

Application of Transource Pennsylvania, LLC Filed Pursuant to 52 Pa. Code Chapter 57,  
Subchapter G, for Approval of the Siting and Construction of the 230 kV Transmission  
Line Associated with the Independence Energy Connection – East and West Project in  
Portions of York and Franklin Counties, Pennsylvania

Docket Nos. A-2017-2640195 & A-2017-2640200

TRANSOURCE PENNSYLVANIA, LLC

REJOINDER TESTIMONY

Statement No. 1-RJ	Brian D. Weber JK
Statement No. 2-RJ	Kamran Ali JS
Statement No. 4-RJ	Barry Baker JK
Statement No. 5-RJ	Kent M. Herzog JK
Statement No. 6-RJ	Thomas Schaffer JK
Statement No. 7-RJ	Steven R. Herling JW
Statement No. 8-RJ	Timothy Horger JW
Statement No. 9-RJ	James H. Cawley JS
Statement No. 10-RJ	Judy Chang JS
Statement No. 12-RJ	Keith Yamatani JK
Statement No. 13-RJ	William F. Rothman JW
Statement No. 14-RJ	David Ray Dominy JW
Statement No. 16-RJ	Nancy C. Lee, MD JW
Statement No. 17-RJ	H. Dwight Mercer, PHD, DVM JW

**BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Application of Transource Pennsylvania, LLC :  
for approval of the Siting and Construction of : Docket No. A-2017-2640195  
the 230 kV Transmission Lines Associated : Docket No. A-2017-2640200  
with the Independence Energy Connection – :  
East and West Projects in portions of Franklin :  
and York Counties, Pennsylvania :  
:  
:  
:  
Petition of Transource Pennsylvania, LLC for a :  
finding that a building to shelter control : Docket No. P-2018-3001878  
equipment at the Rice Substation 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 : Docket No. P-2018-3001883  
equipment at the Furnace Run Substation in :  
York County, Pennsylvania is reasonably :  
necessary for the convenience or welfare of the :  
public :  
:  
:  
:  
Application of Transource Pennsylvania, LLC :  
for approval to acquire a certain portion of the : Docket No. A-2018-3001881, *et al.*  
lands of various landowners in York and :  
Franklin Counties, Pennsylvania for the siting :  
and construction of the 230 kV Transmission :  
Lines associated with the Independence Energy :  
Connection – East and West Projects as :  
necessary or proper for the service, :  
accommodation, convenience or safety of the :  
public :

**TRANSOURCE PENNSYLVANIA, LLC**

**REBUTTAL TESTIMONY**

**KAMRAN ALI**

**STATEMENT NO. 2-R**

Date: November 27, 2018

TPA St. 2-R  
A-2017-2640195  
A-2017-2640200  
2-25-14  
Harrisburg JS

1 Q. Please state your name and business address.

2 A. My name is Kamran Ali. My business address is 8500 Smiths Mill Road, 2<sup>nd</sup> Floor, New  
3 Albany, OH 43054.

4  
5 Q. Have you previously provided Direct Testimony in this proceeding?

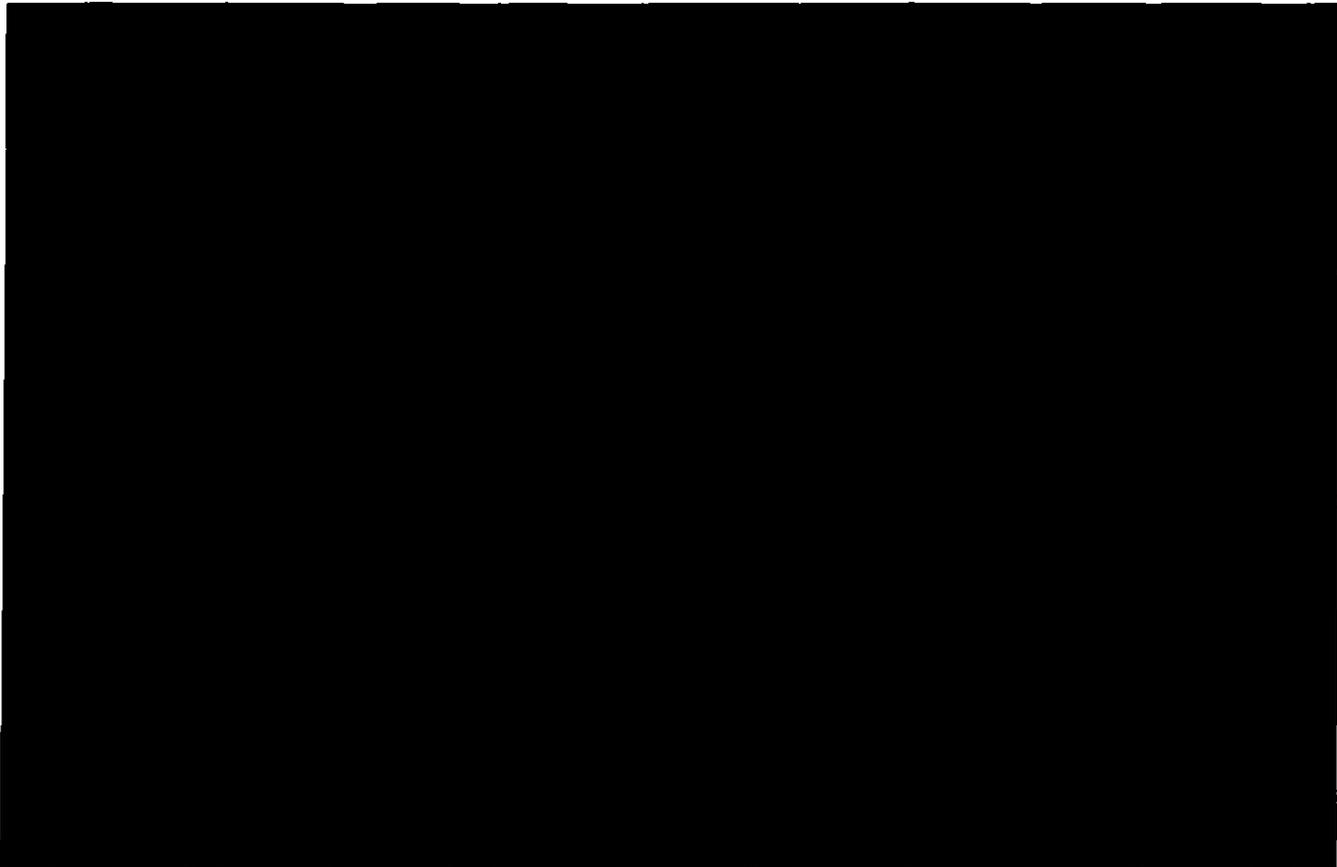
6 A. Yes. Transource Pennsylvania, LLC (“Transource PA” or the “Company”) Statement  
7 No. 2 is my written Direct Testimony.

8  
9 Q. Please describe the purpose of your Rebuttal Testimony.

10 A. In this rebuttal testimony I will address several specific topics raised by intervenors and  
11 in the public hearings that relate to the overall public need for the Project; Mr. Weber  
12 includes these topics in his summarization of “Need Issues” in his Rebuttal Testimony.  
13 Specifically, I will discuss the following:

- 14 • The claim that the Project has no reliability benefits by describing how the  
15 Project provides broad regional and specific local reliability benefits.
- 16 • The claim that the value of the Project has deteriorated since its approval by  
17 PJM by demonstrating that congestion remains a significant issue that  
18 adversely impacts system planning in PJM.
- 19 • The claim that this congestion issue should be addressed with investments and  
20 programs in Maryland and Virginia through rebuttal of multiple points made  
21 by OCA Witness Crandall.
- 22 • The validity of the PROMOD model for this type of transmission system  
23 planning.





13

14 **Q. Mr. Shaw states that it is more reliable for generators to be located closer to load**  
15 **than to construct transmission lines (Shaw St. No. 1, p. 15). Please respond.**

16 A. That is actually not true in practice. Reliability is not a function of location but strength  
17 of the underlying system. Regional Transmission Organizations, such as PJM,  
18 fundamentally function because the ability to leverage greater geographic diversity  
19 provides both improved reliability as well as economic benefit. Mr. Shaw seems to be  
20 advocating a return to a regulatory structure that has not existed for decades, when  
21 individual local utilities only interacted with each other on a limited basis and needed to  
22 build significant generation to plan for generation outages within their specific regions.  
23 Under the current structure, Independent Power Producers have the ability to site new

1 generation closer to the load centers, but we are seeing much more new generation sited  
2 in Pennsylvania closer to the Marcellus natural gas reserves than is being sited near  
3 Baltimore.  
4

5 **THE CONTINUED ECONOMIC VALUE OF THE IEC PROJECT**

6 **Q. OCA witness Lanzalotta states “I conclude that the original need for this Project**  
7 **[AP South congestion] was based on economic conditions that simply no longer**  
8 **exist” (OCA St. No. 2, p. 18). Do you agree with this conclusion?**

9 **A.** No, not at all. As discussed in more detail by Witnesses Herling and Horger, the need for  
10 Project 9A is based on detailed forward-looking analysis of the electric system in PJM,  
11 which was most recently re-affirmed based on updated models in September 2018. These  
12 updated models already incorporated the 2018 Load Forecast that Mr. Lanzalotta notes in  
13 his testimony.  
14

15 **Q. Is it appropriate to draw the conclusion that the need for the Project is going away**  
16 **in the future by comparing the projected Summer Peak Loads in the 2015 and 2018**  
17 **PJM Load Forecasts?**

18 **A.** No. First of all, Mr. Lanzalotta fails to note that PJM’s load forecasting methodology  
19 was significantly revised after the 2015 Load Forecast was published, so the 2015 to  
20 2018 comparison of projected Summer Peak Loads is not valid and certainly not relevant  
21 in assessing the value of Project 9A. The methodology revisions were adopted to further  
22 ensure that PJM’s Load Forecasts, which are used consistently by PJM in connection  
23 with all of its RTEP and Capacity Market analyses, involving thousands of projects and

1 transactions, appropriately capture all relevant factors. That modified methodology was  
2 used to develop the 2018 PJM Load Forecast.

3 Additionally, Mr. Lanzalotta's focus on Peak Load is not meaningful when  
4 discussing congestion in PJM's electric energy market. Congestion occurs during a wide  
5 variety of hours at many different load levels. This is because load is only one factor in  
6 congestion. Congestion occurs when the most cost effective generation is unable to serve  
7 the load due to physical limitations of the transmission system.

8 Although he eventually draws the wrong conclusion, Mr. Lanzalotta is actually  
9 correct when he notes that the results from actual markets are volatile. This volatility is  
10 natural and expected when dealing with a complicated system with large numbers of  
11 variable factors. An illustration of Mr. Lanzalotta's error can be seen in his Table 2,  
12 which shows actual Summer Peaks for 2017 in certain zones being lower than their actual  
13 peaks for 2014 (OCA St. No. 2, p. 16). Mr. Lanzalotta fails to show that latest  
14 forecasted values for 2020 were lower than the actual summer peaks for 2016 and higher  
15 than the actual summer peaks for 2017. Such a comparison of actual and forecasted loads  
16 is not meaningful to begin with, but in any case the data does not support the ultimate  
17 conclusion Mr. Lanzalotta eventually reaches: namely that the need for the Project would  
18 go away on its own. That would be an irresponsible approach to planning the  
19 transmission system.

20 I have added this information in Table 1, which supplements Mr. Lanzalotta's  
21 Table 2, with 2016 values taken from the "Unrestricted" Column from Table B-1 from  
22 the 2017 PJM Load Forecast Report<sup>1</sup>.

---

<sup>1</sup> <https://pjm.com/-/media/library/reports-notices/load-forecast/2017-load-forecast-report.ashx?la=en>.

Table 1

	Actual and Forecast Peak Loads				
	Actual Summer Peak			Forecast 2020 Peak	
	2014	2016	2017	2015 Forecast	2018 Forecast
BGE	6,666	6,932	6,449	7,457	6,753
Pepco	6,346	6,584	6,098	6,853	6,405
DOM	18,761	19,559	18,903	22,068	19,858
Total	31,773	33,075	31,450	36,378	33,016

2

3

As shown in this table, actual summer peaks are volatile. This is not surprising, as peak loads can be highly variable from year to year with one of the largest variable factors being the weather. The load forecasts prepared by PJM and used in the Market Efficiency analyses are intended to represent the middle of an expected range of possible values, not clairvoyant predictions of what will occur in a given year.

4

5

6

7

8

The significant underlying point is that it would be an incorrect conclusion to assume that the lower Summer Peak Load number in the 2018 PJM Load Forecast means that the load is forecasted to be materially different from the load projected in the 2015 PJM Load Forecast, which was prepared using a different methodology and which lacks the refinements adopted after the 2015 PJM Load Forecast was published. The correct conclusion to draw from this volatility is that the benefits of the Project are likely to be higher than computed based on these conservative assumptions.

9

10

11

12

13

14

15

16

**Q. Mr. Lanzalotta states that AP South reactive interface congestion has been decreasing. Can you draw the conclusion from this statement, even if true, that the IEC Project is no longer needed?**

17

18

1 A. No. It is important to keep in mind that congestion on a given facility does not occur in  
2 isolation. As a matter of background in interpreting data about transmission congestion,  
3 one must note that only the most limiting factors at any given time are listed as  
4 congested. The list of congested facilities provides no information about how much  
5 congestion would have existed on other facilities if any particular constraint had not been  
6 a problem. For example, Slides 24-27 of PJM's October 24, 2018 Market Efficiency  
7 Update Presentation  
8 [\[https://pjm.com/-/media/committees-groups/committees/teac/20181024-market-  
10 efficiency/20181024-market-efficiency-update.ashx\]](https://pjm.com/-/media/committees-groups/committees/teac/20181024-market-<br/>9 efficiency/20181024-market-efficiency-update.ashx) show the list of Top 25 Congestion  
11 Constraints from 2017 and details which of those facilities already have approved system  
12 upgrades. See TPA Exhibit No. KA-1R. Those upgrades are assumed to be complete in  
13 PJM's forward looking models.

14 The need for, and benefits of, any particular future system upgrade cannot be  
15 evaluated simply by looking at a list of congested facilities. The only way to evaluate  
16 system needs or specific proposals is to perform detailed simulations using forward  
17 looking models within the PJM RTEP construct. Mr. Lanzalotta has not performed any  
18 analysis or provided any evidence to support his claims.



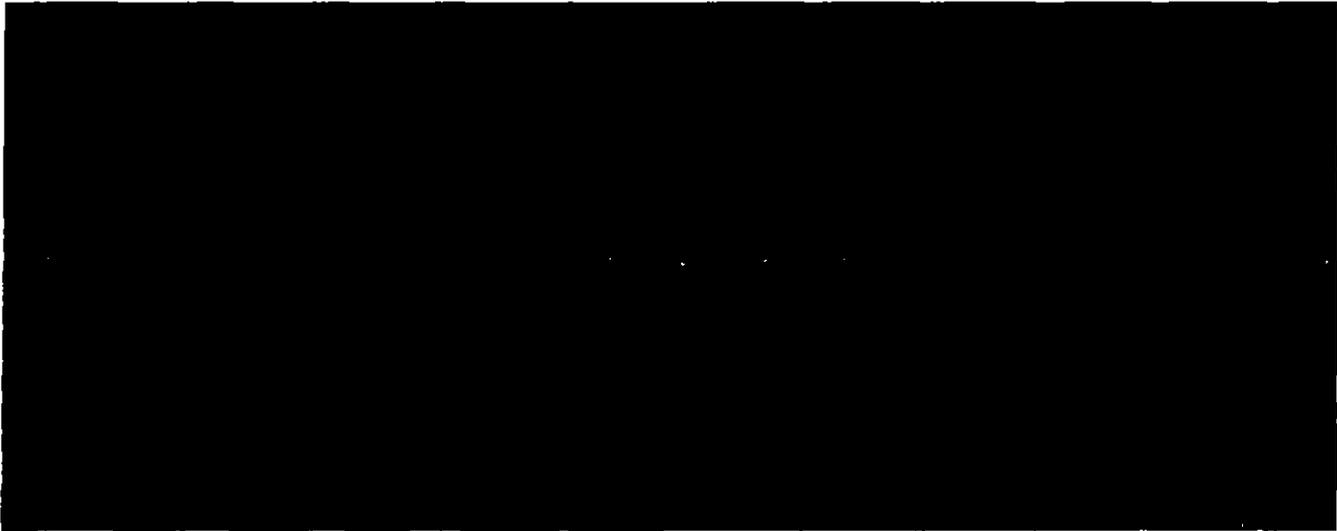


18

19 **Q. What is the typical useful life of transmission assets, such as the Project?**

20 **A. The typical useful life of transmission assets like the Project is well beyond 50 years.**

21



8

9 **Q. Mr. Shaw argues that the IEC Project economics are dependent upon low natural**  
10 **gas costs in Pennsylvania (Shaw St. No. 1, p. 17). How do you respond?**

11 A. I disagree with his analysis. PJM conducted sensitivity analyses varying the price of  
12 natural gas, to ascertain and further validate the fact that the Project is beneficial and that  
13 the Project's costs are significantly outweighed by the value of the benefits of the Project.  
14 The economics of the IEC Project are dependent on a number of factors, and any single  
15 factor could be offset by a combination of other factors. The complexity of this factor  
16 interdependence is the reason it is necessary to conduct specialized analysis to forecast in  
17 an informed and principled manner the conditions and needs of the electric transmission  
18 grid during PJM's planning horizon. As explained by Witnesses Herling and Horger  
19 more in detail, the modeling and analysis of Project 9A as a market efficiency upgrade in  
20 PJM's RTEP includes forecasts of the price of natural gas during the relevant planning  
21 horizon.

22



1 alternative resources he cites, which by and large are intermittent renewable resources,  
2 cannot be dispatched when needed. It is a logical fallacy to conclude that because  
3 *congestion can occur at any time (which is true) non-transmission resources that are*  
4 *available sometimes only are a substitute for addressing transmission congestion (which*  
5 *is most definitely not true).* Obviously, the fact that the non-transmission resources  
6 mentioned by Mr. Crandall cannot be dispatched in the particular hours when they may  
7 be most needed only aggravates the fact that such resources have not resolved the  
8 congestion in the AP South Reactive interface for years. Most importantly and despite  
9 Mr. Crandall's claims, non-transmission resources are not projected to even make a dent  
10 in the considerable transmission congestion that would remain in the AP South Reactive  
11 Interface if Project 9A was not constructed and placed in service.

12 The approach advanced by Mr. Crandall would be completely ineffective in  
13 addressing any transmission congestion. Suffice it to highlight that *none* of the 41  
14 proposals submitted to PJM during its 2014/15 Long-term proposal Window calling for  
15 *solutions* to the transmission congestion problem in the AP South Reactive Interface  
16 proposed a non-transmission resource of the kind that Mr. Crandall argues for as an  
17 alternative.

18 It also bears mentioning that Mr. Crandall's position is irreconcilable with the fact  
19 that PJM's market efficiency analysis employs models and forecasts, including power  
20 flow, load, and generating resources, that extensively and thoroughly take into  
21 consideration the projected addition or retirement of non-transmission resources of the  
22 kind listed by Mr. Crandall. It is erroneous to assume that PJM's analysis failed to take  
23 *into consideration a realistic and well-reasoned forecast of the availability and effect of*



1 such additions and retirements over the planning horizon on the transmission congestion  
2 problem affecting the AP South Reactive Interface specifically and the PJM service area  
3 generally. On the contrary, PJM's market efficiency analysis uses sophisticated  
4 engineering and economic planning tools to determine what are the most effective and  
5 beneficial solutions for addressing market efficiency, as well as reliability, problems in its  
6 footprint, and selected Project 9A as the best solution to the transmission congestion in  
7 the AP South Reactive interface after extensive analysis, subsequently validated multiple  
8 times to re-confirm that the project continues to be beneficial and needed.

9  
10 **Q. OCA witness Crandall argues that non-transmission alternatives will reduce**  
11 **congestion in the AP South Reactive Interface and specifically references certain**  
12 **portions of another utility's integrated resource plan ("IRP") in support of his**  
13 **argument. Do you agree that the charts in that IRP support Mr. Crandall's**  
14 **conclusions that non-transmission alternatives will reduce congestion on AP South**  
15 **are flawed?**

16 **A.** No. I do not have information about how charts in the IRP referenced by Mr. Crandall  
17 were prepared, but what those charts show is that the demand for new energy and  
18 capacity greatly exceeds the level of annual energy savings and capacity projected in the  
19 charts. This tremendous demand for energy and capacity requires a multi-faceted  
20 approach including transmission solutions in addition to any generation and demand side  
21 solutions that can be reasonably projected. The load forecasts included in the IRP  
22 referenced by Mr. Crandall support the conclusion that Virginia will need to import  
23 significantly *more* power, not *less*, over the next 15 years and fully supports the

1 conclusion that the IEC Project is necessary to reduce congestion on the AP South  
2 Interface under the assumptions referenced by Mr. Crandall.

3  
4 **Q. Mr. Crandall states that he evaluated non-transmission alternatives to the east and**  
5 **south of the AP south interface and considered resources available from 7 AM to 10**  
6 **PM to be more valuable (OCA St. No. 3, p. 15). Is this a relevant analysis?**

7 **A. No, not really. Mr. Crandall's analysis is woefully incomplete, and overlooks very many**  
8 **critical elements that are necessary to form a correct and valid view regarding the benefits**  
9 **of Project 9A and the need for the project. Again, it appears Mr. Crandall's analysis**  
10 **incorrectly assumes that elements like peak load during periods of high electric use have**  
11 **similar relevance for market efficiency analysis as they do for reliability analysis. It is**  
12 **well-understood for those versed in electric transmission planning, and particularly in**  
13 **analysis related to market efficiency and transmission congestion causing detrimental**  
14 **economic effects and market price distortions, that the elements involved in these**  
15 **analyses are not the same. When particular non-transmission resources are or are not**  
16 **available, and whether they are intermittent, are two of a very large number of factors**  
17 **affecting transmission congestion in particular facilities and the shift of congestion from**  
18 **certain facilities to others. Focusing on the elements that Mr. Crandall argues are an**  
19 **"alternative" is incomplete to the degree that the information as analyzed by Mr. Crandall**  
20 **is really meaningless in this context.**

1 Q. OCA Witness Crandall further argues that renewable generation, energy efficiency  
2 and Combined Heat and Power (“CHP”) will eliminate the need for the IEC Project  
3 (OCA St. No. 3, pp. 15-28). Do you agree with his conclusions?

4 A. No. As I explained before, Mr. Crandall’s view cannot be reconciled with the fact that  
5 PJM’s market efficiency analysis appropriately takes into consideration those resources.  
6 The congestion in the AP South Reactive interface projected to occur during the PJM  
7 planning horizon requires a solution that goes well beyond the resources discussed by Mr.  
8 Crandall. Further, Mr. Crandall does not offer any evidence to show this “alternative”  
9 would provide similar reliability or congestion benefits as the Project. PJM’s  
10 transmission planning process already appropriately takes into consideration the  
11 resources, including renewable generation, energy efficiency, and CHP, that can be  
12 reasonably expected to be present during the planning horizon.

13 Mr. Crandall’s position is particularly flawed in that he advances his conclusion  
14 without having done any analysis to determine plausible solutions to the congestion  
15 problem addressed by Project 9A. Electric transmission planning as a field of study is a  
16 highly-specialized area of engineering, requiring sophisticated analytical tools and  
17 software, advanced analytical resources, and disciplined analytical approaches to address  
18 complex problems involving a very large number of inter-dependent elements and  
19 variables. The process by which PJM conducts its analysis to determine what projects  
20 are the most beneficial to address the enormous number of needs involved in the  
21 Regional Transmission Expansion Plan is an exceedingly thorough one, subject to close  
22 and intensive scrutiny by numerous stakeholders, including state regulators, consumer  
23 counsel for several states, and competing electric transmission developers, among many

1 other participants. It is a process geared to maximize the reliability and efficiency of the  
2 electric grid in order to provide safe and reliable electric service in a cost-effective  
3 manner to several million electric users. An approach as that suggested by Mr. Crandall  
4 would not even begin to satisfy the requirements for satisfying the needs of the millions  
5 of people who confidently expect electricity will be there when they flip a switch on their  
6 wall.

7  
8 **Q. Do you agree with Mr. Crandall's statement that PJM did not consider energy**  
9 **efficiency, increased solar and wind resources or distributed generation in its**  
10 **analysis? (OCA St. No. 3, pp. 17-18)**

11 A. No. As explained by PJM's experts, those resources are thoroughly and appropriately  
12 taken into consideration in PJM's market efficiency and transmission planning processes.  
13 It bears mentioning that the same process followed by PJM to determine the need for and  
14 the benefits from the Project is the same process used to determine the need and benefits  
15 for thousands of critical transmission projects across its service footprint.

16  
17 **Q. On page 29 of his testimony, Mr. Crandall provided a summary of non-**  
18 **transmission alternative resources that could potentially be developed. Does this**  
19 **potential for non-transmission resources eliminate the need for the IEC Project?**

20 A. No, absolutely not. As explained before, to the extent that the type of resources Mr.  
21 Crandall described are reasonable expected to in fact become part of the electric grid,  
22 those resources are already taken into consideration in PJM's planning analysis. The  
23 need for the Project has been determined looking at a forecast of what the electric grid

1 will be over a 15-year planning horizon. As I explained before, the non-transmission  
2 resources described by Mr. Crandall are not really an alternative; they simply are not a  
3 solution to the congestion problem, but rather (to the extent they can be reasonably  
4 forecasted) are already part of the congested transmission grid that the Project improves.

5  
6 **PROMOD**

7 **Q. Mr. Shaw states that the IEC Project should not be evaluated using the PROMOD**  
8 **model but rather PJM and the Company should use probabilistic weighting (Shaw**  
9 **St. No. 1 p. 17). Do you agree with this statement?**

10 **A. No. PROMOD is an extensively used and accepted software tool used for transmission**  
11 **planning. PJM uses PROMOD to analyze thousands of projects. The process employed**  
12 **by PJM to conduct its market efficiency analysis is not only highly sophisticated, but**  
13 **frankly the state of the art worldwide. A suggestion that the tools employed by PJM to**  
14 **conduct its analysis are weak compared to some other form of analysis are simply**  
15 **without basis.**

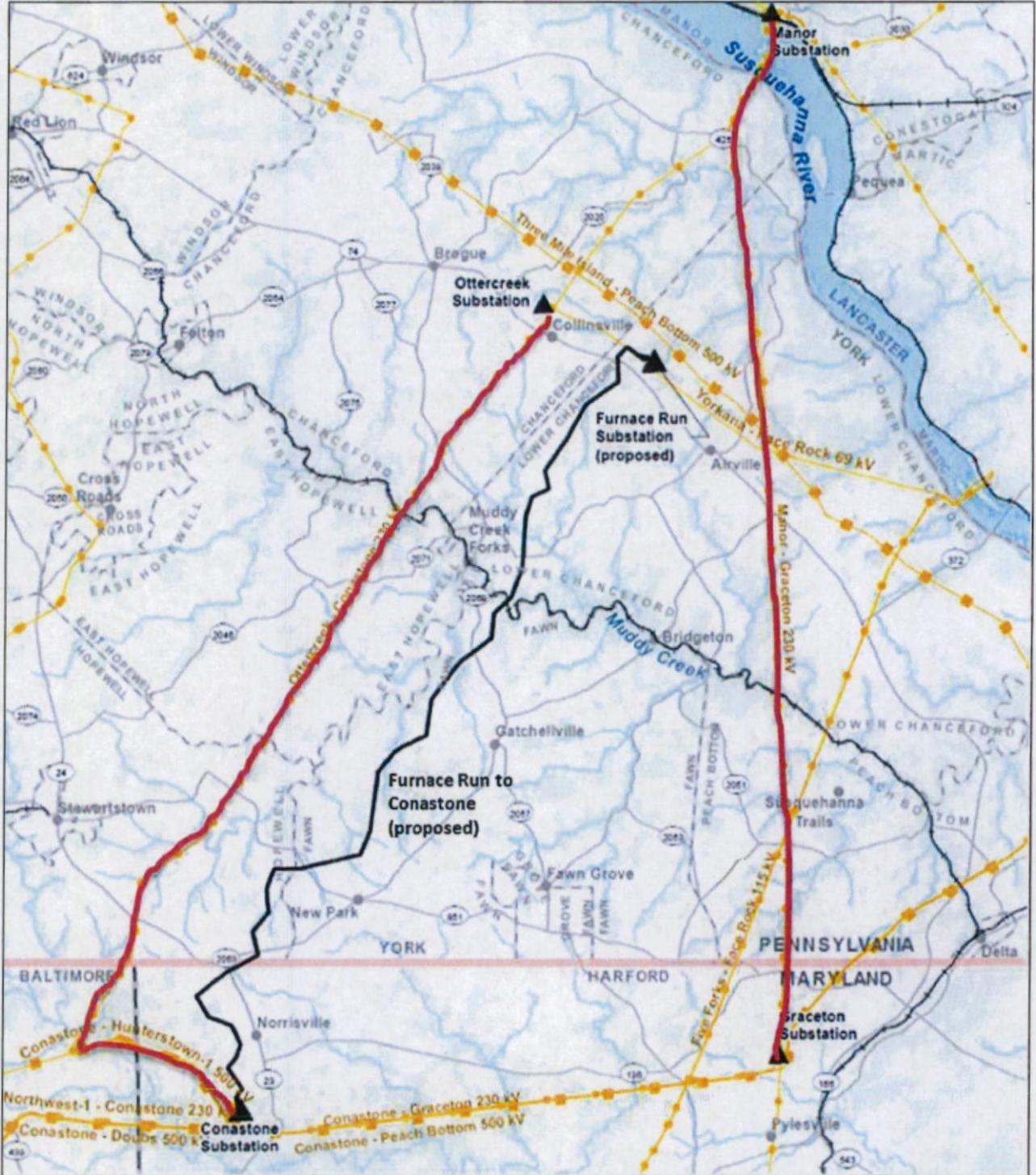
16  
17 **DISCUSSION OF ALTERNATIVES TO THE EAST LEG OF THE PROJECT**

18 **Q. Witness Weber includes in his testimony discussion of alternatives to the East Leg of**  
19 **the Project, specifically, he discusses Mr. Lanzalotta's recommendation to add a**  
20 **new 230-kV circuit to each of the existing PPL tower lines as a replacement to the**  
21 **East Leg of the Project. Please summarize the option suggested by Mr. Lanzalotta.**

22 **A. Mr. Lanzalotta suggests replacing the entire East Leg of the Project, both the new**  
23 **Furnace Run Substation and the new double circuit 230 kV Furnace Run-Conastone line,**

1 with two new single circuit 230 kV lines, one added to the existing towers of the PPL-  
2 owned Otter Creek-Conastone 230 kV line and one added to the existing towers of the  
3 PPL-owned Manor-Graceton 230 kV line. There is some additional complexity to this  
4 option once the suggested new lines enter Maryland, but for purposes of understanding  
5 what is suggested by Mr. Lanzalotta it is not necessary to add this detail. I will refer to  
6 this as the "Lanzalotta Option" in this testimony. The map presented as Figure 1 below  
7 highlights the Lanzalotta Option:  
8

Figure 1



2

3



1 Q. Witness Weber also discusses that subsequent to the submittal of Mr. Lanzalotta's  
2 direct testimony, a party in the Maryland regulatory proceedings for the Project,  
3 Power Plant Research Program or "PPRP", submitted a data request describing a  
4 more detailed and technically supported version of the Lanzalotta Option; Mr.  
5 Weber states that the PPRP referred to this options as the "Conceptual  
6 Alternative." Please summarize the Conceptual Alternative and highlight  
7 similarities and differences in the scope of this option versus Lanzalotta option.

8 A. The Conceptual Alternative is similar to the Lanzalotta Option in that it includes two new  
9 single circuit 230 kV lines, one added to the existing towers of each of the PPL-owned  
10 lines. The difference is that the Conceptual Alternative includes the new Furnace Run  
11 Substation as the origin point for the new single circuit 230 kV lines. Upon exiting the  
12 new Furnace Run Substation, each of the new 230 kV lines would parallel PPL's de-  
13 energized Yorkana-Face Rock 69 kV line (within the existing rights-of-way to the extent  
14 possible) to the interconnection point with the respective existing 230 kV lines. The map  
15 presented as Figure 2 below highlights the Conceptual Alternative versus the Lanzalotta  
16 Option.

17  
18

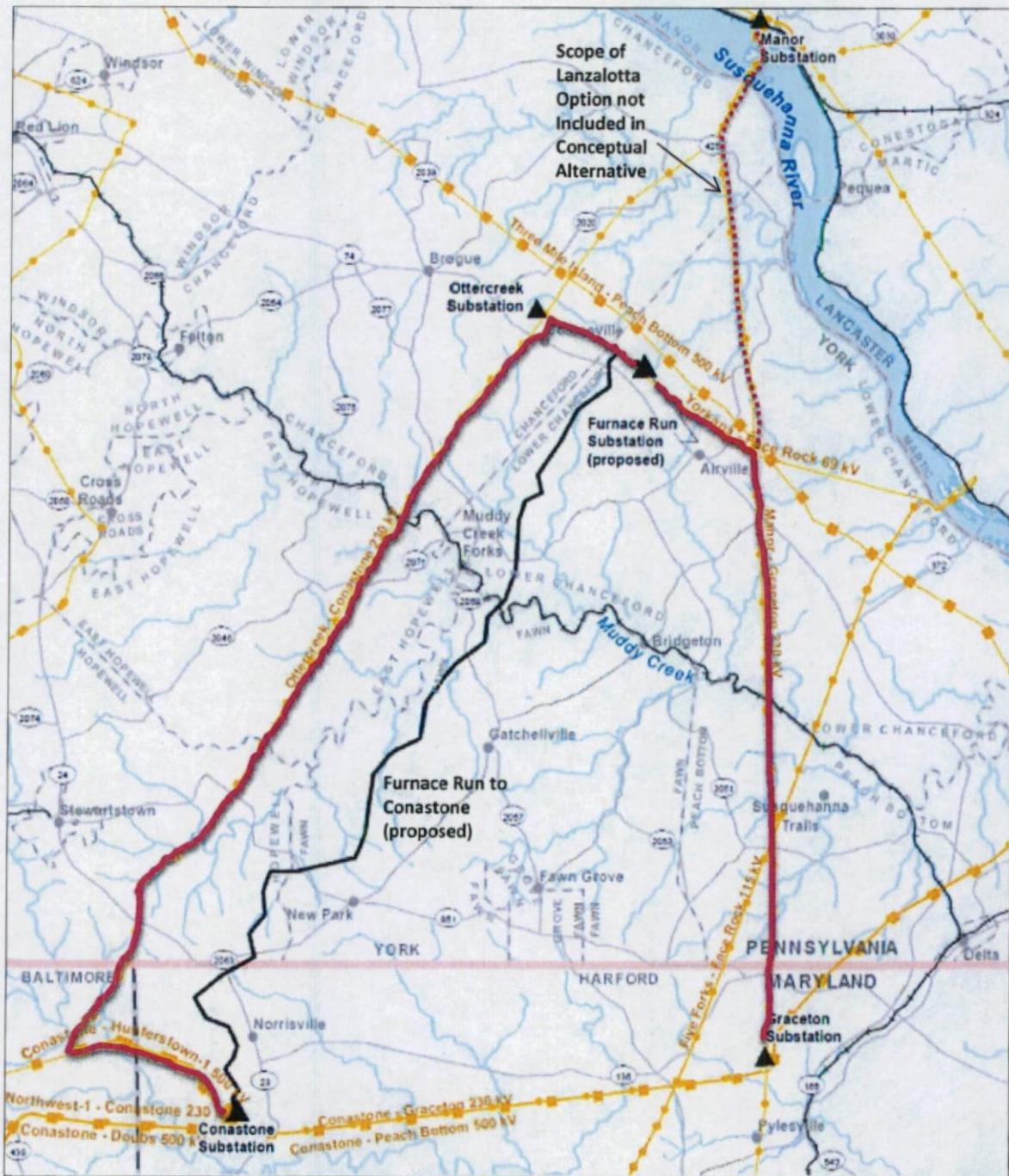


Figure 2

- 1
- 2
- 3

1 **Q. From a technical standpoint, how does the Conceptual Alternative represents a**  
2 **practical and more sophisticated implementation of the Lanzalotta Option, as stated**  
3 **by Witness Weber?**

4 A. As I state above, the Conceptual Alternative is similar to the Lanzalotta Option in that it  
5 includes two new single circuit 230 kV lines, one added to the existing towers of each of  
6 the PPL-owned lines. The key difference is that the Conceptual Alternative uses the new  
7 Furnace Run Substation to tap of the existing Three Mile Island to Peach Bottom 500 kV  
8 line and as the origin point for the two new single circuit 230 kV lines. This is important  
9 for two reasons. First, tapping the existing Three Mile Island-Peach Bottom 500 kV line  
10 is needed to approximate the congestion-relief performance of the East Leg of the  
11 Project. The Lanzalotta Option, by not tapping the existing 500-kV line, is not a robust  
12 option to substantially reduce AP South congestion. Second, it eliminates the complexity  
13 of the Susquehanna River crossing of the Manor-Graceton 230 kV line. As such, the  
14 Conceptual Alternative represents a practical and more sophisticated implementation of  
15 the Lanzalotta Option.

16  
17 **Q. And has the technical performance of the Conceptual Alternative been studied?**

18 A. Yes, it is my understanding that PJM has studied the technical performance of the  
19 Conceptual Alternative and the results of this analysis are discussed by Witness Herling.

20  
21 **Q. Does this conclude your Rebuttal Testimony at this time?**

22 | A. Yes.

23

# Market Efficiency Update

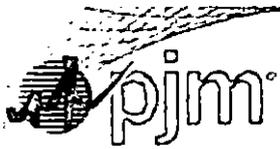
Nick Dumitriu, Market Simulation

Transmission Expansion Advisory Committee  
Market Efficiency Special Session

October 24, 2018

# Agenda

- Congestion Drivers Criteria
- M2M Constraints
- Overview of Posted Market Efficiency Base Case
- MEPETF Proposed Changes
- Market Efficiency Sensitivities
- Market Efficiency Registration
- Review Simulated Congestion Outputs



# Market Efficiency Guidelines

## Objective of PJM Market Efficiency

### Operating Agreement : 1.5.7 Development of Economic-based Enhancements or Expansions

*(b) Following PJM Board consideration of the assumptions, the Office of the Interconnection shall perform a market efficiency analysis to compare the costs and benefits of: (i) accelerating reliability-based enhancements or expansions already included in the Regional Transmission Plan that if accelerated also could relieve one or more economic constraints; (ii) modifying reliability-based enhancements or expansions already included in the Regional Transmission Plan that as modified would relieve one or more economic constraints; and (iii) adding new enhancements or expansions that could relieve one or more economic constraints, but for which no reliability-based need has been identified. Economic constraints include, but are not limited to, constraints that cause: (1) significant historical gross congestion; (2) pro-ration of Stage 1B ARR requests as described in section 7.4.2(c) of Schedule 1 of this Agreement; or (3) significant simulated congestion as forecasted in the market efficiency analysis. The timeline for the market efficiency analysis and comparison of the costs and benefits for items 1.5.7(b)(i-iii) is described in the PJM Manuals.*

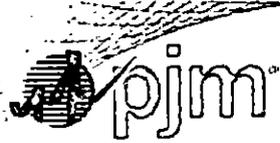
*(c) The process for conducting the market efficiency analysis described in subsection (b) above shall include the following:*

*(i) The Office of the Interconnection shall identify and provide to the Transmission Expansion Advisory Committee a list of economic constraints to be evaluated in the market efficiency analysis.*

## Economic Justification for Market Efficiency

### Operating Agreement : 1.5.6 Development of the Recommended Regional Transmission Expansion Plan

*(i) The recommended plan shall identify enhancements and expansions that relieve transmission constraints and which, in the judgment of the Office of the Interconnection, are economically justified. Such economic expansions and enhancements shall be developed in accordance with the procedures, criteria and analyses described in Sections 1.5.7 and 1.5.8 of this Schedule 6.*



## PJM Eligible Congestion Drivers

- In determining eligible congestion drivers PJM will consider all binding flowgates internal to the PJM footprint (including tie lines), current active Market-to-Market flowgates listed in the NERC book of flowgates, and potential future Market-to-Market flowgates between PJM and MISO
- Eligible congestion drivers are selected to focus proposals on significant issues
  - Identified coincident with the opening of market efficiency proposal window
- Only proposals which address one or more of these PJM identified congestion drivers will be evaluated
  - If the proposal does not substantially address a PJM identified congestion driver, or is otherwise substantially deficient or is seriously flawed, it will be rejected and the proposer will be notified
- Facilities below these thresholds are not anticipated to pass the benefit/cost threshold because of the expected cost of an upgrade



## Market Efficiency Criteria for Target Congestion Drivers

- Market Efficiency Criteria
  - Annual simulated congestion frequency of at least 25 hours in each 2023 and 2026 study years
  - Congestion threshold
    - Lower voltage facilities: minimum of \$1 million congestion in each 2023 and 2026 study years
    - Regional facilities: minimum of \$10 million congestion in each 2023 and 2026 study years
    - Interregional facilities: minimum of \$0.5 million congestion in each 2023 and 2026 study years (lower threshold as there may be interregional benefits in addition to the regional benefits)
- Congestion for 2029 study year is considered more speculative and therefore will be monitored in future analysis



## Market Efficiency Exceptions

PJM may not recommend proposals for certain facilities meeting the criteria due to following exceptions:

- Congestion is significantly influenced by a FSA generator or a set of FSAs
- Majority of the congestion was already addressed in previous window(s)
- Simulated congestion for future study years displays a declining trend

Note: PJM reserves right to add other exceptions as necessary.



## Interregional Market Efficiency Project (IMEP) Study

- PJM and MISO will conduct a two year Interregional Market Efficiency Project (IMEP) study in 2018/2019
- Issues identification and benefit determination conducted in each regional process consistent with current effective JOA



# IMEP Study Scope

- Study progresses in parallel through PJM and MISO regional processes
- Each RTO will develop an economic model and identify issues for which upgrades are being solicited
  - Model and issues identification consistent with region process and practice
- Targeted Market Efficiency Projects (TMEP) are not included in the long term window
- Per PJM-MISO JOA, Interregional Proposals must
  - Address at least one identified issue in each region (could be same issue if identified by both RTOs)
  - be submitted to both PJM and MISO Regional Windows
- PJM and MISO will follow the effective JOA language when analyzing and recommending Interregional Proposals



# Potential Future Market-to-Market Flowgates Identification Steps

- Using the same topology as the Market Efficiency process, PJM will define its control areas to align with the CMP processes as described in the MISO-PJM JOA, Attachment 2, Section 3.2.1
- Monitored facilities included in MISO's Market Efficiency process will be combined with the set of contingencies used in both PJM's and MISO's Market Efficiency processes to establish the domain of flowgates that will be tested for eligibility
- Each of these flowgates will be studied in a sensitivity analysis that will establish the flowgates as congestion drivers should they meet either study criteria:
  - GLDF Threshold Study
  - TDF Threshold Study



## Study Criteria Details

- **GLDF Threshold Study**
  - Under the historical control area representation, if any two PJM generating stations at electrically unique locations have a Generation-to-Load Distribution Factor (GLDF) that is 5% or greater, this flowgate will be eligible to be an identified congestion driver in the Market Efficiency process
- **TDF Threshold Study**
  - Under the historic control area representation, if any historical control area to historical control area transaction (Generation-to-Generation transfer) has a 5% or greater Transfer Distribution Factor (TDF), this flowgate will be eligible to be an identified congestion driver in the Market Efficiency process



## Updated Market Efficiency Base Case (10-23-2018)

- Posted updated 2023 Base Case (XML files PROMOD 11.1.13 format)
  - Includes MISO feedback received by Oct 11<sup>th</sup>
  - Includes PJM stakeholders feedback received by Oct 23<sup>nd</sup>
  - Model includes all years: 2019, 2023, 2026, 2029
  - Also posted updated noFSA case (PROMOD XML file to remove FSA units)
    - <https://www.pjm.com/planning/rtep-development/market-efficiency/economic-planning-process.aspx>
- Posted Additional Files
  - Updated event file
  - 15-years Monte Carlo outage library
  - Current Congestion Output Report (simulated years 2023 and 2026)
- Final Base Case to be posted before the start of Long-Term Window



## 2018/19 Market Efficiency Assumptions

- Posted Market Efficiency Assumptions Whitepaper
  - <https://www.pjm.com/-/media/committees-groups/committees/teac/20181011/20181011-2018-market-efficiency-analysis-assumptions.ashx>
  - Recently announced First Energy retirements not included (network upgrades not finalized at this time)
- Financial parameters, Discount Rate, Carrying Charge Rate, and NSPL based on the Transmission Cost Information Center spreadsheet
  - <http://www.pjm.com/planning/rtep-upgrades-status/cost-allocation-view.aspx>
  - Discount Rate: 7.37%
  - Carrying Charge Rate: 12.84%



# MEPETF Proposed Changes - FSA Modeling

Component	Status Quo	PJM Modification	PJM Reasoning
FSA Modeling	Consider all FSA and Suspended ISA resources at time of case build	By default, exclude from the base case the FSA and Suspended ISA resources, and their associated network upgrades at time of case build. FSA sensitivity studies will be used for proposal evaluations, but not for B/C ratio test.	Including FSAs in the Market Efficiency Base Case can result in unrealistic estimates of specific benefits for any system reinforcement due to having significantly more generation than the reserve requirement.
FSA Exception	If FSA or Suspended ISA resources are excluded from the base case at time of case build, TEAC should be notified.	If FSA or Suspended ISA resources are included in the base case at time of case build or mid-cycle update, TEAC will be notified and the assumptions will be reviewed at TEAC on an as needed basis.	In the case of including FSA or suspended ISA resources in the base case, TEAC will be notified and the assumptions will be reviewed at TEAC
Criterion to Include FSAs	Not defined. PJM practice includes all.	In case of a reserve deficiency, include FSA and Suspended ISA resources (as well as the expected network upgrades) ranked by their commercial probability, until the reserve requirement is met.	In the case of including FSA or suspended ISA resources in the base case, TEAC will be notified and the assumptions will be reviewed at TEAC



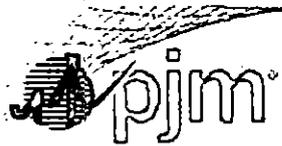
# MEPETF Proposed Changes - Benefit Adjustment

Component	Status Quo	PJM Modification	PJM Reasoning
Benefit Adjustment for In-Service Date*	N/A	Energy benefits of projects that are proposed to be in service later than the RTEP year will be adjusted to account for any savings forgone due to later in-service date.	It is PJM's goal to address Market Efficiency constraints via transmission solutions by the RTEP year, and to incentivize projects that are designed and proposed to be in service by the RTEP year. Therefore, PJM will adjust energy benefits of projects that are proposed to be in service later than the RTEP year to account for any savings forgone due to later in-service date.

- OA revisions were endorsed at September MC for December 1, 2018 effective date
- Any potential changes will be effective for 18/19 Long Term Window

\* Includes 15-year cap.

Will be used as sensitivity if only one proposal per target congestion driver.



# 2018/19 Market Efficiency Sensitivities

Sensitivity	Range
Load Sensitivity	Plus or Minus 2%
Gas Sensitivity	Plus or Minus 20% Henry Hub
No FSA Sensitivity	Remove all units with FSA or suspended ISA status

Note: PJM reserves right to add sensitivities as necessary.



## Market Efficiency RTEP Window Registration

- Register for the 2018/19 RTEP Market Efficiency Window at
  - <http://www.pjm.com/planning/competitive-planning-process.aspx>
- In the CEI Request form write “Access to the 2018-19 Long Term RTEP Window” as the description of the information requested
- Everyone must register to access the data regardless of prior participation in the PJM Competitive Process



# RTEP Window Registration Screenshot

**pjm** | [about pjm](#) | [training](#) | [committees & groups](#) | [planning](#) | [markets & operations](#) | [library](#)

---

Home - Planning - Competitive Planning Process

## Competitive Planning Process

The PJM competitive planning process implements FERC Order 1000. The process affords non-incumbent transmission developers an opportunity to participate in the regional planning and expansion of the PJM bulk electric system. By publicizing a set of criteria violations and soliciting solutions from competing transmission developers, PJM and the FERC hope to encourage innovative, cost effective and timely solutions to the challenges of building and maintaining a highly reliable electric system.

PJM will announce in the Transmission Expansion Advisory Committee (TEAC) its intention to solicit competitive solutions to identified planning needs. The "windows" for submitting such solutions fit into three categories and follow the 18-month and 24-month planning cycles as described in Manual 14F: Clean [\(C\)](#) | Clean [\(Z\)](#).

Planning Cycles	Standard Window Length	Required In-Service Date (Years)
Long Term - considers reliability criteria violations, economic constraints, system conditions and public policy requirements	120 days	+ 5
Short Term - considers reliability criteria violations	60 days	3-5
Immediate-Need Reliability - considers reliability criteria violations	Shortened	+ 3

*While PJM endeavors to adhere to the standard length of the proposal windows, unique situations do arise. When adhering to the standard window length would be unnecessarily burdensome on the transmission developers, PJM may elect to modify the length of a proposal window. Any such changes will be made clear when the proposal window is announced.*

**Current Windows**

2018/19 Long Term RTEP Window 1

[Open](#) 11.1.2018 [Closed](#) 2.28.2018

**2018/19 Long Term Window 1**

Market Efficiency Economic Models - [C](#) requires additional level of CEI specifically for market efficiency data and active license with Verityx for PROMOD and nodal data

**2018 Window 1**

Problem Statement  
With Analytical Files - V6 [\(F\)](#) (26.0 MB) - [C](#) requires CEI

[Training Video](#) | [User Guide](#) [\(F\)](#)

[Request for Community](#) [\(O\)](#)

**Window Registration**

To gain access to a RTEP planning cycle window B analytical data:

1. Submit the Critical Energy Infrastructure Information request.  
Ask for access to "yyyy RTEP Proposal Window."  
Specify the RTEP cycle ["yyyy"] of interest.
2. Complete the Non-Disclosure Agreement.



## Market Efficiency RTEP Window Data Posting

- Market Efficiency Web Page located at
  - <http://www.pjm.com/planning/rtep-development/market-efficiency.aspx>
- Data will be posted before November 1<sup>st</sup> 2018
  - Market Efficiency Base Case files for all study years (XML format)
    - Access requires CEII confirmation (PJM and MISO)
    - Access requires PROMOD vendor (ABB) confirmation
  - PROMOD input files: .lib, .eve
  - Benchmark test case and results
- Auxiliary Files
  - Input Assumptions Summary
  - Updated Modeling Document which will provide details of setup and modeling methods
  - Benefit/Cost Evaluation Tool
  - ARR Data

## Market Efficiency Window Opens on November 1<sup>st</sup>

- Final Market Efficiency 2018/19 base case, problem statement, congestion drivers, and required documentation to be posted before November 1<sup>st</sup> 2018
- PROMOD modeling sensitivity cases will be posted
- Long-Term Market Efficiency Window opens November 1<sup>st</sup> 2018

# Appendix A

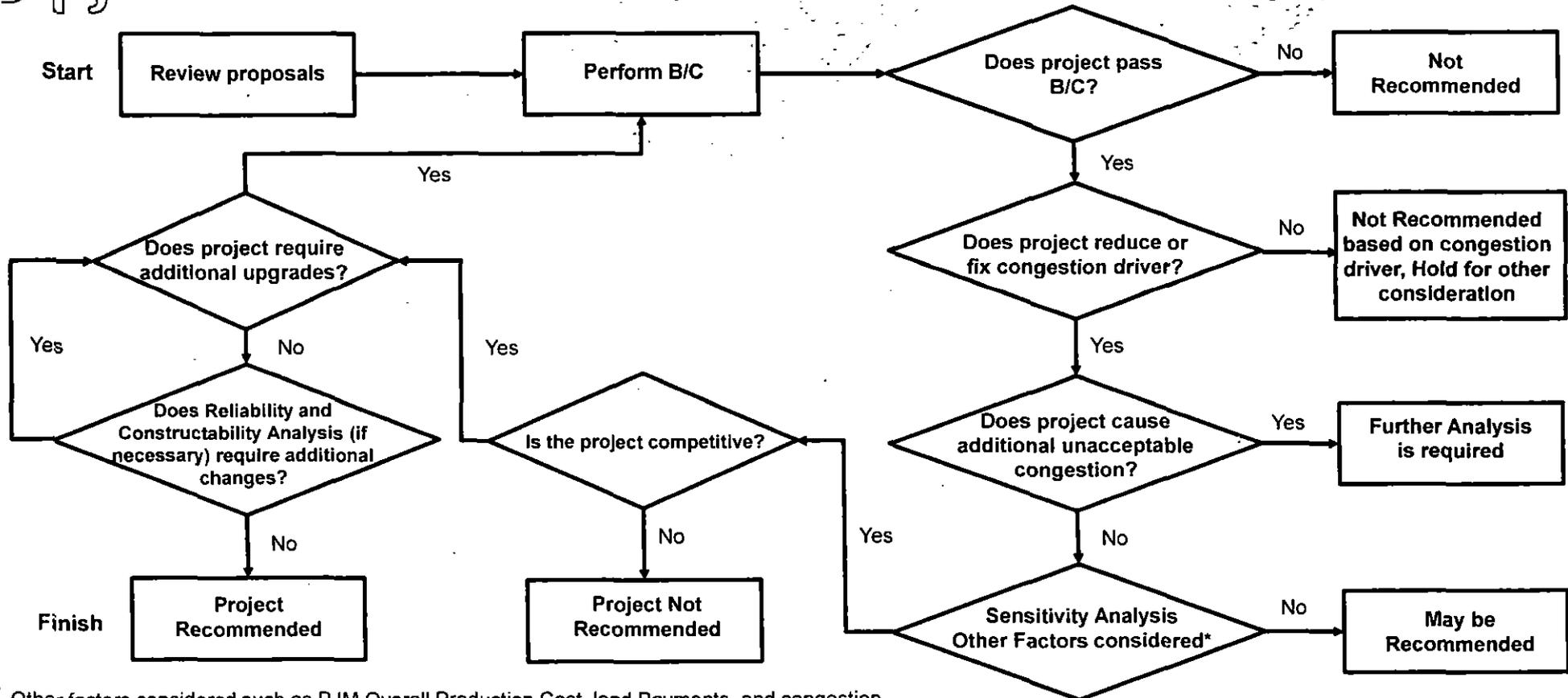
## Proposal Analysis - Process Overview

## Proposal Study Approach

- Step 1: Review submitted project data
  - PJM will contact project sponsor for further clarification as needed
- Step 2: First pass of project evaluations assuming proposer supplied data
- Step 3: Group projects by target congestion driver
- Step 4: Perform detailed analysis
  - Analyze proposals including mid cycle incremental updates
  - Sensitivity runs: load forecast, gas forecast, etc.



# Project Selection – Multiple Proposals per Congestion Driver



\* Other factors considered such as PJM Overall Production Cost, load Payments, and congestion



## Proposal Selection Criteria

- Project must reduce or relieve economic congestion on identified PJM constraints
- Project's Benefit/Cost Ratio > 1.25
  - Various scenario analysis may be performed
- Cost
  - Consistent with the OA Schedule 6 section 1.5.7 (g), for a Market Efficiency proposal with costs in excess of \$50 million, an independent review of such costs will be performed
- Projects may be further analyzed for other secondary considerations
  - Zonal/Total Savings
  - Risk Evaluation
  - Sensitivity Evaluation
  - Reliability Impacts



# Appendix B

## 2017 Historical Congestion



# Top 25 Congestion Causing Constraints in 2017

Rank	Constraint	Type	Location	Approximate total Market Congestion (Millions)*	% of Total Congestion*	Comment
1	Braidwood - East Frankfort	M2M	ComEd	\$43.4	6.2%	RTEP upgrades expected to reduce congestion (s0756 breaker replacement).
2	Conastone - Peach Bottom	PJM Line	500	\$39.5	5.7%	RTEP upgrades expected to reduce congestion (b2766 substation equipment upgrade).
3	Emilie - Falls	PJM Line	PECO	\$25.1	3.6%	RTEP upgrades expected to reduce congestion (b2774 Emilie - Falls 138 kV line reconductoring). Partial congestion is outage related (work on Alburdis-Branchbu, Bustleto-Crosswic, Emilie-Roll, Crosswic-Wardav).
4	Graceton - Safe Harbor	PJM Line	BGE	\$23.9	3.4%	RTEP upgrades expected to reduce congestion (b2690 Graceton - Safe Harbor 230 kV line reconductoring). Partial congestion is outage related (work on Conaston-Ottcrkpl, Conaston-Peachbot, Manor-Safeharb, Conaston-Hunterst).
5	5004/5005 Interface	Interface	500	\$22.5	3.2%	West - East Transfers.
6	AP South	Interface	500	\$21.6	3.1%	RTEP upgrades expected to reduce congestion (b2752, b2743).
7	Westwood	M2M	MISO	\$19.6	2.8%	
8	Cherry Valley Transformer	M2M	ComEd	\$18.7	2.7%	RTEP upgrades expected to reduce congestion (s0900 parallel xfmr).
9	Carson - Rawlings	PJM Line	Dominion	\$18.2	2.6%	
10	Conastone - Otter Creek	PJM Line	PPL	\$15.1	2.2%	RTEP upgrades expected to reduce congestion (s0233 Otter Creek - Conastone 230 kV line rebuild). Partial congestion is outage related (work on Manor-Safeharb, Conaston-Hunterst).

\*Data from 2017 State of Market Report



# Top 25 Congestion Causing Constraints in 2017 (Cont'd)

Rank	Constraint	Type	Location	Approximate total Market Congestion (Millions)*	% of Total Congestion*	Comment
11	Conastone - Northwest	PJM Line	BGE	\$14.1	2.0%	RTEP upgrades expected to reduce congestion (b2752.7 Conastone - Northwest 230 kV lines reconductor/rebuild). Partial congestion is outage related (work on Conaston-Northwes, Brighton-Conaston).
12	Three Mile Island	Transformer	500	\$13.3	1.9%	Impacted by Three Mile Island retirement.
13	Butler - Shanorma	PJM Line	APS	\$11.4	1.6%	RTEP upgrades expected to reduce congestion (b2696 substation equipment upgrade at Butler, Shanor Manor and Krendale substations).
14	Lakeview - Greenfield	PJM Line	ATSI	\$10.8	1.5%	Partial congestion is outage related (work on Beaver-Davisbes, Hayes_FE-Davisbes, Lemoyne2 - Wfremont)
15	Alpine - Belvidere	M2M	MISO	\$10.8	1.5%	RTEP upgrades expected to reduce congestion (b2141 Construct Byron - Wayne 345 kV line).
16	Bedington - Black Oak	Interface	500	\$9.5	1.4%	West - East Transfers. Future reactive upgrades expected to reduce congestion.
17	Person - Sedge Hill	PJM Line	Dominion	\$9.3	1.3%	Partial congestion is outage related (work on Carson4-Rogersrd)
18	Lake George - Aetna	M2M	MISO	\$9.2	1.3%	
19	Batesville - Hubble	M2M	MISO	\$8.9	1.3%	RTEP upgrades expected to reduce congestion (b2634 Convert Miami Fort 345 kV substation to a ring bus).
20	Byron - Cherry Valley	M2M	MISO	\$8.0	1.1%	RTEP upgrades expected to reduce congestion (b2141 Construct Byron - Wayne 345 kV line).

\*Data from 2017 State of Market Report



# Top 25 Congestion Causing Constraints in 2017 (Cont'd)

Rank	Constraint	Type	Location	Approximate total Market Congestion (Millions)*	% of Total Congestion*	Comment
21	AEP - DOM	Interface	500	\$7.8	1.1%	West - East Transfers. Future reactive upgrades expected to reduce congestion.
22	Brunner Island - Yorkanna	PJM Line	Met-Ed	\$7.5	1.1%	RTEP upgrades expected to reduce congestion (b2691 Reconductor Brunner Island - Yorkanna 230 kV line).
23	Brokaw - Leroy	M2M	MISO	\$7.3	1.0%	
24	Loretto - Vienna	PJM Line	DPL	\$6.9	1.0%	Partial congestion is outage related (work on Nsalisbur-Pemberton)
25	Pleasant View - Ashburn	PJM Line	Dominion	\$6.8	1.0%	
<b>Top 25</b>				<b>\$389.2</b>		
<b>Total Congestion</b>				<b>\$697.6</b>		

\*Data from 2017 State of Market Report

Questions?

Email: [MarketEfficiencyGroup@pjm.com](mailto:MarketEfficiencyGroup@pjm.com)



# Revision History

- Revision History
  - V1 – 10/24/2018 – Original Version Posted to PJM.com

**BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

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

Petition of Transource Pennsylvania, LLC for a :  
finding that a building to shelter control : Docket No. P-2018-3001878  
equipment at the Rice Substation 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 : Docket No. P-2018-3001883  
equipment at the Furnace Run Substation in :  
York County, Pennsylvania is reasonably :  
necessary for the convenience or welfare of the :  
public :

Application of Transource Pennsylvania, LLC :  
for approval to acquire a certain portion of the : Docket No. A-2018-3001881, *et al.*  
lands of various landowners in York and :  
Franklin Counties, Pennsylvania for the siting :  
and construction of the 230 kV Transmission :  
Lines associated with the Independence Energy :  
Connection – East and West Projects as :  
necessary or proper for the service, :  
accommodation, convenience or safety of the :  
public :

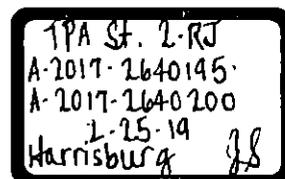
**TRANSOURCE PENNSYLVANIA, LLC**

**REJOINDER TESTIMONY OF**

**KAMRAN ALI**

**STATEMENT NO. 2-RJ**

Date: February 11, 2019



1 **Q. Please state your name and business address.**

2 A. My name is Kamran Ali. My business address is 8500 Smiths Mill Road, 2<sup>nd</sup> Floor, New  
3 Albany, OH 43054.  
4

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

6 A. I am employed by American Electric Power Service Corporation ("AEPSC") as the  
7 Managing Director of Transmission Planning. In this capacity I provide services to  
8 Transource Energy, LLC, the parent of Transource Pennsylvania, LLC ("Transource PA"  
9 or the "Company").  
10

11 **Q. Have you previously provided testimony in this proceeding?**

12 A. Yes. Transource PA Statement No. 2 is my written direct testimony and Statement No.  
13 2-R is my rebuttal testimony.  
14

15 **Q. Do you make any corrections to your rebuttal testimony?**

16 A. Yes. At the time of my testimony and rebuttal testimony, my title was Director,  
17 Transmission Planning. I was subsequently promoted to Managing Director,  
18 Transmission Planning.  
19

20 **Q. Are you sponsoring any exhibits with your rejoinder testimony?**

21 A. No.  
22

23 **Q. What is the purpose of your rejoinder testimony?**

1 A. The purpose of my rejoinder testimony is to rebut certain claims made by PPL Electric  
2 witness Ali, Office of Consumer Advocate (“OCA”) witness Lanzalotta, and Citizens to  
3 Stop Transource York County (“Citizens”) witness Krick.

4  
5 **Q. PPL Electric witness Ali stated that “adding a second high capacity 230 kV circuit  
6 and replacing the current circuit with a higher capacity circuit on the existing Otter  
7 Creek-Conastone 230 kV line” may provide similar economic benefits (p. 2). Do you  
8 have a response?**

9 A. In providing this testimony, PPL provided no studies or analysis to supplement PPL’s  
10 previous responses to Transource PA’s interrogatories which state that PPL “has not  
11 performed the detailed engineering or planning studies required to select a specific higher  
12 capacity conductor” (PPL Electric response to Set I-10)<sup>1</sup> for the Otter Creek-Conastone  
13 230 kV line. In contrast, PJM has studied Conceptual Alternatives 1, 2, 3, & 4 which  
14 utilize the only conductor confirmed by PPL on the Otter Creek- Conastone transmission  
15 line as appropriate for the design capacity of the existing structures, and has determined  
16 that none pass reliability criteria testing. It should be noted that Project 9A was  
17 specifically designed and engineered to be able to carry a certain amount of power into  
18 Conastone station to provide the needed benefits and address chronic congestion which  
19 has existed over the long-term. PPL has done no analysis to show that they can provide  
20 equivalent electrical characteristics required by the Project Designated Entity  
21 Agreements, which would be required to provide “similar economic benefits” to the  
22 Project (PPL Electric Set I-4 and I-8).<sup>2</sup>

---

<sup>1</sup> Previously submitted as Exhibit BDW-3R to the rebuttal testimony of Brian D. Weber.

<sup>2</sup> Previously submitted as Exhibit BDW-3R to the rebuttal testimony of Brian D. Weber.

1  
2 **Q. PPL witness Ali also suggested the PJM had not considered a 500kV circuit from**  
3 **the existing TMI- Peach Bottom 500kV line to the Conastone substation. Please**  
4 **respond.**

5 A. In providing this testimony, PPL provided no studies or analysis to support why this  
6 concept is even viable or should be studied by PJM. Specifically, PPL has done no cost,  
7 siting, or engineering analysis to show the viability of building a new 500 kV line  
8 between Otter Creek and Conastone on their existing 150 ft ROW.<sup>3</sup> In addition, multiple  
9 500kV solutions were analyzed in the 2014/2015 window and none were selected for  
10 inclusion in the PJM's regional transmission expansion plan.

11  
12 **Q. OCA witness Lanzalotta states that the updated Table 1-SR still shows a decrease in**  
13 **forecasted peak loads which are typically accompanied by decreased forecasted**  
14 **energy consumption, which may affect the level of congestion on transmission**  
15 **facilities. Do you agree?**

16 A. No. As I stated in my rebuttal testimony, peak load forecasts are not an indicator of  
17 congestion. The updated numbers do not change this fact.

18  
19 **Q. OCA witness Lanzalotta states that AP South congestion continues to decrease.**  
20 **Please comment.**

21 A. AP South congestion has been chronic for a long period of time. It still exists, and would  
22 continue to exist in future simulation years without the presence of Project 9A. PJM has

---

<sup>3</sup> PPL's Letter of Notification (Docket A-2011-2228595).

1 shown multiple times that the Project continues to pass the B/C ratio threshold through  
2 many restudies.

3  
4 **Q. Citizens witness Krick states that the IEC Project is proposed to enhance market**  
5 **efficiency and is not necessary to ensure that the region enjoys adequate, safe, and**  
6 **reliable electric service (Citizens St. No. 1, p. 14). Do you agree?**

7 A. No. As stated in my direct testimony, the project will have reliability benefits by  
8 providing additional and alternate transmission paths for electricity and, as further  
9 demonstrated by PJM during the most recent analysis and described by witnesses Horger  
10 & Herling, will provide tangible reliability benefits to Pennsylvania.

11  
12 **Q. Does this conclude your rejoinder testimony at this time?**

13 A. Yes. However, there are currently outstanding data requests to PPL Electric, and I  
14 reserve the right to supplement my rejoinder testimony based upon PPL Electric's  
15 responses to the outstanding data requests.



1 **Q. Please state your name and business address.**

2 A. My name is James H. Cawley. My business address is 17 South Second Street, 6<sup>th</sup> Floor,  
3 Harrisburg, PA 17101-2039.

4

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

6 A. I am Of Counsel to the law firm of SkarlatosZonarich LLC.

7

8 **Q. What are your responsibilities in that position?**

9 A. My practice is limited to matters affecting the public utility industry and appellate  
10 practice.

11

12 **Q. Please summarize your background and experience.**

13 A. Before my appointment to the Pennsylvania Public Utility Commission ("Commission")  
14 in 1979, I served as majority counsel to the Pennsylvania Senate Consumer Affairs  
15 Committee where I was a major draftsman of substantial amendments to Pennsylvania's  
16 public utility laws. I then assisted with the codification of those laws into the  
17 Pennsylvania Public Utility Code. In 1977, I was appointed chief counsel to the Senate  
18 Democratic Floor Leader. I then served two terms as a member of Pennsylvania Public  
19 Utility Commission, the first from 1979 to 1985 and the second from 2005 to 2015. I  
20 was Chairman of the Commission from 2008 to 2011. Between my two terms, I  
21 primarily represented clients before the Commission while serving as the managing  
22 partner of the Harrisburg office of the New York City law firm of LeBoeuf, Lamb,  
23 Greene & MacRae LLP (1988-1996) and then as a partner of the Harrisburg law firm of

1 Rhoads & Sinon LLP (1996-2005). From 1998 to 2003, I served on the Board of  
2 Directors of Pennsylvania-American Water Company, and from 1991 to 1999 on the  
3 Pennsylvania Energy Development Authority. Since 2016, I have served on the Board of  
4 Directors of The York Water Company. From 1994 until 2014, I was an adjunct  
5 professor of federal administrative law and of appellate advocacy at Widener University  
6 Commonwealth Law School in Harrisburg.

7  
8 **Q. Please describe the purpose of your Rebuttal Testimony.**

9 A. I have been asked by Transource Pennsylvania, LLC (“Transource PA” or the  
10 “Company”) to provide my expert opinion concerning two subjects: First, to discuss  
11 PJM's expertise in transmission system planning, including PJM Interconnection LLC's  
12 (“PJM's”) cost/benefit analysis for market efficiency projects. Second, the importance of  
13 regional transmission planning regardless of whether Pennsylvania benefits from a  
14 particular project or whether the project is designed to increase reliability or reduce  
15 congestion restraints.

16  
17 **Q. Are you sponsoring any exhibits with your Rebuttal Testimony?**

18 A. No.

19  
20 **PJM EXPERTISE IN TRANSMISSION PLANNING**

21 **Q. The opposing parties in this proceeding dispute PJM's selection of the IEC Project.**  
22 **(See, e.g., OCA St. No. 1, p. 2.) Please describe your experience with PJM.**

1 A. I first became aware of PJM's importance soon after joining the Commission in 1979,  
2 although much of my first year as a commissioner was consumed with addressing the  
3 after effects of the nuclear accident that had occurred earlier that year at Three Mile  
4 Island. PJM's footprint and responsibilities were much smaller then, and I thought it was  
5 principally a "power pool" that economically dispatched power plant generation as  
6 electric customer demand rose and fell during the course of a day, and that coordinated  
7 the flow of wholesale electricity across its grid. I learned that PJM also performed long-  
8 term regional transmission line planning. Then, with the advent of electric choice in  
9 1996 and my participation in its implementation (representing clients before the  
10 Commission and, beginning in 2005, as a commissioner), I came to appreciate PJM's role  
11 as a neutral, independent party operating a competitive wholesale electricity market.

12 On a personal note, especially after visiting PJM's headquarters in Valley Forge  
13 during my second Commission tenure; after wrestling with the complexities of PJM's  
14 Reliability Pricing Model and its part in ensuring efficient wholesale electricity markets;  
15 and especially after seeing the mismanagement and fraud that occurred in California  
16 during that state's implementation of electric choice because it did not have a strong  
17 market monitor like PJM's, I am very proud that Pennsylvania can call PJM its own.

18

19 **Q. What is your view with respect to PJM's expertise in transmission system planning?**

20 A. PJM's expertise in transmission system planning is vitally important for these reasons:

- 21 1. Transmission system planning is a technically complex subject matter.
- 22 2. The Commission has limited core expertise in electric transmission planning.
- 23 3. PJM has nine decades of specialized experience in transmission system planning.

- 1 4. Only PJM has the necessary cross-region information available to it.
- 2 5. PJM's transmission system planning recommendations are the product of
- 3 extensive study and an open and transparent collective decision making process.
- 4 6. PJM's planning process is informed not only by PJM's in-house experts but also
- 5 by experts of the member-owners of transmission and interested parties.
- 6

7 **Q. OCA witness Mr. Rubin disagrees with PJM's cost/benefit analysis and argues that**

8 **PJM should consider net benefits (including increases in power costs) in the**

9 **cost/benefit analysis for market efficiency projects. (OCA St. No. 1, p. 24.) Do you**

10 **agree with PJM's cost/benefit analysis?**

11 **A. I agree with PJM's cost/benefit analysis and disagree with Mr. Rubin's "net benefits"**

12 **analysis.**

13 A "market efficiency" transmission project is necessary when the most economic

14 flow of electricity is impeded by congestion—either by the physical or electrical capacity

15 of the line, or by operational restrictions created and enforced to protect the security and

16 reliability of the grid—requiring higher-cost generation to be used to meet the demand

17 beyond the congestion. A remedial project eliminates the efficiency imbalance,

18 releveling the benefits and burdens as equally as possible.

19 If there is a substantial imbalance between the energy payments on either side of a

20 congestion point, the financial feasibility of a remedial action is determined by assessing

21 the savings in energy payments that could be achieved beyond the congestion point

22 compared to the present value of the cost to do so. Thus, a proper cost-benefit analysis—

1 as here performed by PJM—sums the benefits of an action and then subtracts the costs  
2 associated with taking that action.<sup>1</sup> That action is the elimination of the congestion point.

3 Mr. Rubin advocates subtracting from the benefits "the higher costs that would  
4 result in other regions (including Pennsylvania) because they would no longer have the  
5 benefit of that same lower-cost power) ... when it comes time to determine a project's  
6 'benefits' only those regions that would experience reduced costs are included in [PJM's]  
7 calculation. All regions whose costs would increase as a result of a project are simply  
8 ignored." (OCA St. No. 1, p. 24-25.)

9 Such an approach is not a valid cost/benefit analysis for a market efficiency  
10 project because it introduces costs that are foreign to the remedial action of eliminating  
11 congestion and have nothing to do with determining whether that action is financially  
12 feasible. The achievable savings are what they are and the construction costs are what  
13 they are. Exogenous costs corrupt the feasibility calculation. Costs of other actions skew  
14 the determination of the feasibility of the action.

15 The analytical method suggested by Mr. Rubin is, at heart, a permutation of the  
16 "Pennsylvania-first" approach to regional transmission planning that I address below at  
17 pages 14-15. It is anathema to regional planning because it forsakes the well-being of the  
18 grid as whole in favor of self-interested parochialism. It posits that no transmission  
19 project is acceptable unless it benefits every state affected and/or does no harm to every  
20 state affected. It rejects "all for one, one for all" and instead embraces "me first always."

---

<sup>1</sup> "Cost-benefit analysis – Investment & Finance Definition. A calculation that totals the benefits of making a capital purchase expenditure or an investment decision, then separately totals the costs of that decision. If the benefits outweigh the costs, then the action makes sense." WEBSTER'S NEW WORLD FINANCE AND INVESTMENT DICTIONARY (John Wiley & Sons, Inc. 2010) (*available at* <https://www.yourdictionary.com/cost-benefit-analysis>).

1 Such emphasis on local impact over system wide benefits invites retaliation and  
2 reciprocal self-interest.

3 In short, what Mr. Rubin suggests is a rejection of the reciprocal altruism upon  
4 which the welfare of the grid depends—each grid member must occasionally act in a  
5 manner that forsakes a benefit or even harms it while helping other members, with the  
6 expectation that the other members will act in a similar manner at a later time. This  
7 mutually altruistic behavior is what Prof. Mishan meant when he said, "And in cost-  
8 benefit analysis we are concerned with the economy as a whole, with the welfare of a  
9 defined society, and not any smaller part of it." (OCA St. No. 1, p. 23.)

10 Finally, contrary to Mr. Rubin's suggestion, no customer or group of customers is  
11 entitled to lower cost generation created by congestion constraints. When there is a  
12 constraint or bottleneck, the wholesale market is not functioning as intended, which  
13 results in a disparity of prices in front of and behind the bottleneck/constraint. Customers  
14 in front of the bottleneck are paying artificially low prices and customers behind the  
15 bottleneck are paying artificially high prices. The so-called "benefits" of congestion, i.e.,  
16 the fact that customers in front of the constraint are paying lower than competitive prices,  
17 are not benefits at all. They are the inefficient and uneconomic consequences of the  
18 bottleneck, which are being paid for through higher prices by those customer taking  
19 power behind the constraint. The purpose of the Project is to reduce this congestion and  
20 provide a more open and efficient market and levelized and competitive prices. Mr.  
21 Rubin's characterization of increased power prices in front of the bottleneck after  
22 congestion is relieved as a "cost" of the project makes no economic or factual sense. Mr.  
23 Rubin's argument appears to be that the beneficiaries of a non-competitive market have a

1 right or entitlement to that anti-competitive "benefit". This would be akin to a  
2 monopolist with market power objecting to the introduction of competition because it  
3 would prevent him/her from continuing to charge monopoly prices and reduce his/her  
4 profits.

5  
6 **IMPORTANCE OF REGIONAL PLANNING**

7 **Q. The opposing parties also argue that the IEC Project should be denied because it**  
8 **does not provide benefits to Pennsylvania. (OCA St. No. 1, p. 45.) Please explain**  
9 **your views on the importance of regional transmission planning.**

10 **A. It is my opinion that the Pennsylvania General Assembly in 1996, in order to ensure the**  
11 **success of electric restructuring, required the Commission in Section 2805(a) of the**  
12 **Public Utility Code to support regional transmission planning:**

13 **§ 2805. Regionalism and reciprocity.**

14 **(a) Other states.**—The commission shall take all necessary and  
15 appropriate steps to encourage interstate power pools to  
16 enhance competition and to complement industry  
17 restructuring on a regional basis. The Commonwealth, the  
18 commission and Pennsylvania electric utilities shall work  
19 with the Federal Government, other states in the region and  
20 interstate power pools to accomplish the goals of  
21 restructuring and to establish independent system operators  
22 or their functional equivalents to operate the transmission  
23 system and interstate power pools. The commission,  
24 Pennsylvania electric utilities and all electricity suppliers  
25 shall work with the Federal Government, other states in the  
26 region, the North American Electric Reliability Council and  
27 its regional coordinating councils or their successors,  
28 interstate power pools, and with the independent system  
29 operator or its functional equivalent to ensure the continued  
30 provision of adequate, safe and reliable electric service to  
31 the citizens and businesses of this Commonwealth.<sup>2</sup>

---

<sup>2</sup> 66 Pa.C.S. § 2805(a).

1 Q. Can Section 2805 be interpreted that broadly even though it does not specifically  
2 mention regional transmission planning?

3 A. Yes. The heading of the section and the statute's emphasis on the need for interstate  
4 power pools to accomplish electric restructuring make clear that regional transmission  
5 planning was necessarily included within the General Assembly's intent.

6 The headings prefixed to statutory sections are not controlling but may be used to  
7 aid in the statute's construction.<sup>3</sup> Section 2805's heading references regionalism and  
8 reciprocity. The statute's three sentences use the words "region" twice, "regional" twice,  
9 and "interstate" twice. The word "reciprocity" connotes mutuality across interstate  
10 borders, meaning not only cooperative complementary actions across those borders but  
11 also a balancing of benefits and burdens as equally as possible.

12 Each of the statute's three sentences contains a separate mandate to the  
13 Commission:

14 It is first ordered to encourage interstate power pools "to enhance competition and  
15 to complement industry restructuring on a regional basis."

16 The second sentence requires the Commission, the Commonwealth, and EDCs to  
17 work with the Federal government, other states in the region, and interstate power pools  
18 to accomplish the goals of restructuring and to establish ISOs or their functional  
19 equivalents "to operate the transmission system and interstate power pools."

20 Finally, the Commission, EDCs, and EGSs are directed to work with the Federal  
21 government, other states in the region, NERC and its regional coordinating councils,

---

<sup>3</sup> 1 Pa.C.S. § 1924.

1 interstate power pools, and the ISO "to ensure the continued provision of adequate, safe  
2 and reliable electric service to the citizens and businesses of this Commonwealth."

3 FERC approved PJM as the nation's first fully functioning ISO in 1997, and PJM  
4 became an RTO in 2002, so the first sentence is history while the remaining two  
5 sentences are ongoing obligations for the Commission to work with PJM and other  
6 entities "to accomplish the goals of restructuring" while continuing adequate, safe, and  
7 reliable service in the Commonwealth. In short, the Commission must make multi-state  
8 electric competition work without diminishing electric service for Pennsylvanians (see  
9 the caveat in Section 2802(3) below).

10 The restructuring goals were most reliably voiced in the Electricity Generation  
11 Customer Choice and Competition Act's Declaration of Policy, Section 2802, especially  
12 these four subsections:

13 (3) Because of advances in electric generation technology and  
14 Federal initiatives to encourage greater competition in the  
15 wholesale electric market, it is now in the public interest to permit  
16 retail customers to obtain direct access to a competitive generation  
17 market as long as safe and affordable transmission and distribution  
18 service is available at levels of reliability that are currently enjoyed  
19 by the citizens and businesses of this Commonwealth.

20 \* \* \*

21 (5) Competitive market forces are more effective than economic  
22 regulation in controlling the cost of generating electricity.

23 \* \* \*

24 (7) This Commonwealth must begin the transition from regulation  
25 to greater competition in the electricity generation market to  
26 benefit all classes of customers and to protect this  
27 Commonwealth's ability to compete in the national and  
28 international marketplace for industry and jobs.

29 \* \* \*

30 (14) This chapter requires electric utilities to unbundle their rates  
31 and services and to provide open access over their transmission  
32 and distribution systems to allow competitive suppliers to generate  
33 and sell electricity directly to consumers in this Commonwealth.  
34

1           Reading these goals in conjunction with the first sentence of Section 2805 and  
2           that section's encouragement of interstate power pools to enhance competition and to  
3           complement industry restructuring on a regional basis leads me to conclude that the  
4           legislature envisioned enhancing competition by removing barriers to customer access to  
5           the utility-owned transmission grid within and without Pennsylvania. Section 2802(3)  
6           especially indicates that the legislature was following the lead of the 1992 federal Energy  
7           Policy Act<sup>4</sup> which allowed non-utility generators and marketers to compete in the same  
8           nascent wholesale markets as traditional vertically-integrated utilities, and FERC's 1996  
9           Order 888<sup>5</sup> which was aimed at increasing competition by removing barriers to access to  
10          the utility-owned transmission grid. Consequently, the legislature unbundled electric  
11          generation and created Electric Generation Suppliers with access to the wholesale electric  
12          market via the grid. Simultaneously, the operating efficiency of electric power generators  
13          inevitably improved, leading to lower production costs and retail prices, to enable them to  
14          compete successfully with competitive generators inside and outside of the state  
15          connected by the grid.

16                 All of which, I believe, confirms my conclusion that an RTO managing the grid  
17          across multi-state borders to achieve these far-reaching restructuring goals must  
18          undertake a great deal of continuous planning to manage the flow of electricity and the  
19          marketplace in energy and capacity. Interstate flow management must include regional  
20          transmission planning for both reliability-ensuring and congestion-curing projects.

---

<sup>4</sup> Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776 (codified as amended in scattered sections of 42 U.S.C.).

<sup>5</sup> Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, 61 Fed. Reg. 21,540 (April 24, 1996); reh'g, Order No. 888-A, 62 Fed. Reg. 12,274 (Mar. 4, 1997); reh'g, Order No. 888-B, 62 Fed. Reg. 64,688 (Nov. 25, 1997).

1 Q. While achieving the mandated restructuring goals over the last two decades, what  
2 has the Commission done to promote regional transmission planning?

3 A. The Commission has long supported the concept of regional transmission planning. For  
4 example, the Commission filed comments with the FERC in 2009 stating that FERC  
5 "established an open regional transmission planning process as a core RTO function  
6 because without a regional process, regional transmission upgrades revert to an  
7 ineffective, inefficient and chaotic and balkanized process in which each individual  
8 transmission owner plans only for its own commercial interests."<sup>6</sup> The Commission  
9 added:

10 [N]o individual transmission project's effect on the regional grid  
11 can be evaluated in a vacuum – transmission planning must  
12 optimize the interconnected grid and evaluate all proposed projects  
13 together, selecting that combination of projects that best serves the  
14 region as a whole.<sup>7</sup>  
15

16 As further evidence of this support, the Commission is an active participant in the  
17 PJM stakeholder process and proceedings before the FERC regarding wholesale energy  
18 markets and regional transmission planning. It also is active in regional organizations  
19 that were formed by state commissions in the Mid-Atlantic (Organization of PJM States,  
20 Inc.) and in the Midwest (Organization of MISO States) regions.

21 Most tellingly, the Commission has implemented regional transmission planning  
22 recommendations in its decisions. In the TrAILCo proceeding regarding the

---

<sup>6</sup> Comment by the Pennsylvania Public Utility Commission on the April 24, 2009 Indiana Utility Regulatory Commission Request for Rehearing in Pioneer Transmission, LLC, Docket ER09-75-000, et al. (filed April 27, 2009), at 2.

<sup>7</sup> *Id.*

1 Pennsylvania portion of the "502 Junction Facilities,"<sup>8</sup> the Commission's order approving  
2 the application adopted the language of my motion saying that "the Commission takes  
3 seriously its obligations to enhance regional reliability and mitigate transmission  
4 constraints in order to reduce congestion for rate payers *in Pennsylvania and adjacent*  
5 *jurisdictions.*"<sup>9</sup> Note that neither my motion nor the Commission's order stopped after  
6 the word "Pennsylvania." The words were meant to convey all-inclusiveness for the  
7 greater good of all those affected, not to require that a benefit must always inure to  
8 Pennsylvania.

9 The Commission implemented regional transmission planning again in its  
10 Susquehanna-Roseland 500 kV Transmission Line decision<sup>10</sup> in which it said:

11 As an RTO, PJM plans and operates the integrated Bulk Electric  
12 System for the entire PJM footprint and administers the power  
13 markets in the PJM region. As part of its responsibilities, PJM  
14 undertakes a coordinated and open transmission planning process.  
15 PJM's role expanded in 2007 under FERC Order No. 890, which  
16 amended PJM's existing tariff to require coordinated, open, and  
17 transparent transmission planning on both a local and regional  
18 level. Preventing Undue Discrimination and Preference in  
19 Transmission Service, Order No. 890, 72 FR 12,266 (March 15,  
20 2007), FERC Stats. & Regs. ¶ 31,241, p. 435 (2007) (Order No.  
21 890). In addition, FERC required that transmission providers, such  
22 as PJM, coordinate with interconnected systems. *Id.* at 523.  
23 FERC stated that regional coordination would ensure the feasibility  
24 of simultaneously planned projects and the ability to identify

---

<sup>8</sup> *In re: Application of Trans-Allegheny Interstate Line Company*, Docket Nos. A-110172 et al., G-00071229 (order entered December 12, 2008) ("TrAILCo").

<sup>9</sup> *See, id.*, at 31 (emphasis added) ("this Commission has an obligation to enhance regional reliability and mitigate transmission constraints in order to reduce congestion for ratepayers in Pennsylvania and adjacent jurisdictions. 66 Pa. C.S. § 2805.").

<sup>10</sup> *Application of PPL Electric Utilities Corporation Filed Pursuant to 52 Pa. Code Chapter 57, Subchapter G. for Approval of the Siting and Construction of the Pennsylvania Portion of The Proposed Susquehanna-Roseland 500 kV Transmission Line in Portions of Lackawanna, Luzerne, Monroe, Pike and Wayne Counties, Pennsylvania*, Docket Nos. A-2009-2082652 et al. (order entered February 12, 2010).

1 system enhancements that could relieve congestion or integrate  
2 new resources. *Id.* Further, FERC determined that:  
3 *Greater coordination of planning on a regional basis will also*  
4 *increase efficiency through the coordination of transmission*  
5 *upgrades that have region-wide benefits, as opposed to pursuing*  
6 *transmission expansion on a piecemeal basis. Id. at 524; RD at 99,*  
7 *100.<sup>11</sup>*  
8  
9

10 **Q. Is it proper to focus on only Pennsylvania benefits for a regional transmission**  
11 **project?**

12 A. No. It is noteworthy that the third sentence of Section 2805 requires only that  
13 implementation of electric restructuring "ensure the continued provision of adequate, safe  
14 and reliable electric service to the citizens and businesses of this Commonwealth." It  
15 prohibits a diminution of service, but says nothing about rates which are competitively  
16 driven under restructuring. This omission is a further reason for rejecting Mr. Rubin's  
17 proposed deduction of rate increases on the near side of congestion points from the  
18 savings in energy payments beyond the congestion point.

19 More importantly, it is oxymoronic to claim that a regionally planned  
20 transmission project must produce positive benefits (or no harm) in every state through  
21 which the proposed line traverses. If that were true, regional planning would not be  
22 regional but parochial and self-interested. As the Commission commented to FERC,  
23 "without a regional process, regional transmission upgrades revert to an ineffective,  
24 inefficient and chaotic and balkanized process in which each individual transmission  
25 owner plans only for its own commercial interests." Again, Section 2805's "reciprocity"  
26 suggests complementary cross border actions that balance benefits and burdens as equally  
27 as possible.

---

<sup>11</sup> *Id.* at 28-29 (emphasis added).

1 "Pennsylvania-first" thinking is not only provincial and antithetical to the very  
2 idea of regional planning, it is also economically myopic, because an insistence by the  
3 Commission that today's project to primarily benefit Maryland, Virginia, and the District  
4 of Columbia also must benefit (or not harm) Pennsylvania provides the precedent for an  
5 insistence by the utility regulators in Maryland, Virginia, and the District of Columbia  
6 that tomorrow's project to primarily benefit Pennsylvania must also benefit (or not harm)  
7 their jurisdictions.

8  
9 **Q. The opposing parties also argue that the IEC Project is not necessary because it is**  
10 **designed to reduce congestion. (OCA St. No. 2, p. 12.) Please explain your views on**  
11 **PJM approving transmission projects that are designed to relieve congestion.**

12 **A.** I have already concluded above that interstate electricity flow management must include  
13 regional transmission planning for both reliability-ensuring and congestion-curing  
14 projects.

15 Interpreting Section 2805 to mean that regional transmission planning can consist  
16 of projects that improve system reliability to the exclusion of congestion relief would  
17 frustrate the electric restructuring goals stated in Section 2802. The efficacy of  
18 competitive market forces is precluded when a congestion impediment prevents cheaper  
19 generation from reaching customers in need of it. What sense is there in lauding  
20 measures to assure dependable delivery, while denigrating those that alleviate capricious  
21 costs? If remedial measures can balance the rate burdens on both sides of a congestion  
22 point, why should they be shunned?

1           Narrow-minded exclusion of market efficiency projects is also inconsistent with  
2           the economic dispatch of power generation where customer load is first met with the least  
3           cost generation and then with increasingly less efficient and more costly generation.  
4           Once the electricity is generated, it is economically transmitted on the grid by the most  
5           efficient means. Transmission should be as economically accomplished as generation  
6           dispatch. In fact, it would be planning dereliction to squander the achieved savings of  
7           economic dispatch by allowing them to be offset by costly transmission inefficiencies.

8

9    **Q.    Does this conclude your Rebuttal Testimony at this time?**

10   **A.    Yes.**

**BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

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

Petition of Transource Pennsylvania, LLC for a :  
finding that a building to shelter control : Docket No. P-2018-3001878  
equipment at the Rice Substation 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 : Docket No. P-2018-3001883  
equipment at the Furnace Run Substation in :  
York County, Pennsylvania is reasonably :  
necessary for the convenience or welfare of the :  
public :

Application of Transource Pennsylvania, LLC :  
for approval to acquire a certain portion of the : Docket No. A-2018-3001881, *et al.*  
lands of various landowners in York and :  
Franklin Counties, Pennsylvania for the siting :  
and construction of the 230 kV Transmission :  
Lines associated with the Independence Energy :  
Connection – East and West Projects as :  
necessary or proper for the service, :  
accommodation, convenience or safety of the :  
public :

**TRANSOURCE PENNSYLVANIA, LLC**

**REJOINDER TESTIMONY**

**JAMES H. CAWLEY**

**STATEMENT NO. 9-RJ**

2/25/19  
HJG TS

Date: February 11, 2019



1 **Q. Please state your name and business address.**

2 A. My name is James H. Cawley. My business address is 17 South Second Street, 6<sup>th</sup> Floor,  
3 Harrisburg, PA 17101-2039.

4  
5 **Q. Have you previously submitted testimony in this proceeding?**

6 A. Yes, I submitted rebuttal testimony (Transource PA Statement No. 9-R) on November 27,  
7 2018.

8  
9 **Q. Please describe the purpose of your rejoinder testimony.**

10 A. I will respond to certain assertions made by Office of Consumer Advocate (“OCA”)  
11 witness Rubin, Citizens to Stop Transource York County (“Citizens”) witness Krick, and  
12 Shaw Orchards witness Barron Shaw.

13  
14 **Q. Are you sponsoring any exhibits with your rejoinder testimony?**

15 A. No.

16

17 **RESPONSE TO OCA WITNESS RUBIN**

18 **Q. On pages 11-12 of his surrebuttal testimony, Mr. Rubin states that there is no**  
19 **substantial imbalance in energy payments on either side of the congestion point. Do**  
20 **you agree?**

21 A. No, I do not agree with Mr. Rubin. His testimony on pages 11-12 of his surrebuttal  
22 testimony contradicts his previous claims that a significant increase in customer  
23 payments in the unconstrained area will result from removing the congestion point (an

1 amount that his theory requires to be deducted from the numerator of the benefit/cost  
2 equation). He cannot have it both ways.  
3

4 **Q. On page 12 of his testimony, witness Rubin states that to the extent a generation  
5 source is used to serve the formerly constrained area, it cannot be used to serve the  
6 formerly unconstrained area. How do you respond?**

7 **A. Mr. Rubin makes this assertion in an attempt to counter my argument that increased  
8 customer payments in the unconstrained area as a result of removing the congestion are  
9 “exogenous” and not properly netted against the estimated reduction in customer  
10 payments in the constrained area. His rebuttal testimony response is that such increased  
11 payments are not exogenous but “an inextricable and unavoidable effect of changing the  
12 transmission system.” He states that “if a portion of that capacity is being used to serve  
13 the formerly constrained area, then it will no longer be available to the formerly  
14 unconstrained area.”**

15 I agree with him that such payments result from “changing the transmission  
16 system,” i.e., equalizing the payments across the grid by beneficially removing the  
17 congestion. But for the reasons I have already explained, customers in the unconstrained  
18 area have no entitlement to “benefit” from artificially low and discriminatory rates caused  
19 by the congestion, and they therefore do not suffer a loss that must netted against the  
20 estimated benefits of removing the congestion.

21 I disagree with Mr. Rubin that whatever power is made available to the customers  
22 in the presently constrained area after the congestion is removed will necessarily be  
23 unavailable to the customers in the presently unconstrained area. This assumes a

1 generation deficiency (or transmission or operational constraint) in Pennsylvania that to  
2 my knowledge has not been proven by any opponent of this project. From my limited  
3 knowledge, I doubt there is a generation deficiency that would cause customers in the  
4 unconstrained area to lack for power after the congestion is removed. Pennsylvania  
5 exports 27.5% of the energy generated in the state.\*  
6

7 **Q. Witness Rubin believes that loss of the “benefit” to the unconstrained area must be**  
8 **considered as a cost of constructing the project. OCA St. No. 1, pp. 12-13. Do you**  
9 **agree with Mr. Rubin’s approach?**

10 A. Rubin’s theory of benefit/cost analysis for determining the economic feasibility of a  
11 market efficiency transmission project posits that, before being divided by the estimated  
12 construction costs, any estimated payment reductions by customers on the constrained  
13 side of a congestion point must be offset by the estimated payment increases by  
14 customers on the unconstrained side of the congestion point.

15 The theory is fallacious and if adopted would be highly detrimental to  
16 Pennsylvania for the following reasons.

17 *First*, it corrupts the economic feasibility analysis which seeks to determine  
18 whether energy payments by customers in the constrained area will be reduced  
19 sufficiently if the estimated construction dollars needed to remove the congestion are  
20 spent. PJM’s standard for going forward with a project such as this is a benefit/cost ratio  
21 of at least 1.25 (the breakeven point being 1.0). The benefit/cost ratio formula is the

---

\* See <https://www.pjm.com/-/media/library/reports-notice/state-specific-reports/2017/2017-pennsylvania-state-infrastructure-report.ashx?la=en>.

1 discounted value of the project's benefits divided by the discounted value of the project's  
2 costs.

3 Rather than determining whether the "fix" is worth the candle, Mr. Rubin's theory  
4 introduces an extraneous consideration into the calculation by insisting that the numerator  
5 of the equation (the savings in customers' energy payments in the constrained area) be  
6 diminished by the increased customer payments in the unconstrained area.

7 The latter customer payments are extraneous because they have nothing to do  
8 with the financial feasibility of the corrective project which will be paid for by those  
9 customers benefitting from it in the constrained area. The cost/benefit calculation to  
10 correct the problem—energy savings/construction costs—must stand on its own merits.

11 *Second*, elimination of a market inefficiency is not a "cost" to customers in the  
12 unconstrained area because they are not entitled to discriminatory rates caused by  
13 congestion. Presently, customers in the constrained area are paying artificially high,  
14 discriminatory, and unjust and unreasonable power prices because cheaper generation  
15 cannot reach them and they instead must be served by higher generation sources. One of  
16 the primary benefits of operating a regional energy market and transmission grid is that  
17 local operators, and their customers, realize benefits by greater efficiency of the whole  
18 than could be realized by operating in an insular fashion. This concept is inherent in the  
19 decision of any local area to give operation and control to a regional entity. If this were  
20 not so, what incentive would any local operator have to cede control to an entity with a  
21 wider operational focus? This means that inherent to ensuring these benefits are achieved  
22 and sustained over the long run, inefficiencies in the regional market must be addressed  
23 as long as the cost of implementing solutions does not exceed the cost to the areas which

1 are receiving the benefit and also paying for the solution. Presently, customers in the  
2 unconstrained area are paying artificially low power prices because only they can take  
3 advantage of cheaper generation. In the first instance, the prices are discriminatory to the  
4 customers which agreed to participate in the regional PJM market and cede local  
5 operations in order to receive higher benefits of a regional market; in the second instance,  
6 they are discriminatory to the generators who are deprived by the congestion of realizing  
7 the full market value of the energy they provide to the regional market. Removal of the  
8 congestion, such as the chronic congestion which has existed on the AP South interface  
9 for many years, eliminates discrimination in rates over the length of the line in both of  
10 these instances.

11 Nor is a distortion in prices caused by congestion a “benefit” to which customers  
12 in the unconstrained area are entitled to receive or maintain. Customers are entitled to  
13 fair, just, and reasonable rates, but not discriminatory rates that are the result of market  
14 inefficiencies that do not exist in a well-functioning marketplace. Therefore, the  
15 monetized amount of the “loss” of this nonexistent “benefit” is improperly subtracted  
16 from the legitimate estimated savings to be achieved by removing the congestion.

17 *Third*, I believe that Mr. Rubin’s theory, if adopted, will never allow for the  
18 remediation of the chronic congestion and the discriminatory pricing that currently exists  
19 in the areas affected by the project. Mr. Rubin’s Theory would result in most cases in  
20 unresolved congestion because under PJM’s current (and thoroughly stakeholder vetted)  
21 benefit/cost analysis methodology projects would not satisfy the requisite 1.25 ratio  
22 standard. Its adoption would provide the opponents of any PJM market efficiency project

1 a sure-fire method to kill it. Any other inquiry regarding 52 Pa. Code § 57.76(a)(2)-(4)  
2 will become superfluous.

3 *Fourth*, Mr. Rubin's theory is deleterious to Pennsylvania's beneficial  
4 membership in the grid family which relies on the reciprocal altruism that I described in  
5 my earlier testimony (Transource PA Statement 9R at page 6). If Pennsylvania insists on  
6 maintaining the status quo when nearby members of the grid family need help to relieve  
7 their higher power rates because of a market inefficiency, then it can only expect  
8 reciprocal selfishness in return in its hour of need.

9 *Finally*, I believe the effects on Pennsylvania and its citizens would soon be dire.  
10 Sooner or later congestion problems will become reliability problems. Soon  
11 Pennsylvania will have difficulty maintaining its longstanding status as an exporter of  
12 power because of transmission constraints. Power production will necessarily be  
13 curtailed, jobs will be lost, tax revenues will diminish or be lost for good, and local  
14 economies will suffer. Because of the current transmission constraint, Pennsylvania  
15 generators are already losing sales to Maryland, Virginia, and District of Columbia  
16 customers.

17  
18 **Q. On pages 13-14 of this testimony, witness Rubin states that the Commission is**  
19 **required to evaluate the project based on its effects on Pennsylvania's utility**  
20 **customers and the service they receive. Is he correct?**

21 **A.** I am advised by counsel that the Commission's responsibility is to evaluate this project  
22 according to Section 1501 of the Public Utility Code regarding the character of service  
23 and facilities that must be provided by public utilities, and by subsections 57.76(a)(1)-(4).

1 Mr. Rubin suggests that the “in-state effects” of the project are being ignored by  
2 Transource PA. Given the amount of supporting evidence that Transource PA has  
3 produced and the unprecedented length of this proceeding during which every  
4 conceivable issue has been publicly aired and addressed in written direct testimony and  
5 exhibits, Mr. Rubin’s suggestion is baseless on its face. At bottom, what he really is  
6 urging is adoption of his novel and untenable theory which, if adopted, would  
7 immeasurably harm Pennsylvania’s economy and its citizens, as I have explained above.  
8

9 **RESPONSE TO CITIZENS WITNESS KRICK**

10 **Q. Witness Krick believes that the proposed transmission line should not be built in**  
11 **York County because York County has already done its part in supporting the**  
12 **region’s transmission needs. Citizens St. No. 1, p. 7. Do you agree with witness**  
13 **Krick’s reasoning?**

14 **A.** No, I do not. Without meaning to render a legal opinion, I believe the issue is not  
15 whether York County has already done its part but whether this particular project  
16 complies with the Section 1501 of the Public Utility Code and subsections (1)-(4) of the  
17 Commission’s regulations at 52 Pa. Code § 57.76. The Public Utility Commission has  
18 been vested with the authority to decide whether those requirements have been met  
19 regarding those aspects of the project affecting York County.  
20

21 **Q. On pages 13-14 of her testimony, witness Krick disagrees with your interpretation**  
22 **of Section 2805 of the Public Utility Code. Specifically, witness Krick does not**  
23 **believe that regional planning is part of the analysis. How do you respond?**

1 A. Mrs. Krick’s interpretation (at page 13, lines 24-25 through page 14, lines 1-4, of her  
2 testimony) of my testimony as advocating that regional transmission planning should  
3 occur “without regard for whether there are any benefits to Pennsylvania’s residents and  
4 businesses” is not accurate. An efficiently operating transmission grid benefits all its  
5 participants, as this one will. I still believe, however, as I stated on page 6 of my rebuttal  
6 testimony, that the welfare of the grid depends, at least occasionally, on reciprocal  
7 altruism: “each grid member must occasionally act in a manner that forsakes a benefit or  
8 even harms it while helping other members, with the expectation that the other members  
9 will act in a similar manner at a later time.”

10           Regarding my rebuttal testimony (Transource PA Statement 9-R at 7-10) dealing  
11 with the importance and necessity of regional transmission planning, I concluded, as a  
12 matter of public policy, that the Pennsylvania Legislature in Sections 2802 and 2805 of  
13 the Public Utility Code required the Commission to support such planning to ensure the  
14 success of electric restructuring “as long as safe and affordable transmission and  
15 distribution service is available at levels of reliability that are currently enjoyed by the  
16 citizens and businesses of this Commonwealth” (Section 2802(3)). Mrs. Krick and I  
17 appear to be in substantial agreement given her statements on page 14, lines 4-7 and 14-  
18 16, of her testimony.

19           In response to her statement (page 14, lines 1-4) that Section 2805(a) “does not  
20 say what [I] claim[] it says,” I stand by my interpretation of that entire section, especially  
21 when read *in pari materia* with Section 2802, based on my nearly fifty years of  
22 interpreting Pennsylvania’s statutes for myself and others. Of course, both sections speak  
23 for themselves.

1 Q. Witness Krick states that regional planning is important to ensure safe and reliable  
2 service, not market efficiency. Citizens St. No. 1, p. 14. Do you agree?

3 A. No, I do not agree as I partially explained at pages 14-15 of my rebuttal testimony. Mrs.  
4 Krick at page 14, lines 4-10, seems to argue that ensuring safe and reliable service and  
5 relieving transmission reliability and congestion problems are not synonymous, and  
6 therefore there is no "need" for the project. If that is her argument, she is simply wrong.  
7 [REDACTED] it is essential that the transmission system operate  
8 efficiently, including without congestion constraints that are cured by market efficiency  
9 projects like this one [REDACTED].

10 In fact, regional transmission planning must be comprehensive and therefore  
11 necessarily includes projects to relieve both reliability and congestion problems, which in  
12 turn ensures safe and reliable service. Witness McGlynn (now adopted by Witness  
13 Herling), in his direct testimony outlined how the PJM Regional Transmission Expansion  
14 Plan, and the problem statement issued which resulted in the selection of this Project,  
15 clearly evaluate both reliability and market efficiency matters. It is my understanding  
16 that congestion problems often turn into reliability problems, and it is therefore necessary  
17 to prevent reliability problems by removing congestion. Localized planning to ensure  
18 only safe and reliable service in Pennsylvania would significantly increase transmission  
19 and generation costs, as well as work to erode or negate the significant benefits and  
20 reasons that utilities within Pennsylvania expected when they ceded local grid and market  
21 control to PJM with the expectation of higher benefits through the operation of a regional  
22 market.

1 In addition, if Pennsylvania were to think only of itself and not as a part of a  
2 regional grid, it would promote and condone discriminatory practices completely  
3 incongruous with its PJM membership. Simply put, as a part of a Regional Transmission  
4 Organization, Pennsylvania cannot pick and choose how it participates in the RTO.

5 I must also disagree with Mrs. Krick's characterization of my testimony as a  
6 personal attack on the attitudes or intentions of the landowners in York (or Franklin)  
7 County by my description of Mr. Rubin's benefit/cost analysis as "parochial," "self-  
8 interested," and "provincial." I used those words to describe Mr. Rubin's benefit/cost  
9 analysis method, not to refer in any way to individuals or to Mr. Rubin personally.

10  
11 **RESPONSE TO CITIZENS WITNESS BARRON SHAW**

12 **Q. Witness Shaw states that PJM has no authority to approve the Project, and the**  
13 **Commission is solely responsible for determining need. Shaw St. No. 2, pp. 2-3.**  
14 **Witness Shaw also states that PJM's policy has not been approved by any**  
15 **governmental agency, including FERC. Shaw St. No. 2, p. 4, p. 8. How do you**  
16 **respond?**

17 **A.** I have been advised by counsel that these are legal issues and Transource PA will address  
18 it in Briefs.

19  
20 **Q. Witness Shaw believes that all cost and benefits to all involved parties should be**  
21 **considered. Shaw St. No. 2, p. 7. Do you agree?**

22 **A.** Mr. Shaw's surrebuttal testimony at page 7, lines 6-19, effectively restates and advocates  
23 Mr. Rubin's theory of benefit/cost analysis that I have addressed above. I incorporate my  
24 earlier responses here.



1 Q. On page 7 of his testimony, witness Shaw states that the Project will cause harm in  
2 the form of a rate increase. Is he correct?

3 A. The rates that Mr. Shaw is referring to are wholesale power costs (or rates). Wholesale  
4 power rates are a Federal Energy Regulatory Commission jurisdictional matter, not a  
5 Commission matter.

6  
7 Q. On pages 26-27 of his testimony, witness Shaw disagrees with your testimony which  
8 he characterizes as stating “that Pennsylvania customers should be willing to pay  
9 more in order to support lower rates elsewhere.” Do you agree?

10 A. No, I do not. Mr. Shaw bases his argument on the facts that the Maryland Public Service  
11 Commission has not yet approved the Maryland-related parts of the project; that  
12 opponents of the project have filed a motion to dismiss the case in Maryland; that  
13 Maryland Governor Hogan has asked PJM to stop the project; and that the Pennsylvania  
14 Public Utility Commission should not approve a project that “the beneficiaries  
15 specifically reject.”

16 *First*, the Maryland PSC has already approved the related Ringgold to Catoclin  
17 segment of PJM Project 9A, of which the IEC Project is a part. I believe that the  
18 Maryland Commission will act in the best interests of Maryland customers by approving  
19 the Maryland project to relieve chronic congestion that has long prevented less expensive  
20 power to flow to Maryland, Virginia, and the District of Columbia.

21 *Second*, the Pennsylvania PUC should make its own determination of the need for  
22 the project irrespective of the decision by the Maryland PSC. If the latter disapproves the  
23 Maryland project, the Pennsylvania PUC can at least say that it has done its part to cure



1 the problem and to improve the efficiency of the grid where remedial action is sorely  
2 needed.

3 *Third*, I have been advised by counsel that the opponents' motion to dismiss was  
4 not granted. Moreover, Pennsylvania's procedures should proceed without regard to  
5 procedural actions occurring in other jurisdictions.

6 *Fourth*, the actions of Maryland's Governor may have been motivated by any  
7 number of reasons, rational or otherwise, none of which is before this Commission in this  
8 proceeding (nor is Governor Hogan a party to this proceeding). I also understand that  
9 Governor Hogan did not ask PJM to dismiss the project, but simply to restudy the project  
10 to ensure it was still providing the benefits expected, which PJM has done.

11 Finally, Mr. Shaw at page 27, line 5, of his surrebuttal testimony states that "[i]t is  
12 irrational to exclude the costs to Pennsylvania ratepayers." This statement mirrors his  
13 surrebuttal testimony at page 7, lines 6-19, and effectively restates and advocates Mr.  
14 Rubin's theory of benefit/cost analysis that I have addressed above. I incorporate my  
15 earlier responses here.

16  
17 **Q. Does this conclude your rejoinder testimony at this time?**

18 **A. Yes.**



**BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Application of Transource Pennsylvania, LLC	:	
for approval of the Siting and Construction of	:	Docket No. A-2017-2640195
the 230 kV Transmission Lines Associated	:	Docket No. A-2017-2640200
with the Independence Energy Connection –	:	
East and West Projects in portions of Franklin	:	
and York Counties, Pennsylvania	:	
	:	
	:	
Petition of Transource Pennsylvania, LLC for a	:	
finding that a building to shelter control	:	Docket No. P-2018-3001878
equipment at the Rice Substation 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	:	Docket No. P-2018-3001883
equipment at the Furnace Run Substation in	:	
York County, Pennsylvania is reasonably	:	
necessary for the convenience or welfare of the	:	
public	:	
	:	
	:	
Application of Transource Pennsylvania, LLC	:	
for approval to acquire a certain portion of the	:	Docket No. A-2018-3001881, <i>et al.</i>
lands of various landowners in York and	:	
Franklin Counties, Pennsylvania for the siting	:	
and construction of the 230 kV Transmission	:	
Lines associated with the Independence Energy	:	
Connection – East and West Projects as	:	
necessary or proper for the service,	:	
accommodation, convenience or safety of the	:	
public	:	

**TRANSOURCE PENNSYLVANIA, LLC**

**REBUTTAL TESTIMONY OF**

**JUDY CHANG**

**STATEMENT NO. 10-R**

Date: November 27, 2018

1 **Q. Please state your name and business address.**

2 A. My name is Judy Chang. My business address is One Beacon Street, Suite 2600, Boston,  
3 MA 02108.

4  
5 **Q. By whom are you employed and in what capacity?**

6 A. I am a Principal of The Brattle Group, an economic and finance consulting firm.  
7

8 **Q. Please describe your professional and educational background.**

9 A. I have over 20 years of experience in advising energy companies on regulatory and  
10 financial issues, including investment decisions in transmission. I have submitted expert  
11 testimonies to the U.S. Federal Energy Regulatory Commission, U.S. state and Canadian  
12 provincial regulatory authorities on topics related to transmission planning, access, and  
13 pricing; resource planning; and power purchase and sale agreements. Relatedly, I have  
14 conducted analyses to advise clients on various topics across the energy sector, including  
15 evaluating proposed transmission projects, forming or expanding regional electricity  
16 markets, approaches to integrating renewable energy onto power systems, and proposed  
17 energy and environment policies. I have estimated the economic impacts associated with  
18 transmission and renewable energy investments and provided public policy advice to  
19 policymakers regarding energy investments. I have presented at a variety of industry  
20 conferences and have presented at graduate school seminars on energy and environmental  
21 policies at Harvard Law School, Tuft's Fletcher School of Law and Diplomacy, and  
22 MIT's Sloan School of Management. I hold a Bachelor of Science in Electrical

1 Engineering and Computer Science from University of California, Davis and a Master of  
2 Public Policy from Harvard Kennedy School.

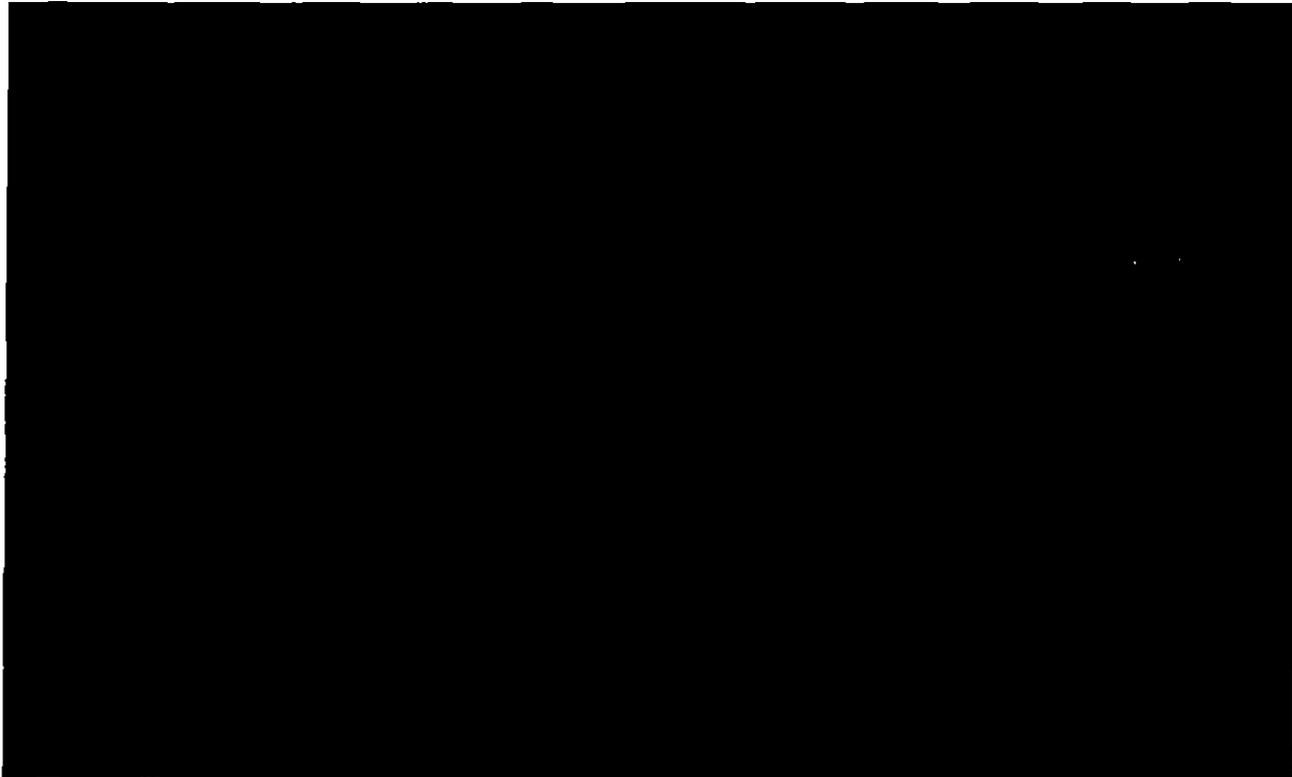
3  
4 **Q. What is the purpose of your testimony?**

5 A. I describe the economic benefits associated with the proposed Independence Energy  
6 Connection Project ("IEC Project" or "the Project"). Specifically, these benefits include  
7 those that the project can provide to electricity customers in Pennsylvania. Further, I  
8 estimate the potential employment and economic stimulus impacts associated with the  
9 construction of the IEC Project.

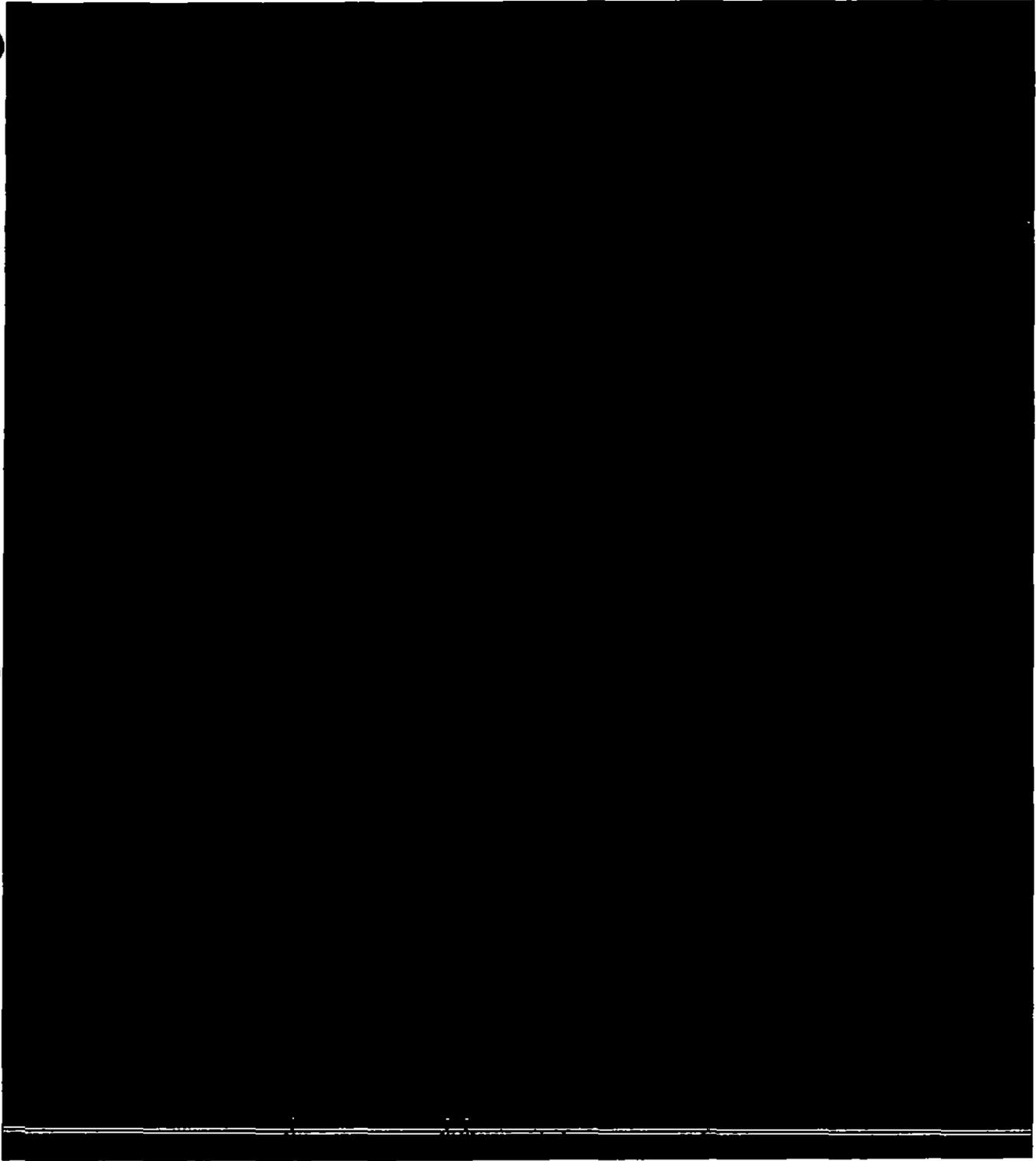
10  
11 **Q. Please describe the IEC Project.**

12 A. The IEC Project is an electric transmission project that is a component of PJM's Market  
13 Efficiency Project 9A. The project is designed to include approximately 45 miles of new  
14 230 kV transmission line, separated into two segments. The western segment will  
15 connect from the newly constructed Rice substation located in Franklin County,  
16 Pennsylvania to the Ringgold substation in Washington County, Maryland. The eastern  
17 segment will connect from another new substation, Furnace Run, in York County,  
18 Pennsylvania to the Conastone substation in Harford County, Maryland. The IEC Project  
19 includes the construction of two new substations, one at each of the northern ends of the  
20 segments in Pennsylvania.

21  
22 **Q. Please summarize the findings of your testimony.**

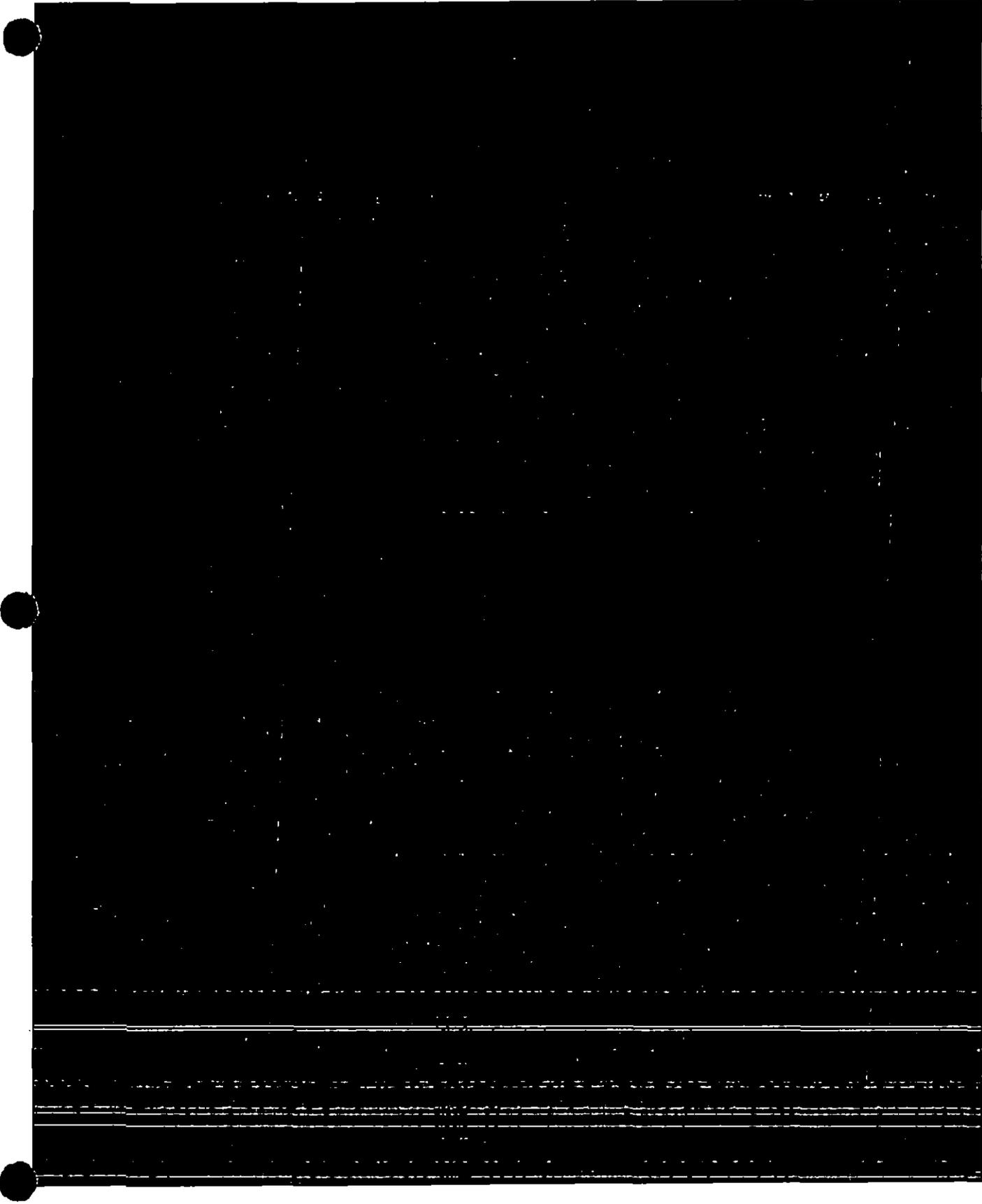


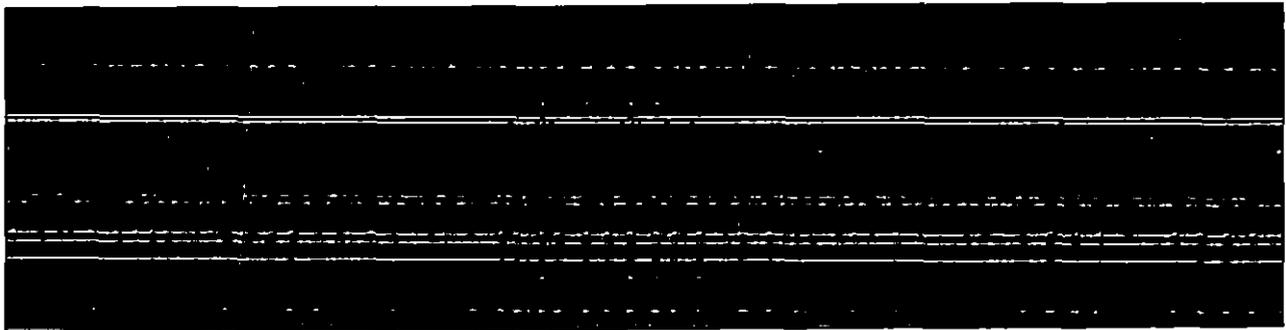
12           The second part of the testimony presents an analysis I conducted to estimate the  
13           employment and economic stimulus benefits to the local economies in Franklin and York  
14           Counties in Pennsylvania, the rest of the state of Pennsylvania, and in Maryland. That  
15           analysis finds that the construction of the IEC Project will support between 74 and 93  
16           jobs and generate between \$25.6 million and \$29.6 million in economic activity in  
17           Pennsylvania. In addition, the construction of the IEC Project will create between  
18           \$530,000 and \$660,000 in tax revenue for state and local governments within  
19           Pennsylvania.  
20



---

<sup>1</sup> See Rebuttal Testimony of PJM witness Steven R. Herling, Transource St. No. 7-R.







---

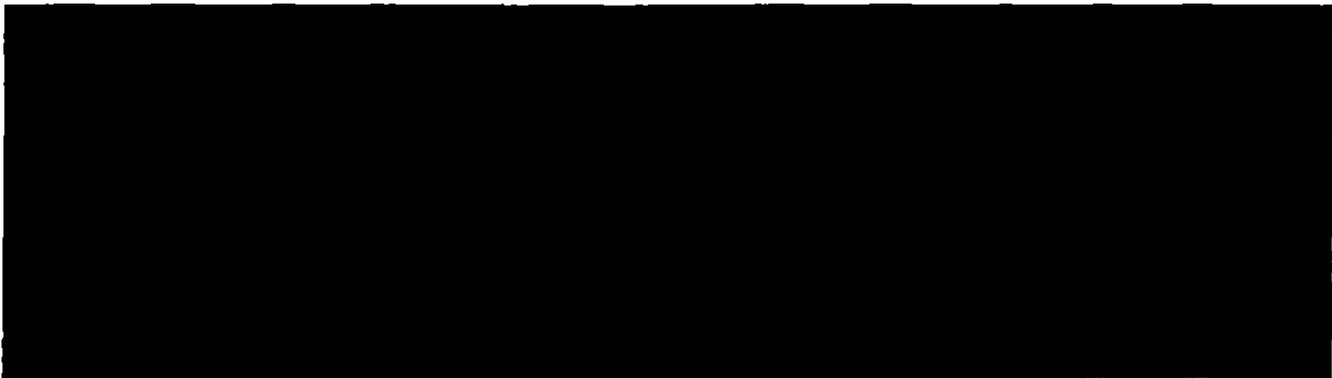
<sup>6</sup> "PJM Cold Snap Performance December 28, 2017 to January 7, 2018," PJM Interconnection, February 26, 2018, p. 26.

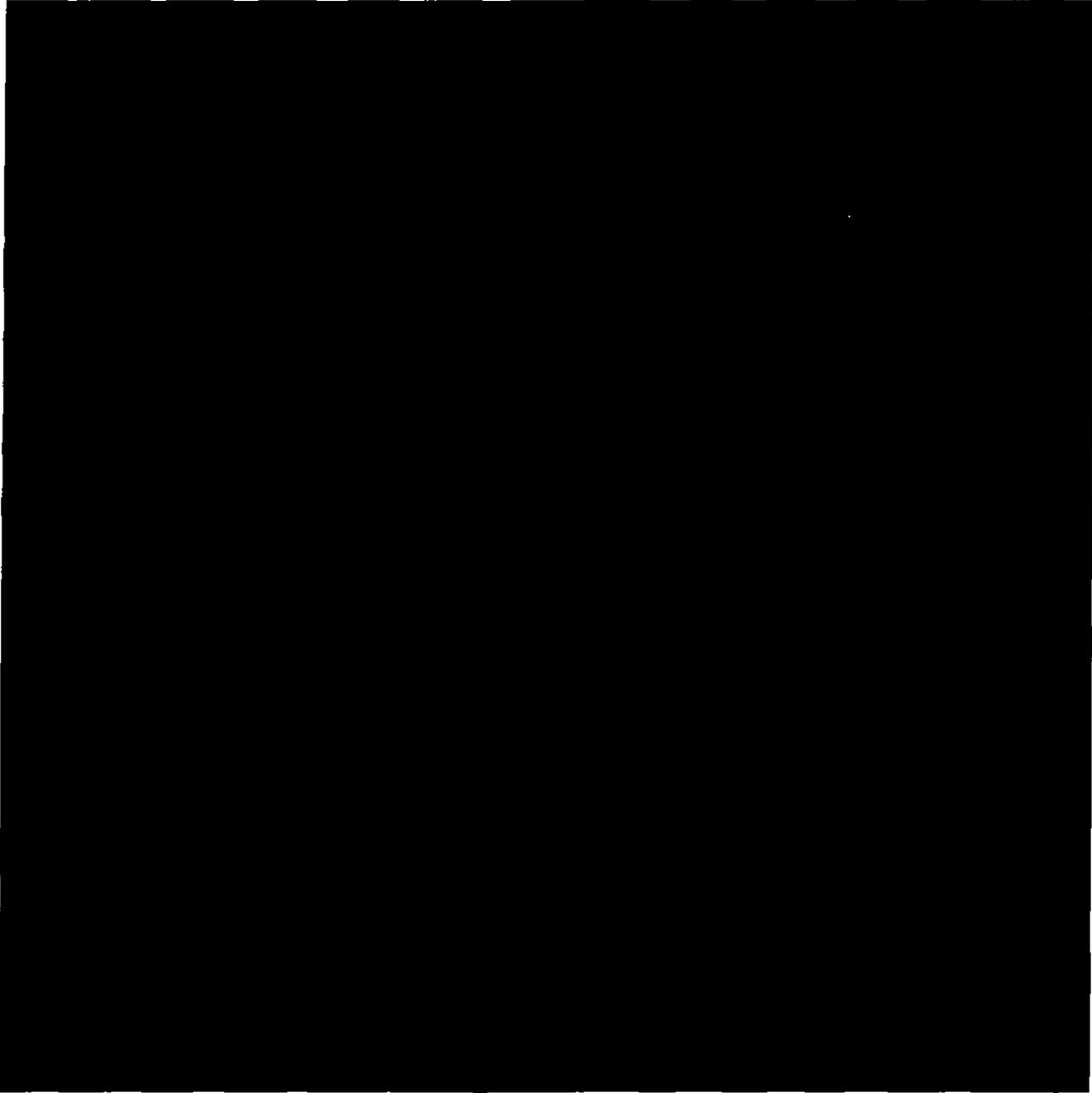
<sup>7</sup> "PJM Cold Snap Performance December 28, 2017 to January 7, 2018," PJM Interconnection, February 26, 2018, p. 25.

<sup>8</sup> "2018 Quarterly State of the Market Report for PJM: January through March", Monitoring Analytics, LLC, Section 11, p. 501, May 10, 2018.

**Table 1: Sample of Benefits Provided by Transmission Infrastructure Projects**

<b>Benefit Category</b>	<b>Transmission-Provided Benefit</b>	<b>Accounted for in PJM Analysis of IEC Project</b>
<b>Traditional Production Cost Analysis</b>	<ul style="list-style-type: none"> <li>• Congestion relief under normal system conditions</li> </ul>	✓
<b>Additional Production Cost Analysis</b>	<ul style="list-style-type: none"> <li>• Mitigation of extreme weather/load events and system contingencies</li> <li>• Reduced congestion due to system outages</li> <li>• Reduced transmission system losses</li> </ul>	✗
<b>[REDACTED]</b>	<b>[REDACTED]</b>	<b>[REDACTED]</b>
<b>Capacity Market Benefits</b>	<ul style="list-style-type: none"> <li>• Increased import/export capability between capacity zones in PJM market</li> </ul>	✗
<b>Market Benefits</b>	<ul style="list-style-type: none"> <li>• Enhanced competition in the PJM market</li> <li>• Increased market liquidity</li> </ul>	✗
<b>Storm Hardening</b>	<ul style="list-style-type: none"> <li>• Improved flexibility of the transmission system in cases of damage from severe weather events</li> </ul>	✗
<b>Public Policy / Customer Choice Benefits</b>	<ul style="list-style-type: none"> <li>• Reduced cost of meeting policy and other customers power purchase goals (e.g., increasingly higher levels of renewable energy purchases)</li> </ul>	✗
<b>Insurance Value</b>	<ul style="list-style-type: none"> <li>• Having a robust and flexible transmission system can deliver cost savings or mitigate increases under uncertain market futures</li> </ul>	✗
<b>Benefits Beyond 15-year Time Horizon</b>	<ul style="list-style-type: none"> <li>• Transmission infrastructure provide benefits throughout its entire useful life, which is generally <i>much longer than 15 years</i></li> </ul>	✗

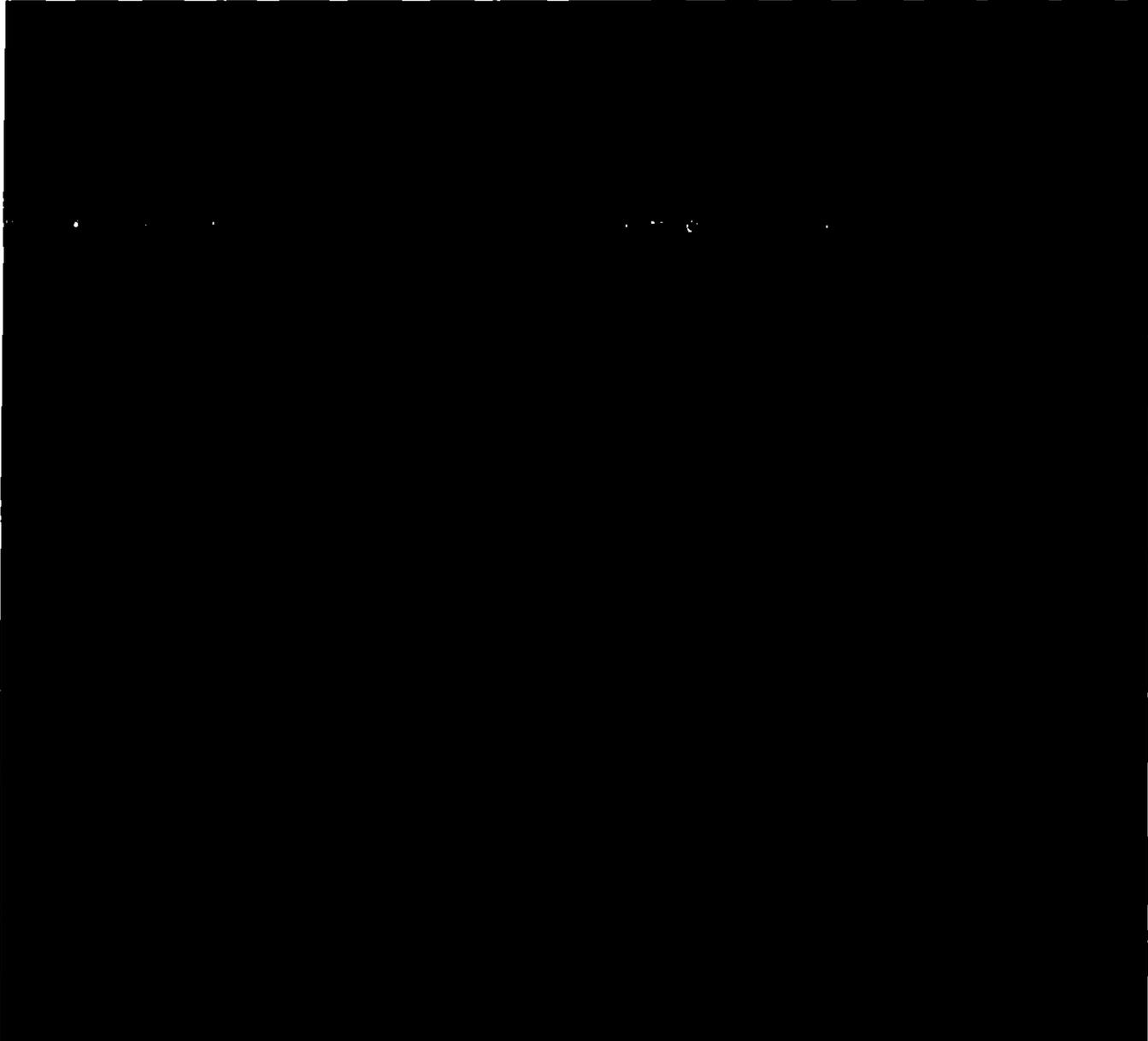




---

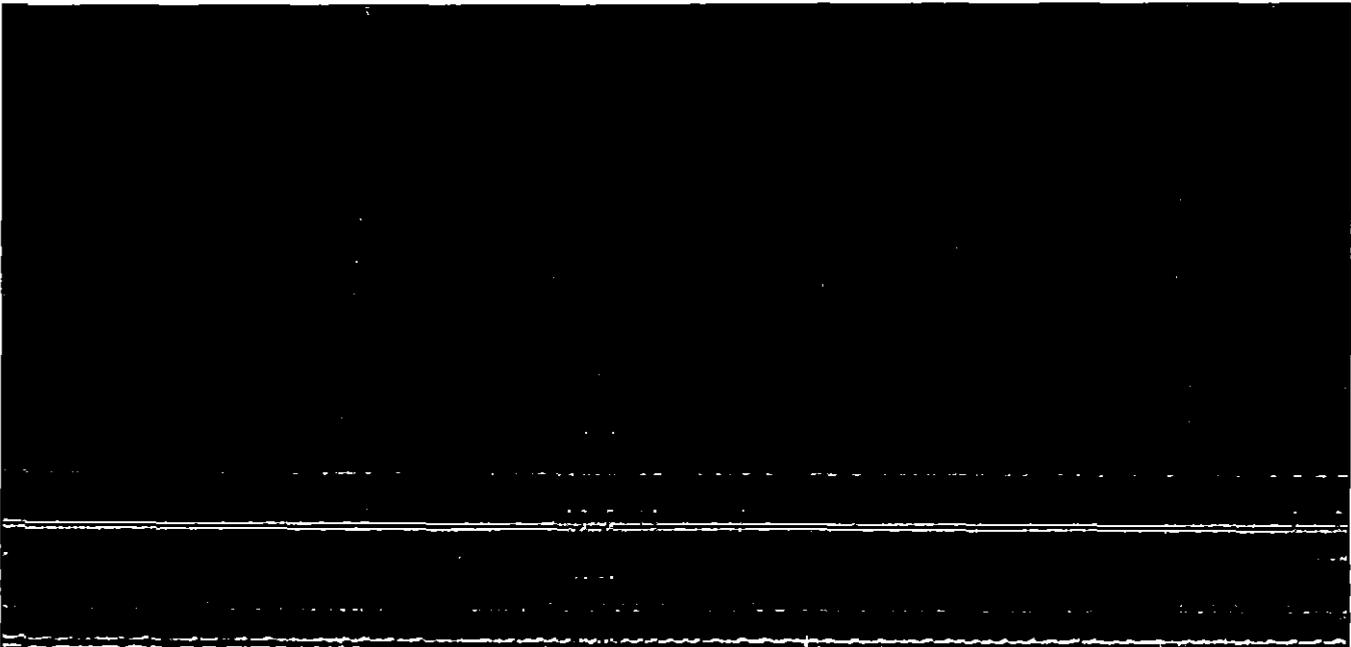
<sup>9</sup> “Transource AP-South (2014/15\_9A) Project Reevaluation,” PJM Transmission Expansion Advisory Committee, September 13, 2018, p. 4.

<sup>10</sup> The five elements are: 1) a transformer at Three Mile Island, 2) a conductor on the Peach Bottom-Conastone 500kV line, 3) a conductor on the Hunterstown-Lincoln 115kV line, 4) a conductor on the Lincoln Tap-Lincoln 115kV line, and 5) a conductor on the Lincoln-Straban 115kV line. The Peach Bottom-Conastone 500kV line is partially located in Maryland. The other 4 elements are located in Pennsylvania.

- 
- 
- <sup>11</sup> The Philadelphia Electric Co. (PECO) and Metropolitan Edison Co. (METED) areas both experienced higher prices than parts of western Pennsylvania, West Virginia, and Virginia in the capacity auction conducted in May 2017 for the 2020/2021 delivery year. See 2020/2021 RPM Base Residual Auction Results located here: <https://www.pjm.com/-/media/markets-ops/rpm/rpm-auction-info/2020-2021-base-residual-auction-report.ashx?la=en>
- <sup>12</sup> See “Transource AP-South (2014/15\_9A) Project Reevaluation,” PJM Transmission Expansion Advisory Committee, September 13, 2018, p. 5.
- <sup>13</sup> See Rebuttal Testimony of Company Witness Kamran Ali, Transource PA St. No. 2-R.

1 Q. The Office of Consumer Advocate witness, Mr. Geoffrey C. Crandall, states that the  
2 addition of energy efficiency, distributed generation (including combined heat and  
3 power), demand response, and renewable energy resources (“non-transmission  
4 alternatives”) in Virginia, Maryland, and Washington DC will alleviate congestion  
5 on the AP-South constraint and reduce the need for the IEC Project.<sup>14</sup> Will adding  
6 non-transmission alternatives in Virginia, Maryland, and Washington DC provide  
7 the same benefits as the IEC Project?

8 A. No. The non-transmission alternatives discussed by Mr. Crandall are not able to deliver  
9 the full range of benefits that the IEC Project can provide. Non-transmission alternatives,  
10 like the resources Mr. Crandall describes, may be able to provide some of the benefits  
11 listed in Table 1 in the areas where they are deployed. However, the non-transmission  
12 alternatives cannot simultaneously provide all of those benefits across a broader section  
13 of the PJM footprint like the IEC Project.



<sup>14</sup> OCA St. No. 3, p. 30.



18  
19

**JOBS AND ECONOMIC STIMULUS IMPACT ANALYSIS FOR THE IEC  
PROJECT**

20  
21  
22

**Q. Various parties argue that the Project does not provide employment or economic stimulus value to Pennsylvania (*see, e.g., Tr. at pp. 1060, 1075, 1101, 1128, 1135*). Do you agree with this position?**

1 A. No, I do not agree. In addition to the various benefits from the new transmission  
2 facilities outlined above, I have performed a study of employment and economic impacts  
3 from the Project.

4  
5 **Q. Please summarize the results of the employment and economic impact analysis.**

6 A. Across Pennsylvania and Maryland, I estimate that during the construction phase of the  
7 Project, Transource's investment will support the equivalent of between 85 to 112 full-  
8 time equivalent years ("FTE-years") of employment,<sup>15</sup> stimulate between \$30.7 million  
9 and \$36.8 million of economic activities, and generate between \$690,000 and \$900,000  
10 of tax revenues for state and local governments. In Pennsylvania, I estimate that the  
11 Project would support between the equivalent of 74 and 93 FTE-years and stimulate  
12 between \$25.6 and \$29.6 million of economic activities. In addition, the construction of  
13 the IEC Project will create between \$530,000 and \$660,000 in tax revenue for state and  
14 local governments within Pennsylvania

15  
16 **Q. Please explain how you estimated the employment and economic stimulus impact of**  
17 **the IEC Project.**

18 A. I gathered information about the Project's expenditures from Transource, including how  
19 those investment dollars would be spent across materials, equipment, and labor, to  
20 estimate the likely economic impact of the Project. Specifically I focused on the labor,

---

<sup>15</sup> This employment figure includes FTE-years calculated using an economic impact model (IMPLAN) and figures provided by Transource, specifically Company Witness Stephen P. Stein. In the economic impact model used here, one FTE-year is equivalent to 52 weeks of 40 hour per week employment, and a single FTE-year could be one year-long full-time position or multiple part-time positions. Transource's estimates of FTE-years are based on a 50-hour work week, which primarily affects direct jobs.

1 materials, and equipment supplied from within the counties and states analyzed. After  
2 gathering the information about the expected investment, an input-output model, called  
3 Impact Analysis for PLANing or IMPLAN, is used to estimate the employment and  
4 economic stimulus impact associated with the IEC Project. I have assumed that the  
5 investment dollars associated with paying for materials, equipment, and labor that would  
6 be procured from outside the localities analyzed would not induce local economic  
7 activities. The model reports the economic activities as the value of all goods and  
8 services sold throughout the supply chain (such as in the form of sale and resale  
9 revenues). Thus, reported economic output refers to the total flow of money that occurs  
10 throughout the local economy examined.

11  
12 **Q. You stated that the IEC Project is part of PJM Market Efficiency Project 9A. Did**  
13 **you quantify the economic impacts of investments other than the IEC Project that**  
14 **are part of PJM Project 9A?**

15 **A.** No, my analysis includes only the investments made by Transource as part of the IEC  
16 Project. While I understand that Project 9A also includes additional investments by other  
17 utilities, I did not estimate the potential economic impacts from investments other than  
18 the IEC Project.

19  
20 **Q. Please describe the IMPLAN model and your use of the model.**

21 **A.** IMPLAN is a well-established industry-standard model used by economists to estimate  
22 how an economy responds to a change in expenditures and adjusts in a way that the  
23 overall quantity of goods and services produced balances with the quantity consumed

1 across the economy.<sup>16</sup> Input-output models contain detailed relationships between the  
2 “outputs” of certain activities across various sectors of the economy (such as constructing  
3 new transmission infrastructure), to their required “inputs,” (such as salaries paid to  
4 workers, spending on certain materials for the project, and the up-stream processes of  
5 producing the necessary materials and equipment that would be used in the project). It is  
6 an industry-standard approach to use an input-output model to estimate the impact of  
7 infrastructure investments on the various sectors of a state’s or region’s economy. The  
8 results that I report in this testimony can be interpreted as the economic activities that  
9 take place in the localities analyzed when Transource invests in the IEC Project.  
10

11 **Q. What are the economic effects that you estimate using IMPLAN?**

12 **A.** The impacts that I estimate using the IMPLAN model include: (1) the number of jobs  
13 supported in each county or state (measured in full-time-equivalent years or FTE-years);  
14 (2) the economic activities associated with the Project (increases in “economic output” as  
15 measured in total sales and resale revenues of businesses within the areas analyzed); and  
16 (3) the likely state and local tax revenues collected due to the Project during construction.

17 These effects are reported by IMPLAN as direct, indirect, or induced effects.  
18 Direct effects represent the changes in employment and economic activities in the  
19 industries that directly support the investment. For example, the investment in the IEC  
20 Project would include direct spending on design, engineering, and construction services.

---

<sup>16</sup> The IMPLAN economic impact modeling system is developed and maintained by the IMPLAN Group LLC, which has continued the original work on the system done at the University of Minnesota in close partnership with the U.S. Forest Service’s Land and Management Planning Unit. IMPLAN divides the economy into 440 sectors and allows the user to specify the expenditure allocations associated with a given expansion in demand to all relevant parts of the local economy in order to derive the economic impacts—changes in employment, earnings, and economic output.

1 Indirect effects measure the changes in the supply chain and inter-industry purchases  
2 associated with the transmission project, including the upstream activities associated with  
3 the construction and manufacturing of the equipment and materials used in the Project.  
4 These activities include, for example, the revenues for and the employment associated  
5 with the suppliers of transmission equipment and installation supplies, such as concrete.  
6 Induced effects represent the increased spending on housing, food, clothing, and other  
7 products and services by those directly or indirectly employed in the development and  
8 construction of the Project.

9  
10 **Q. Which regions did you analyze in your economic impact analysis of the IEC**  
11 **Project?**

12 A. I analyzed the economic impact of the IEC Project in four distinct regions: (1) Franklin  
13 County, Pennsylvania; (2) York County, Pennsylvania; (3) the remaining part of  
14 Pennsylvania ("Rest of PA"), and (4) Maryland.

15  
16 **Q. When Transource invests in Maryland for the IEC Project, would there be any spill-**  
17 **over effects in Pennsylvania? If so, have you analyzed the cross-regional effects?**

18 A. Yes, when spending occurs in Maryland, there may be spill-over effects into  
19 Pennsylvania, and vice versa. I use IMPLAN's Multi-Regional Input-Output (MRIO)  
20 model to estimate the likely economic impact of Transource's investment in each region  
21 separately, which automatically accounts for cross-regional impacts. Even though the  
22 investment dollars are provided based on the location of the spending, the model  
23 considers the interactions among employment, taxes, trade flows, and other aspects of the

1 local economy such that the results capture the spill-over effects that would occur due to  
2 the movements of workers and goods traded across the jurisdictional borders. For  
3 example, when using the IMPLAN MRIO model, the investment dollars assumed to be  
4 made by Transource in Franklin County, PA would affect the regional economy and may  
5 yield indirect and induced effects in the surrounding areas, including York County, PA,  
6 other parts of Pennsylvania, and Maryland. Thus, in reporting the estimated economic  
7 impact, I pay particular attention to account for the interactions across county and state  
8 boundaries.

9  
10 **Q. Why did you model Pennsylvania as three regions and Maryland as one region?**

11 A. I modeled the states differently due to the geographic distribution of the proposed project.  
12 The IEC Project will include over 37 miles of new transmission line in Pennsylvania and  
13 approximately 7.5 miles of new transmission line in Maryland. Since a significant  
14 portion of the physical infrastructure will be constructed in Pennsylvania, I separately  
15 estimated the economic impact on Franklin and York Counties in Pennsylvania, as well  
16 as the rest of Pennsylvania.

17  
18 **Q. How did you estimate the investment expenditures associated with the IEC Project?**

19 A. I obtained the investment expenditures by spending category and location from  
20 Transource, specifically from Company Witness Stephen P. Stein. Those expenditure  
21 data reflect the best estimate of the local spending associated with building the IEC  
22 Project. For the purpose of this study, I use only the investments that will be made in the  
23 regions of interest: Pennsylvania and Maryland. For example, if Transource plans to

1 purchase materials or equipment from outside the two states, the amount budgeted for  
2 that spending is not included in my analysis because I assume that any spending outside  
3 of Pennsylvania and Maryland would not affect the economic activities in the two states  
4 of my focus. Similarly, any expenditures budgeted to hire workers from outside of the  
5 two states is assumed not to contribute toward the economic stimulus impact in the two  
6 states. One exception is the budget for paying for out-of-area workers' that will be  
7 working within Pennsylvania and Maryland on the construction of the IEC Project. The  
8 budgeted amount for lodging and meals for out-of-area works, in the form of "per-diem,"  
9 is included in my analysis because I assume that those dollars would likely be spent on  
10 lodging and restaurants located in Pennsylvania and Maryland, which in turn contributes  
11 toward the local economies. I will explain how I estimated per-diem expenditures  
12 following a discussion of the other expenditures.

13  
14 **Q. Please summarize the expenditures analyzed in the economic impact analysis.**

15 **A.** The investment expenditures data were provided by Transource Witness Stephen P. Stein  
16 and a high and low estimate are summarized in Table 2 below. The table provides a  
17 range of the local investment dollars categorized by the type of spending. Specifically,  
18 Table 2 shows the estimated expenditures on materials and services that will be sourced  
19 from within the various localities analyzed, taxes paid on materials and services sourced  
20 from the local economy, earnings for in-area workers and other payments to local  
21 entities, and spending on food and lodging for out-of-area workers (per-diem spend).

1 The direct expenditures on materials and services that Transource expects to spend in the  
 2 local economy, as shown in Table 2, exclude my estimates of the state and local taxes.  
 3 The estimates of the taxes are shown in row 2 of Table 2.

**Table 2: Estimated Local Project Expenditures in Pennsylvania and Maryland  
 Based on Cost Categories**

<b>Cost Category</b>		<b>Low Estimates</b>	<b>High Estimates</b>
Materials and Services	[1]	\$6,928,000	\$8,503,000
Taxes on Materials & Services	[2]	\$26,000	\$36,000
Local Labor Compensation & Other Payments	[3]	\$14,778,000	\$16,632,000
Per Diem Spend	[4]	\$2,107,000	\$2,384,000
<b>Total</b>	<b>[5]</b>	<b>\$23,839,000</b>	<b>\$27,555,000</b>

Note: The expenditures listed in this table include only the portion of total project costs Transource plans to spend locally in Pennsylvania and Maryland. Therefore, the range of \$23.8 to \$27.6 million shown in the table does not represent the total project costs, only the portion that will be spent locally. Values are rounded to the nearest \$1,000.

4 **Q. How did you allocate the Project's local spending to Pennsylvania and Maryland?**

5 **A.** The investment amounts shown in Table 2 are allocated to the four regions based on the  
 6 proportion of new transmission line miles being built in each region. For example, the  
 7 proposed project will build 24.4 miles of new transmission line in Franklin County, PA,  
 8 which is 55% of total line miles being constructed. Therefore, 55% of the local  
 9 investment is allocated to Franklin County.<sup>17</sup> This allocation of the investment dollars by  
 10 line miles is used to represent how spending would affect the local economies due to the  
 11 relative amount of spending and the associated structures of the local economies. Table 3  
 12 below shows the investment dollars that I estimate Transource would spend for the IEC

<sup>17</sup> For a subset of categories of expenditures, Transource was able to provide more specific estimates of local spend; this is why "Rest of PA" has direct expenditures in Table 3 despite not having any line miles of transmission.

1 Project in Pennsylvania and Maryland based on the high and low estimates provided by  
 2 Transource. These investment assumptions are used as input assumptions in the  
 3 IMPLAN model.

**Table 3: Summary of IMPLAN Inputs for Analyzing Impacts on Pennsylvania and Maryland  
 (in \$thousands)**

Cost Category		Franklin (PA)		York (PA)		Rest of PA		MD		Total	
		Low	High	Low	High	Low	High	Low	High	Low	High
Materials and Services	[1]	\$2,257	\$2,745	\$1,175	\$1,429	\$2,663	\$3,013	\$833	\$1,316	\$6,928	\$8,503
Taxes on Materials & Services	[2]	\$15	\$18	\$7	\$9	N/A	N/A	\$4	\$9	\$26	\$36
Local Labor Compensation & Other Payments	[3]	\$8,085	\$9,099	\$4,208	\$4,736	N/A	N/A	\$2,485	\$2,797	\$14,778	\$16,632
Per Diem Spend	[4]	\$1,152	\$1,305	\$600	\$679	N/A	N/A	\$355	\$400	\$2,107	\$2,384
<b>Total</b>	<b>[5]</b>	<b>\$11,509</b>	<b>\$13,167</b>	<b>\$5,990</b>	<b>\$6,853</b>	<b>\$2,663</b>	<b>\$3,013</b>	<b>\$3,677</b>	<b>\$4,522</b>	<b>\$23,839</b>	<b>\$27,555</b>

Notes: Values are rounded to the nearest \$1,000..

4  
 5 **Q. Please explain how you have estimated the taxes from the direct effects associated**  
 6 **with the Project investment dollars included in Table 2 and Table 3?**

7 **A.** I estimated the state and local tax revenues from direct spending on labor and materials  
 8 shown in Table 2 and Table 3 using the IMPLAN model. Specifically, the IMPLAN  
 9 model contains data and information on the tax rates assessed on the purchases of  
 10 materials and services across various sectors of the economy. Thus, I used those data to  
 11 estimate the amount of state and local taxes that Transource would likely pay when the  
 12 investment dollars are spent on the local purchases of materials and services across the  
 13 regions analyzed. The tax rate assumptions contained in the IMPLAN model are not  
 14 specific to the construction of new transmission projects like the IEC. Thus, I used the  
 15 tax rates typically used for the construction of new highways and streets as a proxy for

1 estimating the local taxes likely to be associated with Transource's purchases of its  
2 project-related materials and services.<sup>18</sup>

3 The estimated state and local taxes associated with the purchase of materials and  
4 services for the Project are shown in row 2 of Table 2. I estimate that Transource will  
5 pay between \$26,000 and \$36,000 in state and local taxes when purchasing local  
6 materials and services across Pennsylvania and Maryland. However, additional direct,  
7 indirect, and induced tax revenues will materialize. For example, the money spent by  
8 Transource to hire local workers and purchase materials or services from local businesses  
9 will ripple through the economy, creating additional tax revenue for local and state  
10 governments.

11  
12 **Q. Please explain how you estimate the "per-diem" expenditures shown in Table 2 and**  
13 **Table 3?**

14 **A.** The food and lodging expenditures (depicted as "per-diem spend") will have an impact  
15 on the local economies where the IEC Project is being constructed. The per-diem  
16 expenditures, shown in row 4 of Table 2 and row 4 of Table 3, are based on information  
17 taken from the U.S. General Services Administration's ("GSA") per-diem rates

---

<sup>18</sup> It is reasonable to use same tax rates for the construction of new highways and streets as for taxes arising from Transource's direct expenditures on the IEC because Transource's estimates of local spending on the IEC Project and highway projects have significant similarities in terms of the sectors of the economy they affect. This means that due to the lack of a specific tax rate that would be applied when purchasing materials and services to build the IEC Project, I have implicitly assumed that the tax rates on the materials and services for the IEC Project are similar to those that would be applied when purchasing the materials and services associated with the construction of new highways and roads. Specifically, I used the level of local taxes that the IMPLAN model estimates for the amount of local IEC Project spending. I used this amount as the estimate of Transource's local taxes paid when purchasing material and services. The use of this proxy industry applies only to the estimation of direct-effect taxes. The other economic impacts described in this report, including the indirect and induced taxes, are estimated by building a custom industry in IMPLAN based on the specific sectors of the local economy Transource will impact through its investment.

1 designated for Pennsylvania and Maryland. The GSA establishes the per-diem rates for  
2 lodging and food to reimburse federal government employees for work-related travel.  
3 For fiscal year 2018, which runs from October 2017 through September 2018, the GSA  
4 has established a rate of \$93/day for lodging and \$51/day for meals and incidentals as the  
5 standard rate for Pennsylvania and Maryland.<sup>19</sup> The salaries of out-of-area workers are  
6 not included in this analysis since I assume that all of the salaries for out-of-area workers  
7 would be spent outside of Pennsylvania and Maryland. I obtained information from  
8 Transource for the estimated number of out-of-areas workers to be employed on the IEC  
9 Project during construction. Transource estimates that the out-of-area workers will range  
10 between 56 and 64, and that construction will last approximately one year. Therefore, I  
11 estimate the amount of per-diem spend as the number of out-of-area workers times 260  
12 workdays in the year (five days a week times 52 weeks in the year), times the per-diem  
13 rates specified by GSA.

14 I assume that the per-diem paid to out-of-area workers will be spent in the areas  
15 where the IEC Project will be constructed. The portion of the per-diem spent on lodging  
16 is allocated to the hotels and motels industry, while the portion spent on meals and  
17 incidentals is allocated to three food service sectors—food and beverage stores (e.g.,  
18 grocery stores), full-service restaurants, and limited-service restaurants.

19  
20 **Q. How do the inputs shown in Table 2 influence direct versus indirect and induced**  
21 **effects?**

---

<sup>19</sup> The standard rate for each state applies in all areas where the IEC Project is being constructed. See data provided on GSA's website: <https://www.gsa.gov/travel/plan-book/per-diem-rates>.

1 A. All of the expenditures shown in Table 3 represent local spending and as a result produce  
2 direct effects. The indirect and induced effects from expenditures depend on where local  
3 business procure materials and services. For example, if Transource purchases certain  
4 equipment from a supplier in Pennsylvania, the amount spent for those purchases would  
5 be considered local spending; this local spending would contribute to the direct effects of  
6 the IEC Project. But if that local supplier does not source all of the equipment sold to  
7 Transource locally, that "next layer" of local spending would reduce the level of indirect  
8 and induced effects on the economy of Pennsylvania compared to a situation where all of  
9 the upstream resources and services were procured locally. As a result, the indirect and  
10 induced effects may be lower than the direct effects.

11  
12 **Q. How did you estimate what portion of the investment dollars spent locally on**  
13 **materials and services would produce indirect effects?**

14 A. For each category of investment in materials and services listed in Table 3 above, I used a  
15 combination of default assumptions contained within the IMPLAN model and  
16 assumptions provided by Transource as to the amount that likely would be provided by  
17 suppliers within the local region studied. These assumptions do not alter the total amount  
18 spent locally (which is shown in Table 3 above), they affect only the indirect and induced  
19 effects associated with the direct spending.

20 Within the IMPLAN model, the portion of each sector that is procured locally is  
21 reflected within the Local Purchase Percentage ("LPP"). The LPP assumptions included  
22 in the IMPLAN model incorporate the likely regional impacts of the local direct spending  
23 made in each industry sector, and the default LPP percentages in IMPLAN are derived

1 from data from the U.S. Bureau of Economic Analysis, the U.S. Census Bureau, and the  
2 analyses of regional trade-flow patterns. For example, an LPP of ten percent results in  
3 ten cents of every dollar spent in the modeled region and ninety cents spent elsewhere.

4 I reviewed the LPP for each category of materials and services listed in Table 4  
5 with Transource's procurement team to determine if the percentage of locally sourced  
6 materials and services is relatively accurate for the IEC Project. For most of the materials  
7 and services categories, I retained the default LPP assumptions that are contained in the  
8 IMPLAN database. However, for certain categories I adjusted the default LPPs to reflect  
9 the Project specific information provided to me by Transource. If Transource knows that  
10 a likely vendor of a material or service will procure 100% of inputs from local sources, I  
11 reflect that in the input used in IMPLAN. For example, if Transource is planning to hire  
12 an environmental consulting firm with offices located in Pennsylvania, I assume that  
13 100% of the money spent to hire that firm will be procured in Pennsylvania based on the  
14 information provided to me by Transource, whereas IMPLAN's default assumption may  
15 be only 68% of expenditures on environmental consulting will be procured locally in  
16 Pennsylvania. The percentages of how each spending would be sourced locally for each  
17 category of materials and services are presented in Table 4 below.

**Table 4: Local Purchase Percentages (LPP) Used in the Modeling**

Sector Description		Franklin (PA)	York (PA)	Rest of PA	MD
Sand and Gravel Mining	[1]	11%	32%	N/A	48%
Ready-Mix Concrete	[2]	3%	9%	N/A	58%
Construction of New Roadways	[3]	100%	100%	N/A	100%
Waste Management	[4]	100%	100%	N/A	95%
Spring and Wire Products	[5]	0.01%	5%	N/A	13%
Real Estate	[6]	N/A	N/A	100%	N/A
Architectural and Engineering	[7]	45%	77%	100%	92%
Environmental Consulting	[8]	37%	45%	100%	91%
Legal Services	[9]	N/A	N/A	100%	100%
Food and Beverage Stores	[10]	87%	86%	N/A	99%
Full-Service Restaurants	[11]	73%	72%	N/A	82%
Limited-Service Restaurants	[12]	84%	83%	N/A	90%
Hotels and Motels	[13]	0.02%	0.1%	N/A	2%

Source: IMPLAN's Regional Social Accounting Matrices adjusted to reflect estimates of local procurement provided by Transource.

1           The local direct investment shown in Table 3 and the LPPs presented in Table 4  
2           make up the main inputs used in simulating the effect of the Project-related expenditures  
3           on local economies. After these inputs are finalized, the IMPLAN model is used to  
4           simulate the economic impacts of the investment dollars spent in each of the regions of  
5           interest.

6  
7   **Q. Please summarize the results of your analysis.**

8   **A.** The simulated economic benefits for Franklin County, York County, and the remaining  
9   part of Pennsylvania are presented in Table 5. The results are broken into three  
10   categories: (1) the number of jobs supported (measured in full-time equivalent years); (2)  
11   the amount of economic activity stimulated; and (3) the state and local taxes generated by  
12   the Project.

**Table 5: Economic Impact of the IEC Transmission Project for Pennsylvania**

Impact Type	Franklin County		York County		Rest of Pennsylvania		
	Low	High	Low	High	Low	High	
<b>Jobs Supported (FTE-years)</b>							
Direct Effect	[1]	11	16	6	9	19	21
Indirect Effect	[2]	6	7	4	5	5	6
Induced Effect	[3]	8	12	5	7	10	11
<b>Total Effect</b>	<b>[4]</b>	<b>25</b>	<b>35</b>	<b>15</b>	<b>21</b>	<b>34</b>	<b>37</b>
<b>Economic Activity Simulated (thousands \$)</b>							
Direct Effect	[5]	\$10,700	\$12,200	\$5,600	\$6,400	\$2,700	\$3,000
Indirect Effect	[6]	\$800	\$900	\$700	\$800	\$1,200	\$1,300
Induced Effect	[7]	\$1,100	\$1,600	\$800	\$1,100	\$2,000	\$2,300
<b>Total Effect</b>	<b>[8]</b>	<b>\$12,600</b>	<b>\$14,700</b>	<b>\$7,100</b>	<b>\$8,300</b>	<b>\$5,900</b>	<b>\$6,600</b>
<b>State and Local Taxes (thousands \$)</b>							
Direct Effect	[9]	\$80	\$110	\$40	\$50	\$90	\$110
Indirect Effect	[10]	\$20	\$20	\$20	\$20	\$50	\$50
Induced Effect	[11]	\$70	\$100	\$50	\$70	\$110	\$130
<b>Total Effect</b>	<b>[12]</b>	<b>\$170</b>	<b>\$230</b>	<b>\$110</b>	<b>\$140</b>	<b>\$250</b>	<b>\$290</b>

Notes: Values rounded to the nearest \$100,000 for Economic Activity and nearest \$10,000 for State and Local Taxes. Direct FTE-years include Transource's estimates, which are based on a 50-hour work week. IMPLAN FTE-year results assume a 40-hour work week.

1            Table 5 shows that the IEC project is expected to support 25 to 35 full-time jobs  
2            in Franklin County and between 15 and 21 full-time jobs in York County during  
3            construction. The project is expected to stimulate \$12.6 million to \$14.7 million in  
4            economic activity within Franklin County, and an additional \$7.1 million to \$8.3 million  
5            of economic activity within York County while under construction. The jobs supported  
6            and the economic activity stimulated in Franklin and York Counties represent about half  
7            of all the job-supported and two-thirds of local economic activity stimulated by the IEC  
8            project. As discussed in the previous section, the majority of the jobs supported and  
9            economic activity stimulated occur within Franklin and York Counties because the  
10           majority of the new transmission line and the two new substations will be constructed in  
11           these two counties. Lastly, Table 5 indicates that in Franklin County, the IEC project is

1 expected to generate between \$170,000 and \$230,000 of state and local taxes while under  
2 construction. Likewise, in York County, the project is expected to generate between  
3 \$110,000 and \$140,000 in state and local taxes.

4 Table 5 also presents the results for the rest of the state of Pennsylvania, outside  
5 of Franklin and York Counties. In the remainder of the state, I estimate that the IEC  
6 project will support between 34 and 37 FTE-year jobs, stimulate between \$5.9 million  
7 and \$6.6 million of economic activities, and generation between \$250,000 and \$290,000  
8 of state and local tax revenues. These economic benefits are in addition to the benefits  
9 seen in Franklin and York Counties.

10 The sum of Pennsylvania and Maryland economic benefits, which represent the  
11 total local economic benefits that I estimate from Transource's investments in the IEC  
12 Project, is shown in Table 6.

**Table 6: Economic Impact of the IEC Transmission Project for Pennsylvania and Maryland**

Impact Type	Pennsylvania		Maryland		Total		
	Low	High	Low	High	Low	High	
<b><u>Jobs Supported (FTE-years)</u></b>							
Direct Effect	[1]	36	45	6	7	41	52
Indirect Effect	[2]	16	17	2	5	17	23
Induced Effect	[3]	22	30	4	7	26	37
<b>Total Effect</b>	<b>[4]</b>	<b>74</b>	<b>93</b>	<b>11</b>	<b>19</b>	<b>85</b>	<b>112</b>
<b><u>Economic Activity Simulated (thousands \$)</u></b>							
Direct Effect	[5]	\$19,000	\$21,600	\$3,400	\$4,300	\$22,400	\$25,900
Indirect Effect	[6]	\$2,700	\$3,000	\$700	\$1,300	\$3,400	\$4,300
Induced Effect	[7]	\$3,900	\$5,000	\$1,000	\$1,600	\$4,900	\$6,600
<b>Total Effect</b>	<b>[8]</b>	<b>\$25,600</b>	<b>\$29,600</b>	<b>\$5,100</b>	<b>\$7,200</b>	<b>\$30,700</b>	<b>\$36,800</b>
<b><u>State and Local Taxes (thousands \$)</u></b>							
Direct Effect	[9]	\$210	\$270	\$70	\$90	\$280	\$360
Indirect Effect	[10]	\$90	\$90	\$30	\$50	\$120	\$140
Induced Effect	[11]	\$230	\$300	\$60	\$100	\$290	\$400
<b>Total Effect</b>	<b>[12]</b>	<b>\$530</b>	<b>\$660</b>	<b>\$160</b>	<b>\$240</b>	<b>\$690</b>	<b>\$900</b>

Notes: Values rounded to the nearest \$100,000 for Economic Activity and nearest \$10,000 for State and Local Taxes. Direct FTE-years include Transource's estimates, which are based on a 50-hour work week. IMPLAN FTE-year results assume a 40-hour work week.

1           The number of jobs supported by the IEC Project is presented in rows 1-4 of  
2 Table 6 above. The results indicate that Transource's investment in the IEC transmission  
3 project would support between 85 and 112 full-time FTE-years during construction, of  
4 which 74 to 93 would be in Pennsylvania. Rows 5-8 of Table 6 show that construction  
5 of the IEC Project would generate between \$30.7 million and \$36.8 million of economic  
6 activity in Pennsylvania and Maryland combined. Of this total, \$25.6 million to \$29.6  
7 million would be in the state of Pennsylvania.

8           The overall economic activities stimulated are larger than the total local  
9 investment associated with the IEC Project because each dollar spent would have a  
10 rippling effect through the economy. For example, a dollar paid to a worker hired to

1 work on the Project may be spent at a restaurant where the worker eats with her family,  
2 and then be paid to staff at the restaurant, and later spent on housing by the restaurant  
3 staff. This ripple effect of spending throughout the economy creates economic activities  
4 larger than the total spending on the Project. As shown in Table 3, Transource is  
5 expecting to invest between \$20.2 and \$23 million in Pennsylvania to construct the IEC  
6 Project, and I estimate that this investment would stimulate between \$25.6 and \$29.6  
7 million of economic activity in Pennsylvania.

8 The last section of Table 6 (rows 9–12) shows the amount of local and state tax  
9 revenues that will be collected during the construction of the IEC Project. The results of  
10 my analysis indicate that the Project will provide local and state governments in  
11 Pennsylvania between \$530,000 and \$660,000 during the construction phase.

12  
13 **Q. Does this complete your testimony?**

14 **A.** Yes, it does. If necessary, I will supplement my testimony if and as additional issues  
15 arise during the course of this proceeding.

**BEFORE THE  
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

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

Petition of Transource Pennsylvania, LLC for a :  
finding that a building to shelter control : Docket No. P-2018-3001878  
equipment at the Rice Substation 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 : Docket No. P-2018-3001883  
equipment at the Furnace Run Substation in :  
York County, Pennsylvania is reasonably :  
necessary for the convenience or welfare of the :  
public :

Application of Transource Pennsylvania, LLC :  
for approval to acquire a certain portion of the : Docket No. A-2018-3001881, *et al.*  
lands of various landowners in York and :  
Franklin Counties, Pennsylvania for the siting :  
and construction of the 230 kV Transmission :  
Lines associated with the Independence Energy :  
Connection – East and West Projects as :  
necessary or proper for the service, :  
accommodation, convenience or safety of the :  
public :

**TRANSOURCE PENNSYLVANIA, LLC**

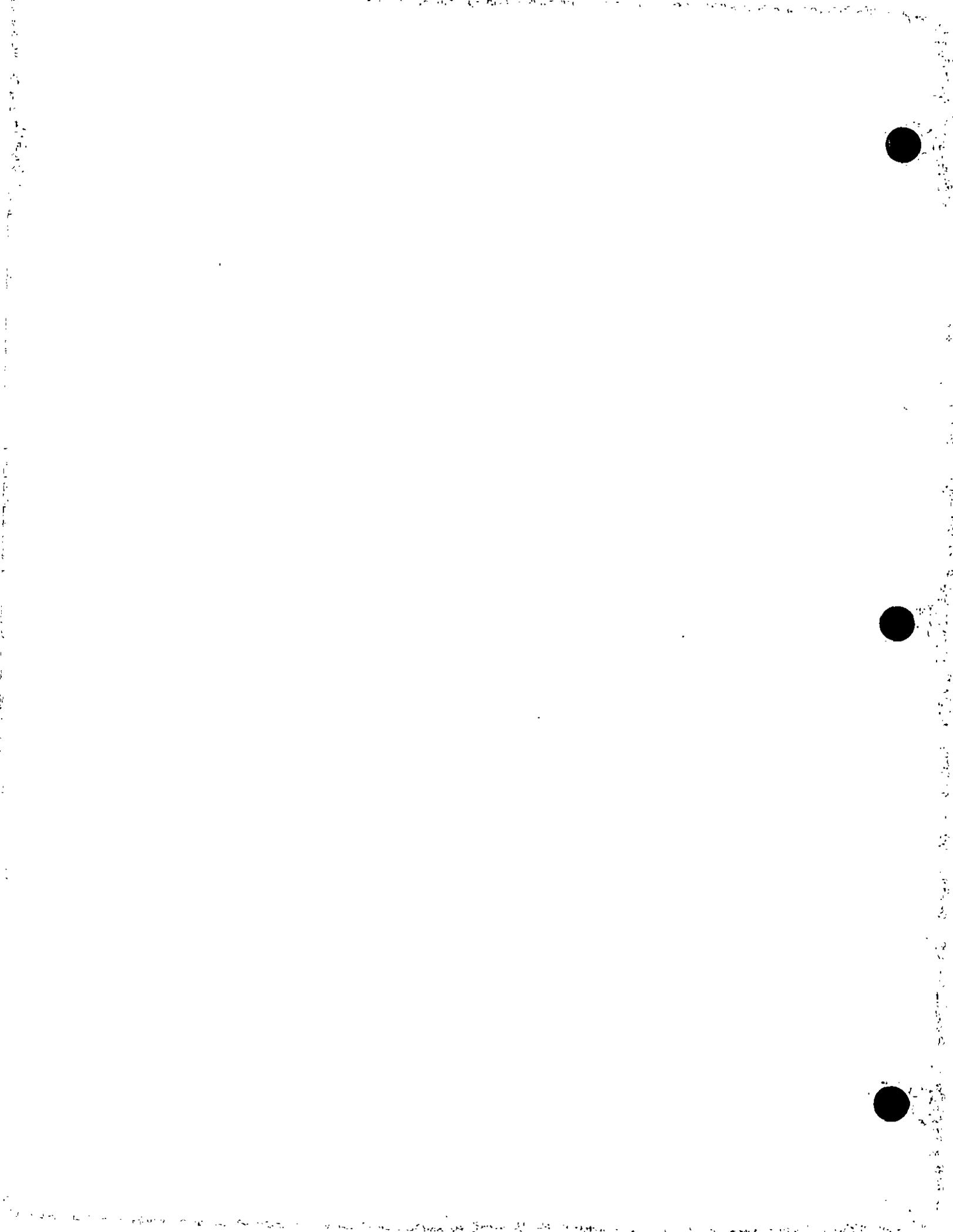
**REJOINDER TESTIMONY OF**

**JUDY CHANG**

**STATEMENT NO. 10-RJ**

Date: February 11, 2019

2/25/19  
Judy Chang JS



1 **Q. Please state your name and business address.**

2 A. My name is Judy Chang. My business address is One Beacon Street, Suite 2600, Boston,  
3 MA 02108.

4  
5 **Q. By whom are you employed and in what capacity?**

6 A. I am a Principal of The Brattle Group, an economic and finance consulting firm.

7  
8 **Q. Have you previously provided testimony in this proceeding?**

9 A. Yes, I submitted rebuttal testimony (Statement No. 10-R) on November 27, 2018.

10

11 **Q. What is the purpose of your rejoinder testimony?**

12 A. I respond to statements regarding the economic benefits of the Independence Energy  
13 Connection ("IEC") Project made in the Surrebuttal Testimony of Dolores Krick,  
14 submitted on behalf of Citizens to STOP Transource York County ("Citizens").

15

16 **Q. Ms. Krick claims that the employment and economic stimulus benefits described in  
17 your testimony are grossly overstated. Citizens St. No. 1, p. 16. How do you  
18 respond?**

19 A. I disagree with Ms. Krick's claim. I have used an industry standard approach and model  
20 in estimating the employment and economic stimulus effects of the IEC Project. The  
21 analysis has been conducted objectively and does not overstate the employment and  
22 economic stimulus benefits associated with the project.



1 Q. Ms. Krick claims that you failed to consider the temporary nature of the economic  
2 stimulus benefits estimated by your analysis of the impact of the IEC project on  
3 York County. Citizens St. No. 1, p. 16. Do you agree with this claim?

4 A. No. I have explained that the estimated jobs supported, economic activity stimulated, and  
5 tax revenue generated by the IEC project correspond to the period when the project is  
6 under construction. For example, in my rebuttal testimony I stated that “the IEC project  
7 is expected to support 25 to 35 full-time jobs in Franklin County and between 15 to 21  
8 full-time jobs in York County during construction,<sup>1</sup>” and that the “project is expected to  
9 stimulate \$12.6 million to \$14.7 million in economic activity within Franklin County, and  
10 an additional \$7.1 million to \$8.3 million of economic activity within York County while  
11 under construction.<sup>2</sup>”

12 The IEC Project will support employment in York County and provide revenues to local  
13 businesses during the construction of the transmission infrastructure. The benefits of the  
14 IEC Project during the construction phase are an important and relevant aspect of the  
15 overall impact of the Project on the economy of York County, particularly for those  
16 businesses and workers that stand to gain during years when the project is being  
17 developed. Therefore, it is appropriate and justified to consider those economic stimulus  
18 benefits in evaluating the IEC project.

19  
20 Q. Ms. Krick states that your analysis of the economic stimulus benefits of the IEC  
21 project in York County relies on “incorrect assumptions... with respect to the

---

<sup>1</sup> Transource Statement No. 10 at 26

<sup>2</sup> *Id.*



1 ability of these areas, particularly York County, to support additional business that  
2 the project might bring.” Citizens St. No. 1, p. 16. Ms. Krick further states that  
3 your analysis does not evaluate whether sufficient businesses are available in York  
4 County to provide these services, even if they are demanded.” Citizens St. No. 1, p.  
5 17. Do you agree with Ms. Krick’s statements?

6 A. No. These statements are incorrect. I used an input-output model called IMPLAN  
7 (Impact Analysis for Planning) to estimate the employment, economic stimulus, and tax  
8 impacts associated with the construction of the IEC Project. The IMPLAN model takes  
9 into account the growth potential of existing businesses and the ability of new businesses  
10 to develop in each county as it estimates the economic impacts of the project. IMPLAN  
11 uses county-level data collected from state and federal data sources; including  
12 employment, employee compensation, proprietary income (self-employment income),  
13 and population to estimate the potential employment and economic stimulus associated  
14 with specific spending.<sup>3</sup> Thus, I have used a model and associated data to reflect the  
15 capacity for the local economy in York County to support the project and therefore, my  
16 analysis does take into account the factors described by witness Krick.

17 **Q. Does this conclude your rejoinder testimony at this time?**

18 A. Yes.

---

<sup>3</sup> For more detail on the data sources used by the IMPLAN model, please see  
<https://implanhelp.zendesk.com/hc/en-us/articles/115009674688-IMPLAN-Data-Components> and  
<https://implanhelp.zendesk.com/hc/en-us/articles/115009674448-IMPLAN-Data-Sources>