energy's ATSI (FE-ATSI), I estimated the percentage of benefits or detriments attributable to Pennsylvania by using PJM data for each distribution utility's estimated summer peak load in 2018. (The calculation is shown in the note on Schedule SJR-6, page 2.) Figure 8 shows that collectively Pennsylvania consumers would experience a \$438 million detriment (that is, higher power costs) over 15 years, using the September 2016 estimate prepared by Transource.



- 1 Q. Did you prepare similar graphs using the September 2017 and September 2018 re-
- 2 evaluations of the IEC Project?
- 3 A. Yes. Figures 9 and 10 provide similar graphs using data from the September 2017 and
- 4 September 2018 re-evaluations of the project.





Q. How much of the IEC Project's costs would be paid by Pennsylvania's utilities?

A. Schedule SJR-6 and Figure 7 show that one Pennsylvania zone (the Pennsylvania portion of APS) would have lower power costs under the 2018 estimate, totaling \$2 million. Under the original cost allocation, the Pennsylvania portion of APS would pay \$19.46 million of the IEC Project's costs as shown on Schedule SJR-7, resulting in a net cost for West Penn customers of approximately \$17 million over 15 years, or about \$1 million per year. The other six PJM zones within Pennsylvania would see their power costs increase by \$349.91 million over 15 years, or by more than \$23 million per year. Thus, when including the costs of paying for the IEC Project, the net effect on Pennsylvania would be to have power costs increase by approximately \$367 million over the next 15 years, or by more than \$24 million per year.

1 Q. Did you make any changes in the Company's analyses, assumptions, or calculations in
2 reaching your conclusions about the effect on Pennsylvania consumers?

3 A. No. As I have for all other calculations, I used Transource's results without changing any
4 of the underlying assumptions or calculations.

5 **Meaning of PJM Project Selection**

6 Q. What is your understanding about the role of the PJM Interconnection in the IEC Project?

7 A. As I understand it, PJM has selected the IEC Project as one that would provide economic
8 efficiency benefits. As I discussed above, when PJM selected the IEC Project, it showed
9 a benefit-cost ratio of 2.5 times. PJM evaluated the IEC Project a second time in late
10 2017 / early 2018, which reduced the benefit-cost ratio of the IEC Project to 1.3 times.
11 The most recent re-evaluation, released on September 13, 2018, shows a benefit-cost
12 ratio of 1.4 times.

13 I already have explained why the methodology used to determine the benefit-cost
14 ratio of the IEC Project is flawed because it ignores the effects on the "losing" zones
15 within PJM.

16 Q. As a matter of regulatory policy (and not as a matter of law), in your opinion does PJM's
17 selection of the IEC Project as one that should be pursued carry with it any implications
18 for this Commission's review of the IEC Project?

19 A. In my opinion, as a matter of public policy, PJM's selection of the IEC Project should not
20 supersede in any way this Commission's duty under Pennsylvania law and regulations to
21 determine whether construction and operation of the IEC Project is necessary or proper

1 for the service, accommodation, convenience or safety of the public.¹⁵ Indeed, in my
2 opinion this Commission has the obligation to fully comply with the law and its
3 regulations and independently determine whether the IEC Project is in the best interests
4 of the Commonwealth in general and utility consumers in particular.

5 In discovery, OCA asked the representative of PJM (Transource witness
6 McGlynn) whether PJM considered any of the factors this Commission is required to
7 consider in approving the development and siting of two substations and more than 30
8 miles of new high-voltage transmission lines. His responses demonstrate that PJM does
9 not consider any of the factors this Commission must consider before approving
10 substation siting, new transmission lines, or the specific locations of the line.¹⁶ I have
11 attached as Schedule SJR-8, copies of interrogatory answers where Mr. McGlynn
12 acknowledges that PJM does not consider the issues associated with siting substations or
13 transmission lines that this Commission is required to consider.¹⁷

14 Moreover, PJM's review process does not consider Pennsylvania law that requires
15 projects to demonstrate that they have minimized environmental impacts (particularly on
16 public lands and waterways) or adequately protected agricultural land.

17 Mr. McGlynn went to great lengths to explain the limit of PJM's selection of the
18 IEC Project, stating: "PJM does not opine or determine the specific location or route of

¹⁵ See 15 Pa. C.S. § 1511 and 66 Pa. C.S. § 1501.

¹⁶ See 52 Pa. Code §§ 57.71 to 57.77, 69.1101, and 69.3101 to 69.3107.

¹⁷ Schedule SJR-8 includes Transource's responses to OCA Set II questions 2, 3, 5, 6, 7, 8, 10, and 11.

1 projects. The siting of the project components described in the Application is the
2 responsibility of Transource PA.” Response to OCA II-03, included in Schedule SJR-8.

3 Q. In your opinion, again as a matter of regulatory policy and not as a question of law,
4 should PJM’s selection of the IEC Project affect this Commission’s determination of
5 need for the IEC Project?

6 A. In my opinion, as a matter of sound public policy, the Commission should make an
7 independent determination of the need for the IEC Project, considering the likely costs
8 (including environmental and land-use impacts) and benefits, as set forth in Pennsylvania
9 law and regulations.

10 **Economic Need for the IEC Project**

11 Q. Do you have any understanding of how the Commission has determined the need for
12 utility projects in the past?

13 A. I have a general understanding of how the Commission has determined need in other
14 cases, but I have not conducted exhaustive research on this point. Generally, I
15 understand that the Commission can consider both engineering need (that is, physical
16 safety or reliability benefits) and economic need (that is, cost reductions) from projects.

17 Q. Based on your general understanding of how the need for a utility project can be
18 determined, do you have an opinion concerning the need for the Transource Project?

19 A. Transource has not claimed any reliability or safety need for the IEC Project, so I do not
20 believe engineering need is an issue in this case. The question, then, is whether there is
21 an economic need for the IEC Project. As I explained above, if the IEC Project as a
22 whole is evaluated, the IEC Project fails to pass a benefit-cost analysis. Indeed, looking

1 at the entire Project's impact on PJM, the net effect of the IEC Project would be to
2 provide benefits (on a present-value basis) of \$1 million per year at a cost to electricity
3 consumers of more than \$33 million per year. That is, the IEC Project would result in a
4 net detriment to PJM of \$32 million per year for at least 15 years. In my opinion,
5 therefore, Transource has failed to demonstrate an economic need for the IEC Project.

6 **Conclusion**

7 Q. Please summarize your conclusions and recommendations.

8 A. I conclude that Transource has failed to demonstrate an economic need for the IEC
9 Project. The Company's own analyses show that the IEC Project's costs will greatly
10 exceed its benefits. While the IEC Project likely would be successful in relieving some
11 economic congestion within PJM, resulting in lower power costs in portions of Maryland,
12 D.C., and Virginia, the costs of the IEC Project greatly exceed the benefits that would be
13 achieved within PJM as a whole. Under PJM's most recent analysis, the IEC Project
14 would generate benefits of only about three cents for each dollar spent.

15 The calculus for Pennsylvania is even worse. Pennsylvania consumers would
16 receive almost none of the IEC Project's benefits – savings of just \$2 million in total for
17 the first 15 years of the IEC Project (a present value of about \$0.1 million per year) for
18 customers of West Penn Power. But energy consumers in the rest of the Commonwealth
19 would pay increased costs of \$350 million – \$23 million per year (present value for 15
20 years). Thus, construction and operation of the IEC Project would produce a net
21 economic harm for Pennsylvania of approximately \$348 million. This would result in

higher electricity costs within the Commonwealth of \$23 million per year on a present-value basis for 15 years.

I recommend, therefore, that the Commission find that Transource has failed to demonstrate an economic need for the IEC Project. Based on that conclusion and the conclusions reached by other OCA witnesses, I recommend that the Commission deny the Applications and Petitions with prejudice. Construction and operation of the IEC Project would be harmful to Pennsylvania and the Commission should not permit it to be constructed.

Q. Does this conclude your direct testimony?

A. Yes.

259346

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Application of Transource Pennsylvania, LLC for approval	:	
of the Siting and Construction of the 230 kV Transmission	:	A-2017-2640195
Line Associated with the Independence Energy Connection -	:	A-2017-2640200
East and West Projects in portions of York and Franklin	:	
Counties, Pennsylvania.	:	


Petition of Transource Pennsylvania, LLC for a finding that	:	
a building to shelter control equipment at the Rice Substation	:	P-2018-3001878
in Franklin County, Pennsylvania is reasonably necessary	:	
for the convenience or welfare of the public.	:	

Petition of Transource Pennsylvania, LLC for a finding that	:	
a building to shelter control equipment at the Furnace Run	:	
Substation in York County, Pennsylvania is reasonably	:	P-2018-3001883
necessary for the convenience or welfare of the public.	:	

Application of Transource Pennsylvania, LLC for approval to	:	
acquire a certain portion of the lands of various landowners	:	
in York and Franklin Counties, Pennsylvania for the siting	:	A-2018-3001881,
and construction of the 230 kV Transmission Line associated	:	<i>et al.</i>
with the Independence Energy Connection – East and West	:	
Projects as necessary or proper for the service, accommodation,	:	
convenience or safety of the public.	:	

VERIFICATION

I, Scott Rubin, hereby state that the facts above set forth in my Direct Testimony OCA Statement No. 1 are true and correct 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).

Signature: 

Scott J. Rubin
333 Oak Lane
Bloomsburg, PA. 17815
Scott.J.Rubin@gmail.com

DATED: September 25, 2018
*259166

OCA STATEMENT NO. 1

Scott J. Rubin

Appendix A

Appendix A

Scott J. Rubin

Attorney + Consultant

333 Oak Lane • Bloomsburg, PA 17815

Current Position

Public Utility Attorney and Consultant. 1994 to present. I provide legal, consulting, and expert witness services to various organizations interested in the regulation of public utilities.

Previous Positions

Lecturer in Computer Science, Susquehanna University, Selinsgrove, PA. 1993 to 2000.

Senior Assistant Consumer Advocate, Office of Consumer Advocate, Harrisburg, PA. 1990 to 1994.

I supervised the administrative and technical staff and shared with one other senior attorney the supervision of a legal staff of 14 attorneys.

Assistant Consumer Advocate, Office of Consumer Advocate, Harrisburg, PA. 1983 to 1990.

Associate, Laws and Staruch, Harrisburg, PA. 1981 to 1983.

Law Clerk, U.S. Environmental Protection Agency, Washington, DC. 1980 to 1981.

Research Assistant, Rockville Consulting Group, Washington, DC. 1979.

Current Professional Activities

Member, American Bar Association, Infrastructure and Regulated Industries Section.

Member, American Water Works Association.

Admitted to practice law before the Supreme Court of Pennsylvania, the New York State Court of Appeals, the United States District Court for the Middle District of Pennsylvania, the United States Court of Appeals for the Third Circuit, and the Supreme Court of the United States.

Previous Professional Activities

Member, American Water Works Association, Rates and Charges Subcommittee, 1998-2001.

Member, Federal Advisory Committee on Disinfectants and Disinfection By-Products in Drinking Water, U.S. Environmental Protection Agency, Washington, DC. 1992 to 1994.

Chair, Water Committee, National Association of State Utility Consumer Advocates, Washington, DC. 1990 to 1994; member of committee from 1988 to 1990.

Member, Board of Directors, Pennsylvania Energy Development Authority, Harrisburg, PA. 1990 to 1994.

Member, Small Water Systems Advisory Committee, Pennsylvania Department of Environmental Resources, Harrisburg, PA. 1990 to 1992.

Member, Ad Hoc Committee on Emissions Control and Acid Rain Compliance, National Association of State Utility Consumer Advocates, 1991.

Member, Nitrogen Oxides Subcommittee of the Acid Rain Advisory Committee, U.S. Environmental Protection Agency, Washington DC. 1991.

Education

J.D. with Honors, George Washington University, Washington, DC. 1981.

B.A. with Distinction in Political Science, Pennsylvania State University, University Park, PA. 1978.

Publications and Presentations (* denotes peer-reviewed publications)

1. "Quality of Service Issues," a speech to the Pennsylvania Public Utility Commission Consumer Conference, State College, PA. 1988.
2. K.L. Pape and S.J. Rubin, "Current Developments in Water Utility Law," in *Pennsylvania Public Utility Law* (Pennsylvania Bar Institute). 1990.
3. Presentation on Water Utility Holding Companies to the Annual Meeting of the National Association of State Utility Consumer Advocates, Orlando, FL. 1990.
4. "How the OCA Approaches Quality of Service Issues," a speech to the Pennsylvania Chapter of the National Association of Water Companies. 1991.
5. Presentation on the Safe Drinking Water Act to the Mid-Year Meeting of the National Association of State Utility Consumer Advocates, Seattle, WA. 1991.
6. "A Consumer Advocate's View of Federal Pre-emption in Electric Utility Cases," a speech to the Pennsylvania Public Utility Commission Electricity Conference. 1991.
7. Workshop on Safe Drinking Water Act Compliance Issues at the Mid-Year Meeting of the National Association of State Utility Consumer Advocates, Washington, DC. 1992.
8. Formal Discussant, Regional Acid Rain Workshop, U.S. Environmental Protection Agency and National Regulatory Research Institute, Charlotte, NC. 1992.
9. S.J. Rubin and S.P. O'Neal, "A Quantitative Assessment of the Viability of Small Water Systems in Pennsylvania," *Proceedings of the Eighth NARUC Biennial Regulatory Information Conference*, National Regulatory Research Institute (Columbus, OH 1992), IV:79-97.
10. "The OCA's Concerns About Drinking Water," a speech to the Pennsylvania Public Utility Commission Water Conference. 1992.
11. Member, Technical Horizons Panel, Annual Meeting of the National Association of Water Companies, Hilton Head, SC. 1992.
12. M.D. Klein and S.J. Rubin, "Water and Sewer -- Update on Clean Streams, Safe Drinking Water, Waste Disposal and Pennvest," *Pennsylvania Public Utility Law Conference* (Pennsylvania Bar Institute). 1992.
13. Presentation on Small Water System Viability to the Technical Assistance Center for Small Water Companies, Pa. Department of Environmental Resources, Harrisburg, PA. 1993

14. "The Results Through a Public Service Commission Lens," speaker and participant in panel discussion at Symposium: "Impact of EPA's Allowance Auction," Washington, DC, sponsored by AER*X. 1993.
15. "The Hottest Legislative Issue of Today -- Reauthorization of the Safe Drinking Water Act," speaker and participant in panel discussion at the Annual Conference of the American Water Works Association, San Antonio, TX. 1993.
16. "Water Service in the Year 2000," a speech to the Conference: "Utilities and Public Policy III: The Challenges of Change," sponsored by the Pennsylvania Public Utility Commission and the Pennsylvania State University, University Park, PA. 1993.
17. "Government Regulation of the Drinking Water Supply: Is it Properly Focused?," speaker and participant in panel discussion at the National Consumers League's Forum on Drinking Water Safety and Quality, Washington, DC. 1993. Reprinted in *Rural Water*, Vol. 15 No. 1 (Spring 1994), pages 13-16.
18. "Telephone Penetration Rates for Renters in Pennsylvania," a study prepared for the Pennsylvania Office of Consumer Advocate. 1993.
19. "Zealous Advocacy, Ethical Limitations and Considerations," participant in panel discussion at "Continuing Legal Education in Ethics for Pennsylvania Lawyers," sponsored by the Office of General Counsel, Commonwealth of Pennsylvania, State College, PA. 1993.
20. "Serving the Customer," participant in panel discussion at the Annual Conference of the National Association of Water Companies, Williamsburg, VA. 1993.
21. "A Simple, Inexpensive, Quantitative Method to Assess the Viability of Small Water Systems," a speech to the Water Supply Symposium, New York Section of the American Water Works Association, Syracuse, NY. 1993.
22. * S.J. Rubin, "Are Water Rates Becoming Unaffordable?," *Journal American Water Works Association*, Vol. 86, No. 2 (February 1994), pages 79-86.
23. "Why Water Rates Will Double (If We're Lucky): Federal Drinking Water Policy and Its Effect on New England," a briefing for the New England Conference of Public Utilities Commissioners, Andover, MA. 1994.
24. "Are Water Rates Becoming Unaffordable?," a speech to the Legislative and Regulatory Conference, Association of Metropolitan Water Agencies, Washington, DC. 1994.
25. "Relationships: Drinking Water, Health, Risk and Affordability," speaker and participant in panel discussion at the Annual Meeting of the Southeastern Association of Regulatory Commissioners, Charleston, SC. 1994.
26. "Small System Viability: Assessment Methods and Implementation Issues," speaker and participant in panel discussion at the Annual Conference of the American Water Works Association, New York, NY. 1994.
27. S.J. Rubin, "How much should we spend to save a life?," *Seattle Journal of Commerce*, August 18, 1994 (Protecting the Environment Supplement), pages B-4 to B-5.

28. S. Rubin, S. Bernow, M. Fulmer, J. Goldstein, and I. Peters, *An Evaluation of Kentucky-American Water Company's Long-Range Planning*, prepared for the Utility and Rate Intervention Division, Kentucky Office of the Attorney General (Tellus Institute 1994).
29. S.J. Rubin, "Small System Monitoring: What Does It Mean?," *Impacts of Monitoring for Phase II/V Drinking Water Regulations on Rural and Small Communities* (National Rural Water Association 1994), pages 6-12.
30. "Surviving the Safe Drinking Water Act," speaker at the Annual Meeting of the National Association of State Utility Consumer Advocates, Reno, NV. 1994.
31. "Safe Drinking Water Act Compliance -- Ratemaking Implications," speaker at the National Conference of Regulatory Attorneys, Scottsdale, AZ. 1995. Reprinted in *Water*, Vol. 36, No. 2 (Summer 1995), pages 28-29.
32. S.J. Rubin, "Water: Why Isn't it Free? The Case of Small Utilities in Pennsylvania," *Utilities, Consumers & Public Policy: Issues of Quality, Affordability, and Competition, Proceedings of the Fourth Utilities, Consumers and Public Policy Conference* (Pennsylvania State University 1995), pages 177-183.
33. S.J. Rubin, "Water Rates: An Affordable Housing Issue?," *Home Energy*, Vol. 12 No. 4 (July/August 1995), page 37.
34. Speaker and participant in the Water Policy Forum, sponsored by the National Association of Water Companies, Naples, FL. 1995.
35. Participant in panel discussion on "The Efficient and Effective Maintenance and Delivery of Potable Water at Affordable Rates to the People of New Jersey," at The New Advocacy: Protecting Consumers in the Emerging Era of Utility Competition, a conference sponsored by the New Jersey Division of the Ratepayer Advocate, Newark, NJ. 1995.
36. J.E. Cromwell III, and S.J. Rubin, *Development of Benchmark Measures for Viability Assessment* (Pa. Department of Environmental Protection 1995).
37. S. Rubin, "A Nationwide Practice from a Small Town in Pa.," *Lawyers & the Internet – a Supplement to the Legal Intelligencer and Pa. Law Weekly* (February 12, 1996), page S6.
38. "Changing Customers' Expectations in the Water Industry," speaker at the Mid-America Regulatory Commissioners Conference, Chicago, IL. 1996, reprinted in *Water* Vol. 37 No. 3 (Winter 1997), pages 12-14.
39. "Recent Federal Legislation Affecting Drinking Water Utilities," speaker at Pennsylvania Public Utility Law Conference, Pennsylvania Bar Institute, Hershey, PA. 1996.
40. "Clean Water at Affordable Rates: A Ratepayers Conference," moderator at symposium sponsored by the New Jersey Division of Ratepayer Advocate, Trenton, NJ. 1996.

41. "Water Workshop: How New Laws Will Affect the Economic Regulation of the Water Industry," speaker at the Annual Meeting of the National Association of State Utility Consumer Advocates, San Francisco, CA. 1996.
42. * E.T. Castillo, S.J. Rubin, S.K. Keefe, and R.S. Raucher, "Restructuring Small Systems," *Journal American Water Works Association*, Vol. 89, No. 1 (January 1997), pages 65-74.
43. * J.E. Cromwell III, S.J. Rubin, F.C. Marrocco, and M.E. Leevan, "Business Planning for Small System Capacity Development," *Journal American Water Works Association*, Vol. 89, No. 1 (January 1997), pages 47-57.
44. "Capacity Development – More than Viability Under a New Name," speaker at National Association of Regulatory Utility Commissioners Winter Meetings, Washington, DC. 1997.
45. * E. Castillo, S.K. Keefe, R.S. Raucher, and S.J. Rubin, *Small System Restructuring to Facilitate SDWA Compliance: An Analysis of Potential Feasibility* (AWWA Research Foundation, 1997).
46. H. Himmelberger, et al., *Capacity Development Strategy Report for the Texas Natural Resource Conservation Commission* (Aug. 1997).
47. Briefing on Issues Affecting the Water Utility Industry, Annual Meeting of the National Association of State Utility Consumer Advocates, Boston, MA. 1997.
48. "Capacity Development in the Water Industry," speaker at the Annual Meeting of the National Association of Regulatory Utility Commissioners, Boston, MA. 1997.
49. "The Ticking Bomb: Competitive Electric Metering, Billing, and Collection," speaker at the Annual Meeting of the National Association of State Utility Consumer Advocates, Boston, MA. 1997.
50. Scott J. Rubin, "A Nationwide Look at the Affordability of Water Service," *Proceedings of the 1998 Annual Conference of the American Water Works Association*, Water Research, Vol. C, No. 3, pages 113-129 (American Water Works Association, 1998).
51. Scott J. Rubin, "30 Technology Tips in 30 Minutes," *Pennsylvania Public Utility Law Conference*, Vol. I, pages 101-110 (Pa. Bar Institute, 1998).
52. Scott J. Rubin, "Effects of Electric and Gas Deregulation on the Water Industry," *Pennsylvania Public Utility Law Conference*, Vol. I, pages 139-146 (Pa. Bar Institute, 1998).
53. Scott J. Rubin, *The Challenges and Changing Mission of Utility Consumer Advocates* (American Association of Retired Persons, 1999).
54. "Consumer Advocacy for the Future," speaker at the Age of Awareness Conference, Changes and Choices: Utilities in the New Millennium, Carlisle, PA. 1999.
55. Keynote Address, \$1 Energy Fund, Inc., Annual Membership Meeting, Monroeville, PA. 1999.
56. Scott J. Rubin, "Assessing the Effect of the Proposed Radon Rule on the Affordability of Water Service," prepared for the American Water Works Association. 1999.

57. Scott J. Rubin and Janice A. Beecher, The Impacts of Electric Restructuring on the Water and Wastewater Industry, *Proceedings of the Small Drinking Water and Wastewater Systems International Symposium and Technology Expo* (Phoenix, AZ 2000), pp. 66-75.
58. American Water Works Association, *Principles of Water Rates, Fees, and Charges, Manual M1 – Fifth Edition* (AWWA 2000), Member, Editorial Committee.
59. Janice A. Beecher and Scott J. Rubin, presentation on “Special Topics in Rate Design: Affordability” at the Annual Conference and Exhibition of the American Water Works Association, Denver, CO. 2000.
60. Scott J. Rubin, “The Future of Drinking Water Regulation,” a speech at the Annual Conference and Exhibition of the American Water Works Association, Denver, CO. 2000.
61. Janice A. Beecher and Scott J. Rubin, “Deregulation Impacts and Opportunities,” a presentation at the Annual Conference and Exhibition of the American Water Works Association, Denver, CO. 2000.
62. Scott J. Rubin, “Estimating the Effect of Different Arsenic Maximum Contaminant Levels on the Affordability of Water Service,” prepared for the American Water Works Association. 2000.
63. * Janice A. Beecher and Scott J. Rubin, *Deregulation! Impacts on the Water Industry*, American Water Works Association Research Foundation, Denver, CO. 2000.
64. Scott J. Rubin, Methods for Assessing, Evaluating, and Assisting Small Water Systems, NARUC Annual Regulatory Studies Program, East Lansing, MI. 2000.
65. Scott J. Rubin, Consumer Issues in the Water Industry, NARUC Annual Regulatory Studies Program, East Lansing, MI. 2000.
66. “Be Utility Wise in a Restructured Utility Industry,” Keynote Address at Be UtilityWise Conference, Pittsburgh, PA. 2000.
67. Scott J. Rubin, Jason D. Sharp, and Todd S. Stewart, “The Wired Administrative Lawyer,” *5th Annual Administrative Law Symposium*, Pennsylvania Bar Institute, Harrisburg, PA. 2000.
68. Scott J. Rubin, “Current Developments in the Water Industry,” *Pennsylvania Public Utility Law Conference*, Pennsylvania Bar Institute, Harrisburg, PA. 2000.
69. Scott J. Rubin, “Viewpoint: Change Sickening Attitudes,” *Engineering News-Record*, Dec. 18, 2000.
70. Janice A. Beecher and Scott J. Rubin, “Ten Practices of Highly Effective Water Utilities,” *Opflow*, April 2001, pp. 1, 6-7, 16; reprinted in *Water and Wastes Digest*, December 2004, pp. 22-25.
71. Scott J. Rubin, “Pennsylvania Utilities: How Are Consumers, Workers, and Corporations Faring in the Deregulated Electricity, Gas, and Telephone Industries?” Keystone Research Center. 2001.
72. Scott J. Rubin, “Guest Perspective: A First Look at the Impact of Electric Deregulation on Pennsylvania,” *LEAP Letter*, May-June 2001, pp. 2-3.

73. Scott J. Rubin, Consumer Protection in the Water Industry, NARUC Annual Regulatory Studies Program, East Lansing, MI. 2001.
74. Scott J. Rubin, Impacts of Deregulation on the Water Industry, NARUC Annual Regulatory Studies Program, East Lansing, MI. 2001.
75. Scott J. Rubin, "Economic Characteristics of Small Systems," *Critical Issues in Setting Regulatory Standards*, National Rural Water Association, 2001, pp. 7-22.
76. Scott J. Rubin, "Affordability of Water Service," *Critical Issues in Setting Regulatory Standards*, National Rural Water Association, 2001, pp. 23-42.
77. Scott J. Rubin, "Criteria to Assess the Affordability of Water Service," White Paper, National Rural Water Association, 2001.
78. Scott J. Rubin, Providing Affordable Water Service to Low-Income Families, presentation to Portland Water Bureau, Portland, OR. 2001.
79. Scott J. Rubin, Issues Relating to the Affordability and Sustainability of Rates for Water Service, presentation to the Water Utility Council of the American Water Works Association, New Orleans, LA. 2002.
80. Scott J. Rubin, The Utility Industries Compared – Water, NARUC Annual Regulatory Studies Program, East Lansing, MI. 2002.
81. Scott J. Rubin, Legal Perspective on Water Regulation, NARUC Annual Regulatory Studies Program, East Lansing, MI. 2002.
82. Scott J. Rubin, Regulatory Options for Water Utilities, NARUC Annual Regulatory Studies Program, East Lansing, MI. 2002.
83. Scott J. Rubin, Overview of Small Water System Consolidation, presentation to National Drinking Water Advisory Council Small Systems Affordability Working Group, Washington, DC. 2002.
84. Scott J. Rubin, Defining Affordability and Low-Income Household Tradeoffs, presentation to National Drinking Water Advisory Council Small Systems Affordability Working Group, Washington, DC. 2002.
85. Scott J. Rubin, "Thinking Outside the Hearing Room," *Pennsylvania Public Utility Law Conference*, Pennsylvania Bar Institute, Harrisburg, PA. 2002.
86. Scott J. Rubin, "Update of Affordability Database," White Paper, National Rural Water Association. 2003.
87. Scott J. Rubin, *Understanding Telephone Penetration in Pennsylvania*, Council on Utility Choice, Harrisburg, PA. 2003.
88. Scott J. Rubin, *The Cost of Water and Wastewater Service in the United States*, National Rural Water Association, 2003.

89. Scott J. Rubin, What Price Safer Water? Presentation at Annual Conference of National Association of Regulatory Utility Commissioners, Atlanta, GA. 2003.
90. George M. Aman, III, Jeffrey P. Garton, Eric Petersen, and Scott J. Rubin, Challenges and Opportunities for Improving Water Supply Institutional Arrangements, *Water Law Conference*, Pennsylvania Bar Institute, Mechanicsburg, PA. 2004.
91. Scott J. Rubin, Serving Low-Income Water Customers. Presentation at American Water Works Association Annual Conference, Orlando, FL. 2004.
92. Scott J. Rubin, Thinking Outside the Bill: Serving Low-Income Water Customers. Presentation at National League of Cities Annual Congress of Cities, Indianapolis, IN. 2004.
93. Scott J. Rubin, Buying and Selling a Water System – Ratemaking Implications, *Pennsylvania Public Utility Law Conference*, Pennsylvania Bar Institute, Harrisburg, PA. 2005.
94. *Thinking Outside the Bill: A Utility Manager's Guide to Assisting Low-Income Water Customers*, American Water Works Association. 2005; Second Edition published in 2014
95. * Scott J. Rubin, "Census Data Shed Light on US Water and Wastewater Costs," *Journal American Water Works Association*, Vol. 97, No. 4 (April 2005), pages 99-110, reprinted in Maxwell, *The Business of Water: A Concise Overview of Challenges and Opportunities in the Water Market.*, American Water Works Association, Denver, CO. 2008.
96. Scott J. Rubin, Review of U.S. Environmental Protection Agency Notice Concerning Revision of National-Level Affordability Methodology, National Rural Water Association. 2006.
97. * Robert S. Raucher, et al., *Regional Solutions to Water Supply Provision*, American Water Works Association Research Foundation, Denver, CO. 2007; 2nd edition published in 2008.
98. Scott J. Rubin, Robert Raucher, and Megan Harrod, The Relationship Between Household Financial Distress and Health: Implications for Drinking Water Regulation, National Rural Water Association. 2007.
99. * John Cromwell and Scott Rubin, *Estimating Benefits of Regional Solutions for Water and Wastewater Service*, American Water Works Association Research Foundation, Denver, CO. 2008.
100. Scott J. Rubin, "Current State of the Water Industry and Stimulus Bill Overview," in *Pennsylvania Public Utility Law* (Pennsylvania Bar Institute). 2009.
101. Scott J. Rubin, Best Practice in Customer Payment Assistance Programs, webcast presentation sponsored by Water Research Foundation. 2009.
102. * Scott J. Rubin, How Should We Regulate Small Water Utilities?, National Regulatory Research Institute. 2009.
103. * John Cromwell III, et al., *Best Practices in Customer Payment Assistance Programs*, Water Research Foundation, Denver, CO. 2010.

104. * Scott J. Rubin, What Does Water Really Cost? Rate Design Principles for an Era of Supply Shortages, Infrastructure Upgrades, and Enhanced Water Conservation, , National Regulatory Research Institute. 2010.
105. Scott J. Rubin and Christopher P.N. Woodcock, Teleseminar: Water Rate Design, National Regulatory Research Institute. 2010.
106. David Monie and Scott J. Rubin, Cost of Service Studies and Water Rate Design: A Debate on the Utility and Regulatory Perspectives, Meeting of New England Chapter of National Association of Water Companies, Newport, RI. 2010.
107. * Scott J. Rubin, A Call for Water Utility Reliability Standards: Regulating Water Utilities' Infrastructure Programs to Achieve a Balance of Safety, Risk, and Cost, National Regulatory Research Institute. 2010.
108. * Raucher, Robert S.; Rubin, Scott J.; Crawford-Brown, Douglas; and Lawson, Megan M. "Benefit-Cost Analysis for Drinking Water Standards: Efficiency, Equity, and Affordability Considerations in Small Communities," *Journal of Benefit-Cost Analysis*: Vol. 2: Issue 1, Article 4. 2011.
109. Scott J. Rubin, A Call for Reliability Standards, *Journal American Water Works Association*, Vol. 103, No. 1 (Jan. 2011), pp. 22-24.
110. Scott J. Rubin, Current Topics in Water: Rate Design and Reliability. Presentation to the Water Committee of the National Association of Regulatory Utility Commissioners, Washington, DC. 2011.
111. Scott J. Rubin, Water Reliability and Resilience Standards, *Pennsylvania Public Utility Law Conference* (Pennsylvania Bar Institute). 2011.
112. Member of Expert Panel, Leadership Forum: Business Management for the Future, Annual Conference and Exposition of the American Water Works Association, Washington, DC. 2011.
113. Scott J. Rubin, Evaluating Community Affordability in Storm Water Control Plans, *Flowing into the Future: Evolving Water Issues* (Pennsylvania Bar Institute). 2011.
114. Invited Participant, Summit on Declining Water Demand and Revenues, sponsored by The Alliance for Water Efficiency, Racine, WI. 2012.
115. * Scott J. Rubin, Evaluating Violations of Drinking Water Regulations, *Journal American Water Works Association*, Vol. 105, No. 3 (Mar. 2013), pp. 51-52 (Expanded Summary) and E137-E147. Winner of the AWWA Small Systems Division Best Paper Award.
116. * Scott J. Rubin, Structural Changes in the Water Utility Industry During the 2000s, *Journal American Water Works Association*, Vol. 105, No. 3 (Mar. 2013), pp. 53-54 (Expanded Summary) and E148-E156.
117. * Scott J. Rubin, Moving Toward Demand-Based Residential Rates, *The Electricity Journal*, Vol. 28, No. 9 (Nov. 2015), pp. 63-71, <http://dx.doi.org/10.1016/j.tej.2015.09.021>.
118. Scott J. Rubin, Moving Toward Demand-Based Residential Rates. Presentation at the Annual Meeting of the National Association of State Utility Consumer Advocates, Austin, TX. 2015.

- 119.* Stacey Isaac Berahzer, et al., *Navigating Legal Pathways to Rate-Funded Customer Assistance Programs: A Guide for Water and Wastewater Utilities*, American Water Works Association, et al. 2017.
- 120.* Janet Clements, et al., *Customer Assistance Programs for Multi-Family Residential and Other Hard-to-Reach Customers*, Water Research Foundation, Denver, CO. 2017.
- 121.Scott J. Rubin, Water Costs and Affordability in the US: 1990 to 2015, *Journal American Water Works Association*, Vol. 110, No. 4 (Apr. 2018), pp. 12-16.

Testimony as an Expert Witness

1. *Pa. Public Utility Commission v. Pennsylvania Gas and Water Co. - Water Division*, Pa. Public Utility Commission, Docket R-00922404. 1992. Concerning rate design, on behalf of the Pa. Office of Consumer Advocate.
2. *Pa. Public Utility Commission v. Shenango Valley Water Co.*, Pa. Public Utility Commission, Docket R-00922420. 1992. Concerning cost allocation, on behalf of the Pa. Office of Consumer Advocate
3. *Pa. Public Utility Commission v. Pennsylvania Gas and Water Co. - Water Division*, Pa. Public Utility Commission, Docket R-00922482. 1993. Concerning rate design, on behalf of the Pa. Office of Consumer Advocate
4. *Pa. Public Utility Commission v. Colony Water Co.*, Pa. Public Utility Commission, Docket R-00922375. 1993. Concerning rate design, on behalf of the Pa. Office of Consumer Advocate
5. *Pa. Public Utility Commission v. Dauphin Consolidated Water Supply Co. and General Waterworks of Pennsylvania, Inc.*, Pa. Public Utility Commission, Docket R-00932604. 1993. Concerning rate design and cost of service, on behalf of the Pa. Office of Consumer Advocate
6. *West Penn Power Co. v. State Tax Department of West Virginia*, Circuit Court of Kanawha County, West Virginia, Civil Action No. 89-C-3056. 1993. Concerning regulatory policy and the effects of a taxation statute on out-of-state utility ratepayers, on behalf of the Pa. Office of Consumer Advocate
7. *Pa. Public Utility Commission v. Pennsylvania Gas and Water Co. - Water Division*, Pa. Public Utility Commission, Docket R-00932667. 1993. Concerning rate design and affordability of service, on behalf of the Pa. Office of Consumer Advocate
8. *Pa. Public Utility Commission v. National Utilities, Inc.*, Pa. Public Utility Commission, Docket R-00932828. 1994. Concerning rate design, on behalf of the Pa. Office of Consumer Advocate
9. *An Investigation of the Sources of Supply and Future Demand of Kentucky-American Water Company*, Ky. Public Service Commission, Case No. 93-434. 1994. Concerning supply and demand planning, on behalf of the Kentucky Office of Attorney General, Utility and Rate Intervention Division.
10. *The Petition on Behalf of Gordon's Corner Water Company for an Increase in Rates*, New Jersey Board of Public Utilities, Docket No. WR94020037. 1994. Concerning revenue requirements and rate design, on behalf of the New Jersey Division of Ratepayer Advocate.

11. *Re Consumers Maine Water Company Request for Approval of Contracts with Consumers Water Company and with Ohio Water Service Company*, Me. Public Utilities Commission, Docket No. 94-352. 1994. Concerning affiliated interest agreements, on behalf of the Maine Public Advocate.
12. *In the Matter of the Application of Potomac Electric Power Company for Approval of its Third Least-Cost Plan*, D.C. Public Service Commission, Formal Case No. 917, Phase II. 1995. Concerning Clean Air Act implementation and environmental externalities, on behalf of the District of Columbia Office of the People's Counsel.
13. *In the Matter of the Regulation of the Electric Fuel Component Contained within the Rate Schedules of the Dayton Power and Light Company and Related Matters*, Ohio Public Utilities Commission, Case No. 94-105-EL-EFC. 1995. Concerning Clean Air Act implementation (case settled before testimony was filed), on behalf of the Office of the Ohio Consumers' Counsel.
14. *Kennebec Water District Proposed Increase in Rates*, Maine Public Utilities Commission, Docket No. 95-091. 1995. Concerning the reasonableness of planning decisions and the relationship between a publicly owned water district and a very large industrial customer, on behalf of the Maine Public Advocate.
15. *Winter Harbor Water Company, Proposed Schedule Revisions to Introduce a Readiness-to-Serve Charge*, Maine Public Utilities Commission, Docket No. 95-271. 1995 and 1996. Concerning standards for, and the reasonableness of, imposing a readiness to serve charge and/or exit fee on the customers of a small investor-owned water utility, on behalf of the Maine Public Advocate.
16. *In the Matter of the 1995 Long-Term Electric Forecast Report of the Cincinnati Gas & Electric Company*, Public Utilities Commission of Ohio, Case No. 95-203-EL-FOR, and *In the Matter of the Two-Year Review of the Cincinnati Gas & Electric Company's Environmental Compliance Plan Pursuant to Section 4913.05, Revised Cost*, Case No. 95-747-EL-ECP. 1996. Concerning the reasonableness of the utility's long-range supply and demand-management plans, the reasonableness of its plan for complying with the Clean Air Act Amendments of 1990, and discussing methods to ensure the provision of utility service to low-income customers, on behalf of the Office of the Ohio Consumers' Counsel..
17. *In the Matter of Notice of the Adjustment of the Rates of Kentucky-American Water Company*, Kentucky Public Service Commission, Case No. 95-554. 1996. Concerning rate design, cost of service, and sales forecast issues, on behalf of the Kentucky Office of Attorney General.
18. *In the Matter of the Application of Citizens Utilities Company for a Hearing to Determine the Fair Value of its Properties for Ratemaking Purposes, to Fix a Just and Reasonable Rate of Return Thereon, and to Approve Rate Schedules Designed to Provide such Rate of Return*, Arizona Corporation Commission, Docket Nos. E-1032-95-417, *et al.* 1996. Concerning rate design, cost of service, and the price elasticity of water demand, on behalf of the Arizona Residential Utility Consumer Office.
19. *Cochrane v. Bangor Hydro-Electric Company*, Maine Public Utilities Commission, Docket No. 96-053. 1996. Concerning regulatory requirements for an electric utility to engage in unregulated business enterprises, on behalf of the Maine Public Advocate.
20. *In the Matter of the Regulation of the Electric Fuel Component Contained within the Rate Schedules of Monongahela Power Company and Related Matters*, Public Utilities Commission of Ohio, Case No. 96-106-EL-EFC. 1996. Concerning the costs and procedures associated with the implementation of the Clean Air Act Amendments of 1990, on behalf of the Ohio Consumers' Counsel.

21. *In the Matter of the Regulation of the Electric Fuel Component Contained within the Rate Schedules of Cleveland Electric Illuminating Company and Toledo Edison Company and Related Matters*, Public Utilities Commission of Ohio, Case Nos. 96-107-EL-EFC and 96-108-EL-EFC. 1996. Concerning the costs and procedures associated with the implementation of the Clean Air Act Amendments of 1990, on behalf of the Ohio Consumers' Counsel.
22. *In the Matter of the Regulation of the Electric Fuel Component Contained within the Rate Schedules of Ohio Power Company and Columbus Southern Power Company and Related Matters*, Public Utilities Commission of Ohio, Case Nos. 96-101-EL-EFC and 96-102-EL-EFC. 1997. Concerning the costs and procedures associated with the implementation of the Clean Air Act Amendments of 1990, on behalf of the Ohio Consumers' Counsel.
23. *An Investigation of the Sources of Supply and Future Demand of Kentucky-American Water Company (Phase II)*, Kentucky Public Service Commission, Docket No. 93-434. 1997. Concerning supply and demand planning, on behalf of the Kentucky Office of Attorney General, Public Service Litigation Branch.
24. *In the Matter of the Regulation of the Electric Fuel Component Contained within the Rate Schedules of Cincinnati Gas and Electric Co. and Related Matters*, Public Utilities Commission of Ohio, Case No. 96-103-EL-EFC. 1997. Concerning the costs and procedures associated with the implementation of the Clean Air Act Amendments of 1990, on behalf of the Ohio Consumers' Counsel.
25. *Bangor Hydro-Electric Company Petition for Temporary Rate Increase*, Maine Public Utilities Commission, Docket No. 97-201. 1997. Concerning the reasonableness of granting an electric utility's request for emergency rate relief, and related issues, on behalf of the Maine Public Advocate.
26. *Testimony concerning H.B. 1068 Relating to Restructuring of the Natural Gas Utility Industry*, Consumer Affairs Committee, Pennsylvania House of Representatives. 1997. Concerning the provisions of proposed legislation to restructure the natural gas utility industry in Pennsylvania, on behalf of the Pennsylvania AFL-CIO Gas Utility Caucus.
27. *In the Matter of the Regulation of the Electric Fuel Component Contained within the Rate Schedules of Cleveland Electric Illuminating Company and Toledo Edison Company and Related Matters*, Public Utilities Commission of Ohio, Case Nos. 97-107-EL-EFC and 97-108-EL-EFC. 1997. Concerning the costs and procedures associated with the implementation of the Clean Air Act Amendments of 1990, on behalf of the Ohio Consumers' Counsel.
28. *In the Matter of the Petition of Valley Road Sewerage Company for a Revision in Rates and Charges for Water Service*, New Jersey Board of Public Utilities, Docket No. WR92080846J. 1997. Concerning the revenue requirements and rate design for a wastewater treatment utility, on behalf of the New Jersey Division of Ratepayer Advocate.
29. *Bangor Gas Company, L.L.C., Petition for Approval to Furnish Gas Service in the State of Maine*, Maine Public Utilities Commission, Docket No. 97-795. 1998. Concerning the standards and public policy concerns involved in issuing a certificate of public convenience and necessity for a new natural gas utility, and related ratemaking issues, on behalf of the Maine Public Advocate.
30. *In the Matter of the Investigation on Motion of the Commission into the Adequacy of the Public Utility Water Service Provided by Tidewater Utilities, Inc., in Areas in Southern New Castle County, Delaware*,

- Delaware Public Service Commission, Docket No. 309-97. 1998. Concerning the standards for the provision of efficient, sufficient, and adequate water service, and the application of those standards to a water utility, on behalf of the Delaware Division of the Public Advocate.
31. *In the Matter of the Regulation of the Electric Fuel Component Contained within the Rate Schedules of Cincinnati Gas and Electric Co. and Related Matters*, Public Utilities Commission of Ohio, Case No. 97-103-EL-EFC. 1998. Concerning fuel-related transactions with affiliated companies and the appropriate ratemaking treatment and regulatory safeguards involving such transactions, on behalf of the Ohio Consumers' Counsel.
 32. *Olde Port Mariner Fleet, Inc. Complaint Regarding Casco Bay Island Transit District's Tour and Charter Service*, Maine Public Utilities Commission, Docket No. 98-161. 1998. Concerning the standards and requirements for allocating costs and separating operations between regulated and unregulated operations of a transportation utility, on behalf of the Maine Public Advocate and Olde Port Mariner Fleet, Inc.
 33. *Central Maine Power Company Investigation of Stranded Costs, Transmission and Distribution Utility Revenue Requirements, and Rate Design*, Maine Public Utilities Commission, Docket No. 97-580. 1998. Concerning the treatment of existing rate discounts when designing rates for a transmission and distribution electric utility, on behalf of the Maine Public Advocate.
 34. *Pa. Public Utility Commission v. Manufacturers Water Company*, Pennsylvania Public Utility Commission, Docket No. R-00984275. 1998. Concerning rate design on behalf of the Manufacturers Water Industrial Users.
 35. *In the Matter of Petition of Pennsgrove Water Supply Company for an Increase in Rates for Water Service*, New Jersey Board of Public Utilities, Docket No. WR98030147. 1998. Concerning the revenue requirements, level of affiliated charges, and rate design for a water utility, on behalf of the New Jersey Division of Ratepayer Advocate.
 36. *In the Matter of Petition of Seaview Water Company for an Increase in Rates for Water Service*, New Jersey Board of Public Utilities, Docket No. WR98040193. 1999. Concerning the revenue requirements and rate design for a water utility, on behalf of the New Jersey Division of Ratepayer Advocate.
 37. *In the Matter of the Regulation of the Electric Fuel Component Contained within the Rate Schedules of Ohio Power Company and Columbus Southern Power Company and Related Matters*, Public Utilities Commission of Ohio, Case Nos. 98-101-EL-EFC and 98-102-EL-EFC. 1999. Concerning the costs and procedures associated with the implementation of the Clean Air Act Amendments of 1990, on behalf of the Ohio Consumers' Counsel.
 38. *In the Matter of the Regulation of the Electric Fuel Component Contained within the Rate Schedules of Dayton Power and Light Company and Related Matters*, Public Utilities Commission of Ohio, Case No. 98-105-EL-EFC. 1999. Concerning the costs and procedures associated with the implementation of the Clean Air Act Amendments of 1990, on behalf of the Ohio Consumers' Counsel.
 39. *In the Matter of the Regulation of the Electric Fuel Component Contained within the Rate Schedules of Monongahela Power Company and Related Matters*, Public Utilities Commission of Ohio, Case No. 99-106-EL-EFC. 1999. Concerning the costs and procedures associated with the implementation of the Clean Air Act Amendments of 1990, on behalf of the Ohio Consumers' Counsel.

40. *County of Suffolk, et al. v. Long Island Lighting Company, et al.*, U.S. District Court for the Eastern District of New York, Case No. 87-CV-0646. 2000. Submitted two affidavits concerning the calculation and collection of court-ordered refunds to utility customers, on behalf of counsel for the plaintiffs.
41. *Northern Utilities, Inc., Petition for Waivers from Chapter 820*, Maine Public Utilities Commission, Docket No. 99-254. 2000. Concerning the standards and requirements for defining and separating a natural gas utility's core and non-core business functions, on behalf of the Maine Public Advocate.
42. *Notice of Adjustment of the Rates of Kentucky-American Water Company*, Kentucky Public Service Commission, Case No. 2000-120. 2000. Concerning the appropriate methods for allocating costs and designing rates, on behalf of the Kentucky Office of Attorney General.
43. *In the Matter of the Petition of Gordon's Corner Water Company for an Increase in Rates and Charges for Water Service*, New Jersey Board of Public Utilities, Docket No. WR00050304. 2000. Concerning the revenue requirements and rate design for a water utility, on behalf of the New Jersey Division of Ratepayer Advocate.
44. *Testimony concerning Arsenic in Drinking Water: An Update on the Science, Benefits, and Costs*, Committee on Science, United States House of Representatives. 2001. Concerning the effects on low-income households and small communities from a more stringent regulation of arsenic in drinking water.
45. *In the Matter of the Application of The Cincinnati Gas & Electric Company for an Increase in Gas Rates in its Service Territory*, Public Utilities Commission of Ohio, Case No. 01-1228-GA-AIR, *et al.* 2002. Concerning the need for and structure of a special rider and alternative form of regulation for an accelerated main replacement program, on behalf of the Ohio Consumers' Counsel.
46. *Pennsylvania State Treasurer's Hearing on Enron and Corporate Governance Issues*. 2002. Concerning Enron's role in Pennsylvania's electricity market and related issues, on behalf of the Pennsylvania AFL-CIO.
47. *An Investigation into the Feasibility and Advisability of Kentucky-American Water Company's Proposed Solution to its Water Supply Deficit*, Kentucky Public Service Commission, Case No. 2001-00117. 2002. Concerning water supply planning, regulatory oversight, and related issue, on behalf of the Kentucky Office of Attorney General.
48. *Joint Application of Pennsylvania-American Water Company and Thames Water Aqua Holdings GmbH*, Pennsylvania Public Utility Commission, Docket Nos. A-212285F0096 and A-230073F0004. 2002. Concerning the risks and benefits associated with the proposed acquisition of a water utility, on behalf of the Pennsylvania Office of Consumer Advocate.
49. *Application for Approval of the Transfer of Control of Kentucky-American Water Company to RWE AG and Thames Water Aqua Holdings GmbH*, Kentucky Public Service Commission, Case No. 2002-00018. 2002. Concerning the risks and benefits associated with the proposed acquisition of a water utility, on behalf of the Kentucky Office of Attorney General.
50. *Joint Petition for the Consent and Approval of the Acquisition of the Outstanding Common Stock of American Water Works Company, Inc., the Parent Company and Controlling Shareholder of West Virginia-American Water Company*, West Virginia Public Service Commission, Case No. 01-1691-W-PC. 2002.

Concerning the risks and benefits associated with the proposed acquisition of a water utility, on behalf of the Consumer Advocate Division of the West Virginia Public Service Commission.

51. *Joint Petition of New Jersey-American Water Company, Inc. and Thames Water Aqua Holdings GmbH for Approval of Change in Control of New Jersey-American Water Company, Inc.*, New Jersey Board of Public Utilities, Docket No. WM01120833. 2002. Concerning the risks and benefits associated with the proposed acquisition of a water utility, on behalf of the New Jersey Division of Ratepayer Advocate.
52. *Illinois-American Water Company, Proposed General Increase in Water Rates*, Illinois Commerce Commission, Docket No. 02-0690. 2003. Concerning rate design and cost of service issues, on behalf of the Illinois Office of the Attorney General.
53. *Pennsylvania Public Utility Commission v. Pennsylvania-American Water Company*, Pennsylvania Public Utility Commission, Docket No. R-00038304. 2003. Concerning rate design and cost of service issues, on behalf of the Pennsylvania Office of Consumer Advocate.
54. *West Virginia-American Water Company*, West Virginia Public Service Commission, Case No. 03-0353-W-42T. 2003. Concerning affordability, rate design, and cost of service issues, on behalf of the West Virginia Consumer Advocate Division.
55. *Petition of Seabrook Water Corp. for an Increase in Rates and Charges for Water Service*, New Jersey Board of Public Utilities, Docket No. WR3010054. 2003. Concerning revenue requirements, rate design, prudence, and regulatory policy, on behalf of the New Jersey Division of Ratepayer Advocate.
56. *Chesapeake Ranch Water Co. v. Board of Commissioners of Calvert County*, U.S. District Court for Southern District of Maryland, Civil Action No. 8:03-cv-02527-AW. 2004. Submitted expert report concerning the expected level of rates under various options for serving new commercial development, on behalf of the plaintiff.
57. *Testimony concerning Lead in Drinking Water*, Committee on Government Reform, United States House of Representatives. 2004. Concerning the trade-offs faced by low-income households when drinking water costs increase, including an analysis of H.R. 4268.
58. *West Virginia-American Water Company*, West Virginia Public Service Commission, Case No. 04-0373-W-42T. 2004. Concerning affordability and rate comparisons, on behalf of the West Virginia Consumer Advocate Division.
59. *West Virginia-American Water Company*, West Virginia Public Service Commission, Case No. 04-0358-W-PC. 2004. Concerning costs, benefits, and risks associated with a wholesale water sales contract, on behalf of the West Virginia Consumer Advocate Division.
60. *Kentucky-American Water Company*, Kentucky Public Service Commission, Case No. 2004-00103. 2004. Concerning rate design and tariff issues, on behalf of the Kentucky Office of Attorney General.
61. *New Landing Utility, Inc.*, Illinois Commerce Commission, Docket No. 04-0610. 2005. Concerning the adequacy of service provided by, and standards of performance for, a water and wastewater utility, on behalf of the Illinois Office of Attorney General.

62. *People of the State of Illinois v. New Landing Utility, Inc.*, Circuit Court of the 15th Judicial District, Ogle County, Illinois, No. 00-CH-97. 2005. Concerning the standards of performance for a water and wastewater utility, including whether a receiver should be appointed to manage the utility's operations, on behalf of the Illinois Office of Attorney General.
63. *Hope Gas, Inc. d/b/a Dominion Hope*, West Virginia Public Service Commission, Case No. 05-0304-G-42T. 2005. Concerning the utility's relationships with affiliated companies, including an appropriate level of revenues and expenses associated with services provided to and received from affiliates, on behalf of the West Virginia Consumer Advocate Division.
64. *Monongahela Power Co. and The Potomac Edison Co.*, West Virginia Public Service Commission, Case Nos. 05-0402-E-CN and 05-0750-E-PC. 2005. Concerning review of a plan to finance the construction of pollution control facilities and related issues, on behalf of the West Virginia Consumer Advocate Division.
65. *Joint Application of Duke Energy Corp., et al., for Approval of a Transfer and Acquisition of Control*, Case Kentucky Public Service Commission, No. 2005-00228. 2005. Concerning the risks and benefits associated with the proposed acquisition of an energy utility, on behalf of the Kentucky Office of the Attorney General.
66. *Commonwealth Edison Company proposed general revision of rates, restructuring and price unbundling of bundled service rates, and revision of other terms and conditions of service*, Illinois Commerce Commission, Docket No. 05-0597. 2005. Concerning rate design and cost of service, on behalf of the Illinois Office of Attorney General.
67. *Pennsylvania Public Utility Commission v. Aqua Pennsylvania, Inc.*, Pennsylvania Public Utility Commission, Docket No. R-00051030. 2006. Concerning rate design and cost of service, on behalf of the Pennsylvania Office of Consumer Advocate.
68. *Central Illinois Light Company d/b/a AmerenCILCO, Central Illinois Public Service Company d/b/a AmerenCIPS, and Illinois Power Company d/b/a AmerenIP, proposed general increases in rates for delivery service*, Illinois Commerce Commission, Docket Nos. 06-0070, et al. 2006. Concerning rate design and cost of service, on behalf of the Illinois Office of Attorney General.
69. *Grens, et al., v. Illinois-American Water Co.*, Illinois Commerce Commission, Docket Nos. 5-0681, et al. 2006. Concerning utility billing, metering, meter reading, and customer service practices, on behalf of the Illinois Office of Attorney General and the Village of Homer Glen, Illinois.
70. *Commonwealth Edison Company Petition for Approval of Tariffs Implementing ComEd's Proposed Residential Rate Stabilization Program*, Illinois Commerce Commission, Docket No. 06-0411. 2006. Concerning a utility's proposed purchased power phase-in proposal, in behalf of the Illinois Office of Attorney General.
71. *Illinois-American Water Company, Application for Approval of its Annual Reconciliation of Purchased Water and Purchased Sewage Treatment Surcharges Pursuant to 83 Ill. Adm. Code 655*, Illinois Commerce Commission, Docket No. 06-0196. 2006. Concerning the reconciliation of purchased water and sewer charges, on behalf of the Illinois Office of Attorney General and the Village of Homer Glen, Illinois.

72. *Illinois-American Water Company, et al.*, Illinois Commerce Commission, Docket No. 06-0336. 2006. Concerning the risks and benefits associated with the proposed divestiture of a water utility, on behalf of the Illinois Office of Attorney General.
73. *Joint Petition of Kentucky-American Water Company, et al.*, Kentucky Public Service Commission, Docket No. 2006-00197. 2006. Concerning the risks and benefits associated with the proposed divestiture of a water utility, on behalf of the Kentucky Office of Attorney General.
74. *Aqua Illinois, Inc. Proposed Increase in Water Rates for the Kankakee Division*, Illinois Commerce Commission, Docket No. 06-0285. 2006. Concerning various revenue requirement, rate design, and tariff issues, on behalf of the County of Kankakee.
75. *Housing Authority for the City of Pottsville v. Schuylkill County Municipal Authority*, Court of Common Pleas of Schuylkill County, Pennsylvania, No. S-789-2000. 2006. Concerning the reasonableness and uniformity of rates charged by a municipal water authority, on behalf of the Pottsville Housing Authority.
76. *Application of Pennsylvania-American Water Company for Approval of a Change in Control*, Pennsylvania Public Utility Commission, Docket No. A-212285F0136. 2006. Concerning the risks and benefits associated with the proposed divestiture of a water utility, on behalf of the Pennsylvania Office of Consumer Advocate.
77. *Application of Artesian Water Company, Inc., for an Increase in Water Rates*, Delaware Public Service Commission, Docket No. 06-158. 2006. Concerning rate design and cost of service, on behalf of the Staff of the Delaware Public Service Commission.
78. *Central Illinois Light Company, Central Illinois Public Service Company, and Illinois Power Company: Petition Requesting Approval of Deferral and Securitization of Power Costs*, Illinois Commerce Commission, Docket No. 06-0448. 2006. Concerning a utility's proposed purchased power phase-in proposal, in behalf of the Illinois Office of Attorney General.
79. *Petition of Pennsylvania-American Water Company for Approval to Implement a Tariff Supplement Revising the Distribution System Improvement Charge*, Pennsylvania Public Utility Commission, Docket No. P-00062241. 2007. Concerning the reasonableness of a water utility's proposal to increase the cap on a statutorily authorized distribution system surcharge, on behalf of the Pennsylvania Office of Consumer Advocate.
80. *Adjustment of the Rates of Kentucky-American Water Company*, Kentucky Public Service Commission, Case No. 2007-00143. 2007. Concerning rate design and cost of service, on behalf of the Kentucky Office of Attorney General.
81. *Application of Kentucky-American Water Company for a Certificate of Convenience and Necessity Authorizing the Construction of Kentucky River Station II, Associated Facilities and Transmission Main*, Kentucky Public Service Commission, Case No. 2007-00134. 2007. Concerning the life-cycle costs of a planned water supply source and the imposition of conditions on the construction of that project, on behalf of the Kentucky Office of Attorney General.
82. *Pa. Public Utility Commission v. Pennsylvania-American Water Company*, Pennsylvania Public Utility Commission, Docket No. R-00072229. 2007. Concerning rate design and cost of service, on behalf of the Pennsylvania Office of Consumer Advocate.

83. *Illinois-American Water Company Application for Approval of its Annual Reconciliation of Purchased Water and Purchased Sewage Treatment Surcharges*, Illinois Commerce Commission, Docket No. 07-0195. 2007. Concerning the reconciliation of purchased water and sewer charges, on behalf of the Illinois Office of Attorney General.
84. *In the Matter of the Application of Aqua Ohio, Inc. to Increase Its Rates for Water Service Provided In the Lake Erie Division*, Public Utilities Commission of Ohio, Case No.07-0564-WW-AIR. 2007. Concerning rate design and cost of service, on behalf of the Office of the Ohio Consumers' Counsel.
85. *Pa. Public Utility Commission v. Aqua Pennsylvania Inc.*, Pennsylvania Public Utility Commission, Docket No. R-00072711. 2008. Concerning rate design, on behalf of the Masthope Property Owners Council.
86. *Illinois-American Water Company Proposed increase in water and sewer rates*, Illinois Commerce Commission, Docket No. 07-0507. 2008. Concerning rate design and demand studies, on behalf of the Illinois Office of Attorney General.
87. *Central Illinois Light Company, d/b/a AmerenCILCO; Central Illinois Public Service Company, d/b/a AmerenCIPS; Illinois Power Company, d/b/a AmerenIP: Proposed general increase in rates for electric delivery service*, Illinois Commerce Commission Docket Nos. 07-0585, 07-0586, 07-0587. 2008. Concerning rate design and cost of service studies, on behalf of the Illinois Office of Attorney General.
88. *Commonwealth Edison Company: Proposed general increase in electric rates*, Illinois Commerce Commission Docket No. 07-0566. 2008. Concerning rate design and cost of service studies, on behalf of the Illinois Office of Attorney General.
89. *In the Matter of Application of Ohio American Water Co. to Increase Its Rates*, Public Utilities Commission of Ohio, Case No. 07-1112-WS-AIR. 2008. Concerning rate design and cost of service, on behalf of the Office of the Ohio Consumers' Counsel.
90. *In the Matter of the Application of The East Ohio Gas Company d/b/a Dominion East Ohio for Authority to Increase Rates for its Gas Service*, Public Utilities Commission of Ohio, Case Nos. 07-829-GA-AIR, et al. 2008. Concerning the need for, and structure of, an accelerated infrastructure replacement program and rate surcharge, on behalf of the Office of the Ohio Consumers' Counsel.
91. *Pa. Public Utility Commission v. Pennsylvania American Water Company*, Pennsylvania Public Utility Commission, Docket No. R-2008-2032689. 2008. Concerning rate design, cost of service study, and other tariff issues, on behalf of the Pennsylvania Office of Consumer Advocate.
92. *Pa. Public Utility Commission v. York Water Company*, Pennsylvania Public Utility Commission, Docket No. R-2008-2023067. 2008. Concerning rate design, cost of service study, and other tariff issues, on behalf of the Pennsylvania Office of Consumer Advocate.
93. *Northern Illinois Gas Company d/b/a Nicor Gas Company*, Illinois Commerce Commission, Docket No. 08-0363. 2008. Concerning rate design, cost of service, and automatic rate adjustments, on behalf of the Illinois Office of Attorney General.

94. *West Virginia American Water Company*, West Virginia Public Service Commission, Case No. 08-0900-W-42T. 2008. Concerning affiliated interest charges and relationships, on behalf of the Consumer Advocate Division of the Public Service Commission of West Virginia.
95. *Illinois-American Water Company Application for Approval of its Annual Reconciliation of Purchased Water and Purchased Sewage Treatment Surcharges*, Illinois Commerce Commission, Docket No. 08-0218. 2008. Concerning the reconciliation of purchased water and sewer charges, on behalf of the Illinois Office of Attorney General.
96. *In the Matter of Application of Duke Energy Ohio, Inc. for an Increase in Electric Rates*, Public Utilities Commission of Ohio, Case No. 08-0709-EL-AIR. 2009. Concerning rate design and cost of service, on behalf of the Office of the Ohio Consumers' Counsel.
97. *The Peoples Gas Light and Coke Company and North Shore Gas Company Proposed General Increase in Rates for Gas Service*, Illinois Commerce Commission, Docket Nos. 09-0166 and 09-0167. 2009. Concerning rate design and automatic rate adjustments on behalf of the Illinois Office of Attorney General, Citizens Utility Board, and City of Chicago.
98. *Illinois-American Water Company Proposed Increase in Water and Sewer Rates*, Illinois Commerce Commission, Docket No. 09-0319. 2009. Concerning rate design and cost of service on behalf of the Illinois Office of Attorney General and Citizens Utility Board.
99. *Pa. Public Utility Commission v. Aqua Pennsylvania Inc.*, Pennsylvania Public Utility Commission, Docket No. R-2009-2132019. 2010. Concerning rate design, cost of service, and automatic adjustment tariffs, on behalf of the Pennsylvania Office of Consumer Advocate.
100. *Apple Canyon Utility Company and Lake Wildwood Utilities Corporation Proposed General Increases in Water Rates*, Illinois Commerce Commission, Docket Nos. 09-0548 and 09-0549. 2010. Concerning parent-company charges, quality of service, and other matters, on behalf of Apple Canyon Lake Property Owners' Association and Lake Wildwood Association, Inc.
101. *Application of Aquarion Water Company of Connecticut to Amend its Rate Schedules*, Connecticut Department of Public Utility Control, Docket No. 10-02-13. 2010. Concerning rate design, proof of revenues, and other tariff issues, on behalf of the Connecticut Office of Consumer Counsel.
102. *Illinois-American Water Company Annual Reconciliation Of Purchased Water and Sewage Treatment Surcharges*, Illinois Commerce Commission, Docket No. 09-0151. 2010. Concerning the reconciliation of purchased water and sewer charges, on behalf of the Illinois Office of Attorney General.
103. *Pa. Public Utility Commission v. Pennsylvania-American Water Co.*, Pennsylvania Public Utility Commission, Docket Nos. R-2010-2166212, et al. 2010. Concerning rate design and cost of service study for four wastewater utility districts, on behalf of the Pennsylvania Office of Consumer Advocate.
104. *Central Illinois Light Company d/b/a AmerenCILCO, Central Illinois Public Service Company d/b/a AmerenCIPS, Illinois Power Company d/b/a AmerenIP Petition for accounting order*, Illinois Commerce Commission, Docket No. 10-0517. 2010. Concerning ratemaking procedures for a multi-district electric and natural gas utility, on behalf of the Illinois Office of Attorney General.

105. *Commonwealth Edison Company Petition for General Increase in Delivery Service Rates*, Illinois Commerce Commission Docket No. 10-0467. 2010. Concerning rate design and cost of service study, on behalf of the Illinois Office of Attorney General.
106. *Pa. Public Utility Commission v. City of Lancaster Bureau of Water*, Pennsylvania Public Utility Commission, Docket No. R-2010-2179103. 2010. Concerning rate design, cost of service, and cost allocation, on behalf of the Pennsylvania Office of Consumer Advocate.
107. *Application of Yankee Gas Services Company for Amended Rate Schedules*, Connecticut Department of Public Utility Control, Docket No. 10-12-02. 2011. Concerning rate design and cost of service for a natural gas utility, on behalf of the Connecticut Office of Consumers' Counsel.
108. *California-American Water Company*, California Public Utilities Commission, Application 10-07-007. 2011. Concerning rate design and cost of service for multiple water-utility service areas, on behalf of The Utility Reform Network.
109. *Little Washington Wastewater Company, Inc., Masthope Wastewater Division*, Pennsylvania Public Utility Commission Docket No. R-2010-2207833. 2011. Concerning rate design and various revenue requirements issues, on behalf of the Masthope Property Owners Council.
110. *In the matter of Pittsfield Aqueduct Company, Inc.*, New Hampshire Public Utilities Commission Case No. DW 10-090. 2011. Concerning rate design and cost of service on behalf of the New Hampshire Office of the Consumer Advocate.
111. *In the matters of Pennichuck Water Works, Inc. Permanent Rate Case and Petition for Approval of Special Contract with Anheuser-Busch, Inc.*, New Hampshire Public Utilities Commission Case Nos. DW 10-091 and DW 11-014. 2011. Concerning rate design, cost of service, and contract interpretation on behalf of the New Hampshire Office of the Consumer Advocate.
112. *Artesian Water Co., Inc. v. Chester Water Authority*, U.S. District Court for the Eastern District of Pennsylvania Case No. 10-CV-07453-JP. 2011. Concerning cost of service, ratemaking methods, and contract interpretation on behalf of Chester Water Authority.
113. *North Shore Gas Company and The Peoples Gas Light and Coke Company Proposed General Increases in Rates for Gas Service*, Illinois Commerce Commission, Docket Nos. 11-0280 and 11-0281. 2011. Concerning rate design and cost of service on behalf of the Illinois Office of Attorney General, the Citizens Utility Board, and the City of Chicago.
114. *Ameren Illinois Company: Proposed general increase in electric delivery service rates and gas delivery service rates*, Illinois Commerce Commission, Docket Nos. 11-0279 and 11-0282. 2011. Concerning rate design and cost of service for natural gas and electric distribution service, on behalf of the Illinois Office of Attorney General and the Citizens Utility Board.
115. *Pa. Public Utility Commission v. Pennsylvania-American Water Co.*, Pennsylvania Public Utility Commission, Docket No. R-2011-2232243. 2011. Concerning rate design, cost of service, sales forecast, and automatic rate adjustments on behalf of the Pennsylvania Office of Consumer Advocate.
116. *Aqua Illinois, Inc. Proposed General Increase in Water and Sewer Rates*, Illinois Commerce Commission, Docket No. 11-0436. 2011. Concerning rate design and cost of service on behalf of the

Illinois Office of Attorney General.

117. *City of Nashua Acquisition of Pennichuck Corporation*, New Hampshire Public Utilities Commission, Docket No. DW 11-026. 2011. Concerning the proposed acquisition of an investor-owned utility holding company by a municipality, including appropriate ratemaking methodologies, on behalf of the New Hampshire Office of Consumer Advocate.
118. *An Application by Heritage Gas Limited for the Approval of a Schedule of Rates, Tolls and Charges*, Nova Scotia Utility and Review Board, Case NSUARB-NG-HG-R-11. 2011. Concerning rate design and cost of service, on behalf of the Nova Scotia Consumer Advocate.
119. *An Application of Halifax Regional Water Commission for Approval of a Cost of Service and Rate Design Methodology*, Nova Scotia Utility and Review Board, Case NSUARB-W-HRWC-R-11. 2011. Concerning rate design and cost of service, on behalf of the Nova Scotia Consumer Advocate.
120. *National Grid USA and Liberty Energy Utilities Corp.*, New Hampshire Public Utilities Commission, Docket No. DG 11-040. 2011. Concerning the costs and benefits of a proposed merger and related conditions, on behalf of the New Hampshire Office of Consumer Advocate.
121. *Great Northern Utilities, Inc., et al.*, Illinois Commerce Commission, Docket Nos. 11-0059, et al. 2012. Concerning options for mitigating rate impacts and consolidating small water and wastewater utilities for ratemaking purposes, on behalf of the Illinois Office of Attorney General.
122. *Pa. Public Utility Commission v. Aqua Pennsylvania, Inc.*, Pennsylvania Public Utility Commission, Docket No. R-2011-2267958. 2012. Concerning rate design, cost of service, and automatic rate adjustment mechanisms, on behalf of the Pennsylvania Office of Consumer Advocate.
123. *Golden State Water Company*, California Public Utilities Commission, Application 11-07-017. 2012. Concerning rate design and quality of service, on behalf of The Utility Reform Network.
124. *Golden Heart Utilities, Inc. and College Utilities Corporation*, Regulatory Commission of Alaska, Case Nos. U-11-77 and U-11-78. 2012. Concerning rate design and cost of service, on behalf of the Alaska Office of the Attorney General.
125. *Illinois-American Water Company*, Illinois Commerce Commission, Docket No. 11-0767. 2012. Concerning rate design, cost of service, and automatic rate adjustment mechanisms, on behalf of the Illinois Office of Attorney General.
126. *Application of Tidewater Utilities, Inc., for a General Rate Increase in Water Base Rates and Tariff Revisions*, Delaware Public Service Commission, Docket No. 11-397. 2012. Concerning rate design and cost of service study, on behalf of the Staff of the Delaware Public Service Commission.
127. *In the Matter of the Philadelphia Water Department's Proposed Increase in Rates for Water and Wastewater Utility Services*, Philadelphia Water Commissioner, FY 2013-2016. 2012. Concerning rate design and related issues for storm water service, on behalf of Citizens for Pennsylvania's Future.
128. *Corix Utilities (Illinois) LLC, Hydro Star LLC, and Utilities Inc. Joint Application for Approval of a Proposed Reorganization*, Illinois Commerce Commission, Docket No. 12-0279. 2012. Concerning merger-related synergy savings and appropriate ratemaking treatment of the same, on behalf of the

Illinois Office of Attorney General.

129. *North Shore Gas Company and The Peoples Gas Light and Coke Company*, Illinois Commerce Commission, Docket Nos. 12-0511 and 12-0512. 2012. Concerning rate design, cost of service study, and automatic rate adjustment tariff on behalf of the Illinois Office of Attorney General.
130. *Pa. Public Utility Commission v. City of Lancaster Sewer Fund*, Pennsylvania Public Utility Commission, Docket No. R-2012-2310366. 2012. Concerning rate design, cost of service, and cost allocation, on behalf of the Pennsylvania Office of Consumer Advocate.
131. *Aquarion Water Company of New Hampshire*, New Hampshire Public Utilities Commission, Docket No. DW 12-085. 2013. Concerning tariff issues, including an automatic adjustment clause for infrastructure improvement, on behalf of the New Hampshire Office of Consumer Advocate.
132. *In the Matter of the Application of Duke Energy Ohio, Inc., for an Increase in Electric Distribution Rates*, Public Utilities Commission of Ohio, Case No. 12-1682-EL-AIR, et al. 2013. Concerning rate design and tariff issues, on behalf of the Office of the Ohio Consumers' Counsel.
133. *In the Matter of the Application of Duke Energy Ohio, Inc., for an Increase in Natural Gas Distribution Rates*, Public Utilities Commission of Ohio, Case No. 12-1685-GA-AIR, et al. 2013. Concerning cost-of-service study, rate design, and tariff issues, on behalf of the Office of the Ohio Consumers' Counsel.
134. *In the Matter of the Application of The Dayton Power and Light Company to Establish a Standard Service Offer in the Form of an Electric Security Plan*, Public Utilities Commission of Ohio, Case No. 12-426-EL-SSO, et al. 2013. Concerning rate design, on behalf of the Office of the Ohio Consumers' Counsel.
135. *Application of the Halifax Regional Water Commission, for Approval of Amendments to its Schedule of Rates and Charges and Schedule of Rules and Regulations for the delivery of water, public and private fire protection, wastewater and stormwater services*, Nova Scotia Utility and Review Board, Matter No. M05463, 2013. Concerning rate design, cost-of-service study, and miscellaneous tariff provisions, on behalf of the Consumer Advocate of Nova Scotia.
136. *California Water Service Co. General Rate Case Application*, California Public Utilities Commission, Docket No. A.12-07-007. 2013. Concerning rate design, phase-in plans, low-income programs, and other tariff issues, on behalf of The Utility Reform Network.
137. *Application of The United Illuminating Company to Amend its Rate Schedules*, Connecticut Public Utility Regulatory Authority, Docket No. 13-01-19. 2013. Concerning sales forecast, rate design, and other tariff issues, on behalf of the Connecticut Office of Consumer Counsel.
138. *Application of Aquarion Water Company of Connecticut to Amend its Rate Schedules*, Connecticut Public Utility Regulatory Authority, Docket No. 13-02-20. 2013. Concerning sales forecast and rate design on behalf of the Connecticut Office of Consumer Counsel.
139. *Ameren Illinois Company, Proposed General Increase in Natural Gas Delivery Service Rates*, Illinois Commerce Commission, Docket No. 13-0192. 2013. Concerning rate design and revenue allocation, on behalf of the Illinois Office of Attorney General and Citizens Utility Board.

140. *Commonwealth Edison Company, Tariff filing to present the Illinois Commerce Commission with an opportunity to consider revenue neutral tariff changes related to rate design*, Docket No. 13-0387. 2013. Concerning rate design and cost of service study issues, on behalf of the Illinois Office of Attorney General.
141. *In the Matter of the Potomac Electric Power Company for Authority to Increase Existing Retail Rates and Charges for Electric Distribution Service*, District of Columbia Public Service Commission, Formal Case No. 1103. 2013. Concerning rate design, revenue allocation, and cost-of-service study issues, on behalf of the District of Columbia Office of Peoples' Counsel.
142. *Pa. Public Utility Commission v. Pennsylvania-American Water Co.*, Pennsylvania Public Utility Commission, Docket No. R-2013-2355276. 2013. Concerning rate design, revenue allocation, and regulatory policy, on behalf of the Pennsylvania Office of Consumer Advocate.
143. *In the Matter of the Revenue Requirement and Transmission Tariff Designated as TA364-8 filed by Chugach Electric Association, Inc.*, Regulatory Commission of Alaska, U-13-007. 2013. Concerning rate design and cost-of-service study issues, on behalf of the Alaska Office of the Attorney General.
144. *Ameren Illinois Company: Tariff filing to present the Illinois Commerce Commission with an opportunity to consider revenue neutral tariff changes related to rate design*, Docket No. 13-0476. 2013. Concerning rate design and cost of service study issues, on behalf of the Illinois Office of Attorney General.
145. *Pa. Public Utility Commission v. City of Bethlehem Bureau of Water*, Pennsylvania Public Utility Commission, Docket No. R-2013-2390244. 2014. Concerning rate design, cost of service study, and revenue allocation on behalf of the Pennsylvania Office of Consumer Advocate.
146. *In the Matter of the Tariff Revision Designated as TA332-121 filed by the Municipality of Anchorage d/b/a Municipal Light and Power Department*, Regulatory Commission of Alaska, U-13-184. 2014. Concerning rate design and cost-of-service study issues, on behalf of the Alaska Office of the Attorney General.
147. *Pa. Public Utility Commission v. Pike County Light and Power Co. - Gas*, Pennsylvania Public Utility Commission, Docket No. R-2013-2397353. 2014. Concerning rate design and revenue allocation on behalf of the Pennsylvania Office of Consumer Advocate.
148. *Pa. Public Utility Commission v. Pike County Light and Power Co. - Electric*, Pennsylvania Public Utility Commission, Docket No. R-2013-2397237. 2014. Concerning rate design, cost of service study, and revenue allocation on behalf of the Pennsylvania Office of Consumer Advocate.
149. *The Peoples Gas Light and Coke Company North Shore Gas Company Proposed General Increase In Rates for Gas Service*, Illinois Commerce Commission, Docket Nos. 14-0224 and 14-0225. 2014. Concerning rate design on behalf of the Illinois Office of the Attorney General and the Environmental Law and Policy Center.
150. *Apple Valley Ranchos Water Company*, California Public Utilities Commission, Docket No. A.14-01-002. 2014. Concerning rate design and automatic rate adjustment mechanisms on behalf of the Town of Apple Valley.

151. *Application by Heritage Gas Limited for Approval to Amend its Franchise Area*, Nova Scotia Utility and Review Board, Matter No. M06271. 2014. Concerning criteria, terms, and conditions for expanding a utility's service area and using transported compressed natural gas to serve small retail customers, on behalf of the Nova Scotia Consumer Advocate.
152. *Notice of Intent of Entergy Mississippi, Inc. to Modernize Rates to Support Economic Development, Power Procurement, and Continued Investment*, Mississippi Public Service Commission Docket No. 2014-UN-132. 2014. Concerning rate design and tariff issues, on behalf of the Mississippi Public Utilities Staff.
153. *Pa. Public Utility Commission v. City of Lancaster Bureau of Water*, Pennsylvania Public Utility Commission, Docket No. R-2014-2418872. 2014. Concerning rate design, cost of service study, and revenue allocation on behalf of the Pennsylvania Office of Consumer Advocate.
154. *Pa. Public Utility Commission v. Borough of Hanover Municipal Water Works*, Pennsylvania Public Utility Commission, Docket No. R-2014-2428304. 2014. Concerning rate design, cost of service study, and revenue allocation on behalf of the Pennsylvania Office of Consumer Advocate.
155. *Investigation of Commonwealth Edison Company's Cost of Service for Low-Use Customers In Each Residential Class*, Illinois Commerce Commission, Docket No. 14-0384. 2014. Concerning rate design on behalf of the Illinois Office of Attorney General.
156. *Application of the Halifax Regional Water Commission, for Approval of its Schedule of Rates and Charges and Schedule of Rules and Regulations for the Provision of Water, Public and Private Fire Protection, Wastewater and Stormwater Services*, Nova Scotia Utility and Review Board, Matter No. M06540. 2015. Concerning rate design, cost of service study, and tariff issues on behalf of the Nova Scotia Consumer Advocate.
157. *Testimony concerning organization and regulation of Philadelphia Gas Works*, Philadelphia City Council's Special Committee on Energy Opportunities. 2015.
158. *Testimony concerning proposed telecommunications legislation*, Maine Joint Standing Committee on Energy, Utilities, and Technology. 2015.
159. *Pa. Public Utility Commission v. United Water Pennsylvania, Inc.*, Pennsylvania Public Utility Commission, Docket No. R-2015-2462723. 2015. Concerning rate design, cost of service study, and revenue allocation on behalf of the Pennsylvania Office of Consumer Advocate.
160. *Ameren Illinois Company Proposed General Increase in Gas Delivery Service Rates*, Illinois Commerce Commission, Docket No. 15-0142. 2015. Concerning rate design on behalf of the Illinois Office of Attorney General.
161. *Maine Natural Gas Company Request for Multi-Year Rate Plan*, Maine Public Utilities Commission, Docket No. 2015-00005. 2015. Concerning rate design and automatic rate adjustment tariffs on behalf of the Maine Office of the Public Advocate.
162. *Application of Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company for Authority to Provide for a Standard Service Offer*, Public Utilities Commission of Ohio, Case No. 14-1297-EL-SSO. 2015. Concerning rate design and proposed rate discounts on behalf

of the Office of the Ohio Consumers' Counsel.

163. *An Application of the Halifax Regional Water Commission, for approval of revisions to its Cost of Service Manual and Rate Design for Stormwater Service*, Nova Scotia Utility and Review Board, Matter No. M07147. 2016. Concerning stormwater rate design and cost of service, on behalf of the Nova Scotia Consumer Advocate.
164. *In The Matter Of An Application By Heritage Gas Limited For Enhancement To Its Existing Residential Retro-Fit Assistance Fund*, Nova Scotia Utility and Review Board, Matter No. M07146. 2016. Concerning costs and benefits associated with utility system expansion, on behalf of the Nova Scotia Consumer Advocate.
165. *In the Matter of the Application of UNS Electric, Inc. for the Establishment of Just and Reasonable Rates and Charges*, Arizona Corporation Commission, Docket No. E-04204A-15-0142. 2016. Concerning rate design and residential demand charges on behalf of Arizona Utility Ratepayer Alliance.
166. *In the Matter of Application of Water Service Corporation of Kentucky for a General Adjustment in Existing Rates*, Kentucky Public Service Commission, Case No. 2015-00382. 2016. Concerning rate design and service area consolidation on behalf of the Kentucky Office of the Attorney General.
167. *Massachusetts Electric Company And Nantucket Electric Company*, Massachusetts Department of Public Utilities, Docket No. DPU 15-155. 2016. Concerning rate design and cost-of-service studies on behalf of the Massachusetts Office of Attorney General.
168. *In the Matter of Abenaki Water Company*, New Hampshire Public Utilities Commission, Docket No. DW 15-199. 2016. Concerning rate design on behalf of the New Hampshire Office of the Consumer Advocate.
169. *In the Matter of an Application by Heritage Gas Limited for Approval of its Customer Retention Program*, Nova Scotia Utility and Review Board Matter No. M07346. 2016. Concerning a regulatory response to competition and potential business failure on behalf of the Nova Scotia Consumer Advocate.
170. *Joint Application of Pennsylvania-American Water Company and the Sewer Authority of the City of Scranton*, Pennsylvania Public Utility Commission Docket No. A-2016-2537209. 2016. Concerning the lawfulness, costs and benefits, and ratemaking treatment of a proposed acquisition of a combined wastewater and storm water utility on behalf of the Pennsylvania Office of Consumer Advocate.
171. *Application of The United Illuminating Company to Amend its Rate Schedules*, Connecticut Public Utility Regulatory Authority Docket No. 16-06-04. 2016. Concerning rate design, cost-of-service study, and other tariff issues on behalf of the Connecticut Office of Consumer Counsel.
172. *Ameren Illinois Company Tariff filing to present the Illinois Commerce Commission with an opportunity to consider revenue neutral tariff changes related to rate design*, Illinois Commerce Commission Docket No. 16-0387. 2016. Concerning rate design and cost-of-service study on behalf of the Illinois Office of the Attorney General.
173. *Unitil Energy Systems, Inc.*, New Hampshire Public Utilities Commission Docket No. 16-384. 2016. Concerning rate design and cost-of-service study on behalf of the New Hampshire Office of Consumer

Advocate.

174. *Liberty Utilities (Granite State Electric) Corp.*, New Hampshire Public Utilities Commission Docket No. 16-383. 2016. Concerning rate design and cost-of-service study on behalf of the New Hampshire Office of Consumer Advocate.
175. *Arizona Public Service Co.*, Arizona Corporation Commission Docket No. E-01345A-16-0123. 2017. Concerning rate design and cost-of-service study on behalf of the Arizona Utility Ratepayer Alliance.
176. *Commonwealth Edison Company, Tariff filing to present the Illinois Commerce Commission with an opportunity to consider revenue neutral tariff changes related to rate design*, Illinois Commerce Commission Docket No. 17-0049. 2017. Concerning rate design and cost of service study issues, on behalf of the Illinois Office of Attorney General.
177. *NSTAR Electric Company and Western Massachusetts Electric Company*, Massachusetts Department of Public Utilities Docket No. D.P.U. 17-05. 2017. Concerning rate design and cost of service study issues, on behalf of the Massachusetts Office of Attorney General.
178. *In the Matter of the Tariff Revision Designated as TA857-2 Filed by Alaska Power Company*, Regulatory Commission of Alaska No. U-16-078. 2017. Concerning rate design and cost of service study issues on behalf of the Alaska Office of the Attorney General.
179. *In the Matter of the Application of Minnesota Power For Authority to Increase Rates for Electric Utility Service in Minnesota*, Minnesota Public Utilities Commission Docket No. E015/GR-16-664. 2017. Concerning rate design and cost of service study issues on behalf of AARP.
180. *Pennsylvania Public Utility Commission v. Pennsylvania-American Water Company*, Pennsylvania Public Utility Commission, Docket No. R-2017-2595853. 2017. Concerning rate design, cost of service, and policy issues, on behalf of the Pennsylvania Office of Consumer Advocate.
181. *Aqua Illinois, Inc. Proposed Rate Increases for Water and Sewer Services*, Illinois Commerce Commission, Docket No. 17-0259. 2017. Concerning rate design and single-tariff pricing, on behalf of the Illinois Office of Attorney General.
182. *Petition of Pennsylvania-American Water Company for Approval of Tariff Changes and Accounting and Rate Treatment Related to Replacement of Lead Customer-Owned Service Pipes*, Pennsylvania Public Utility Commission, Docket No. P-2017-2606100. 2017. Concerning public policy and ratemaking issues associated with the replacement of customer-owned lead service lines, on behalf of the Pennsylvania Office of Consumer Advocate.
183. *In the Matter of Application and Notice of Change in Natural Gas Rates of Montana-Dakota Utilities Co.*, North Dakota Public Service Commission, Case No. PU-17-295. 2017. Concerning rate design and cost of service study issues, on behalf of AARP.
184. *Aqua Illinois, Inc. Petition for the Issuance of a Certificate of Public Convenience and Necessity to Operate a Water and Wastewater System in the Village of Peotone*, Illinois Commerce Commission, Docket No. 17-0314. 2018. Concerning rate consolidation and rate design, on behalf of the Illinois Office of Attorney General.

185. *Application Of The Connecticut Light and Power Company d/b/a Eversource Energy to Amend Its Rate Schedules*, Connecticut Public Utilities Regulatory Authority, Docket No. 17-10-46. 2018. Concerning rate design issues, on behalf of the Connecticut Office of Consumer Counsel.
186. *Application by Heritage Gas for Approval of a Long-Term Natural Gas Transportation Contract and Cost Recovery Mechanism*, Nova Scotia Utility and Review Board, Matter M08473. 2018. Concerning evaluation of costs, benefits, and risks of a long-term natural gas pipeline contract, on behalf of the Consumer Advocate of Nova Scotia.
187. *Boston Gas Company and Colonial Gas Company*, Massachusetts Department of Public Utilities, D.P.U. 17-170. 2018. Concerning class revenue allocation and rate design, on behalf of the Massachusetts Office of Attorney General.
188. *In the Matter of the Application of Maryland-American Water Company for Authority to Adjust its Existing Schedule of Tariffs and Rates*, Maryland Public Service Commission, Case No. 9487. 2018. Concerning cost-of-service study, on behalf of the Staff of the Maryland Public Service Commission.
189. *Joint Application and Petition of South Carolina Electric & Gas Company and Dominion Energy, Inc. for review and approval of a proposed business combination between SCANA Corporation and Dominion Energy, Inc., as may be required, and for a prudency determination regarding the abandonment of the V.C. Summer Units 2 & 3 Project and associated merger benefits and cost recovery plans*, South Carolina Public Service Commission, Docket No. 2017-370-E. 2018. Concerning regulatory policy, prudency of decision-making, and cost sharing, on behalf of AARP.

OCA STATEMENT NO. 1

Schedule SJR-1

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

Data Request OCA-II-14:

Reference: Transource Statement 3 (McGlynn), p. 21, lines 12-14.

- a. Please describe in detail what Mr. McGlynn means by the statement: "In determining the Change in Load Energy Payments, only zones that show a decrease will be considered in determining the Change in Load Energy Payments."
- b. For example, if a particular project results in energy costs to Zone A decreasing by \$10 million and energy costs to Zone B increasing by \$8 million, would the Change in Load Energy Payments for purposes of the cost-benefit analysis be \$10 million or \$2 million?
- c. Specifically for the Independence Energy Project, did the modeling show any zones experiencing an increase in energy costs? If so, please identify each such zone, the amount of energy cost increase in the zone, and the total Change in Load Energy Payments for the Project (both including and excluding zones with cost increases).

Response:

- a. The quoted portion of Mr. McGlynn's testimony refers to the market efficiency process contained in PJM Manual 14B.
- b. \$10 Million.
- c. Yes. Please refer to OCA-II-14 Attachment 1.pdf for the requested information. This analysis indicated an overall reduction (i.e., netting the total of the transmission zones with cost increases minus the transmission zones with cost reductions) of approximately \$336 million as a result of Project 9A.

Witness: Paul McGlynn

Change in 15-Year Net Present Value of Net Load Payment
Project 9A

PJM ZONE	(\$Millions)
AECO	33.55
AEP	-71.38
APS	-96.53
BGE	-218.19
COMED	-23.86
CONABCIK	-4.12
DAY	-6.54
DEOK	-11.25
DOM	-441.33
DPL	74.12
DUQ	-0.11
EKPC	-5.01
FE-ATSI	13.37
JCPL	91.25
LINDVFT	-63.83
METED	96.82
NEPTHVDC	5.82
O66HVDC	-15.16
PECO	178.95
PENELEC	34.15
PEPCO	-230.76
PLGRP	170.02
PSEG	149.65
RECO	3.97
Total PJM Change	-336.40
Zones that decrease	-1188.07
Zones that increase	851.67

OCA STATEMENT NO. 1

Schedule SJR-2

Change in Net Load Payments (Δ NLP) Sept. 2017 Re-evaluation
(negative numbers are a benefit; positive numbers are a detriment)

<u>PJM Zone</u>	<u>Δ NLP</u>
AECO	\$ 15,327,708
AEP	(52,089,668)
APS	(85,590,533)
BGE	(44,930,925)
COMED	(11,700,983)
DAY	(5,378,001)
DEOK	(6,824,715)
DOM	(274,155,876)
DPL	33,704,983
DUQ	(2,844,756)
EKPC	(4,184,839)
FE-ATSI	260,370
JCPL	29,886,093
LINDVFT	3,797,655
METED	22,005,619
NEPTHVDC	7,480,044
O66HVDC	3,131,553
PECO	85,911,567
PENELEC	13,178,628
PEPCO	(123,784,114)
PLGRP	52,483,339
PSEG	57,392,516
RECO	2,007,128
zPJMIMP	-
Total	\$ (284,917,209)
Σ Benefits	\$ (611,484,411)
Σ Costs	\$ 326,567,201

Source: Transource response to OCA 6-2 attachment, NLP Analysis tab

OCA STATEMENT NO. 1

Schedule SJR-3

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East & West Projects
Docket Nos. A-2017-2640195 and A-2017-2640200**

**Interrogatories of the Office of Consumer Advocate
Set XXII**

Data Request 02:

The following questions are directed to Mr. McGlynn/PJM. These questions should be viewed as a continuing request to provide updated responses (with the exception of Question 4) thereto as soon as they are available, but in no event later than every 60 days.

Please reference OCA-II-14(c) and the responses thereto. Please provide a current, updated chart in the same format and containing the same information as provided in OCA-II-14 Attachment 1.

Response:

Please refer to the Company's response to OCA-XXII-01. Company will supplement its response accordingly upon PJM completion of the Benefit/Cost ratio re-evaluation.

Supplemental Response (September 19, 2018):

Please see Attachment OCA-XXII-02-Supplemental-Sep-13-2018.

Witness: Paul F. McGlynn

Change in 15-Year Net Present Value of Net Load Payment
Project 9A

PJM ZONE	(\$million)
AECO	17.90
AEP	5.32
APS	-4.74
BGE	-158.44
COMED	67.47
DAY	1.67
DEOK	17.19
DOM	-382.05
DPL	30.42
DUQ	4.23
EKPC	-0.36
FE-ATSI	55.32
JCPL	52.66
LINDVFT	5.32
METED	62.15
NEPTHVDC	9.97
O66HVDC	5.11
PECO	83.00
PENELEC	31.63
PEPCO	-161.71
PLGRP	164.91
PSEG	72.97
RECO	2.99
Total PJM Change	-17.05
Zones that decrease	-707.29
Zones that increase	690.24

Change in 15-Year Net Present Value of Net Load Payment
Project 9A

PJM ZONE		NLP NPV (\$)
AECO	\$	17,903,639
AEP	\$	5,318,294
APS	\$	(4,738,473)
BGE	\$	(158,435,444)
COMED	\$	67,467,567
DAY	\$	1,670,667
DEOK	\$	17,188,314
DOM	\$	(382,049,485)
DPL	\$	30,415,129
DUQ	\$	4,232,346
EKPC	\$	(357,204)
FE-ATSI	\$	55,324,876
JCPL	\$	52,659,515
LINDVFT	\$	5,322,364
METED	\$	62,147,589
NEPTHVDC	\$	9,969,764
O66HVDC	\$	5,107,620
PECO	\$	83,000,950
PENELEC	\$	31,631,372
PEPCO	\$	(161,710,391)
PLGRP	\$	164,913,851
PSEG	\$	72,968,290
RECO	\$	2,994,278
Total PJM Change	\$	(17,054,570)
Zones that decrease	\$	(707,290,998)
Zones that increase	\$	690,236,427

OCA STATEMENT NO. 1

Schedule SJR-4

Components of IEC Project Cost Estimates, by Transmission Owner

Project Name	Transmission Owner	Upgrade ID	Description	Latest Cost Estimate (\$M)
201415_1-9A	Transource	b2743.1	Tap the Conemaugh - Hunterstown 500 kV line & create new Rice 500 kV & 230 kV stations. Install two 500/230 kV transformers, operated together.	\$ 39.81
201415_1-9A	PENELEC	b2743.2	Tie in new Rice substation to Conemaugh-Hunterstown 500 kV	\$ 6.11
201415_1-9A	PENELEC	b2743.3	Upgrade terminal equipment at Conemaugh 500 kV: on the Conemaugh - Hunterstown 500 kV circuit	\$ 0.20
201415_1-9A	ME	b2743.4	Upgrade terminal equipment at Hunterstown 500 kV: on the Conemaugh - Hunterstown 500 kV circuit	\$ 0.20
201415_1-9A	Transource	b2743.5	Build new 230 kV double circuit line between Rice and Ringgold 230 kV, operated as a single circuit.	\$ 72.88
201415_1-9A	APS	b2743.6	Reconfigure the Ringgold 230 kV substation to double bus double breaker scheme	\$ 7.87
201415_1-9A	APS	b2743.6.1	Replace the two Ringgold 230/138 kV transformers	\$ 6.26
201415_1-9A	APS	b2743.7	Rebuild/Reconductor the Ringgold - Catoctin 138 kV circuit and upgrade terminal equipment on both ends	\$ 47.22
201415_1-9A	APS	b2743.8	Replace Ringgold Substation 138 kV breakers '138 BUS TIE' and 'RCM0' with 40 kA breakers	\$ 0.71
201415_1-9A	Transource	b2752.1	Tap the Peach Bottom - TMI 500 kV line & create new Furnace Run 500 kV & 230 kV stations. Install two 500/230 kV transformers, operated together.	\$ 44.66
201415_1-9A	PECO	b2752.2	Tie in new Furnace Run substation to Peach Bottom-TMI 500 kV	\$ 5.50
201415_1-9A	PECO	b2752.3	Upgrade terminal equipment and required relay communication at Peach Bottom 500 kV: on the Peach Bottom - TMI 500 kV circuit	\$ 2.00
201415_1-9A	ME	b2752.4	Upgrade terminal equipment and required relay communication at TMI 500 kV: on the Peach Bottom - TMI 500 kV circuit	\$ 2.00
201415_1-9A	Transource	b2752.5	Build new 230 kV double circuit line between Furnace Run and Conastone 230 kV, operated as a single circuit.	\$ 39.72
201415_1-9A	BGE	b2752.6	Conastone 230 kV substation tie-in work (install a new circuit breaker at Conastone 230 kV and upgrade any required terminal equipment to terminate the new circuit)	\$ 4.12
201415_1-9A	BGE	b2752.7	Reconductor/Rebuild the two Conastone - Northwest 230 kV lines and upgrade terminal equipment on both ends	\$ 45.88
201415_1-9A	BGE	b2752.8	Replace the Conaston 230kV '2322 B5' breaker with a 63kA breaker	\$ 0.54
201415_1-9A	BGE	b2752.9	Replace the Conaston 230kV '2322 B6' breaker with a 63kA breaker	\$ 0.54
Total				\$ 326.21

Cost Summary by Transmission Owner

APS	Allegheny Power System	\$ 62.06
BGE	Baltimore Gas & Electric	51.07
ME	Metropolitan Edison (MAIT)	2.20
PECO	PECO Electric	7.50
PENELEC	Pennsylvania Electric (MAIT)	6.31
Transource	Transource	197.07

Add Transource other capital costs (difference between Transource estimate of \$230 million and amount shown above) 32.93

Total project cost (does not fully reflect 9/13/2018 TEAC update) \$ 359.14

Schedule SJR-5

Allocation of Project Costs and Benefits to PJM Zones - Sept. 2018
(negative numbers are a benefit; positive numbers are a cost)
(Dollars are millions)

Project cost PVRR estimate as of 9/13/2018: \$ 498

<u>PJM Zone</u>	<u>% of Project Cost</u>	<u>PVRR \$</u>	<u>NPV of ΔNLP</u>	<u>Net Cost (Benefit)</u>
AEP	6.46%	\$ 32.18	\$ 5.32	\$ 37.50
APS	8.73%	43.48	(4.74)	38.74
BGE	19.73%	98.27	(158.44)	(60.17)
COMED	2.16%	10.76	67.47	78.23
CONED	0.06%	0.30	-	0.30
DAY	0.59%	2.94	1.67	4.61
DEOK	1.02%	5.08	17.19	22.27
DOM	39.92%	198.83	(382.05)	(183.22)
DUQ	0.01%	0.05	4.23	4.28
EKPC	0.45%	2.24	(0.36)	1.88
PEPCO	<u>20.87%</u>	<u>103.95</u>	<u>(161.71)</u>	<u>(57.76)</u>
Total	100.00%	498.08	(611.41)	(113.33)

Sources:

% of Project Cost from PJM TEAC Recommendations to the PJM Board (Staff Whitepaper) (Aug. 2, 2016), Attach. B, available at: <https://www.pjm.com/~media/committees-groups/committees/teac/20160811/20160811-board-whitepaper-august-2016.ashx>.

Project cost PVRR derived from 9/13/18 benefit (OCA XXII-2) and PJM stated benefit-cost ratio of 1.42.

NPV of ΔNLP from OCA XXII-2.

OCA STATEMENT NO. 1

Schedule SJR-6

Summary of Δ NLP for Pennsylvania Zones from Sept. 2016 and Sept. 2017 Estimates
(negative numbers are a benefit; positive numbers are a detriment)
(\$ x million)

PA Zone	Sept. 2016	Sept. 2017	Sept. 2017
	Estimated Δ NLP	Estimated Δ NLP	Estimated Δ NLP
APS	\$ (43.20)	\$ (38.30)	\$ (2.12)
DUQ	(0.11)	(2.84)	4.23
FE-ATSI	0.96	0.02	3.98
METED	96.82	22.01	62.15
PECO	178.95	85.91	83.00
PENELEC	34.15	13.18	31.63
PLGRP	170.02	52.48	164.91
Total	\$ 437.60	\$ 132.45	\$ 347.79

**Change in Net Load Payments (Δ NLP) for Pennsylvania (PA) Based on Sept. 2016 Estimate
(negative numbers are a benefit; positive numbers are a detriment)**

PJM Zone	Δ NLP	% in PA	Δ NLP for PA
AECO	\$ 33,500,000	0.00%	\$ -
AEP	(71,380,000)	0.00%	-
APS	(96,530,000)	44.75%	(43,197,175)
BGE	(218,190,000)	0.00%	-
COMED	(23,860,000)	0.00%	-
CONABCIK	(4,120,000)	0.00%	-
DAY	(6,540,000)	0.00%	-
DEOK	(11,250,000)	0.00%	-
DOM	(441,330,000)	0.00%	-
DPL	74,120,000	0.00%	-
DUQ	(110,000)	100.00%	(110,000)
EKPC	(5,010,000)	0.00%	-
FE-ATSI	13,370,000	7.20%	962,640
JCPL	91,250,000	0.00%	-
LINDVFT	(63,830,000)	0.00%	-
METED	96,820,000	100.00%	96,820,000
NEPTHVDC	5,820,000	0.00%	-
O66HVDC	(15,160,000)	0.00%	-
PECO	178,950,000	100.00%	178,950,000
PENELEC	34,150,000	100.00%	34,150,000
PEPCO	(230,760,000)	0.00%	-
PLGRP	170,020,000	100.00%	170,020,000
PSEG	149,650,000	0.00%	-
RECO	3,970,000	0.00%	-
Total	\$ (336,450,000)		\$ 437,595,465
Σ Benefits	\$ (1,188,070,000)		\$ (43,307,175)
Σ Costs	\$ 851,620,000		\$ 480,902,640

Source: Transource response to OCA II-14 (Sch. SJR-1)

Notes:

PA portion of APS and FE-ATSI Zones calculated as the ratio of estimated 2018 summer peak demand in PA (from PJM, Pennsylvania State Infrastructure Report, May 2018) to estimated 2018 summer peak demand for the zone (from PJM Load Forecast Report, Jan. 2018):

	PA	Zone	Percent
APS	3,949	8,825	44.75%
FE-ATSI	932	12,952	7.20%

PLGRP is comprised of PPL and UGI, all of which is in PA

Change in Net Load Payments (Δ NLP) for Pennsylvania (PA) Based on Sept. 2017 Estimate
(negative numbers are a benefit; positive numbers are a cost)

PJM Zone	Δ NLP	% in PA	Δ NLP for PA
AECO	\$ 15,327,708	0.00%	\$ -
AEP	(52,089,668)	0.00%	-
APS	(85,590,533)	44.75%	(38,301,764)
BGE	(44,930,925)	0.00%	-
COMED	(11,700,983)	0.00%	-
DAY	(5,378,001)	0.00%	-
DEOK	(6,824,715)	0.00%	-
DOM	(274,155,876)	0.00%	-
DPL	33,704,983	0.00%	-
DUQ	(2,844,756)	100.00%	(2,844,756)
EKPC	(4,184,839)	0.00%	-
FE-ATSI	260,370	7.20%	18,747
JCPL	29,886,093	0.00%	-
LINDVFT	3,797,655	0.00%	-
METED	22,005,619	100.00%	22,005,619
NEPTHVDC	7,480,044	0.00%	-
O66HVDC	3,131,553	0.00%	-
PECO	85,911,567	100.00%	85,911,567
PENELEC	13,178,628	100.00%	13,178,628
PEPCO	(123,784,114)	0.00%	-
PLGRP	52,483,339	100.00%	52,483,339
PSEG	57,392,516	0.00%	-
RECO	2,007,128	0.00%	-
zPJMIMP	-	0.00%	-
Total	\$ (284,917,209)		\$ 132,451,379
Σ Benefits	\$ (611,484,411)		\$ (41,146,520)
Σ Costs	\$ 326,567,201		\$ 173,597,899

Source: Transource response to OCA VI-2 attachment, NLP Analysis tab

Note: PA portion of APS and FE-ATSI Zones calculated on p. 2

Change in Net Load Payments (Δ NLP) for Pennsylvania (PA) Based on Sept. 2018 Estimate
(negative numbers are a benefit; positive numbers are a cost)

PJM Zone	Δ NLP	% in PA	Δ NLP for PA
AECO	\$ 17,903,639	0.00%	\$ -
AEP	5,318,294	0.00%	-
APS	(4,738,473)	44.75%	(2,120,467)
BGE	(158,435,444)	0.00%	-
COMED	67,467,567	0.00%	-
DAY	1,670,667	0.00%	-
DEOK	17,188,314	0.00%	-
DOM	(382,049,485)	0.00%	-
DPL	30,415,129	0.00%	-
DUQ	4,232,346	100.00%	4,232,346
EKPC	(357,204)	0.00%	-
FE-ATSI	55,324,876	7.20%	3,983,391
JCPL	52,659,515	0.00%	-
LINDVFT	5,322,364	0.00%	-
METED	62,147,589	100.00%	62,147,589
NEPTHVDC	9,969,764	0.00%	-
O66HVDC	5,107,620	0.00%	-
PECO	83,000,950	100.00%	83,000,950
PENELEC	31,631,372	100.00%	31,631,372
PEPCO	(161,710,391)	0.00%	-
PLGRP	164,913,851	100.00%	164,913,851
PSEG	72,968,290	0.00%	-
RECO	2,994,278	0.00%	-
zPJMIMP	-	0.00%	-
Total	\$ (17,054,570)		\$ 347,789,033
Σ Benefits	\$ (707,290,998)		\$ (2,120,467)
Σ Costs	\$ 690,236,427		\$ 349,909,499

Source: Transource response to OCA XXII-2

Note: PA portion of APS and FE-ATSI Zones calculated on p. 2

OCA STATEMENT NO. 1

Schedule SJR-7

Allocation of Project Costs to PJM Zones in Pennsylvania
(Dollars are millions)

PVRR of Project cost estimate as of 9/13/2018: \$ 498.09

<u>PJM Zone</u>	<u>% of Project Cost</u>	<u>Project Cost \$</u>	<u>% in PA</u>	<u>\$ in PA</u>
AEP	6.46%	\$ 32.18	0.00%	\$ -
APS	8.73%	43.48	44.75%	19.46
BGE	19.73%	98.27	0.00%	-
COMED	2.16%	10.76	0.00%	-
CONED	0.06%	0.30	0.00%	-
DAY	0.59%	2.94	0.00%	-
DEOK	1.02%	5.08	0.00%	-
DOM	39.92%	198.83	0.00%	-
DUQ	0.01%	0.05	100.00%	0.05
EKPC	0.45%	2.24	0.00%	-
PEPCO	<u>20.87%</u>	<u>103.95</u>	0.00%	-
Total	100.00%	\$ 498.08		\$ 19.51

Sources:

Project cost from Sch. SJR-5

% in PA from Sch. SJR-6, p. 2

Schedule SJR-8

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

Data Request OCA-II-02:

Reference: Transource Statement 3 (McGlynn), p. 3, lines 8-12. Concerning the description of the IEC Project:

- a. Did PJM determine the specific location for the new Furnace Run substation? If so, please provide all studies used by PJM to determine the location, including any alternative locations considered and rejected. If not, why not?
- b. Did PJM determine the specific route of the Furnace Run-Conastone 230 kV Transmission Line? If so, please provide all studies used by PJM to determine the location, including any alternative locations considered and rejected. If not, why not?

Response:

- a. & b. No. The general locations of Project 9A's individual components are determined by Transource PA and are dependent on the location of existing facilities.

Witness: Paul McGlynn

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

Interrogatories of the Office of Consumer Advocate

Set II

(Responses dated 2/16/2018)

Data Request OCA-II-03:

Reference: Transource Statement 3 (McGlynn), p.5, lines 17-20. Mr. McGlynn states that "PJM supports" the PUC's approval of the IEC-East Project.

- a. Does this statement mean that PJM supports the concept of constructing East Project facilities consistent with the general scope of the project set forth in the Designated Entity Agreement?
- b. Does this statement mean that PJM supports the specific route and location of the East Project substation and transmission line as set forth in this Application? If so, please provide all studies, analyses, and decision documents (minutes of meetings, for example) PJM used or relied upon to determine that it "supports" the specific route and location of the East Project.
- c. What is Mr. McGlynn's understanding of the specific questions the PUC is being asked to determine in this case? For each such question, please state the meaning of PJM's "support" for the PUC's "approval" of the East Project.

Response:

- a. Yes.
- b. PJM does not opine or determine the specific location or route of projects. The siting of the project components described in the Application is the responsibility of Transource PA.
- c. To the extent this question calls for a legal conclusion, no answer is required. Mr. McGlynn's testimony is limited to the facts related to PJM's analysis determining the need for the project under PJM's planning criteria.

Witness: Paul McGlynn

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

Data Request OCA-II-05:

In selecting Project 9A over alternative proposals, please state whether PJM considered each of the following criteria. For each criterion that PJM did consider, please provide all studies or other documents showing the comparative evaluation and/or weighting of the criterion.

- a. Impact of Project 9A and alternatives on the natural environment in Pennsylvania;
- b. Impact of Project 9A and alternatives on scenic and historic areas in Pennsylvania;
- c. Impact of Project 9A and alternatives on land use in Pennsylvania;
- d. Impact of Project 9A and alternatives on soil and sedimentation in Pennsylvania;
- e. Impact of Project 9A and alternatives on plant and wildlife habitats in Pennsylvania;
- f. Impact of Project 9A and alternatives on terrain in Pennsylvania;
- g. Impact of Project 9A and alternatives on hydrology in Pennsylvania;
- h. Impact of Project 9A and alternatives on landscape in Pennsylvania;
- i. Impact of Project 9A and alternatives on archaeologic areas in Pennsylvania;
- j. Impact of Project 9A and alternatives on geologic areas in Pennsylvania;
- k. Impact of Project 9A and alternatives on historic areas in Pennsylvania;
- l. Impact of Project 9A and alternatives on scenic areas in Pennsylvania;
- m. Impact of Project 9A and alternatives on wilderness areas in Pennsylvania;
- n. Impact of Project 9A and alternatives on scenic rivers in Pennsylvania;
- o. Impact of Project 9A and alternatives on airports in Pennsylvania;
- p. Impact of Project 9A and alternatives on local comprehensive plans in Pennsylvania;
- q. Impact of Project 9A and alternatives on local zoning ordinances in Pennsylvania;

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

- r. The proximity of Project 9A and alternatives to residential structures in Pennsylvania;
- s. The proximity of Project 9A and alternatives to non-residential structures in Pennsylvania;
- t. Impact of Project 9A and alternatives on the preservation of the natural, scenic, historic and esthetic values of the environment in Pennsylvania; and
- u. Impact of Project 9A and alternatives on Pennsylvania's public natural resources.

Response:

The criteria listed above generally relate to the siting studies which were conducted by and are the responsibility of Transource PA.

However, PJM engaged an independent consultant to produce an Independent Cost Review/Constructability Report. Please refer to PJM's website for a copy of this report, available at [<http://www.pjm.com/~media/planning/rtep-dev/expand-plan-process/ferc-order-1000/rtep-proposal-windows/2014-2015-long-term-proposal-window-independent-cost-review-whitepaper.ashx>]. Among many other requirements, the Statement of Work ("SOW") for this engagement required a summary (desktop review) of "potential high-level environmental risks and items that may require protracted permitting timeframes or raise serious issues during the permitting process."

More specifically, the SOW stated as follows:

The consultant "will examine each Project utilizing available public sector data, aerial photographs, and real estate records to determine if the Project is feasible and to identify potential regulatory permitting risks." (...)

The independent consultant reviewed the following information:

- National Wetland Inventory mapping from United States Fish and Wildlife
- Mapping of specially designated wetlands or rivers
- United States Department of Agriculture (USDA)/The Natural Resources Conservation Service (NRCS) Land Cover mapping
- Land Use Mapping
- Public Lands: State/National Forests, Natural Areas, Preserves, Game Lands,

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

and Recreation area mapping

- Cultural Resources Mapping including the count of previously identified Resources
- Aquatic Resource mapping including the count of Submerged Historic Resources (if applicable)
- Online distribution data of Rare, Threatened and Endangered (RTE) species within a 0.5 mile radius of the study corridor
- Online distribution data of Rare, Threatened and Endangered (RTE) species within a 0.5 mile radius of the study corridor

The following is a summary of findings:

- Four critical constraints were identified for the proposed Southern Pennsylvania project. Of these, the most problematic is likely to be surveys associated with rare bat species and timeline associated with environmental permitting. The other critical constraints involve the access and/or usage of state lands, right of way acquisition, and cultural resources investigations and clearances (as necessary). The major potential risks are:
 - Based on the length of the East and West lines, and the rebuild project, it is assumed that a Joint (Individual) Permit will be needed for the Pennsylvania and/or Maryland project facilities once final alignment and access roads are laid out. This will involve coordination between federal and state agencies. This type of review process can require 12 months or more.
 - The East and West lines, rebuild project, and associated substation expansions and installations are all within the range of rare bat species. Surveys could be required that have time of year requirements, furthermore time of year restrictions on tree clearing could be implemented pending coordination with U.S. Fish and Wildlife Service and results of surveys.
 - The East line crosses Pennsylvania State Game Land 327. Acquiring easements on state public lands typically involve multiple reviews and coordination between state environmental and real estate divisions.
 - The vast majority of the Southern Pennsylvania project is located on undeveloped land that would potentially be subject to archaeological surveys. Historic and archaeological investigations (Phase II and Phase III) beyond initial Phase I reconnaissance surveys, along with ongoing consultation and reporting, can have a substantial impact on schedule and cost.

Witness: Paul McGlynn

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

Data Request OCA-II-06:

Reference: Transource Statement 3 (McGlynn), p. 9, lines 5-8. Do any of the "applicable laws, regulations, and tariffs" that govern PJM's operations and decisions include responsibilities for the protection or preservation of the natural, scenic, historic and/or aesthetic environment? If so, please list and describe the specific laws, regulations, and/or tariffs that include such responsibilities.

Response:

The responsibilities referenced in the question with respect to operational decisions about siting matters remain entity designated as the appropriate entity to construct and own or finance the project and are addressed in paragraph 4.2.1 of the Consolidated Transmission Owners Agreement (CTOA). To the extent those responsibilities impact operations, transmission owners must convey any necessary operating restrictions to PJM.

In relevant part, the CTOA provides as follows:

4.2.1

Subject to: (i) the requirements of applicable law, government regulations and approvals, including, without limitation, requirements to obtain any necessary state or local siting, construction and operating permits; (ii) the availability of required financing; (iii) the ability to acquire necessary right-of-way; (iv) the right to recover, pursuant to appropriate financial arrangements and tariffs or contracts, all reasonably incurred costs, plus a reasonable return on investment; and (v) other conditions or exceptions set forth in the Regional Transmission Expansion Planning Protocol, Parties designated as the appropriate entities to construct and own or finance enhancements or expansions applicable to the PJM Region specified in the Regional Transmission Expansion Plan or required to expand or modify Transmission Facilities pursuant to the PJM Tariff shall construct and own or finance such facilities or enter into appropriate contracts to fulfill such obligations.

Witness: Paul McGlynn

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

Data Request OCA-II-07:

Reference: Transource Statement 3 (McGlynn), pp. 10-16. In conducting its planning process, please state whether PJM considers each of the following criteria. For each criterion that PJM considers, please describe the information PJM requires in order to make informed decisions about each such criterion as part of its planning process.

- a. Impact on the natural environment;
- b. Impact on scenic and historic areas;
- c. Impact on land use;
- d. Impact on soil and sedimentation;
- e. Impact on plant and wildlife habitats;
- f. Impact on terrain;
- g. Impact on hydrology;
- h. Impact on landscape;
- i. Impact on archacologic areas;
- j. Impact on geologic areas;
- k. Impact on historic areas;
- l. Impact on scenic areas;
- m. Impact on wilderness areas;
- n. Impact on scenic rivers;
- o. Impact on airports;
- p. Impact on local comprehensive plans;

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

- q. Impact on local zoning ordinances;
- r. Proximity to residential structures;
- s. Proximity to non-residential structures;
- t. Impact on the preservation of the natural, scenic, historic and esthetic values of the environment; and
- u. Impact on public natural resources.

Response:

Please see the response to OCA-II-5.

Witness: Paul McGlynn

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

Data Request OCA-II-08:

Reference: Transource Statement 3 (McGlynn), p. 13 line 9 to p. 14 line 5. For each of the following factors or criteria, please state whether the Transmission Expansion Advisory Committee considers and evaluates information concerning each such criterion in performing its responsibilities.

- a. Impact on the natural environment;
- b. Impact on scenic and historic areas;
- c. Impact on land use;
- d. Impact on soil and sedimentation;
- e. Impact on plant and wildlife habitats;
- f. Impact on terrain;
- g. Impact on hydrology;
- h. Impact on landscape;
- i. Impact on archaeologic areas;
- j. Impact on geologic areas;
- k. Impact on historic areas;
- l. Impact on scenic areas;
- m. Impact on wilderness areas;
- n. Impact on scenic rivers;
- o. Impact on airports;
- p. Impact on local comprehensive plans;

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

- q. Impact on local zoning ordinances;
- r. Proximity to residential structures;
- s. Proximity to non-residential structures;
- t. Impact on the preservation of the natural, scenic, historic and esthetic values of the environment; and
- u. Impact on public natural resources.

Response:

Please see the response to OCA-II-5.

PJM does not have information sufficient to opine on what factors or criteria individual members of the Transmission Expansion Advisory Committee may consider and evaluate at different times or in connection with different projects or needs.

Witness: Paul McGlynn

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

Data Request OCA-II-10:

Reference: Transource Statement 3 (McGlynn), p. 15, lines 10-12. In evaluating the "costs" and "benefits" of a proposed market efficiency project, please state whether PJM considers and evaluates information concerning "costs" and "benefits" related to each of the following criteria. (PJM note – all siting studies are completed by Transource, not PJM)

- a. Impact on the natural environment;
- b. Impact on scenic and historic areas;
- c. Impact on land use;
- d. Impact on soil and sedimentation;
- e. Impact on plant and wildlife habitats;
- f. Impact on terrain;
- g. Impact on hydrology;
- h. Impact on landscape;
- i. Impact on archaeologic areas;
- j. Impact on geologic areas;
- k. Impact on historic areas;
- l. Impact on scenic areas;
- m. Impact on wilderness areas;
- n. Impact on scenic rivers;
- o. Impact on airports;
- p. Impact on local comprehensive plans;
- q. Impact on local zoning ordinances;

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

- r. Proximity to residential structures;
- s. Proximity to non-residential structures;
- t. Impact on the preservation of the natural, scenic, historic and esthetic values of the environment; and
- u. Impact on public natural resources.

Response:

Please see the response to OCA-II-5.

Witness: Paul McGlynn

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

Data Request OCA-II-11:

Reference: Transource Statement 3 (McGlynn), p. 16 lines 3-4. Does the consideration of "State Public Policy" include a consideration or evaluation by PJM of each of the following criteria as related to a proposed project?

- a. Impact on the natural environment;
- b. Impact on scenic and historic areas;
- c. Impact on land use;
- d. Impact on soil and sedimentation;
- e. Impact on plant and wildlife habitats;
- f. Impact on terrain;
- g. Impact on hydrology;
- h. Impact on landscape;
- i. Impact on archaeologic areas;
- j. Impact on geologic areas;
- k. Impact on historic areas;
- l. Impact on scenic areas;
- m. Impact on wilderness areas;
- n. Impact on scenic rivers;
- o. Impact on airports;
- p. Impact on local comprehensive plans;
- q. Impact on local zoning ordinances;

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East Project
Docket No A-2017-2640195**

**Interrogatories of the Office of Consumer Advocate
Set II
(Responses dated 2/16/2018)**

- r. Proximity to residential structures;
- s. Proximity to non-residential structures;
- t. Impact on the preservation of the natural, scenic, historic and esthetic values of the environment; and
- u. Impact on public natural resources.

Response:

The question is not applicable because Project 9A is not driven by State Public Policy, as that term is used in connection with PJM's planning process.

Witness: Paul McGlynn

OCA STATEMENT NO. 1SR

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

**Application of Transource Pennsylvania, LLC :
for approval of the Siting and Construction of the :
230 kV Transmission Line Associated with the : Docket No. A-2017-2640195
Independence Energy Connection - East and : Docket No. A-2017-2640200
West Projects in portions of York and Franklin :
Counties, Pennsylvania. :**

**Petition of Transource Pennsylvania, LLC for a :
finding that a building to shelter control :
equipment at the Rice Substation in Franklin : P-2018-3001878
County, Pennsylvania is reasonably necessary :
for the convenience or welfare of the public. :**

**Petition of Transource Pennsylvania, LLC for a :
finding that a building to shelter control :
equipment at the Furnace Run Substation in :
York County, Pennsylvania is reasonably : P-2018-3001883
necessary for the convenience or welfare of the :
public. :**

**Application of Transource Pennsylvania, LLC for :
approval to acquire a certain portion of the lands :
of various landowners in York and Franklin :
Counties, Pennsylvania for the siting and :
construction of the 230 kV Transmission Line : A-2018-3001881, *et al.*
associated with the Independence Energy :
Connection – East and West Projects as necessary :
or proper for the service, accommodation, :
convenience or safety of the public. :**

**SURREBUTTAL TESTIMONY OF
SCOTT J. RUBIN**

**ON BEHALF OF
THE OFFICE OF CONSUMER ADVOCATE**

JANUARY 30, 2019

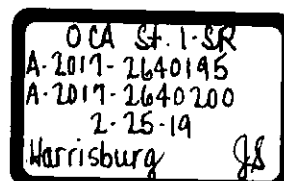


Table of Contents

Introduction.....	1
Response to Mr. Herling.....	2
Response to Mr. Horger	9
Response to Mr. Cawley	10
Conclusion	15

Introduction

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21

Q. Please state your name.

A. My name is Scott J. Rubin. I previously submitted direct testimony on behalf of the Office of Consumer Advocate, identified as OCA Statement 1.

Q. What is the purpose of your surrebuttal testimony?

A. I am responding to certain statements made in the rebuttal testimonies submitted by Transource Pennsylvania, LLC (“Transource” or “Company”) witnesses Steven Herling (Transource St. 7R), Timothy Horger (Transource St. 8R), and James Cawley (Transource St. 9R).

Q. Did you review the testimony of any other Transource witnesses to which you are not responding at this time?

A. Yes. I also reviewed the testimony of Mr. Weber (Transource St. 1R), Mr. Baker (Transource St. 4R), and Ms. Chang (Transource St. 10R). Some of this testimony is being responded to by other OCA witnesses, and some was stricken by the Administrative Law Judge in Prehearing Order 7 issued on January 24, 2019. My failure to respond to specific statements in any of this testimony should not be taken as consent by me or the OCA to the validity of the statements or opinions made in that testimony.

Q. Before addressing specific statements made in the Company’s rebuttal testimony, do you have any general comments about the Company’s rebuttal?

A. Yes. Initially, it is important to mention that the Company’s rebuttal witnesses did not challenge any of the numbers or analyses I present in my direct testimony. Consequently,

1 there does not appear to be any dispute about the accuracy of the specific numbers,
2 tables, graphs, and schedules that are part of my direct testimony.

3 I also believe it is worth mentioning that while I am not addressing the details of
4 Ms. Chang's testimony, the alleged benefits to the economy in her model do not take into
5 consideration the hundreds of millions of dollars in higher electricity costs that would be
6 paid by Pennsylvania consumers if the Project is constructed, as I described in my direct
7 testimony. Those costs dwarf the alleged benefits to the economy from her model of
8 construction spending. Thus, while her analysis may be an interesting academic exercise
9 in estimating the multiplier effect from construction projects, it completely ignores the
10 real-world harm from the Project on Pennsylvania's energy consumers.

11 **Response to Mr. Herling**

12 **Q. Have you reviewed the rebuttal testimony submitted by Mr. Herling?**

13 **A. Yes, I have reviewed Transource Statement 7R.**

14 **Q. Mr. Herling defines "transmission congestion" as occurring "when least cost energy**
15 **cannot be delivered to the consumer because of physical constraints on the electric**
16 **transmission system." (Transource St. 7R, p. 10, lines 1-3) Do you agree?**

17 **A. Yes, I agree with his general definition. As I will discuss below, where PJM, the**
18 **Company, and I differ is in how we define the detriment (or cost) associated with**
19 **congestion.**

20 **Q. Mr. Herling testifies on page 14 that it is "appropriate that the regions benefitting**
21 **from the deployment of market efficiency projects are the regions paying for the**
22 **upgrades." Do you agree?**

1 A. Yes, I agree with him. I am not aware of any witness in this case who disagreed with this
2 proposition.

3 **Q. Then what is the basis for your disagreement with PJM's methodology?**

4 A. I disagree with PJM's methodology for determining the total benefits of a project for
5 PJM; not the way in which project costs are allocated among zones.

6 **Q. Can you explain that distinction?**

7 A. Yes. PJM's benefit-cost calculation considers only the higher price paid for electricity by
8 customers who live on the constrained side of a congestion point. That calculation is a
9 reasonable way to allocate the costs of a project among zones because it requires zones
10 that benefit from the project to pay the costs of the project in proportion to the benefits
11 each zone would receive. But that methodology is not a proper way to determine the
12 economic benefits from a project.

13 **Q. What is the proper way to determine the economic benefits from a project?**

14 A. As I explained in my direct testimony, the benefits from a project (that is, the system's
15 "cost" of congestion) is the total of the reduction in power costs that would be
16 experienced by customers in presently constrained zones and the increase in power costs
17 that would be experienced by customers on the presently unconstrained side of the
18 congestion point.

19 **Q. Can you provide a simple illustration of the difference?**

20 A. Yes. For the sake of illustration, I will assume a very simple system with two identical
21 towns, two power plants, and one transmission line. Town A has Plant A with a capacity
22 of 60 MW and an incremental cost of \$20 per MWH. Town B has Plant B with a

1 capacity of 20 MW and an incremental cost of \$30 per MWH. Transmission line A-B
2 can transfer the equivalent of 20 MW from Plant A to Town B.

3 When the demand in each town is 20 MW or less, all electricity can be provided
4 by Plant A and the incremental cost of power is \$20 per MWH in each town. But once
5 the demand in each town reaches 20 MW, then the next increment of power in Town B
6 must come from Plant B (at \$30 per MWH). Even though capacity remains in Plant A,
7 the transmission constraint prevents that lower-cost power from reaching Town B.

8 Until total demand reaches the capacity of Plant A (60 MW), the entire cost of the
9 constraint is borne by customers in Town B with no change in cost to Town A customers.
10 But once demand exceeds 60 MW something interesting happens -- costs are lower to
11 Town A customers than they would be in an unconstrained system.

12 **Q. Can you expand your example to illustrate how Town A's costs could be lower than**
13 **they would be in an optimal (unconstrained) system?**

14 A. Yes. Let's assume that each town's demand has reached 30 MW. Because of the
15 transmission constraint, the demand is being met with 50 MW from Plant A (30 MW
16 used in Town A and 20 MW exported to Town B) and 10 MW from Plant B (all used in
17 Town B). If there were no transmission constraint, the demand would be met from the
18 full capacity of Plant A.

19 So the next increment of demand (the 61st MW) in Town A in an unconstrained
20 system would be met from Plant B at a cost of \$30 per MWH. But due to the constraint,
21 Plant A is not at full capacity, so additional demand in Town A can be met from Plant A
22 at only \$20 per MWH.

1 To illustrate the dollar impact, and to show the difference between PJM's
2 approach and a proper economic analysis, I'll take the scenario where each town's
3 demand is 35 MW, or 70 MW in total. Ideally, this demand for one hour would be met
4 with 60 MWH @ \$20 (\$1,200) from Plant A and 10 MWH @ \$30 (\$300) from Plant B,
5 for a total cost of \$1,500. But in our constrained example, Plant A can produce only 55
6 MW (35 MW for Town A and 20 MW for export over the transmission line), so the
7 actual cost is 55 MWH @ \$20 (\$1,100) + 15 MWH from Plant B @ \$30 (\$450) = \$1,550.
8 The real cost to the system of the transmission constraint during this hour is \$50.

9 But the distribution of that cost between towns is not identical. Under
10 unconstrained conditions, each town would pay the identical cost (1/2 of \$1,500, or \$750
11 each). But with the transmission constraint, Town A's entire 35 MW demand will be met
12 from Plant A at a cost \$20 per MWH, or \$700 per hour; and Town B will pay for 20
13 MWH @ \$20 + 15 MWH @ \$30, or a total of \$850 for the hour. Thus, congestion has
14 created a benefit of \$50 for Town A (\$750 efficient cost - \$700 constrained cost) and a
15 cost of \$100 for Town B (\$750 efficient cost - \$850 constrained cost).

16 In other words, a transmission constraint can have two effects: it can increase the
17 price of power on the constrained side of the congestion point and it can decrease the cost
18 of power on the other side of the constraint. It is the sum of those two effects that
19 determines the economic cost of the constraint to the system as a whole.

20 In my very simple example, total system costs increased by \$50 (5 additional
21 MWH from Plant B at a higher cost of \$10 per MWH). A properly performed economic
22 analysis would recognize that the potential benefit from eliminating the constraint would

1 be \$50. That is, you would replace the production of 5 MW of Plant B @ \$30 (\$150)
2 with 5 MW from Plant A @ \$20 (\$100), for a savings of \$50. This is the maximum
3 savings achievable during this hour.

4 I agree with Mr. Herling that if a project can be devised to cost-effectively
5 eliminate the transmission constraint, the entire cost of that project should be borne by
6 customers in Town B. As a matter of cost allocation, that is the fairest way to allocate the
7 cost.

8 Where PJM and Transource are incorrect, however, is in ignoring the increase in
9 costs in unconstrained areas when determining the benefits of a project. By using only
10 the decrease in costs on the constrained side of the congestion point to determine the
11 benefits of a project, PJM and Transource greatly inflate the benefits of the project,
12 making an uneconomical project look economical. That is, in my example, the PJM
13 approach would calculate that eliminating the constraint would save the system \$100 in
14 the sample hour. That is wholly inconsistent with the facts. It is not physically possible
15 in my example for the shifting of 5 MWH of production from Plant B to Plant A to create
16 a \$100 benefit to the system.

17 **Q. On page 16 of his rebuttal, Mr. Herling states that PJM's methodology for**
18 **calculating benefits and costs for lower-voltage market efficiency projects was**
19 **"accepted by FERC on April 23, 2014 in Docket No. ER14-1394-000." Have you**
20 **reviewed the order of the Federal Energy Regulatory Commission ("FERC")**
21 **referred to by Mr. Herling?**

1 A. I have reviewed the document referred to by Mr. Herling, but it is not an order issued by
2 FERC. Rather, on that date FERC's Secretary issued a short letter that accepted the
3 filing. I am attaching a copy of FERC's letter as Schedule SJR-1SR.

4 **Q. As you understand it, does FERC's letter approve the benefit-cost methodology that**
5 **was used by PJM to evaluate the Independence Energy Project ("Project")?**

6 A. No, as I understand it, FERC's letter specifically does not approve the reasonableness of
7 the procedure used by PJM. Rather, FERC's letter specifically states the following:

8 This acceptance for filing shall not be construed as constituting approval
9 of the referenced filing or of any rate, charge, classification, or any rule,
10 regulation, or practice affecting such rate or service contained in your
11 filing; nor shall such acceptance be deemed as recognition of any claimed
12 contractual right or obligation associated therewith; and such acceptance is
13 without prejudice to any findings or orders which have been or may
14 hereafter be made by the Commission in any proceeding now pending or
15 hereafter instituted by or against PJM.

16 Schedule SJR-1SR, p. 2. I am advised by counsel that this language means that FERC
17 has not determined that PJM's benefit-cost methodology is consistent with the public
18 interest, or that the methodology is a component of a legally determined "just and
19 reasonable" rate under the Federal Power Act.

20 **Q. To the best of your knowledge, has FERC taken any further action in that case to**
21 **address PJM's benefit-cost procedure?**

22 A. To the best of my knowledge, FERC has not issued any subsequent letters or orders in
23 Docket ER14-1394-000. I confirmed this fact by reviewing the entire on-line docket for
24 that case using FERC's electronic library (elibrary.ferc.gov).

1 **Q. Despite the tenor of some of the testimony in this case, is it your understanding that**
2 **PJM believes that it has developed a market efficiency review process that is**
3 **incapable of being changed or criticized?**

4 A. No. In its operations, PJM recognizes the need to improve its process for evaluating and
5 selecting market efficiency projects. Since January 2018, PJM has had a Market
6 Efficiency Process Enhancement Task Force that is evaluating ways to improve the
7 process.¹ I would hope that the enhancement task force would consider the concerns
8 raised by me and others, both before this Commission and in proceedings in other
9 jurisdictions involving the review of proposed market efficiency projects.

10 **Q. On page 20, line 20-22, Mr. Herling states that the Project is “estimated to save**
11 **\$866.2 million in congestion costs over 15 years.” Does he provide a source for that**
12 **estimate?**

13 A. No. The most recent information provided by Transource shows that using PJM’s
14 incorrect assessment of benefits (that is, looking solely at zones that would have reduced
15 power costs) results in reduced congestion costs with a net present value of \$707.29
16 million over 15 years. Schedule SJR-3, attached to my direct testimony. Moreover, as I
17 explained in my direct testimony and as that same schedule shows, the total benefit to
18 PJM (the sum of zones with reduced power costs and those with increased power costs) is
19 only \$17.05 million over 15 years.

20 **Q. Does anything in Mr. Herling’s rebuttal testimony cause you to change your**
21 **opinions, analyses, conclusions, or recommendations?**

22 A. No.

¹ See <https://www.pjm.com/committees-and-groups/task-forces/mepetf.aspx> (last access 1/22/19).

Response to Mr. Horger

Q. Have you reviewed Mr. Horger's rebuttal testimony?

A. Yes, I have reviewed Transource Statement 8R.

Q. On page 18, lines 20-21, of Transource St. 8R, Mr. Horger states that the Project would result in lower "system level production costs." Do you have any information about the extent of system-level production-cost savings from the Project?

A. Yes. In response to OCA XXVII-02 (attached as Schedule SJR-2SR), Mr. Horger states that the most recent estimate of these savings is \$260.13 million (net present value over 15 years). This estimate was prepared in September 2018 as part of PJM's reassessment of the costs and benefits of the Project.

Q. Can you place that \$260 million savings in context?

A. Yes. The \$260 million savings in system production costs is equivalent to the \$50 savings in my simple example above -- it's the amount by which the Project would lead to the more efficient use of generation resources throughout all of PJM. In other words, it represents the reduced power production costs (discounted over 15 years) that would result if the Project were constructed and the system operated as PJM modeled it to operate.

Importantly, that level of savings would occur from a project with a 15-year cost (present value of revenue requirements) of \$498 million, as I discussed on page 35 (and elsewhere) in my direct testimony. In other words, a project with a 15-year cost of almost \$500 million would produce just \$260 million of system-wide production cost savings

1 over that same time period. This is a further indication that the Project is not economical
2 and should not be constructed.

3 **Q. Does PJM's analysis of the Project consider system-wide production-cost savings?**

4 A. No. PJM considers the Project to be a "lower voltage" project. Under PJM's benefit-cost
5 methodology, system-level production-cost savings are ignored for such projects.

6 **Q. Hypothetically, if the Project were not considered to be a "lower voltage" project,
7 would PJM consider production cost savings?**

8 A. Yes. Under PJM's methodology for higher-voltage market-efficiency projects, system-
9 level production cost savings would receive a 50% weighting in determining the project's
10 benefits. The other 50% would be made up of savings in the benefiting zones. If that
11 methodology were used for this project, it would result in the Project's 15-year
12 discounted "benefits" being calculated to be: $(50\% \times \$260.13 \text{ million}) + (50\% \times \707.29
13 $\text{million}) = \$483.71 \text{ million}$. This is less than the Project's 15-year discounted cost of
14 \$498 million, meaning that the Project would fail to provide a benefit-cost ratio of 1.0, let
15 alone PJM's required ratio of 1.25 or higher. Thus, if system-level production cost
16 savings were considered, as Mr. Horger posits, PJM's own methodology would result in
17 the project failing the benefit-cost test.

18 **Q. Does anything in Mr. Horger's rebuttal testimony cause you to change your
19 opinions, analyses, conclusions, or recommendations?**

20 A. No.

21 **Response to Mr. Cawley**

22 **Q. Did you review the rebuttal testimony submitted by Mr. Cawley?**

1 A. Yes, I reviewed Transource Statement 9R.

2 **Q. On page 4, lines 19-22, Mr. Cawley testifies: “If there is a substantial imbalance**
3 **between the energy payments on either side of a congestion point, the financial**
4 **feasibility of a remedial action is determined by assessing the savings in energy**
5 **payments that could be achieved beyond the congestion point compared to the**
6 **present value of the cost to do so.” Do you agree?**

7 A. No. There is a fundamental problem with this statement that permeates not only Mr.
8 Cawley’s testimony, but Transource’s entire economic case for the Project. The sentence
9 properly begins by stating, “if there is a substantial imbalance between energy payments
10 on either side a congestion point” (emphases added), then something should be done to
11 try to cost-effectively alleviate that imbalance. I agree with this general premise. But
12 nowhere in his testimony does Mr. Cawley help us determine if that essential fact is
13 present. Indeed, nothing in PJM’s methodology or Transource’s entire case helps us
14 determine if, in fact, there is a “substantial imbalance between the energy payments on
15 either side of a congestion point.”

16 From the information provided by PJM and Transource in discovery, it is readily
17 apparent that this fundamental and essential fact is not present in this case. When both
18 sides of the congestion point are evaluated, PJM’s most recent analysis shows that energy
19 costs are higher by \$707.29 million (present value over 15 years) on the constrained side
20 of the congestion points, and that costs are lower by \$690.24 (present value over 15
21 years) on the unconstrained side of the congestion points. In other words, the
22 “imbalance” is only \$17 million over 15 years -- an imbalance of only \$1 million

1 annually, compared to the billions of dollars in power transactions that occur each year
2 within PJM.²

3 **Q. On page 5 of his rebuttal, Mr. Cawley criticizes your approach to determining**
4 **project benefits because “it introduces costs that are foreign to the remedial action**
5 **of eliminating congestion and have nothing to do with determining whether the**
6 **action is financially feasible.” He also calls the change in costs on the unconstrained**
7 **side of a congestion point to be “exogenous costs.” Do you agree with Mr. Cawley?**

8 **A.** No, I do not agree with Mr. Cawley. As I showed in the simple example earlier in this
9 testimony, congestion by definition results in more lower-cost power being used in the
10 unconstrained area than is economically optimal, and less lower-cost power being used in
11 the constrained area than is economically optimal. Eliminating (or reducing) congestion
12 must affect both sides. A generation source only can be used at its full capacity; if a
13 portion of that capacity is being used to serve the formerly constrained area, then it will
14 no longer be available to the formerly unconstrained area. This effect is not a “foreign”
15 action or “exogenous cost” -- it is an inextricable and unavoidable effect of changing the
16 transmission system.

17 **Q. On page 6, Mr. Cawley criticizes you, saying “no customer or group of customers is**
18 **entitled to lower cost generation created by congestion constraints.” Do you agree?**

19 **A.** Yes, I agree with him that customers are not “entitled” to the benefits of market
20 inefficiencies. Contrary to the implications of Mr. Cawley’s statements, however, I am
21 not suggesting that customers in formerly unconstrained zones should be compensated in

² PJM Market Monitor, 2017 State of the Market Report for PJM < <https://www.pjm.com/-/media/committees-groups/committees/mc/20180322-state-of-market-report-review/20180322-2017-state-of-the-market-report-review.ashx> >, p. 29, shows total PJM billings in excess of \$40 billion in 2017. (Last accessed 1/22/2019.)

1 any way for the loss of these inefficiency benefits. If I felt that customers were “entitled”
2 to those benefits, I would necessarily be asking that customers be compensated when
3 those benefits are lost. But that is not the case. I am stating only that the loss of the
4 benefit must be recognized for what it is -- a very real cost that would be a direct result of
5 constructing the Project. As I have explained, the change in power prices on both sides
6 of the constraint must be evaluated in determining whether a project creates an overall
7 benefit or detriment for the PJM system as a whole. If it is cost-effective for the system
8 as a whole to eliminate the congestion, then the benefiting zones should pay for the
9 project and there should not be any compensation to the non-benefiting zones. This is
10 precisely because customers are not “entitled” to the benefits of market inefficiencies.

11 But following Mr. Cawley’s suggestion and completely ignoring the loss of
12 lower-cost power to many Pennsylvania consumers would lead to an absurd result that
13 does not represent the real world, as I discussed above. Simply stated, spending almost
14 \$500 million to eliminate a \$17 million inefficiency makes no sense, but that is exactly
15 what Transource is proposing and Mr. Cawley appears to be supporting. The only way to
16 reach such a result is to ignore what happens on both sides of the congestion point.

17 **Q. On pages 5-6 of his rebuttal, Mr. Cawley accuses you of “self-interested**
18 **parochialism” by looking at the costs and benefits of the Project to Pennsylvania’s**
19 **consumers. How do you respond?**

20 **A.** I disagree with Mr. Cawley. As Mr. Cawley well knows, the Commission is a creation of
21 the Commonwealth with a mission to ensure that the rates paid by Pennsylvania’s
22 consumers are just and reasonable and that those consumers receive service that is safe,
23 adequate, reliable, and economically efficient. In my opinion, it is not only reasonable

1 but required for the Commission to evaluate any action it takes for the effects it would
2 have on Pennsylvania's utility consumers and the utility service they receive. Moreover,
3 I am advised by counsel that the Administrative Law Judge in this matter requested
4 specific information about the costs and benefits of the Project on Pennsylvania's
5 consumers (in addition to other important information, of course).

6 I am not attempting to elevate in-state concerns over the welfare of the PJM grid
7 as a whole. I well understand the benefits available to Pennsylvanians by being part of a
8 regional transmission network. At the same time, however, I do not think it is reasonable
9 to ignore in-state effects either. My testimony discusses costs and benefits at the PJM
10 system level, as well as the effects on individual Pennsylvania utilities. In my opinion, it
11 is important for the Commission to consider all of this information.

12 **Q. On page 13, Mr. Cawley is asked whether it is "proper to focus on only**
13 **Pennsylvania benefits for a regional transmission project" and he responds in the**
14 **negative. Do you agree?**

15 A. Yes, I agree that the Commission should not look solely at the effects of the proposed
16 project on Pennsylvania. I did not do that and I do not believe that any other OCA
17 witness did so either. But at the same time, the Commission should not ignore the costs
18 and benefits to Pennsylvania. Based on my analyses using Transource's and PJM's own
19 studies, I concluded that the Project fails to provide economical congestion relief either
20 for PJM as a whole or for Pennsylvania's utilities and consumers in particular.

21 **Q. Does anything in Mr. Cawley's rebuttal testimony cause you to change your**
22 **opinions, analyses, conclusions, or recommendations?**

1 A. No.

2 **Conclusion**

3 **Q. In summary, based on your review of Transource's rebuttal testimony and exhibits,**
4 **do you find it necessary to change any of your opinions, analyses, conclusions, or**
5 **recommendations?**

6 A. No. I continue to recommend that the Commission reject the Project as being contrary to
7 the public interest.

8 **Q. Does this conclude your surrebuttal testimony?**


9 A. Yes, it does.

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

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.	:	A-2017-2640195 A-2017-2640200
Petition of Transource Pennsylvania, LLC for a finding that a building to shelter control equipment at the Rice Substation in Franklin County, Pennsylvania is reasonably necessary for the convenience or welfare of the public.	:	P-2018-3001878
Petition of Transource Pennsylvania, LLC for a finding that a building to shelter control equipment at the Furnace Run Substation in York County, Pennsylvania is reasonably necessary for the convenience or welfare of the public.	:	P-2018-3001883
Application of Transource Pennsylvania, LLC for approval to acquire a certain portion of the lands of various landowners in York and Franklin Counties, Pennsylvania for the siting and construction of the 230 kV Transmission Line associated with the Independence Energy Connection – East and West Projects as necessary or proper for the service, accommodation, convenience or safety of the public.	:	A-2018-3001881, <i>et al.</i>

VERIFICATION

I, Scott J. Rubin, hereby state that the facts above set forth in my Surrebuttal Testimony, OCA Statement No. 1SR are true and correct 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).

Signature: 

Scott J. Rubin
333 Oak Lane
Bloomsburg, PA. 17815
Scott.J.Rubin@gmail.com

DATED: January 30, 2019
*265482

OCA STATEMENT NO. 1SR

Exhibit SJR-1SR

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY MARKET REGULATION

PJM Interconnection, L.L.C.
Docket No. ER14-1394-000

Issued: 4/23/14

PJM Interconnection, L.L.C.
2750 Monroe Blvd.
Audubon, PA 19403

Attention: Pauline Foley, Assistant General Counsel

Reference: Market Efficiency Transmission Project Analysis

Dear Ms. Foley:

On February 28, 2014, PJM Interconnection, L.L.C. (PJM), pursuant to section 205 of the Federal Power Act (FPA),¹ submitted revisions to the Amended and Restated Operating Agreement of PJM Interconnection, L.L.C. to modify certain components of its market efficiency analysis relating to Regional Transmission Expansion Planning.² You state that these revisions will ensure that PJM's market efficiency planning standards are better aligned with the Commission-accepted cost allocation methods for PJM market efficiency projects, and will ensure consideration of data relevant to analyzing market efficiency needs.

Pursuant to the authority delegated to the Director, Division of Electric Power Regulation – East, under 18 C.F.R. §375.307, your submittal is accepted for filing, effective April 30, 2014, as requested.

The filing was noticed on March 4, 2014, with comments, interventions and protests due on or before March 21, 2014. PJM filed an erratum on April 1, 2014. The erratum was noticed on April 1, 2014, with comments, interventions and protests due on

¹ 16 U.S.C. § 824d (2012).

² PJM Interconnection, L.L.C., Intra-PJM Tariffs, OA Schedule 6 Sec 1.5, OA Schedule 6 Sec 1.5 Procedure for Development of the Regional Transmission Expansion Plan, 5.0.0.

or before April 22, 2014. Pursuant to Rule 214 (18 C.F.R. § 385.214 (2013)), to the extent that any timely filed motions to intervene and any motion to intervene out-of-time were filed before the issuance date of this order, such interventions are granted. Granting late interventions at this stage of the proceeding will not disrupt the proceeding or place additional burdens on existing parties.

This acceptance for filing shall not be construed as constituting approval of the referenced filing or of any rate, charge, classification, or any rule, regulation, or practice affecting such rate or service contained in your filing; nor shall such acceptance be deemed as recognition of any claimed contractual right or obligation associated therewith; and such acceptance is without prejudice to any findings or orders which have been or may hereafter be made by the Commission in any proceeding now pending or hereafter instituted by or against PJM.

This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. § 385.713.

Sincerely,

Jignasa Gadani, Director
Division of Electric Power
Regulation – East

OCA STATEMENT NO. 1SR

Exhibit SJR-2SR

Schedule SJR-2SR

**Application of Transource Pennsylvania LLC
Independence Energy Connection-East & West Projects
Docket Nos. A-2017-2640195 and A-2017-2640200**

**Interrogatories of the Office of Consumer Advocate
Set XXVII
(Responses dated 12/17/2018)**

Data Request OCA XXVII-02:

Reference: Transource Statement 8-R (Horger), p. 18, lines 20-21.

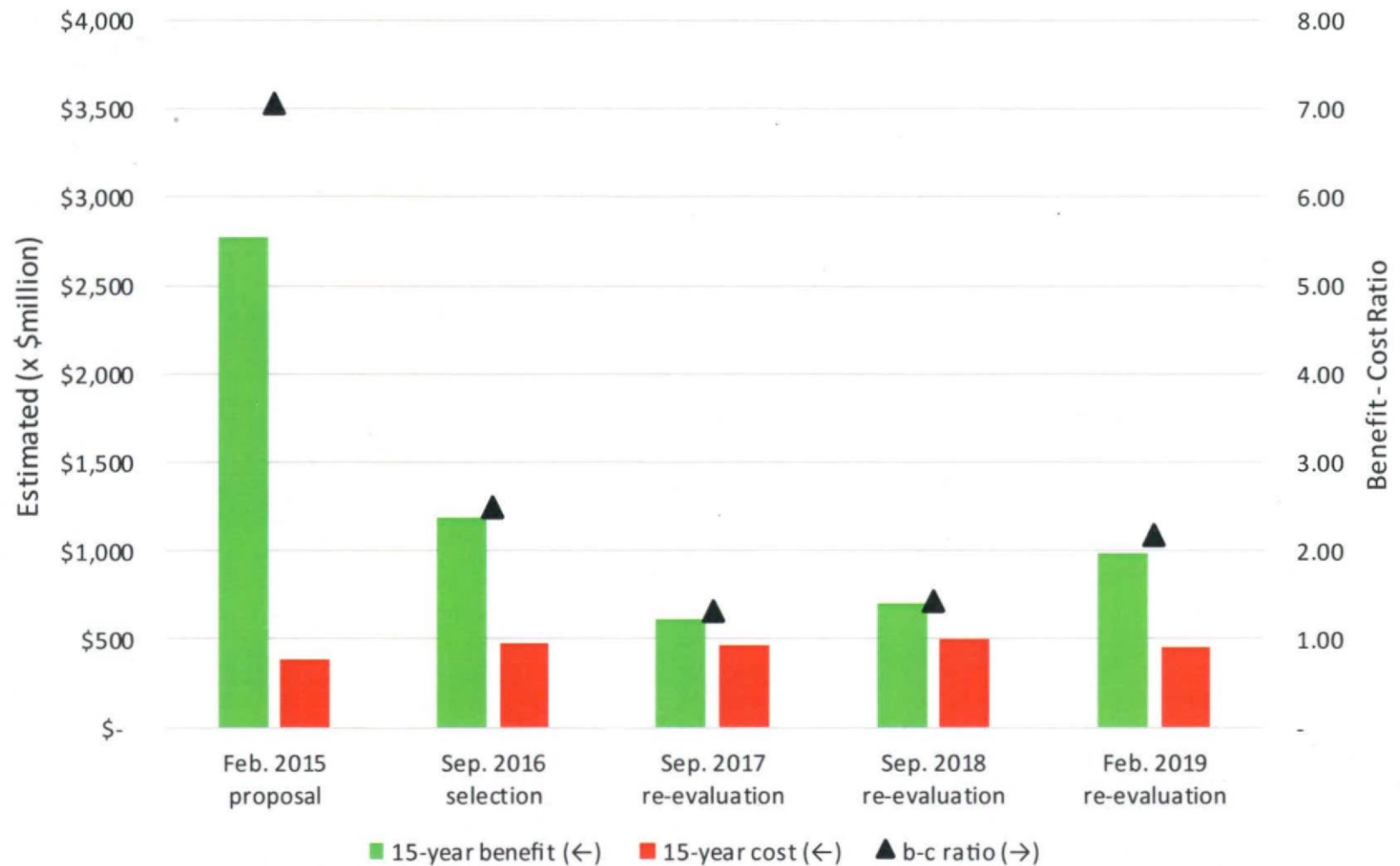
- a. Please provide the most recent quantification of the “reduction to system level production costs” resulting from Project 9A, and provide any supporting studies and/or workpapers.
- b. Please explain in detail how the “reduction to system level production costs” was considered in the most recent benefit-cost analysis conducted for Project 9A. If it was not considered, please explain why not.

Response:

- a. The “most recent quantification of the reduction to system level production costs resulting from Project 9A” can be found in response to OCA-X-02, Supplemental Response dated 9/19/2018 (referring to OCA VI-02 CONFIDENTIAL Attachment 1-Supplemental-13Sep2018, which is the workbook used by PJM to calculate the 1.42 B/C ratio presented at the September 13, 2018 TEAC meeting). The present value of the 15-years Adjusted Production Cost (APC) simulated savings is \$260.13 million.
- b. PJM evaluated Project 9A as a “lower voltage project” in accordance with the PJM Operating Agreement. As a lower voltage project, the benefit/cost metric does not include a measurement of production cost reduction. However, PJM did perform sensitivity studies as demonstrated in TPA Exhibit N. TH-1R to verify the benefit which included a reduction in production costs along with various other benefits.

Witness: Timothy J. Horger

Figure 1: History of IEC Project Benefits and Costs Estimates
(revised for Feb. 2019 update)



OCA Hrg. Exh. 2
A-2017-1640195
A-2017-1640200
2-15-19
Harrisburg
JL

Figure 11: Feb. 2019 Estimate of IEC Project 15-Year Costs and Benefits

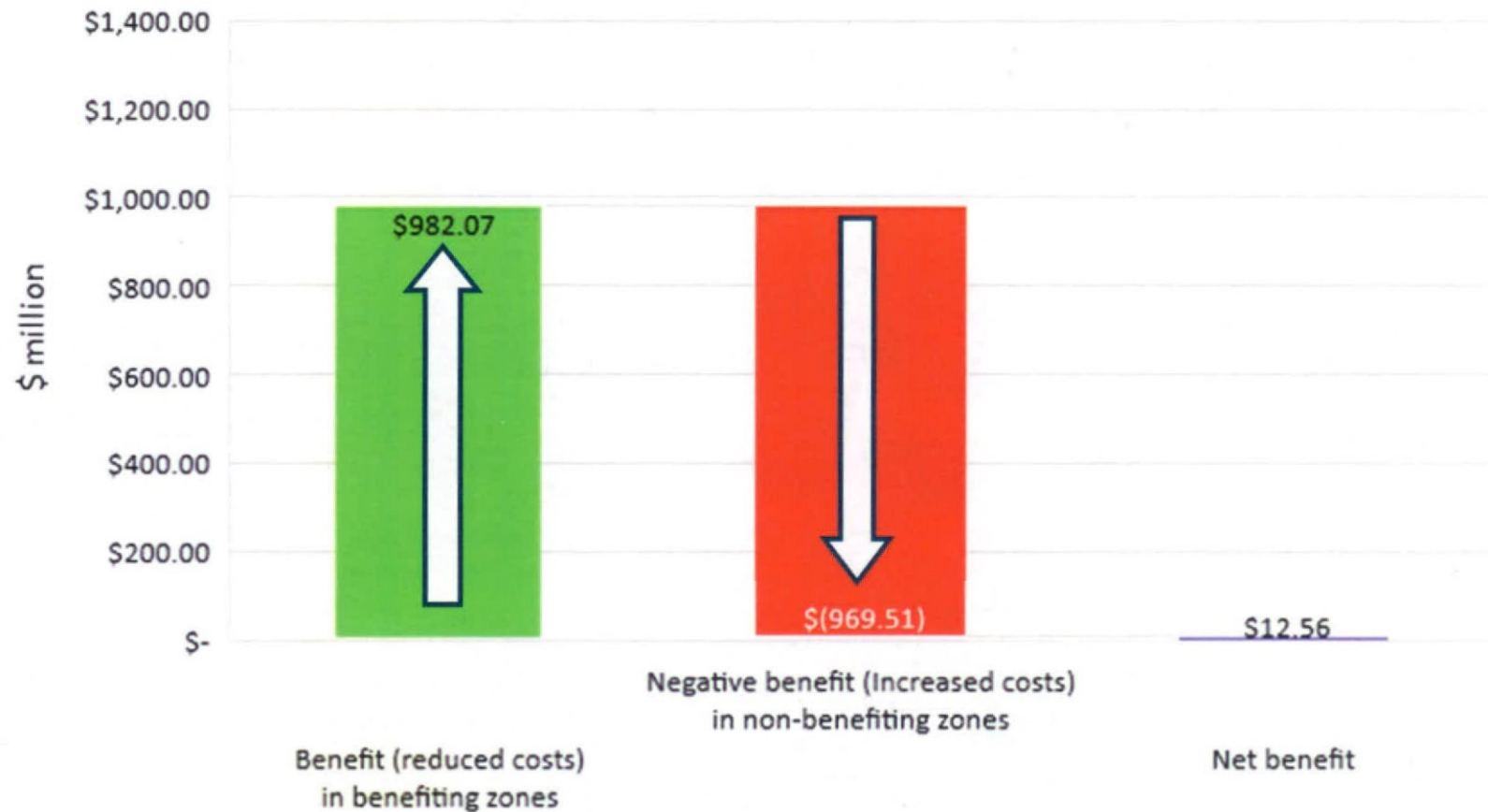
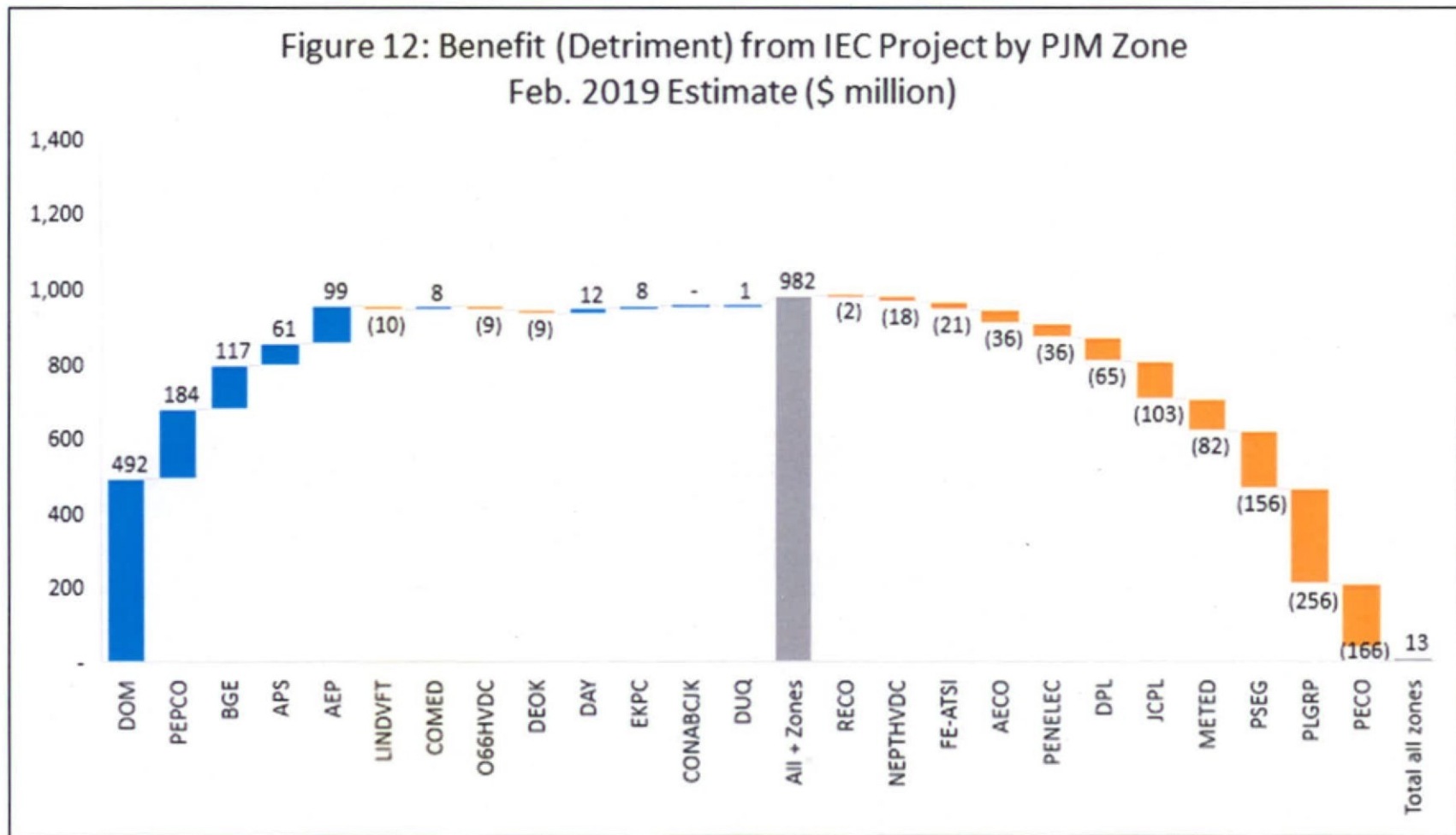
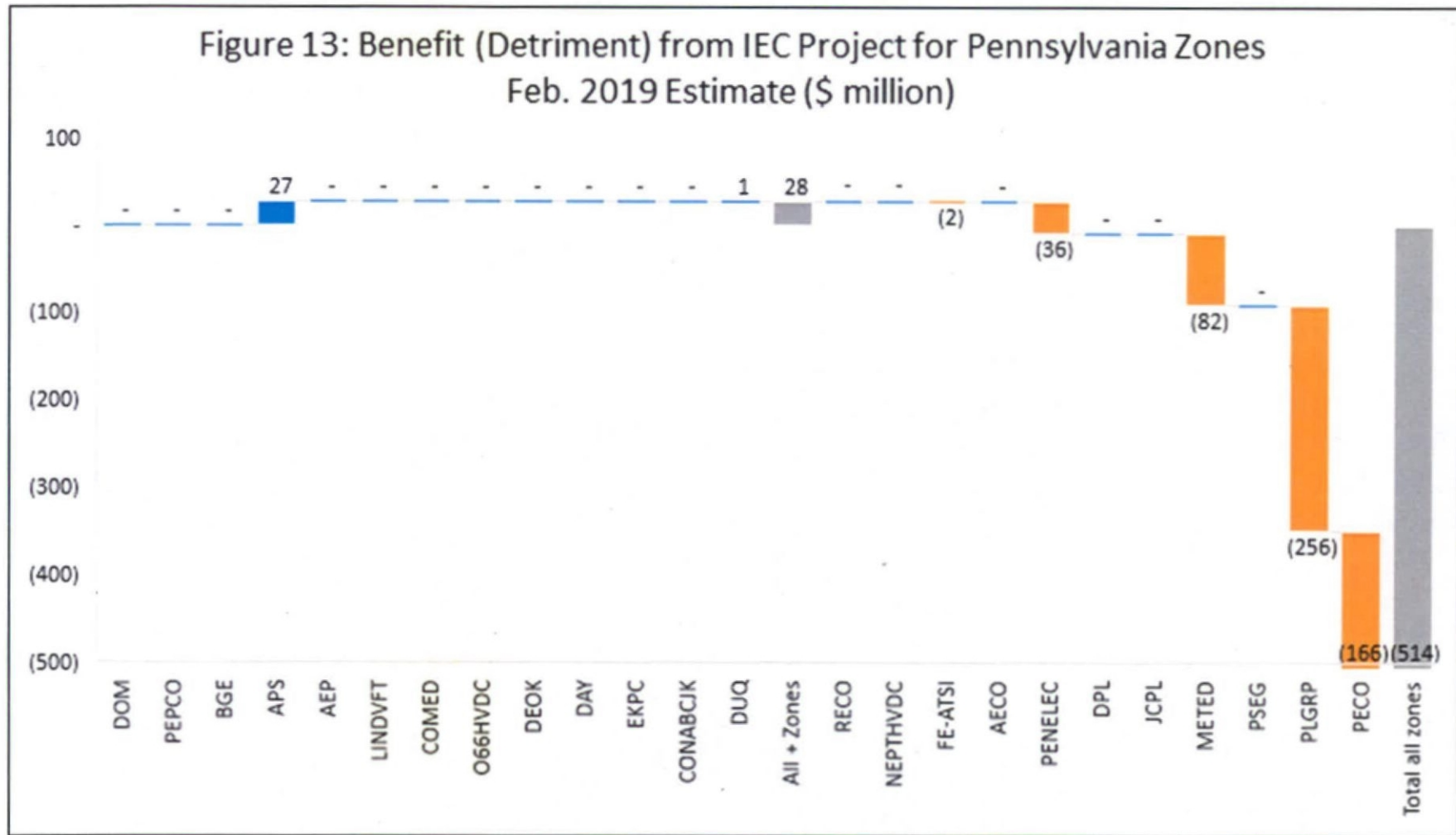


Figure 12: Benefit (Detriment) from IEC Project by PJM Zone
Feb. 2019 Estimate (\$ million)





Transource Pennsylvania LLC
PA PUC Docket Nos. A-2017-2640195, et al.

Schedule SJR-6
Page 5 (2/25/2019)

**Change in Net Load Payments (Δ NLP) for Pennsylvania (PA) Based on Feb. 2019 Estimate
(negative numbers are a benefit; positive numbers are a cost)**

PJM Zone	Δ NLP	% in PA	Δ NLP for PA
AECO	\$ 35,748,657	0.00%	\$ -
AEP	(99,080,486)	0.00%	-
APS	(60,881,635)	44.75%	(27,244,531)
BGE	(117,110,617)	0.00%	-
COMED	(8,127,192)	0.00%	-
DAY	(12,455,084)	0.00%	-
DEOK	9,077,322	0.00%	-
DOM	(492,477,845)	0.00%	-
DPL	64,796,136	0.00%	-
DUQ	(525,787)	100.00%	(525,787)
EKPC	(7,730,393)	0.00%	-
FE-ATSI	20,919,636	7.20%	1,506,214
JCPL	102,661,170	0.00%	-
LINDVFT	9,859,634	0.00%	-
METED	82,294,555	100.00%	82,294,555
NEPTHVDC	17,937,729	0.00%	-
O66HVDC	9,103,387	0.00%	-
PECO	166,149,176	100.00%	166,149,176
PENELEC	36,109,156	100.00%	36,109,156
PEPCO	(183,684,741)	0.00%	-
PLGRP	256,020,365	100.00%	256,020,365
PSEG	156,370,587	0.00%	-
RECO	2,465,813	0.00%	-
zPJMIMP	-	0.00%	-
Total	\$ (12,560,456)		\$ 514,309,147
Σ Benefits	\$ (982,073,779)		\$ (27,770,319)
Σ Costs	\$ 969,513,323		\$ 542,079,466

Source: TPA Exhibit 6 (2/22/2019)

Note: PA portion of APS and FE-ATSI Zones calculated on Sch. SJR-6, p. 2