

**BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of the Application Seeking)	
Approval of Ohio Power Company's)	
Proposal to Enter into an Affiliate Power)	Case No. 14-1693-EL-RDR
Purchase Agreement for Inclusion in the)	
Power Purchase Agreement Rider)	
)	
In the Matter of the Application of Ohio)	
Power Company for Approval of Certain)	Case No. 14-1694-EL-AAM
Accounting Authority)	

**DIRECT TESTIMONY
OF
NOAH C. DORMADY**

**On Behalf of the
The Office of the Ohio Consumers' Counsel**
*10 West Broad Street, Suite 1800
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September 11, 2015

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ATTACHMENTS

Attachment NCD-1

1 **I. INTRODUCTION**

2

3 ***Q1. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.***

4 ***A1.*** My name is Noah C. Dormady. My business address is 1810 College Rd,
5 Columbus OH 43210.

6

7 ***Q2. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?***

8 ***A2.*** I am employed by The John Glenn College of Public Affairs at The Ohio State
9 University. I am an Assistant Professor of Public Policy. My teaching and
10 research areas at Ohio State are in two main substantive areas: 1) energy and
11 environmental economics and policy, and 2) the economics of terrorism and
12 natural hazards. Public policy is a field of study that deals with the application of
13 economics and other tools to address applied societal issues.

14

15 ***Q3. WOULD YOU PLEASE DESCRIBE YOUR EDUCATIONAL AND***
16 ***PROFESSIONAL BACKGROUND?***

17 ***A3.*** Yes. I earned a Ph.D. in Public Policy, Planning and Development from the Price
18 School of Public Policy at the University of Southern California in 2012. I have
19 published in highly-ranked peer reviewed scholarly journals on the subject of
20 energy and environmental economics and policy, as well as the economic costs of
21 terrorism. I am the co-recipient of the 2012 national REMI Award for
22 Outstanding Economic Analysis from Regional Economic Models, Inc.
23 (“REMI”), the maker of a leading economic impact analysis and forecasting

1 software. My research has been supported through competitive peer-reviewed
2 grants from a variety of sources, including the National Science Foundation, GE
3 Capital, and the Department of Homeland Security ("DHS"). Prior to joining the
4 faculty at Ohio State University in 2012, I was employed as a researcher at the
5 DHS Center for Risk and the Economic Analysis of Terrorism Events
6 ("CREATE"), a DHS National Center of Excellence. There I was tasked with
7 estimating the regional economic impacts of terrorism events, and was the lead
8 author on one of DHS's largest research projects at the time in estimating the
9 economic impacts of a joint DOD-DHS terrorism scenario.

10
11 ***Q4. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY IN ANY***
12 ***REGULATORY PROCEEDING?***

13 ***A4.*** No. Thus far I have devoted my career to teaching and research, and consulting
14 on economic impacts of environmental and energy policies. I have consulted for
15 NGO's, state governments, regional governments, and the federal government.

16
17 ***Q5. WHAT IS THE PURPOSE OF YOUR TESTIMONY?***

18 ***A5.*** The purpose of my testimony is to evaluate the economic modeling approach
19 provided by Ohio Power Company ("Utility") witness Allen in this case.

II. EVALUATION OF ECONOMIC ANALYSIS

Q6. UTILITY WITNESS ALLEN'S TESTIMONY PROVIDES THE CORE ECONOMIC IMPACT ANALYSIS TO SUPPORT THE UTILITY'S AMENDED APPLICATION. DOES THE ANALYSIS THOROUGHLY ADDRESS THE COMMISSION'S FACTOR PERTAINING TO ECONOMIC IMPACTS OF THE POWER PURCHASE AGREEMENT ("PPA") RIDER?

A6. No. According to the amended application, the Public Utilities Commission of Ohio ("Commission") tasked the Utility with providing "[t]he impact that a closure of the generating plant would have on electric prices and the resulting effect on economic development within Ohio." Utility witness Allen's testimony, on the other hand, provides an analysis of the purported economic impacts of closure of the generating plants and associated regional coal production on the regional economy.

I did not find analysis contained within Utility witness Allen's testimony, or discovery documents provided in relation thereto, of the impacts on electric prices or of the economic impacts of potential electricity price changes on the regional or statewide economy, with one exception. On page 13 of Allen's testimony, the following statement is provided: "Based on the forecasted revenues and expenses provided by Utility witness Pearce, customers would see an initial rate under the PPA rider of \$1.75/MWh. The PPA Rider along with the avoided transmission costs is projected to provide an incremental customer benefit exceeding \$1 billion

1 through the forecast period (2024).” From reviewing the analysis contained
2 within Allen’s testimony, it is not clear how that \$1 billion figure was estimated.

3
4 I also reviewed testimony by Utility witness Bradish, who finds a similar but
5 different cost estimate of \$1.6 billion. Whereas witness Pearce’s testimony
6 provides a range of forecasted electricity price changes, the total economic
7 analysis of those forecasted estimates is not provided in any documents or
8 testimony that I reviewed. And the total economic impacts of the proposed
9 transmission upgrades are not provided. Moreover, it is not clear how Allen
10 estimated that \$1 billion benefit.

11
12 ***Q7. DOES THE MODELING APPROACH PROVIDED BY UTILITY WITNESS***
13 ***ALLEN ALLOW FOR ESTIMATING THE ECONOMIC IMPACTS OF***
14 ***FORECASTED CREDITS/CHARGES ON THE UTILITY’S CUSTOMERS?***

15 ***A7.*** No. From my review, the modeling approach utilized in Utility witness Allen’s
16 testimony is static (i.e., based on historic, non-forecasted data of a single point in
17 time), rather than dynamic (i.e., across time).

18
19 The forecasted values that witness Pearce provides through 2024 cannot be
20 soundly incorporated into the economic analysis provided by Utility witness Allen
21 utilizing the approach that he utilized. This is important because appropriately-
22 developed long run models allow for inputs (e.g., labor and capital) to be adjusted
23 in response to economic changes, and over time can mitigate some of the results

1 that a static model would otherwise identify as large economic impacts.
2 Further, the appropriate method to accomplish this macroeconomic analysis
3 would be to take future charges/credits as provided by witness Pearce and
4 evaluate the macroeconomic impacts that would result from that range of
5 charges/credits. It should be noted that the economic base model as utilized by
6 Utility witness Allen cannot account for price changes -- such technical details
7 cannot be modeled in an economic base model. Simply put, the modeling
8 approach used by Utility witness Allen cannot, and did not, estimate the
9 macroeconomic impact (employment, personal income, gross state product, etc.)
10 of the forecasted charges/credits. Thus, the model used by Utility witness Allen
11 cannot, and did not, estimate the macroeconomic impact of PPA Rider
12 charges/credits flowing from low/high wholesale electric prices, respectively, on
13 AEP Ohio's customers.

14
15 ***Q8. WHAT APPROACH DOES UTILITY WITNESS ALLEN UTILIZE IN THE***
16 ***ANALYSIS PROVIDED?***

17 ***A8.*** A two-sector economic base multiplier model using the location quotient
18 estimation approach.

19
20 ***Q9. IS THIS MODELING APPROACH HIGHLY REGARDED AMONG***
21 ***CONTEMPORARY ECONOMISTS OR POLICY ANALYSTS?***

22 ***A9.*** No. The Utility's economic base modeling approach is not highly regarded and I
23 know of no credible analysts or economists who utilize the approach. The

1 approach was used for simple analyses from the 1920's onward, and throughout
2 the 1950s and 1960s it was sharply criticized. Since the 1970's it has gone largely
3 forgotten.

4
5 The following two retrospective excerpts from leading economists on the subject
6 are illustrative:

7 1) "Economic base models suffer from old age: they have
8 been built by so many analysts with varying levels of
9 quality and they have been criticized so often that little
10 remains except the concept."¹

11 2) "Economic base models have had a long and checkered
12 history, going back to the 1940's and even earlier. They
13 have never been quite academically respectable..."²

14
15 ***Q10. WHAT ARE SOME OF THE MAIN PROBLEMS WITH THE ECONOMIC***
16 ***BASE MODELING APPROACH AND HOW MIGHT THEY AFFECT THE***
17 ***ANALYSIS PROVIDED IN UTILITY WITNESS ALLEN'S TESTIMONY?***

18 ***A10.*** Many of the core simplifications and assumptions of the economic base model
19 can lead to estimation errors if they are violated. Many of these were likely
20 violated in the analysis provided by Utility witness Allen. Measures can be taken

¹ Excerpt from Schaffer, William A. 2010. "Regional Impact Models" in *The Web Book of Regional Science*, West Virginia University, 1999, Revised 2010, Chapter 2. Available at: <http://rri.wvu.edu/WebBook/Schaffer/index.html>. William Schaffer is Professor Emeritus of Economics at Georgia Institute of Technology.

² Excerpt from Richardson, Harry W. 1985. "Input-Output and Economic Base Multipliers: Looking Backward and Forward." *Journal of Regional Science*, 25(4): 607-661, pp.608. Harry Richardson is Professor of Public Policy and Economics at the University of Southern California.

1 to remedy some of these as I describe below, but I see no evidence that any
2 remedial measures were taken. It is incumbent upon anyone running an economic
3 impact model to provide details of the remedial measures taken so that credibility
4 of approach can be ascertained. However, given that economic base models are
5 the least sophisticated and most error prone regional economic model possible,
6 even if all of these details were provided, many of these assumptions would still
7 be inherently violated because of the rudimentary modeling approach utilized.

8
9 Below, I provide a list of some of the core simplifications and assumptions of the
10 economic base model and the effect that they likely had on modeling results in
11 Utility witness Allen's testimony:

- 12 1) The approach is quite simplistic in that it relegates all
13 economic activity to one of two main sectors -- basic and
14 non-basic. Basic sectors are those sectors that provide the
15 core of the regional economic base and export products or
16 services to outside the region and thus generate an inflow
17 of money to the region. Non-basic sectors are those sectors
18 that provide products and services within the region to the
19 basic sector and its employees. At this high level of
20 aggregation, much detail on economic transactions, as well
21 as stocks and flows of capital and labor, are absent from
22 analysis. This will result in aggregation bias that will
23 almost certainly result in erroneous findings.

1 2) Similarly, the approach has been widely criticized by
2 scholars for the clumsy and inaccurate method by which
3 industries are assigned to each of these two highly
4 aggregated sectors, which ultimately result in misspecified
5 results. The most basic approach, and the one provided in
6 Utility witness Allen's testimony, assigns all industries that
7 have a location quotient larger than one (1) to the basic
8 sector. A location quotient larger than one (1) indicates
9 that the industry employs a greater share of the local
10 workforce in a particular industry than it does nationally,
11 and produces more goods or services than are consumed
12 within the region, which are exported. This is important
13 because it is from this that the employment and income
14 multipliers are derived, which drive the resultant total
15 economic impact analysis. This is problematic for three
16 main reasons.

17 a. First, the location quotient method as utilized likely
18 results in misassignment of industries into sectors,
19 basic or non-basic. Commonly misassigned sectors
20 include construction industries and education,
21 among others. This misassignment occurs because
22 the economic base approach simplistically assigns
23 sectors based on employment ratios. Those

1 industries that are employed at a greater proportion
2 locally than nationally are assigned entirely to the
3 basic sector when these industries are not entirely
4 basic. This is a major problem because it is the
5 sectoral ratio that generates the ultimate economic
6 multiplier that produces the total economic impact
7 assessment.

8 b. Second, the approach as utilized, relegates all
9 industries entirely, 100%, to either basic or non-
10 basic. In reality, many of these industries are
11 partially basic and partially non-basic. Historical
12 corrections to this misspecification have relied upon
13 share parameters to allow for proportions of
14 industries to be assigned to basic and non-basic to
15 avoid extreme results. I saw no such
16 parameterization correction approach taken in
17 Utility witness Allen's analysis.

18 c. The error inherent in determining which industries
19 are considered basic versus non-basic is heavily
20 dependent upon the level of industrial classification
21 disaggregation utilized. The North American
22 Industrial Classification System (NAICS) is often
23 utilized for determining the aggregation scheme for

1 regional modeling. These classification systems
2 range from thousands of sectors (highly
3 disaggregated and relatively precise) to only a
4 handful of sectors (highly disaggregated and
5 generally imprecise). The greater the degree of
6 aggregation that was utilized for determining the
7 assignment of basic and non-basic, the greater the
8 potential for error in the modeling approach
9 provided. From the testimony provided and
10 accompanying documents that I reviewed, I see no
11 mention of the aggregation scheme utilized to
12 determine the assignment of industries into basic
13 and non-basic sectors for this analysis.

- 14 3) The economic base modeling approach utilized violates the
15 “cross-hauling” assumption, which can lead to overstated
16 impacts. The economic base model assumes no cross-
17 hauling—this is the simultaneous import and export of
18 commodities, which can frequently occur in regions for
19 commodities such as electricity or coal. This means that
20 the model assumes that all consumption in the basic sector
21 is locally produced (from within the county or multi-county
22 region modeled). This assumption would otherwise mean
23 that the model assumes 100% of the labor and capital

1 inputs to the plants and to the associated mining operations
2 (as well as any other industries that may have been
3 specified [or misspecified] as basic) are provided for
4 completely from within the region. If any employees of the
5 plants being analyzed live in neighboring Kentucky or
6 West Virginia, for example, their income supports non-
7 basic industries outside of the region and thus the
8 magnitude of the model as employed would misstate the
9 economic impacts. If the plant itself purchases parts or
10 materials, computer equipment, etc., from anywhere
11 outside of the county (or multi-county region of analysis)
12 the magnitude of the indirect labor and income effects as
13 provided would be overestimated. The economic base
14 model cannot account for these details, and thus
15 misspecifies economic impacts.

- 16 4) Similarly, the approach assumes that all basic sector
17 employee wages stay in the local area and are spent on the
18 consumption of local goods and services. Any violations of
19 this assumption would result in misspecification of the
20 economic impacts, and likely over specification. To the
21 extent that portions of employee wages are not spent within
22 the region (either because they are taxed at the state or
23 federal level or because they are placed into savings

accounts or retirement accounts etc.) the model
misspecifies economic impacts.

5) Oftentimes economic base models use employment
multipliers to determine income impacts. This is a
common problem of measuring income from employment.
From my review of the analysis provided in Utility witness
Allen's testimony it appears that is the approach taken there
as well. This is problematic because it is based upon the
assumption that employment and per capita income are
perfectly correlated. This would only be the case in a pure
case economy with perfectly elastic supplies of labor. Such
an assumption can vastly misstate income effects. This is
another error inherent to the approach utilized.

6) The economic base modeling approach assumes that
economic growth is determined solely by the basic
(exporting) sector. More modern production function
approaches to estimating economic growth account for a
variety of other factors that can contribute to economic
growth besides export-led development. These include
parameters such as technology, labor and capital
productivity, etc., which increase the marginal product of
production inputs. These can also include savings ratios
and return on capital. Economic base models do not

1 account for features of economic growth beyond exports of
2 the basic sector, and as a result, grossly simplify
3 macroeconomic effects of the analysis.

4 7) The economic base modeling approach assumes that labor
5 and capital productivities in the region being analyzed are
6 the same as they are for the nation. To the extent that this
7 assumption does not hold, the economic base model will
8 misspecify macroeconomic impacts.

9 8) The economic base modeling approach does not account
10 for general equilibrium effects. These are the effects of the
11 economy balancing itself due to price changes and changes
12 in supply and demand. Because each industry requires a
13 different production mix of inputs (e.g., labor, capital, land,
14 energy), changes that occur in one sector can be mitigated
15 by corresponding changes in other sectors through various
16 linkages in upstream and downstream supply chains and
17 through economic substitution. Models that do not account
18 for these effects misspecify macroeconomic impacts.

19 9) Economic base models assume that consumption ratios of
20 non-basic sector goods and services is the same in the
21 region as it is nationally. This assumption is often violated
22 in rural areas or “company towns” in which many of the
23 workers in the town do not purchase consumer goods and

1 services at the same proportion as do consumers on average
2 nationally or in which a relatively small proportion of
3 employment is in the non-basic sector. To the extent that
4 this assumption is violated, the model can misspecify the
5 macroeconomic impacts. For example, if employees in the
6 basic sector do not purchase local consumer goods in the
7 same proportion as employees on average nationally, the
8 reliance upon local non-basic sector inputs is overstated in
9 the model, and thus the modeling results will overstate the
10 macroeconomic impacts.

11 10) Similarly, economic base models do not account for
12 government expenditures on consumption. By assuming
13 that all non-basic employment is generated by demand
14 from consumption by the basic sector, one ignores the very
15 likely possibility that some consumption can also be driven
16 by government expenditures. Examples of these can
17 include state or federal employees not supported directly by
18 the basic sector, capital projects (e.g., bridges, tunnels,
19 roads) funded by the federal government, among many
20 others. This assumption will tend to overstate the reliance
21 of the local economy on the basic sector and overstate the
22 magnitude of macroeconomic impacts.

1 ***Q11. ARE THERE ANY OTHER MACROECONOMIC MODELING***
2 ***ASSUMPTIONS PROVIDED IN UTILITY WITNESS ALLEN'S***
3 ***TESTIMONY THAT LIKELY RESULT IN ERRONEOUS FINDINGS?***

4 ***A11.*** Yes. From my review of Utility witness Allen's analysis, all coal workers in Ohio
5 that supply coal to these plants are assumed to be unemployed by the hypothetical
6 modeled plant closures. It is not immediately clear to me why some, if not many,
7 of the coal workers would not continue to produce coal if coal was sold
8 competitively to other plants in Ohio and/or elsewhere in the nation. Given that
9 coal markets allow for the sale and transport of coal across state lines, etc., I see
10 no discussion in the analysis of the likelihood, at the very least, of the coal plants
11 remaining in partial/reduced operation following the plant retirements. If any of
12 those coal workers continued to produce coal for other plants, either in Ohio or in
13 other states, they would not be accounted for in the economic impact model
14 provided. In this way, the provided analysis represents a worst case scenario for
15 coal worker unemployment and associated indirect economic consequences.

16
17 ***Q12. GIVEN ALL OF THE ISSUES WITH THE ECONOMIC BASE MODEL***
18 ***THAT YOU HAVE JUST DESCRIBED, IS IT LIKELY THAT UTILITY***
19 ***WITNESS ALLEN ACCURATELY PORTRAYS THE ECONOMIC IMPACTS***
20 ***OF THE PLANT CLOSURES?***

21 ***A12.*** No. The macroeconomic results provided by Utility witness Allen are likely
22 larger than the actual macroeconomic impacts that would result from the plant
23 closures. However, I cannot guarantee that this would be the case without seeing

1 the results of a more accurate, modern, regional economic model.

2
3 ***Q13. UTILITY WITNESS PEARCE PROVIDES FOUR COST SCENARIOS FOR***
4 ***THE IMPACTS OF THE PPA RIDER ON CUSTOMER CHARGES OR***
5 ***CREDITS—WEATHER NORMALIZED LOAD, FIVE % HIGHER LOAD,***
6 ***FIVE % LOWER LOAD AND AVERAGE. DOES THE ECONOMIC***
7 ***ANALYSIS PROVIDED BY UTILITY WITNESS ALLEN ASSESS THE***
8 ***MACROECONOMIC/ECONOMIC DEVELOPMENT IMPACTS OF THESE***
9 ***PRICE SCENARIOS?***

10 ***A13.*** No. It does not. Utility witness Allen's study addresses only the economic
11 impacts of the plant closures and the unemployment of the associated coal
12 workers who provide coal to those plants. As I said above, the modeling
13 approach utilized by Allen cannot estimate the macroeconomic/economic
14 development impacts of electric price changes. Because of the limited nature of
15 the model, it is not able to accomplish the Commission's task, as I understand it,
16 of estimating the economic impacts of electric price changes resulting from plant
17 closures. The model just cannot handle that kind of analysis.

18
19 ***Q14. THESE COST SCENARIOS SEEM TO DECLINE (I.E., RESULT IN MORE***
20 ***LIKELY CONSUMER CHARGES) BEGINNING IN FORECASTED YEAR***
21 ***2022. WHAT MIGHT ACCOUNT FOR THE CHANGE IN COSTS?***

22 ***A14.*** It seems most likely that those costs are due to the integration of greenhouse gas
23 costs associated with the implementation of the Clean Power Plan, and the

1 associated declines in price-based dispatch into PJM Interconnection, L.L.C.
2 (“PJM”) when those costs are internalized into the units’ marginal costs. As
3 stated on page 20 of Utility witness Pearce’s testimony, “The results are
4 reasonably conservative in that they include a ‘double whammy’ of both the
5 carbon expense and the resulting reduced dispatch due to the higher cost basis.”
6 The analysis contained in Utility witness Pearce’s testimony includes more than
7 three quarters of a billion dollars of carbon costs associated with the PPA Rider
8 for the last three forecasted years that will be passed on to customers.
9

10 ***Q15. THESE COST SCENARIOS PROVIDED END IN 2024. COULD***
11 ***CUSTOMERS BE RESPONSIBLE FOR ADDITIONAL GREENHOUSE GAS***
12 ***COSTS IF THE PLANTS CONTINUE TO OPERATE UNDER THE RIDER***
13 ***BEYOND 2024?***

14 ***A15.*** It is not immediately clear to me why the forecasting provided by Utility witness
15 Pearce ends in year 2024. If these plants continue to operate beyond 2024, the
16 stringency of required carbon reductions will likely increase under the Clean
17 Power Plan. In existing tradeable carbon permit programs, fewer emissions
18 permits are auctioned each year to force the stringency of the cap gradually across
19 time. This has the effect of creating permit scarcity and, depending upon
20 abatement and/or fuel switching, demand and other market conditions, is likely to
21 result in higher carbon costs in later years. However, the compliance route
22 selected by Ohio is not yet determined, and may or may not include tradeable
23 permits or direct carbon taxes. In any event, by ending the forecast in 2024 it is

likely that the Commission is not being provided the full range of negative impacts associated with the PPA Rider and resultant negative economic impacts on customers or economic development.

Q16. WOULD THERE BE OTHER ECONOMIC IMPACTS (AND COSTS TO CONSUMERS) ASSOCIATED WITH ADDITIONAL GREENHOUSE GAS COSTS ON THESE PLANTS IN FUTURE YEARS?

A16. That is highly likely under the Clean Power Plan. If the carbon costs that are assumed in Utility witness Pearce's testimony continue in future years and these plants remain in operation, these carbon costs will likely be factored into the plants' marginal cost bids into PJM, and will likely result in reduced economic dispatch of the plants due to their lack of competitiveness with other generation units that do not incur similar carbon costs. Under the PPA Rider calculation scheme provided, this would result in the plants incurring higher operating costs and lower energy revenues, thus incurring additional financial liabilities on captive retail customers. Moreover, Utility witness Allen's analysis does not model the potential impact that these additional carbon costs, if incurred by ratepayers, would have on the statewide economy.

Q17. WHAT CARBON COSTS DOES UTILITY WITNESS PEARCE'S ANALYSIS INCLUDE AND ARE THEY MODELED IN A ROBUST MANNER?

A17. Utility witness Pearce's analysis includes a \$15 per ton of carbon dioxide equivalent costs, which is modeled as a tax on production from these plants.

1 While the cost estimate is not unreasonable, actual costs could be much higher or
2 much lower depending upon a range of market forces (e.g., abatement, demand
3 for energy and regional growth, power imports) and therefore modeling
4 sensitivity analysis is generally good form when this type of scenario is being
5 modeled. Sensitivity analysis would allow the Commission to evaluate the degree
6 to which a valid range of carbon costs, that the PPA Rider would impose on
7 customers, would affect the range of likely cost/credit scenarios. Sensitivity
8 analyses typically consist of modeling the same scenarios with both higher and
9 lower parameters to measure the degree to which the results are sensitive (i.e., not
10 robust) to higher or lower carbon prices. For example, in this case that might
11 include modeling the results with a \$5/ton carbon cost as well as a \$25/ton cost.

12
13 Based on a routine calculation with the values provided in Table 1 of Utility
14 witness Pearce's testimony, a \$25/ton carbon cost would result in \$1.28 billion of
15 carbon costs being passed on to customers in the last three forecasted years alone,
16 whereas with \$15/ton that figure is \$768 million. This was derived simply by
17 dividing 768 million by 15 and multiplying that by 25 to adjust the ratio. Given
18 that wide variability in customer liability due to a change in one key parameter,
19 sensitivity analyses would be a more appropriate method for presenting these
20 consumer cost liability results.

21
22 It should also be noted that these costs are direct costs and the Commission, to my
23 knowledge, has not been provided by the Utility a macroeconomic impact

1 analysis (i.e., direct + indirect costs) of the effect that these costs would have on
2 Ohio. Utility witness Allen's analysis certainly does not include this detail.
3 Under the PPA rider, these carbon costs would be incurred by customers non-
4 bypassable (i.e., they could not avoid them through customer choice by selecting
5 a CRES). \$1.28 billion of additional costs on AEP Ohio customers for 2022-
6 2024, and an undisclosed amount beyond 2024, without any recourse for avoiding
7 those costs, would likely offset any potential benefit that the PPA rider might
8 deliver to customers. These macroeconomic effects would provide for a more
9 accurate assessment of the economic development implications of these cost
10 liabilities and any resultant regional decline stemming from manufacturing flight
11 (e.g., Honda leaving central Ohio).

12
13 Another modeling concern with regard to the future carbon costs is also worth
14 mentioning. From my review of Utility witness Pearce's testimony, the carbon
15 costs and dollar values of the PPA Rider cost estimates are in nominal, rather than
16 in real dollars. Because the supply of money changes across time due to inflation
17 and other factors, it is customary to utilize Consumer Price Index ("CPI")
18 adjustment (i.e., based on the CPI for electricity prices) to a base year currency so
19 that the analysis can be more easily evaluated for future years. Using nominal
20 dollar figures for the assumed carbon cost is tantamount to assuming that
21 compliance costs for these plants (holding all else constant) will decline annually
22 by the rate of inflation. That is because \$15 nominal dollars in 2024 is less in real
23 (purchasing power/inflation adjusted) terms than \$15 nominal dollars in 2022.

1 Given that the compliance costs of these plants will likely increase as the
2 stringency of required carbon reductions (under whatever compliance plan the
3 State of Ohio puts forward), the analysis put forward by Utility witness Pearce
4 likely understates the carbon cost burden that would be imposed on customers by
5 the PPA Rider.

6

7 **III. CONCLUSION**

8

9 ***Q18. DOES THIS COMPLETE YOUR DIRECT TESTIMONY***

10 ***A18.*** Yes. I reserve the right to supplement it if and when additional information
11 becomes available.

CERTIFICATE OF SERVICE

It is hereby certified that a true copy of the foregoing *Direct Testimony of Noah C. Dormady on Behalf of the Office of the Ohio Consumers' Counsel* was served via electronic transmission to the persons listed below this 11th day of September, 2015.

/s/ William J. Michael

William J. Michael

Assistant Consumers' Counsel

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Research & Teaching Fields

Energy Policy | Environmental Policy | Emissions Markets (Cap & Trade) | Electricity Markets
Auctions & Strategic Behavior | Terrorism & Natural Hazards | Economic Resilience

Education

Ph.D., Public Policy, Planning and Development Price School of Public Policy University of Southern California (USC) Henry Reining Jr. Award for Best Dissertation in Public Policy, USC Price	2012
M.A., Political Science University of California, Riverside	2006
B.A., Political Science (<i>Cum Laude</i>) University of California, Riverside	2004

Appointments

Assistant Professor (tenure-track) John Glenn School of Public Affairs The Ohio State University	2012–Present
Doctoral Research Assistant National Center for Risk and the Economic Analysis of Terrorism Events (CREATE) U.S. Department of Homeland Security	2010–2011
Doctoral Research Assistant Price School of Public Policy University of Southern California	2008–2012
Associate/Adjunct Faculty Department of Political Science Chaffey College	2008
Associate/Adjunct Faculty Department of Political Science Mt. San Jacinto College	2008
Staff Member United States Senate Office of U.S. Senator Barbara Boxer	2004–2008

Peer-Reviewed Publications

- Wei, D., Dormady, N. & Rose, A. Forthcoming. Development of Reduced-Form Models to Evaluate Macroeconomic Impacts of Greenhouse Gas Mitigation. *Journal of Sustainable Energy Engineering*.
- Dormady, N. & Englander, A.G. Forthcoming. Carbon Allowances and the Demand for Offsets: A Comprehensive Assessment of Imperfect Substitutes. *Journal of Public Policy*.
- Dormady, N. 2014. Carbon Auctions, Energy Markets & Market Power: An Experimental Analysis, *Energy Economics*, 44: 468-482.
- Dormady, N., Szelazek, T. & Rose, A. 2014. The Potential Impact of an Anthrax Attack on Real Estate Prices and Foreclosures in Seattle, *Risk Analysis*, 34(1): 187-201.
- Dormady, N. 2013. Market Power in Cap-and-Trade Auctions: A Monte Carlo Approach, *Energy Policy*, 62: 788-797.
- Dormady, N. 2013. The Political Economy of Collaborative Organization, *Administration and Society*, 45(6): 748-772.
- Rose, A., Wei, D. & Dormady, N. 2011. Macroeconomic Assessment of the Pennsylvania Climate Action Plan, *Regional Science Policy and Practice*, 3(4): 357-379.
2012 Economic Analysis Award Winner: Regional Economic Models Inc. (REMI)
- Rose, A., & Dormady, N. 2011. A Meta-Analysis of the Economic Impacts of Climate Change Policy in the United States, *The Energy Journal*, 32(2): 143-166.

Current Research Support

- GE Capital. 2014-2015. *An Experimental Analysis of Middle Market Resilience: Gender, Frequency & Information*. \$68k. (PIs Noah Dormady and Robert Greenbaum).
- National Science Foundation (NSF). 2014-2016. *An Integrated Approach to Measuring Dynamic Economic Resilience Following Disasters*. \$493k. (Co-I) (PIs: Adam Rose and Kathleen Tierney).
- Department of Homeland Security (DHS). 2016-2017. *Analyzing and Measuring Economic Resilience to Disasters*. \$500K. (PIs: Adam Rose, Noah Dormady and Kathleen Tierney).

Research Reports & Policy Papers

- The Costs of Inefficiency: Ignoring Ohio's Energy Efficiency Potential (With Cheryl Roberto [currently VP of Environmental Defense Fund]). *John Glenn School of Public Affairs Policy Brief*. March, 2013.
- Three-State Regression Analysis of the Macroeconomic Impacts of Climate Mitigation Options: Report to the State of Maryland. *The Center for Climate Strategies*. August, 2011.
- Economic Analysis of the Consequences of a Potential Anthrax Terrorist Attack in the Pacific Northwest: Business Income Losses and Real Estate Price Declines. *Center for Risk and the Economic Analysis of Terrorism Events (CREATE)*, University of Southern California. Final Report to the United States Department of Homeland Security. August, 2011.

Aggregate and Distributional Impacts of AB32 on the California Economy: Alternative Allocation Strategies for Cap and Trade. *The Next 10 Foundation*. December, 2010.

Impacts of Comprehensive Climate and Energy Policy Options on the U.S. Economy. *The Center for Climate Strategies*. July, 2010.

Southern Regional Economic Assessment of Climate Policy Options and Review of Economic Studies of Climate Policy: A White Paper Report. Prepared for The Southern Governors' Association. *The Center for Climate Strategies*. October, 2009.

Conference Papers

Pollution Permit Consignment Auctions: Theory and Experiments (With Paul Healy). *American Economic Association*, Boston, January 2-5, 2015.

Pollution Permit Consignment Auctions: Theory and Experiments (With Paul Healy). *International Association for Energy Economics*, New York, June 18-18, 2014.

Emissions Markets, Power Markets and Market Power: An Experimental Approach, *Association of Environmental and Resource Economists: Western Economic Association International*, San Francisco, June 29 – July 3, 2012.

Emissions Markets, Power Markets and Market Power: Regulatory Mechanisms and Policy Approaches, *Association for Environmental Studies and Sciences*, Santa Clara, June 21-24, 2012.

Anthrax Outbreak in Downtown Seattle: A Spatial and Longitudinal Assessment of Terrorism's Impact on Real Estate Prices, *Second International Conference on Integrated Disaster Risk Management*, Los Angeles, July 15-18, 2011.

Market Power in Cap and Trade Auctions: A Monte Carlo Approach, *Western Economics Association International*, San Diego, July 1-3, 2011.

The Exercise of Market Power in Contemporary Transferable Property Rights Markets, *Southern Political Science Association*, Atlanta, Georgia, January 6-9, 2010.

Global Economic Impacts of an International Climate Change Treaty. (With Adam Rose), *CENTRA Technologies National Security Impacts of a Prospective Climate Change Treaty Workshop*. Washington, D.C., 2010.

Climate Change Mitigation Policy and Energy Markets: Cooperation and Competition in Integrating Renewables into Deregulated Markets (With Elena Maggioni), *Forging Closer Ties: Transatlantic Relations, Climate and Energy*, Freie University Berlin, (Germany), November 29 – December 5, 2009.

Invited Presentations & Expert Interviews

Dialogue: Ohio's Algae Crisis. John Glenn School of Public Affairs Dialogue Policy Forum Series, The Ohio State University, April, 2015.

Carbon Allowances and the Demand for Offsets: A Comprehensive Assessment of Imperfect Substitutes. John Glenn School of Public Affairs Seminar Series, The Ohio State University, March, 2015.

Pollution Permit Consignment Auctions: Theory and Experiments, Knowlton School of Architecture Seminar Series, The Ohio State University, February, 2015.

Climate Change, Public Policy and the Economy, (Keynote Panelist) American Lung Association, Columbus Public Health, Ohio Sea Grant, Byrd Polar Research Center, *et al.*, Climate Explorations Series. *A Matter of Dollars and Sense: Climate Change, Carbon Standards and Public Health*, October 30, 2014

Pollution Permit Consignment Auctions: Theory and Experiments, John Glenn School of Public Affairs Seminar Series, The Ohio State University, December, 2013.

Energy and the Environment, Battelle Center for Science and Technology Policy, The Ohio State University, January, 2013.

Emissions Markets, Power Markets, and Market Power: An Experimental Approach, The Ohio State University, Department of Agricultural, Environmental and Development Economics, Seminar Series, November, 2012.

Energy and Environmental Policy: An Introduction, John Glenn School of Public Affairs, The Ohio State University, Guest lecture, October, 2012.

Anthrax Outbreak in Downtown Seattle: A Spatial and Longitudinal Assessment of Terrorism's Impact on Real Estate Prices, USC Center for Risk and the Economic Analysis of Terrorism Events (CREATE) Fall Seminar Series, October, 2011.

Transferable Property Rights Markets (Cap and Trade), School of Policy, Planning and Development (SPPD), University of Southern California, November, 2010.

California's Perspective on Progressive Electricity and Feed-In Tariffs, University of Meunster, (Germany), August, 2010.

Succeeding on the PhD Qualifying Examination, School of Policy, Planning and Development (SPPD), University of Southern California, May, 2010.

Teaching

The Ohio State University

Graduate Courses:

Risk Analysis (in development for Spring 2016)
Energy and Environmental Policy Capstone (Public Affairs 7910)
Public Sector Economics (Public Affairs 6030)
Environmental & Energy Policy (Public Affairs 5800)

Undergraduate Courses:

Environmental & Energy Policy (Public Affairs 5800)
Public Policy Analysis (Public Affairs 3000)

Chaffey College

Undergraduate Courses:

American Government (Political Science 1)

Mt. San Jacinto College
Undergraduate Courses:
American Government (Political Science 100)

Software Packages

Pollution Permit Consignment Auction Human Experiment Software
Utility: Zurich Toolbox for Readymade Economics Experiments (Z-TREE) application for conducting Coasian auction market experiments utilizing a consignment mechanism.

Oligopsony 1.0
Utility: Windows-based (C# .NET 3.0) stochastic Monte Carlo simulation environment for simulating market power in uniform price auctions.

Simultaneous Energy-Emissions Market Experiment Software
Utility: Zurich Toolbox for Readymade Economics Experiments (Z-TREE) application for conducting energy-emissions market experiments, Control and Experimental Treatments.

Awards

2012 Economic Analysis Award (National) (First Winner of Annual Award)
Regional Economic Models Inc. (REMI)

2012 Henry Reining Jr. Award, Best Dissertation in Public Policy
University of Southern California
Sol Price School of Public Policy

2012 Excellence in Publication Award
University of Southern California
Sol Price School of Public Policy

Past Research Support

- The John Randolph & Dora Haynes Foundation
- The Southern Governors' Association
- The Center for Climate Strategies
- The Pennsylvania Department of Environmental Protection
- The Next 10 Foundation
- The University of Southern California
- The University of California

Journal Referee

The Energy Journal | Energy Policy | Journal of Public Policy | Risk Analysis | Canadian Journal of Economics |
Journal of Regional Science | Eastern European Economics | Energy Economics

Professional Affiliations

- *Association of Environmental and Resource Economists*

- *Association of Public Policy and Management*
- *Canadian Economics Association*
- *International Association of Energy Economics*
- *Southern Political Science Association*
- *Western Economic Association International*

Recent Media Coverage

- TBS eFM (Radio)—National (Korea) (2015)
- NBC News (Print)—National (2014)
- NBC News (Television)—Columbus, Ohio (2014)
- NBC News (Television)—Columbus, Ohio (2014)
- Seattle PI (Print)—Seattle, Washington (2013)

Recent Committee Service & University Leadership

University—Energy Management Faculty Advisory Committee (2014-Present)

Duties: Consult on the university's potential to meaningfully contract with private provider(s) for all of the university's energy, water, heating, steam, utility and facilities management operations, and engage in affinity agreements with external firms.

University—Sustainability Curriculum Committee (2014-Present)

Duties: Develop, promote and evaluate curriculum and curricular opportunities for students at all levels in topics related to sustainability.

College—Curriculum Development Committee: Program Evaluation and Public Policy Analysis (2013)

Duties: Develop a new program curriculum for an undergraduate degree track in program evaluation and public policy analysis.

College—Robert Backoff Research Award Committee (2012-Present)

Duties: Evaluate PhD student published and pre-published research papers to award the annual Robert Backoff research stipend.

College—(Ad hoc) Appointment, Promotion & Tenure (APT) Review (2014-2015)

Duties: Co-author revised Appointment, Promotion & Tenure (APT) document for the John Glenn College of Public affairs.

College—Search Committee for School of Environment and Natural Resources, Ohio State University (2014-2015)

Duties: Serve as external member on public policy search for the Ohio State School of Environment and Natural Resources faculty hire.

College—Masters Examination Review Committee (2014-Present)

Duties: Review MA student comprehensive examinations.

College—Discovery Themes Committee (2014-Present)

Duties: Consult on proposals for faculty hiring, educational and outreach opportunities under the university's Discovery Themes initiatives.

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Summary: Testimony Direct Testimony of Noah C. Dormady on behalf of the Office of the Ohio Consumers' Counsel electronically filed by Ms. Gina L Brigner on behalf of Mr. William J. Michael