BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company for Authority to Provide for a Standard Service Offer Pursuant to R.C. 4928.143 in the Form of an Electric Security Plan.	)	Case No. 14-1297-EL-SSO

THIRD SUPPLEMENTAL TESTIMONY OF EDWARD W. HILL ON BEHALF OF THE OHIO MANUFACTURERS' ASSOCIATION ENERGY GROUP

December 30, 2015

1 **Introduction, Purpose, and Summary of Conclusions**

2 **Q. Please state your name, title, and business address.**

3 A. My name is Edward W. Hill. I am Professor of Public Affairs and City and
4 Regional Planning and a member of the Faculty of the Discovery Theme in
5 Materials and Manufacturing for Sustainability at The Ohio State University's
6 John Glenn College of Public Affairs and College of Engineering. I was appointed
7 to this position beginning September 1, 2015. I retired as the Dean of the Maxine
8 Goodman Levin College of Urban Affairs at Cleveland State University and
9 Professor of Economic Development on June 30, 2015. My business address is
10 310P Page Hall, 1810 College Road, Columbus, Ohio 43210.

11

12 **Q. Please describe your educational background, professional qualifications,**
13 **and employment experience.**

14 A. I graduated from the University of Pennsylvania with a bachelor's degree in
15 economics and urban studies. I then attended the Massachusetts Institute of
16 Technology where I earned a master's degree in City and Regional Planning and
17 a Ph.D. in Economics and Regional Planning. My doctoral field examinations in
18 economics were in industrial organization and regulation, labor economics, and
19 urban and regional economics. In the Department of Urban Studies and Planning
20 my examinations were in regional economic development.

21 I was a member of the Cleveland State University faculty from 1985 to the end of
22 June 2015. During my 30 years at Cleveland State University I rose through the
23 academic ranks: Assistant Professor, Associate Professor, Professor and

1 Distinguished Scholar of Economic Development, Vice President of Economic
2 Development, and then serving as Dean of the Levin College of Urban Affairs.
3 The Ohio State University asked me to join the interdisciplinary Discovery
4 Theme in Materials and Manufacturing for a Sustainable World beginning in the
5 2015-16 academic year. I was appointed as a Professor in the John Glenn College
6 of Public Affairs and in City and Regional Planning and I am a faculty member of
7 the Ohio Manufacturing Institute. I am teaching the doctoral seminar in Public
8 Economics in the spring of 2016. I will be teaching economic development policy
9 and practice and public finance in subsequent semesters.
10 In addition, I am a non-resident Senior Fellow at the Brookings Institution's
11 Metropolitan Policy Program and was an Adjunct Professor in Public
12 Administration at South China University of Technology for three years. I was
13 also a non-resident Visiting Fellow at the Institute of Government Studies at the
14 University of California at Berkeley for five years, ending in 2013.
15 I was the inaugural chair of the National Institute of Standards and Technology's
16 Manufacturing Extension Partnership's National Advisory Board. I served in that
17 capacity from 2007 until 2010. I continued to serve on that Board until my term
18 statutorily expired in 2014.
19 I have also served on Ohio's Urban Revitalization Task Force (appointed by
20 Governor Taft), the Auto Industry Support Council (appointed by Governor
21 Strickland), the Cooperative Education Advisory Commission (appointed by
22 Speaker Batchelder), and the Manufacturing Task Force (appointed by Director
23 Schmenk).

1 My research has focused on the areas of urban and regional economic
2 development policy, the operation of regional labor markets, and industry
3 studies with an emphasis on manufacturing. My research has a particular
4 emphasis on issues that are important to the state of Ohio's economy.
5 I am widely published. I have published one book and am in the process of
6 completing my second. I have edited five books, written eight book-length
7 reports, and have authored over 90 articles, book chapters, and columns. I was
8 the editor of *Economic Development Quarterly* from 1994 to 2005. *Economic*
9 *Development Quarterly* publishes peer-reviewed research that is relevant to the
10 development and renewal of the American economy.
11 I participated in much of the energy research conducted at the Levin College
12 either as an advisor or as an investigator. I led the research and writing of the
13 publication titled *Ohio Utica Shale Gas Monitor* and was one of the authors of *An*
14 *Analysis of the Economic Potential for Shale Gas Formations in Ohio* (February
15 2012).[1] I was also the co-chair of the advisory committee to the recently
16 released three-part report on the natural gas resources in the state of Ohio.[2]
17
18 **Q. Have you provided written testimony before in this proceeding?**

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[1] See, e.g., Edward W. Hill, et al., "Ohio Utica Shale Gas Monitor" (January 10, 2014) at http://engagedscholarship.csuohio.edu/urban_facpub/1143/; Thomas, Andrew R., Iryna Lendel, Edward Hill, Douglas Southgate, and Robert Chase, "An Analysis of the Economic Potential for Shale Gas Formations in Ohio" (February 2012) at http://engagedscholarship.csuohio.edu/urban_facpub/453/.

[2] See, e.g., Iryna Lendel et al., "Economics of Utica Shale: "Mapping the Opportunities for Shale in Ohio: Workforce Analysis." (September 2015) at http://engagedscholarship.csuohio.edu/urban_facpub/1330/; "Economics of Utica Shale: Supply Chain Analysis" (September 2015) at http://engagedscholarship.csuohio.edu/urban_facpub/1329/; "Mapping Opportunities for Shale Development in Ohio" (September 2015) at http://engagedscholarship.csuohio.edu/urban_facpub/1328/.

1 A. Yes, I provided written Direct Testimony on December 22, 2014,[3] Supplemental
2 Testimony on May 11, 2015,[4] and Second Supplemental Testimony on August 10,
3 2015.[5] My testimony addressed the policy implications that I believe the Public
4 Utilities Commission of Ohio (Commission or PUCO) should consider regarding the
5 request of Ohio Edison Company (Ohio Edison), The Cleveland Electric Illuminating
6 Company (CEI), and The Toledo Edison Company (Toledo Edison) (collectively, the
7 Companies) for approval of an Economic Stability Program (Program), which
8 includes shifting the financial risk of operating generation plants onto their customers
9 through a rider and the utilization of a power purchase agreement (PPA) to subsidize
10 portions of the generation capacity owned by the Companies' affiliate, FirstEnergy
11 Solutions,[6] as well as the various stipulations filed.[7] I explained that the proposal,
12 adopted by the stipulations, shifts the risk of owning and operating generating
13 capacity to customers, including those customers who choose to shop and purchase
14 their generation from alternative suppliers or generators other than the Companies'
15 affiliate, FirstEnergy Solutions. I also addressed, in response to the Attorney
16 Examiner's Entries dated March 23, 2015 and May 1, 2015, whether and how the
17 Commission's factors set forth in the recent AEP Ohio Order regarding AEP's
18 electric security plan (ESP) and request for cost recovery associated with a PPA[8]

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[3] OMAEG Ex. 17.

[4] OMAEG Ex. 18.

[5] OMAEG Ex. 19.

[6] Companies Ex. 1.

[7] Companies Ex. 2 through 4.

[8] *In the Matter of the Application of Ohio Power Company for Authority to Establish a Standard Service Offer Pursuant to R.C. 4928.143, in the Form of an Electric Security Plan*, Case No. 13-2385-EL-SSO, et al., Opinion and Order at 25 (February 25, 2015) (AEP Ohio Order).

1 should be considered in evaluating the Companies' request for future cost recovery
2 associated with a PPA.[9]
3
4 **Q. What is the purpose of your Third Supplemental Testimony?**
5 A. My Third Supplemental Testimony addresses the Third Supplemental
6 Stipulation and Recommendation filed in this proceeding on December 1, 2015
7 (Third Supp. Stipulation), and explains how the Third Supp. Stipulation
8 submitted by the Companies differs considerably from the Application that it
9 filed on August 4, 2014, as amended by the three previously filed stipulations.[10]
10 The Third Supp. Stipulation presents a new ESP (termed by the Companies as
11 the "Stipulated ESP IV"[11]) while keeping its economic security plan for the power
12 plants included in the PPA largely unchanged. The Third Supp. Stipulation is also
13 purportedly supported by a number of signatory or non-opposing parties
14 (collectively, Signatory Parties), which has also changed in substantial ways
15 since the first stipulation was filed on December 22, 2014.[12] In the Third Supp.
16 Stipulation, the Companies have raised new issues, offered new arguments, and
17 presented an expanded coalition of supporters, labeled a "redistributive

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[9] *In the Matter of the Application of Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison Company for Authority to Provide for a Standard Service Offer Pursuant to R.C. § 4928.143 in the Form of an Electric Security Plan*, Case No. 14-1297-EL-SSO (ESP IV Proceeding), Entry at 2 (March 23, 2015) and Entry at 10 (May 1, 2015) (citing AEP Ohio Order).

[10] As explained by the Third Supp. Stipulation at 2, the Third Supp. Stipulation, together with the "Prior Stipulations" (defined as the December 22, 2014 Stipulation, the May 28, 2015 Supplemental Stipulation, and the June 4, 2015 Second Supplemental Stipulation) form the "Stipulated ESP IV," which must be considered as a package. See also Fifth Supplemental Testimony of Eileen M. Mikkelsen at 2 (December 1, 2015) (Mikkelsen Fifth Supplemental Testimony). See OMAEG Ex. 19 for a discussion of the amendments to the Application as a result of the three Prior Stipulations.

[11] Id.

[12] Company Ex. 2 and 2A.

1 coalition," in an attempt to influence the public policy process in ways that are
2 deleterious for the state of Ohio. Also, the Third Supp. Stipulation and
3 supporting testimony presents an analysis of the Commission's three-pronged
4 test used to evaluate regulatory settlements.[13]
5 The Signatory Parties of the Third Supp. Stipulation and Stipulated ESP IV, with
6 the exception of the staff of the PUCO, constitute a redistributive coalition; they
7 are not a representative cross-section of diverse interests that serve as a proxy
8 for the public's interest in this case as is asserted in the Third Supp. Stipulation.
9 Rather, the Signatory Parties represent their own corporate and organizational
10 interests.
11
12 **Q. Does the Third Supp. Stipulation or Stipulated ESP IV satisfy all prongs of**
13 **the Commission's three-part test referenced by the Companies?**[14]
14 A. No. Neither the Third Supp. Stipulation nor the Stipulated ESP IV satisfies any
15 prong of the three-part test:
16 (a) The Signatory Parties do not "represent a variety of diverse interests." Instead,
17 they represent a somewhat diverse, *ad hoc*, collection of corporate and institutional
18 interests that benefit directly from specific aspects of the Third Supp. Stipulation or
19 the other stipulations comprising the Stipulated ESP IV. The Signatory Parties only
20 represent themselves and provide a façade of representational diversity. The
21 Signatory Parties did not bargain on behalf of large classes of customers or a diverse

[13]Third Supp. Stipulation at 4; (Mikkelsen Fifth Supplemental Testimony) at 7-10.
[14]Id. at 9-10.

group. They did not secure benefits for all individuals or businesses that were not direct participants in the bargaining, a particular type of participant, or members of organizations that participated in the bargaining. They sought benefits either for their own company or what amount to benefits for their members.

(b) The Stipulated ESP IV violates a number of important regulatory principles and practices. Specifically, the Stipulated ESP IV:

- Re-imposes an oligopoly in the electric generating market.
- Deters new entry into the electric generating market, thwarting both competition and hurting the long-term reliability of the electric power system as a whole in the state of Ohio.
- Introduces *de facto* price discrimination among competing large electricity users based solely on organizational membership or a particular type of customer.
- Relies upon an opaque system of income transfers and cross-subsidies among consumers.

(c) The Stipulated ESP IV as a whole does not benefit customers and the public interest. The major beneficiaries from the Stipulated ESP IV are FirstEnergy, its stockholders, and management. The Stipulated ESP IV shifts business risk away from stockholders and management to customers. The Stipulated ESP IV will result in regulatory taxation produced by two forms of subsidy. The first is through the Affiliate PPA and Rider RSS, where losses incurred in the operations of the plants covered by the PPA are passed on to all electricity users in the Companies' service territories. The second is through the way that negotiated rate discounts, subsidies,

1 and energy efficiency investments are made. Typically, the cost of utility negotiating
2 provisions in a regulatory setting are not borne by the utility, but instead, the amounts
3 spent are passed on to ratepayers that do not directly benefit. If you are a member of
4 the club that negotiated benefits to support the PPA politically, then you receive the
5 benefits of membership while others pay for the privilege.
6 The Stipulated ESP IV holds out the very real potential of deterring investment in
7 the electric generating capacity and harming the long-term reliability of the
8 electric system. The Stipulated ESP IV will reverse the benefits received by
9 consumers from deregulated markets for electric generation and will increase
10 electric rates relative to rates in competing regions and, thereby, harming the
11 economic prospects for businesses that are not members of the redistributive
12 coalition and of residents of the state of Ohio.
13
14 **Q. Have you had an opportunity to review the Third Supp. Stipulation?**
15 A. Yes. At various times I have reviewed all of the stipulations that have been filed to
16 date and together comprise the Stipulated ESP IV, as well as relevant portions of the
17 Companies' Plan termed at different times *Powering Ohio's Progress*, Electric
18 Security Plan IV, and ESP IV. In addition to reading the Third Supp. Stipulation, I
19 have also reviewed the supplemental testimony of Eileen Mikkelsen filed in this
20 proceeding on behalf of the Companies.[15]

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[15] Supplemental Testimony of Eileen M. Mikkelsen (December 22, 2014) (Mikkelsen Supplemental Testimony or Company Ex. 8), Second Supplemental Testimony of Eileen M. Mikkelsen (May 4, 2015) (Mikkelsen Second Supplemental Testimony or Company Ex. 9), Third Supplemental Testimony of Eileen M. Mikkelsen (June 1, 2015) (Mikkelsen Third Supplemental Testimony or Company Ex. 10), Fourth

1 **Q. What are the public benefits that are claimed in the Stipulated ESP IVresulting**
2 **from the Third Supp. Stipulation?**
3 A. There are six purported benefits presented in the testimony supporting the Stipulated
4 ESP IV resulting from the Third Supp. Stipulation: (1) Long-term, stable, and
5 predictable retail prices, (2) consumer empowerment and retail competition, (3)
6 economic development and job retention, (4) a business plan for transmission grid
7 modernization, (5) investments to begin modernizing the distribution system, and (6)
8 a mixture of alternative energy and carbon reduction actions.[16] I have listed these
9 purported benefits from the most misleading to the truly beneficial. To accept items 1
10 through 3 on their face requires suspending all knowledge of how markets operate
11 along with ignoring data that documents the economic benefits that competition in the
12 wholesale electric generating business has produced. My testimony is a response to
13 these six claims as they are justification for the Companies asserting that the PUCO's
14 three-prong test has been met by the Stipulated ESP IV.
15
16 **(1) LONG-TERM, STABLE AND PREDICTABLE RETAIL PRICES[17]**
17 **Q. Will long-term retail electric prices be more predictable and stable under the**
18 **terms of the Stipulated ESP IV?**
19 A. There are four components to an honest answer to this question: (i) the Companies'
20 affiliate's rate of return on equity on the PPA generating plants included in the Third
21 Supp. Stipulation will be both stable and predictable under the Stipulated ESP IV. (ii)

Supplemental Testimony of Eileen M. Mikkelsen (June 4, 2015) (Mikkelsen Fourth Supplemental Testimony or Company Ex. 11), and Mikkelsen Fifth Supplemental Testimony.
[16] Mikkelsen Fifth Supplemental Testimony at 10-12.
[17] Id. at 10, 13; Third Supp. Stipulation at 6.

1 Retail electric prices may be somewhat more predictable under the Stipulated ESP IV
2 than if the generating market remained unregulated. (iii) It is unlikely that retail
3 electric prices will be more stable than they are currently. There are two reasons for
4 this expectation. One is based on the documented 10-year record of stable electric
5 prices that I will present. The other is based on the algebra of the Affiliate PPA. And,
6 (iv) it is very likely that prices will be higher than if the generating market remain
7 unregulated.
8
9 *The Companies' Affiliate's Return on Equity*:[18] The affiliate PPA has been the central,
10 consistent, element through all proposals and submittals culminating in the Stipulated
11 ESP IV. The Companies have testified that the two power plants in question, along
12 with the Companies' partial ownership in OVEC lose money. What is new in the
13 Third Supp. Stipulation is a reduction in the return on equity that FirstEnergy
14 Solutions will receive (from 11.15% to 10.38%) from its equity invested in the plants
15 covered by the affiliate PPA.[19] The period covered by the PPA, and its associated
16 Rider RRS, has also been shortened from 16 years—2016 to 2031—to 8 years—2016
17 to 2024—in the Third Supp. Stipulation.[20] If approved this return on equity will be
18 both stable and predictable.

[18] Mikkelsen Fifth Supplemental Testimony at 7.

[19] Id. at 7 (which will be reflected in a modified Term Sheet regarding the PPA between the Compnaies and FirstEnergy Solutions).

[20] Id. at 3, 7 (which will be reflected in a modified Term Sheet regarding the PPA between the Compnaies and FirstEnergy Solutions).

1 *Retail electric prices will be more predictable*:[21] Retail electric prices may be
2 somewhat more predictable under the affiliate PPA than under an unregulated
3 generating market based on how the algebra of the PPA works. However, consumers
4 will be negatively impacted by higher prices.

5 Under the structure of the affiliate PPA, the associated generating plants sell their
6 power to the Companies at a price that covers the operating, or variable, costs
7 associated with generating electricity, the cost of debt associated with the plant, and a
8 10.38% return on equity. Debt payments and the mandated return on equity are fixed
9 costs—they do not vary substantially over time. The variable costs associated with
10 producing power will change over time, with the cost of fuel being a large
11 component.

12 If P_{PPA} represents the sales price to the Companies under the affiliate PPA, D the
13 amortized debt payments, E the return on equity, VC the variable cost of producing
14 electricity, and with ΔVC representing a one-unit change variable costs, then:

15 $$P_{PPA} = D + E + VC, \text{ then } \Delta PP_{PA} = \Delta VC.$$

16 If D and E change they do so at a very gradual rate and for purposes of this
17 illustration they are essentially fixed. The only parts of the equation above that can
18 vary are the variable costs associated with production. In terms of microeconomics,
19 the marginal cost of operating the generating plants are only associated with changes
20 in variable costs. However, in a competitive market, equilibrium prices are associated
21 with marginal or variable costs, not total costs.

[21] Id. at 10; Third Supp. Stipulation at 6.

1 Will prices be more predictable then they are now as stated in the supporting
2 testimony?[22] The answer is yes because predicting the fixed costs will be well known
3 to both the Companies and the Commission, and, because making electricity is a
4 capital intense business, fixed costs have a higher share of total costs then in other
5 industries. The formulaic nature of fixed costs and their relatively large share of total
6 costs, along with a guaranteed return on equity (profit) will improve the predictability
7 of the retail electricity costs passed onto the Companies under the PPA (assuming no
8 large capital investments are required), and then flowed through to customers per
9 Rider RRS. This will be also create a more predictable revenue stream to FirstEnergy
10 Solutions compared to the units selling directly into the grid where the generator can
11 lose money.
12 Under the affiliate PPA, retail prices will still change, however, with changes in the
13 variable costs associated with making electricity (i.e., necessary capital investments).
14 The confusion comes from the fact that under the PPA retail prices will be more
15 predictable than they are currently due to the large fixed cost component in the sales
16 formula. However, retail electric prices will also be higher and will be as variable as
17 they are now since variable costs drive the equilibrium price in a free market and in
18 the PPA's formula.
19 If a two-dimensional graph were drawn of the cost curves under the PPA and under
20 the current unregulated market, the slopes of the two curves will be the same, but the
21 place where the cost curve intersects the y-axis (the axis that measures cost) will be
22 higher for the PPA generating cost curve than it will be for the free market cost curve,

[22] Id. at 10.

as will every other point of the PPA cost curve. Both lines will be equally variable, but the PPA cost curve will be more slightly predictable.

The Companies want us to believe that predictability coupled with both higher prices than currently exist in today's free market and with the same level of variability is preferred by retail customers. I do not agree.

Retail electric prices will be more stable than they are currently:[23] Data collected by the Commission over the past 10 years is remarkable for two statistical facts. First, after adjusting for the electricity component in the consumer price index for all urban consumers electricity prices have been declining. The decline is most likely due to a combination of falling demand and the introduction of competitive electrical generating markets. The decline in demand is secular due to a combination of population loss, the profound negative impact of the Great Recession and the slow pace of recovery, greatly increased efficiency in the manufacturing sector, and then the opening of the vast natural gas resources in the Appalachian Basin—first in the Marcellus shale formation and then in the Utica formation—creating a cheap fuel source, especially when considering environmental compliance costs. Second, in statistical terms, prices have been stable around a downward trend. See Figures 1 to 5 included below.

Statistical stability means low levels of variation in the data, where variation means the spread of observations around the mean of the distribution. Two measures of variation are commonly used to describe dispersion in a data series: the standard

[23] Id. at 9.

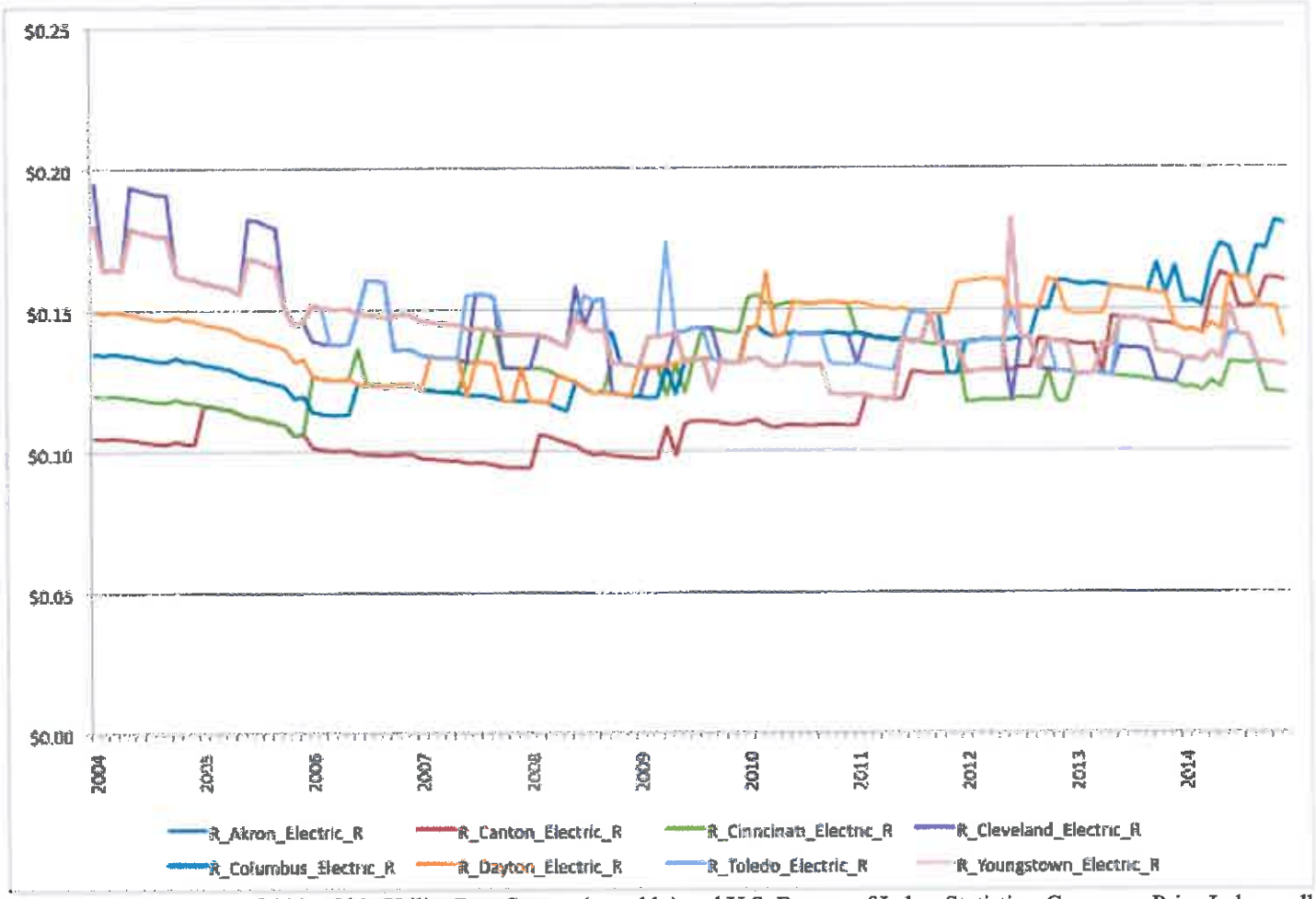
deviation and the Coefficient of Variation (CV). The standard deviation is an absolute measure of the spread of distribution around its mean, or average. In a normal distribution approximately two-thirds of the observations will be clustered within plus or minus one standard deviation of the mean. The smaller the standard deviation the tighter is the spread of data around the mean. The CV is a relative measure that allows comparison of spread in different data series that are measured differently. The CV is defined as the standard deviation divided by the mean. See Table 1 included below.

The data displayed in Figures 1 to 5 below are from the monthly Ohio Utility Rate Survey, with the data covering January 2004 to December 2005. The staff of the Commission collects data monthly on the standard service offer (SSO) rates in the state's eight large metropolitan areas, Akron, Canton, Cincinnati, Cleveland, Columbus, Dayton, Toledo and Youngstown, based on prototypical usage. These data are in the figures below. Figure 1 is for residential electric SSO for 750 KWH of electricity; Figure 2 is for commercial electricity customers using 300,000 KWH monthly and 1,000 KWH daily; Figure 3 is for a major industrial customer using 6,000,000 KWH a month and 20,000 KWH daily. The data in Figures 1 to 3 are adjusted for inflation using the electricity component of CPI-U so that the data are presented in 2014 real dollars.

To illustrate the impact that the discovery of major natural gas resources in the Appalachian Basin has had on industrial energy prices, Figure 4 presents the data for commercial users of 45 MCF natural gas a month, while Figure 5 depicts the cost of a

large industrial user of 350 MCF of natural gas. The data for Youngstown were incomplete in the dataset used to plot Figure 5.

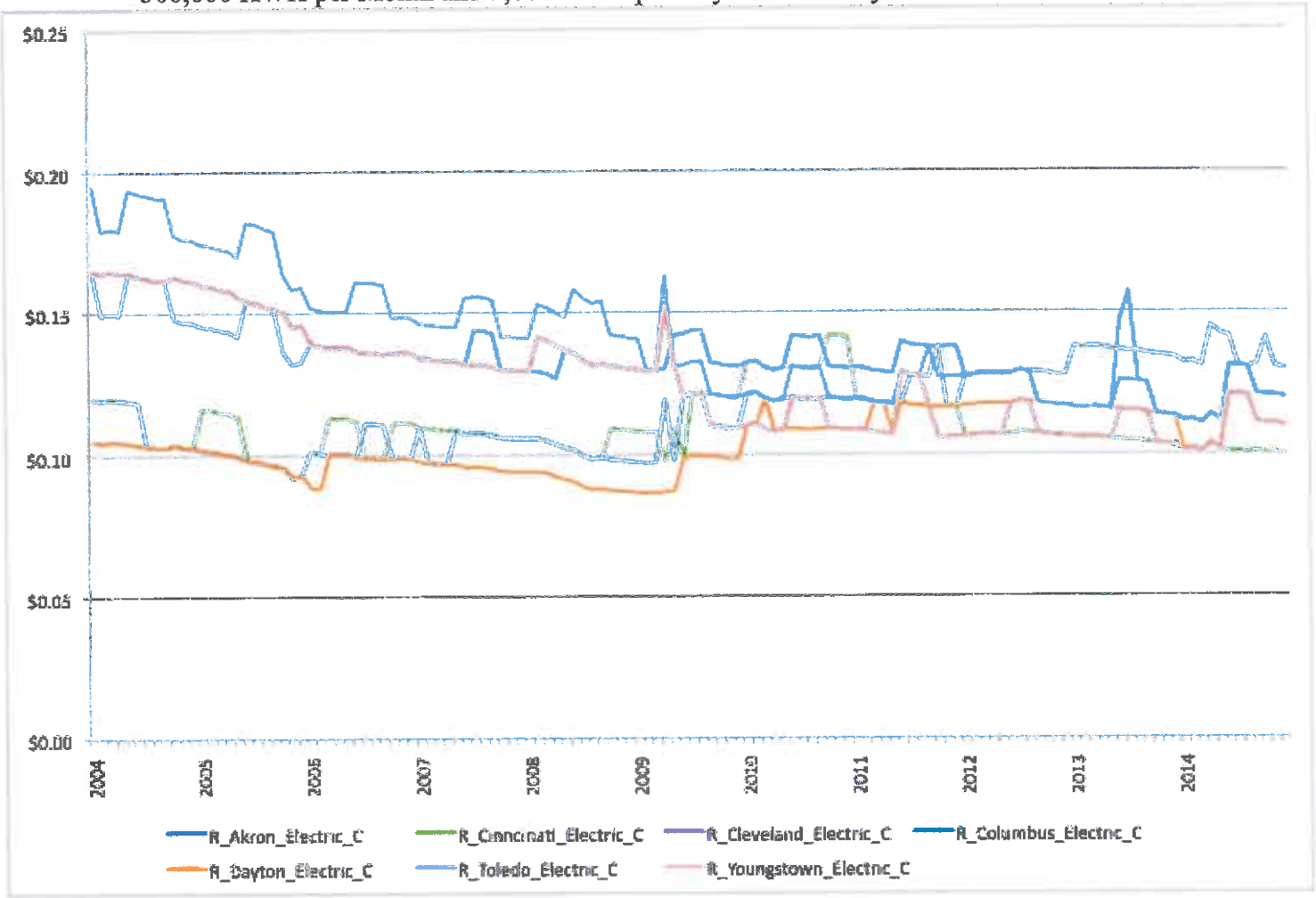
Figure 1
Inflation Adjusted Residential Standard Service Offer per KWH Based on a Standard Service Offer of 750KWH from January 2004 to December 2014



Sources: Public Utilities Commission of Ohio, Ohio Utility Rate Survey (monthly) and U.S. Bureau of Labor Statistics, Consumer Price Index—all Urban Consumers—Electricity, monthly downloaded from FRED, the data service of the St. Louis Federal Reserve Bank (December 29, 2015).

Figure 2

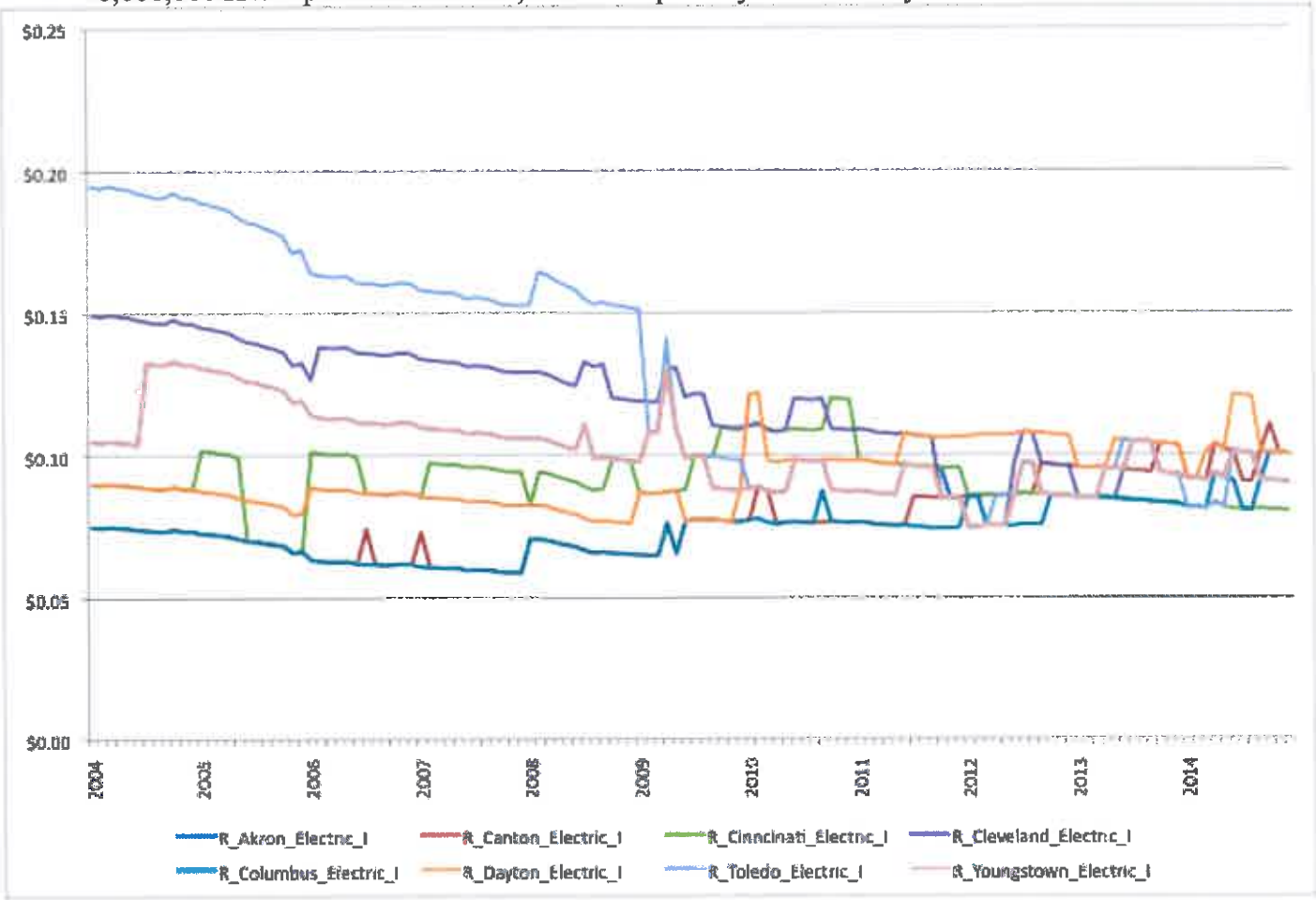
Inflation Adjusted Comparison of Commercial Utility Bills per KWH in 8 Major Ohio Cities Based on a Standard Service Offer of 300,000 KWH per Month and 1,000 KWH per Day from January 2004 to December 2014



Sources: See Figure 1

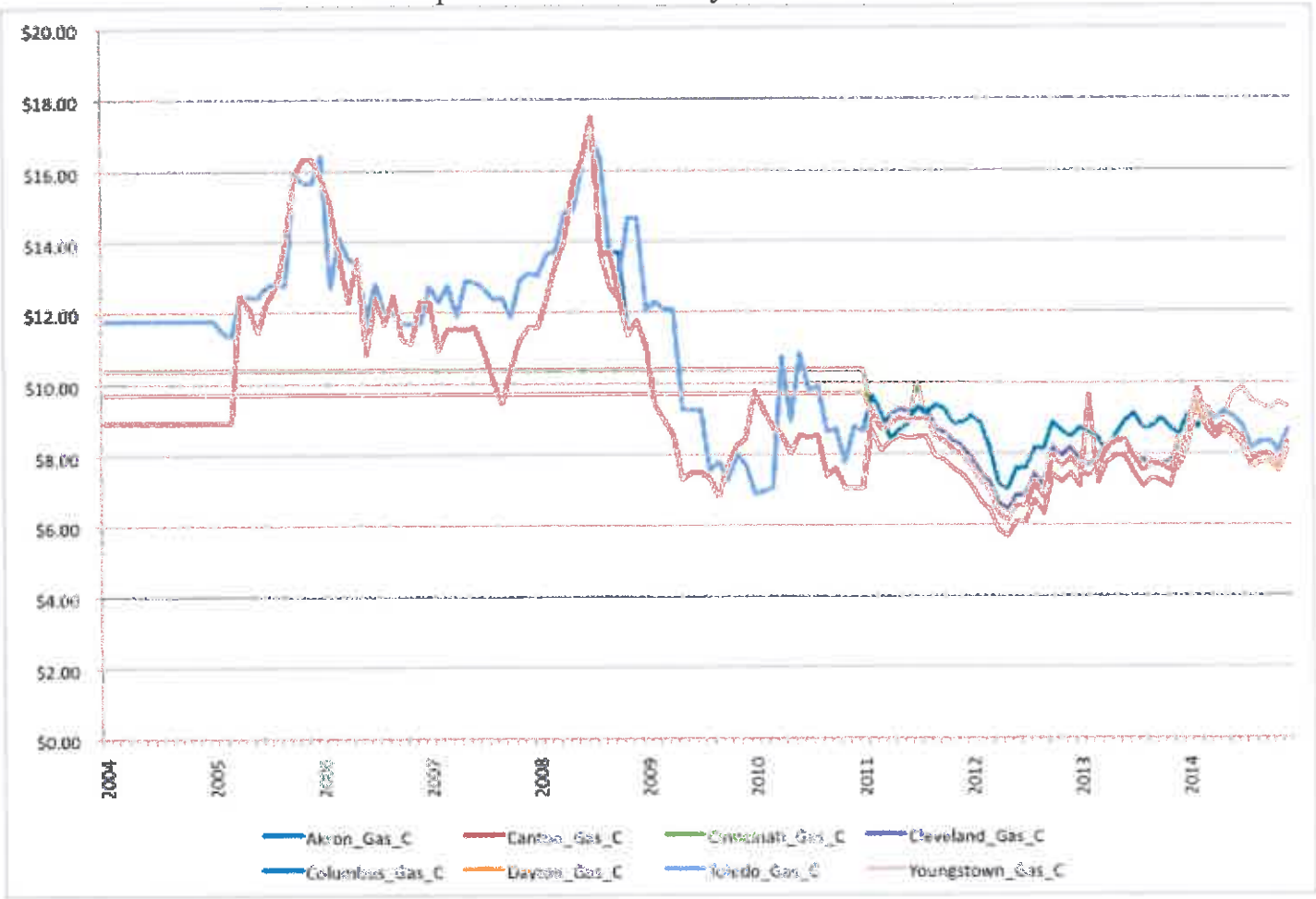
Figure 3

Inflation Adjusted Comparison of Industrial Utility Bills in 8 Major Ohio Cities per KWH Based on a Standard Service Offer of 6,000,000 KWH per Month and 20,000 KWH per Day from January 2004 to December 2014



Sources: See Figure 1

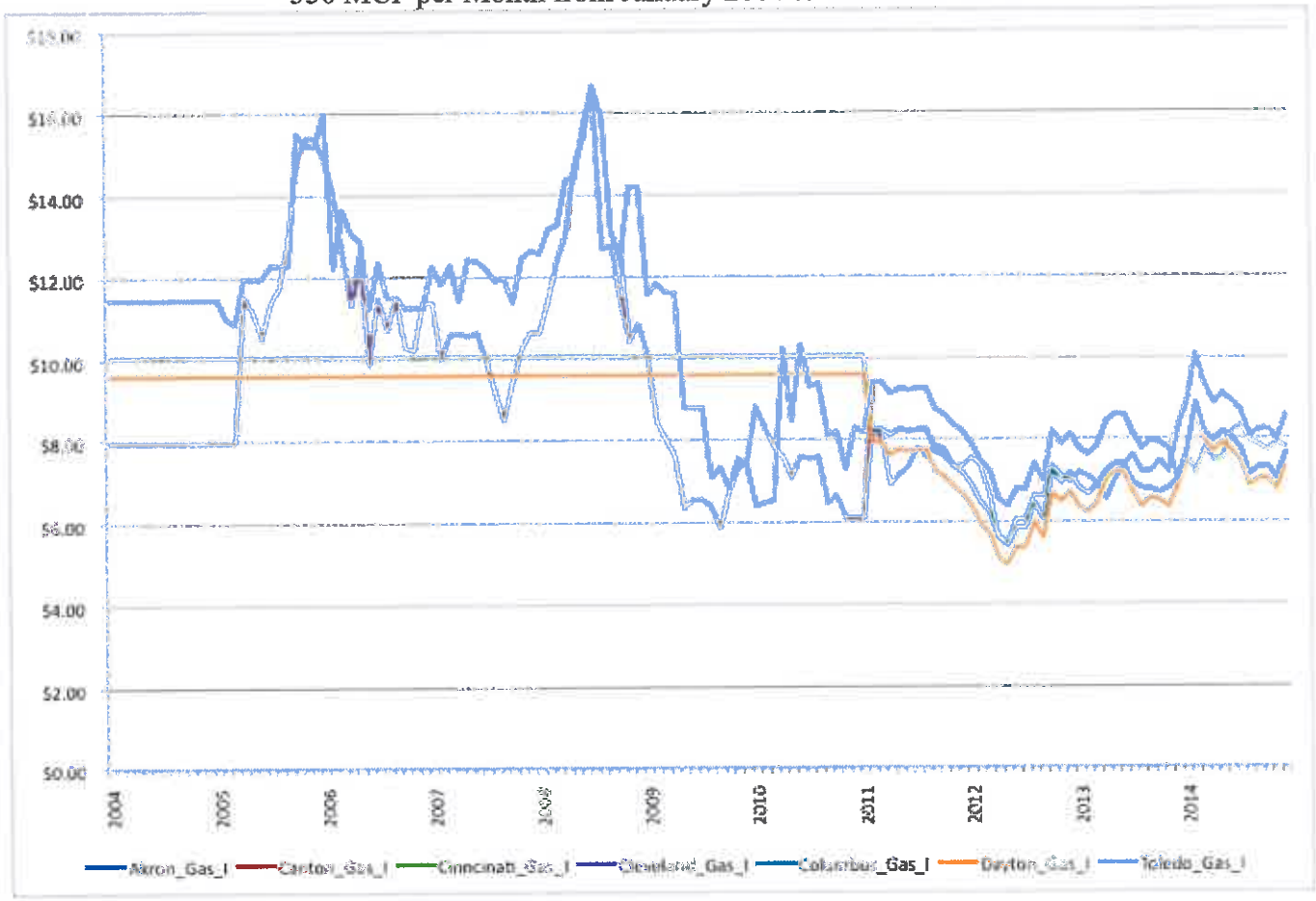
Figure 4
Comparison of Current Dollar Natural Gas Bills for Commercial Customers per MCF in 8 Ohio Cities with a Standard Service Offer on 46 MCF per Month from January 2004 to December 2014



Source: See Figure 1

Figure 5

Comparison of Current Dollar Natural Gas Bills of Industrial Customers per MCF in 8 Ohio Cities with a Standard Service Offer of 350 MCF per Month from January 2004 to December 2014



Source: See Figure 1

Table 1

Monthly Utility Rates Have Been Extremely Stable From 2004 to 2014. Variances Have Gotten Smaller

		Residential Electricity			Commercial Electricity			Industrial Electricity		
Years	Metropolitan Area	Standard Deviation	Average (Mean)	Coefficient of Variation	Standard Deviation	Average (Mean)	Coefficient of Variation	Standard Deviation	Average (Mean)	Coefficient of Variation
2004-2014	Akron	0.01	$0.14	0.10	0.02	$0.13	0.15	0.01	$0.10	0.14
	Canton	0.02	$0.12	0.16	0.02	$0.09	0.22	0.01	$0.08	0.17
	Cincinnati	0.01	$0.13	0.09	0.01	$0.11	0.09	0.01	$0.09	0.12
	Cleveland	0.02	$0.14	0.12	0.01	$0.13	0.09	0.02	$0.12	0.18
	Columbus	0.02	$0.14	0.12	0.01	$0.12	0.12	0.01	$0.07	0.12
	Dayton	0.01	$0.14	0.09	0.01	$0.10	0.10	0.01	$0.09	0.12
	Toledo	0.01	$0.14	0.09	0.02	$0.14	0.16	0.04	$0.13	0.32
	Youngstown	0.01	$0.14	0.10	0.02	$0.13	0.15	0.01	$0.10	0.14
Jan-04 to Dec-08	Akron	0.01	$0.15	0.08	0.01	$0.14	0.09	0.01	$0.11	0.09
	Canton	0.01	$0.10	0.06	0.00	$0.07	0.04	0.01	$0.07	0.08
	Cincinnati	0.01	$0.12	0.06	0.01	$0.11	0.05	0.01	$0.09	0.11
	Cleveland	0.02	$0.15	0.13	0.01	$0.14	0.07	0.01	$0.14	0.06
	Columbus	0.01	$0.12	0.05	0.01	$0.10	0.07	0.01	$0.07	0.08
	Dayton	0.01	$0.13	0.08	0.01	$0.10	0.05	0.00	$0.08	0.05
	Toledo	0.01	$0.15	0.09	0.02	$0.16	0.10	0.02	$0.17	0.09
	Youngstown	0.01	$0.15	0.08	0.01	$0.14	0.09	0.01	$0.11	0.09
Jan-09 to Dec-14	Akron	0.01	$0.13	0.07	0.01	$0.11	0.08	0.01	$0.09	0.10
	Canton	0.02	$0.13	0.14	0.02	$0.10	0.17	0.01	$0.09	0.13
	Cincinnati	0.01	$0.13	0.09	0.01	$0.11	0.10	0.01	$0.09	0.12
	Cleveland	0.01	$0.14	0.05	0.01	$0.13	0.08	0.01	$0.10	0.14
	Columbus	0.01	$0.15	0.10	0.01	$0.13	0.09	0.01	$0.08	0.09
	Dayton	0.01	$0.15	0.06	0.01	$0.11	0.08	0.01	$0.10	0.11
	Toledo	0.01	$0.14	0.06	0.01	$0.12	0.07	0.01	$0.09	0.13
	Youngstown	0.01	$0.13	0.07	0.01	$0.11	0.08	0.01	$0.09	0.10
Difference 04 to 08 and 09 to 14	Akron	0.00	-0.02	-0.01	0.00	-0.03	-0.01	0.00	-0.02	0.00
	Canton	0.01	0.03	0.08	0.01	0.03	0.12	0.01	0.02	0.05
	Cincinnati	0.00	0.01	0.03	0.01	0.01	0.05	0.00	0.00	0.02
	Cleveland	-0.01	-0.02	-0.08	0.00	-0.01	0.00	0.01	-0.04	0.08
	Columbus	0.01	0.02	0.05	0.00	0.02	0.02	0.00	0.01	0.01
	Dayton	0.00	0.02	-0.02	0.00	0.01	0.03	0.01	0.02	0.06
	Toledo	-0.01	-0.02	-0.04	-0.01	-0.04	-0.03	0.00	-0.08	0.04
	Youngstown	0.00	-0.02	-0.01	0.00	-0.03	-0.01	0.00	-0.02	0.00

Source: Calculated from Public Utilities Commission of Ohio, Ohio Utility Rate Survey, monthly.
http://www.puco.ohio.gov/puco/index.cfm/industry-information/statistical-reports/ohio-utility-rate-survey/#sthash.dL7uGQBs.dpbs

1 Real, inflation-adjusted, residential electricity prices have experienced 10-years of
2 secular decline with very modest price recovery beginning in mid-2009 (Figure 1)
3 across the state of Ohio. Since 2009, residential retail prices have gone up the most
4 in Canton and Akron regions, followed by Dayton, with the biggest real declines
5 occurring in the state's largest metropolitan areas. Because the data are for SSO
6 rates, it most likely overstates the rise in average monthly residential electric bills,
7 especially in Northeast Ohio. The downward trend in the cost of electricity to
8 commercial and industrial users is unmistakable in Figures 2 and 3, respectively.
9 Here, the Akron metropolitan area is the outlier with commercial bills increasing
10 from 2009 until they stabilized in late 2012 and Dayton's commercial users also saw
11 prices jump throughout 2009 before stabilizing. The other metropolitan areas
12 experienced consistent declines in commercial rates over the entire time period.
13 The industrial electricity market has converged over the decade. As the Figures
14 demonstrate, in 2004, there was a $0.12 per KWH spread in SSO rates in 2004 with
15 a high of nearly $0.20 per KWH in the Toledo region being the extreme outlier and
16 holding that position until 2009 when average SSO rates declined to the norm for the
17 state. Since 2012, the regional spread is about $0.03 per KWH.
18 The three Figures all show an overall pattern of decline in the cost of electricity
19 across the state's metropolitan areas with significant convergence in prices taking
20 place within each class for residential, commercial, and industrial customers
21 beginning in 2011. This is exactly the pattern an analyst expects to see in an
22 operating market. Nonetheless, if we review the statistics included in Table 1, we
23 can see what has occurred in terms of the spread and stability of rates across time.

Table 1 lists the standard deviation, mean, and CV by the eight metropolitan areas in the PUCO's data for each class of customers, residential, commercial, and industrial. The first block of rows provides this information for the full 10-year time period. The second block covers the first five-years, January 2004 to December 2008, and the third block covers the second five-year period, January 2009 to December 2014. Not only does the data break evenly into two five-year blocks, but early 2009 appears to be a break point in the data with a slight recovery in electric prices and an acceleration in the convergence in prices paid within each group of customers across the state's major metropolitan areas. In terms of electricity prices, early 2009 marked an important event—most likely associated with e recovery from the Great Recession. The second time period also marks the full realization of the benefits of deregulation of the electric generating markets.

The last block of rows in the table lists the differences between the values in the two time periods. The value for the 2004 to 2009 time period was subtracted from the value for the later period, 2009 to 2014. If the result is negative it means that the value from 2009 to 2014 is smaller than the previous time period. For example, the negative mean number for residential customers in Cleveland in this bottom block means that the average SSO residential electric bill dropped by $0.02 per KWH. Similarly, the negative mean for industrial customers shows that the average SSO industrial customer saw their electric bill drop by $0.08 a KWH.

The data in Table 1 reveal the following:

- Bills for industrial customers have converged. Mean bill rates were lower in the second time period than in the first and the standard deviations in most of

the regions are at 0.01; this is ± one cent per KWH. Deregulation is working for industrial operations.

- Commercial electricity users have also experienced lower bills in the second time period compared to the first in Akron, Cleveland, and Toledo. The largest increase was in Canton at $.03 per KWH. Spreads are narrow with the standard deviation being 0.01 in most of the metros in second time period, with the exception of Canton.
- Residential ratepayers experienced average monthly bills decrease in Akron, Cleveland, Toledo, and Youngstown. Canton had a mean increase of $0.03 per KWH, Columbus and Dayton increased by $0.02 per KWH, and Cincinnati increased by $0.01 per KWH.
- The distributions of monthly billing rates for all three groups of customers were very narrow across both time periods, but were generally smaller form 2009 to 2014. Again, deregulation appears to be working. Prices have become less volatile.

The data presented in this section show that the Signatory Parties to the Stipulated ESP IV resulting from the Third Supplemental Stipulation got it wrong on this count. Electricity prices haves become more stable and predictable as deregulation progressed. Reregulation cannot narrow the spreads further, except by increasing costs across the board.

(2) CONSUMER EMPOWERMENT AND RETAIL COMPETITION

1 The Third Supp. Stipulation and supporting testimony asserts that the
2 Stipulated ESP IV will empower customers and enhance retail competition.[24]
3 This is an assertion that was made in previous iterations of the Prior
4 Stipulations and supporting testimony and it suffers from the same logical and
5 factual shortcomings as it did in the earlier versions. Consumers can never be
6 empowered and retail competition can never be enhanced when regulatory
7 powers are being used to increase the base price of the product and when
8 regulation takes away the consumer's ability to choose a supplier. There is no
9 amount of technology or information that can repeal partial price-fixing.
10 Rider RRS is explicitly designed to socialize the losses from the three power
11 plants under the PPA. The losses experienced by the Companies when they
12 purchase power from the generating plants and then sell it into the grid at a
13 lower price through PJM will be spread across to all ratepayers in the
14 Companies' service territories (unless the ratepayer obtains an exemption from
15 the PUCO), even if the residential consumer or business purchases their power
16 from another supplier. This *de facto* tax imposed by regulation to support the
17 Companies' affiliates uneconomic power plants neither empowers customers
18 nor enhances retail competition. All that it does is increase the cost of electricity
19 and lower the incentive to shop for lower electric prices and choose a
20 competitive supplier. Rider RRS is a cross-subsidy.

[24] Id.

1 Any benefits that may be derived from deployment of smart meters included in
2 the Third Supp. Stipulation[25] cannot offset the losses that will be derived from
3 empowering a monopoly in the generating market.
4
5 **(3) ECONOMIC DEVELOPMENT AND JOB RETENTION[26]**
6 **Q. Does the Stipulated ESP IV constitute a major economic and job development**
7 **investment or set of policies?[27]**
8 **A.** As a package, the Stipulated ESP IV resulting from the Third Supp. Stipulation does
9 not constitute a major economic and job development investment or set of policies.
10 There is a mixture in what the proposed Stipulated ESP IV purports to do to support
11 economic development activities within the Companies' footprint. The Companies
12 are an active supporter of the economic development profession and take a leadership
13 position in regional economic development activities. And the cooperative reputation
14 of the Companies' economic development group is well known. Of course, the
15 Companies do benefit from attracting and expanding the number of electricity users
16 in their service territories. The Companies agree to spend $3 million "in shareholders
17 dollars" in each of the eight 12-month cycles covered by the agreement on energy
18 conservation, and economic and job development programs in the Third Supp.
19 Stipulation.[28]

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[25] Third Supp. Stipulation at 3, 9-10.
[26] Mikkelsen Fifth Supplemental Testimony at 9-10; Third Supp. Stipulation at 3, 6.
[27] Id.
[28] See Mikkelsen Fifth Supplemental Testimony at 6. The Companies also drape their actions to keep its uneconomic power plants open as economic development spending. See comments that I previously made on the Prior Stipulations, which explain the analytical inadequacies of the analysis performed on that count. See Hill Supplemental Testimony at 10-13 (May 11, 2015) (OMAEG Ex. 18).

1 When considered in its totality, the Stipulated ESP IV cannot be seriously considered
2 to be a source of economic development stimulus because its ultimate goal is to raise
3 electricity prices within the Companies' service territories as a way of making its
4 three loss-making power plants profitable. When the price of a major factor of
5 production increases operating costs will rise, with the increase in operating costs
6 comes pressure to increase product prices, and when product prices increase relative
7 to competitors' prices profits shrink, pressure to hold back wages increases, and jobs
8 are lost. All other parts of the Stipulated ESP IV are window dressing. The primary
9 goal of the Companies is to provide enough gain to the various members of its
10 redistributive coalition to obtain approval of the affiliate PPA and Rider RRS.
11
12 **Q. Do the provisions of the joint stipulation improve the competitive standing of the**
13 **state of Ohio in terms of private sector operating costs?**
14 **A.** No. Despite the benefits derived in the marketplace from decreases in real electricity
15 rates to commercial and industrial customers, Ohio's rates remain above those
16 available in competitor states. Table 2 provides data from the U.S. Energy
17 Information Agency on the competitive position of Ohio in the aggregate compared to
18 states in the upper Midwest that we compete with—Illinois, Indiana, Kentucky,
19 Michigan, New York, Pennsylvania, and West Virginia, and in the Southeast and
20 Middle South—Alabama, Georgia, North Carolina, South Carolina, and Tennessee.
21 Table 2 has data on the average retail price of electricity in these selected states as of
22 2013. Ohio is ranked 23rd in the nation with an average price of $0.125 cents per
23 KWH, which corresponds with the data in Table 1. Kentucky, Indiana, and West

1 Virginia are all have lower rates. Many of the Southeastern industrial states that Ohio
2 competes with regularly also have lower rates—Alabama, Georgia, North Carolina,
3 and Tennessee. I am using retail rates as a proxy for commercial and industrial rates,
4 assuming that they are highly correlated. If so, this is no time to be raising rates and
5 discouraging new investment through regulatory fiat.
6 Ohio is the 9th largest electricity generating state in the nation while we are the 7th
7 largest in terms of the amount of total energy used by our industrial sector, the 6th
8 largest user of energy in the commercial sector, and 7th largest in terms of total energy
9 use in the residential sector. Ohio is not a state that can be autarkic in terms of
10 energy.[29] We are a huge producer of energy, but we important energy as well.
11 Increasing self-reliance in energy requires a commitment on the part of the private
12 sector to develop the natural gas resources of the Appalachian Basin. This will
13 require encouraging investment by new entrants in gas fired power plants, which this
14 agreement along with the parallel joint stipulation being considered simultaneously
15 by the Commission.
16

[29]See Table 2 and Appendix Table 1.

Table 2

Electricity Data for Ohio and Its Competitor States

State	Net Electricity Generation Sept.2015			Total Carbon Dioxide Emissions 2013			Average Retail Price Residential Electricity Sept. 2015			Total Energy Consumed per Capita, 2013		Total Energy Expenditures per Capita, 2013		Per Capita Energy Expenditure per Million Btu, 2013		State
	National Rank	thousand MWh	Percent of U.S.	National Rank	million metric tons	Percent of U.S.	National Rank	cents/kWh	State:US Average	National Rank	million Btu	National Rank	Dollars	National Rank	Ratio Dollars: million Btu	
Ohio	**9**	**11,033**	**3.1%**	**5**	**229**	**4.3%**	**23**	**12.55**	**1.0**	**23**	**324**	**28**	**4,334**	**23**	**13.38**	**OH**
Regional competitors																
Illinois	5	15,882	4.5%	4	230	4.4%	21	12.68	1.0	25	311	39	3,824	10	12.30	IL
Indiana	14	8,384	2.4%	7	200	3.8%	40	11.40	0.9	9	441	16	5,079	4	11.52	IN
Kentucky	20	6,724	1.9%	11	137	2.6%	47	10.36	0.8	11	414	15	5,097	11	12.31	KY
Michigan	13	9,044	2.6%	9	160	3.0%	13	14.56	1.1	32	287	36	4,107	34	14.31	MI
New York	7	12,005	3.4%	9	160	3.0%	6	18.44	1.4	50	184	51	3,350	44	18.21	NY
Pennsylvania	4	18,054	5.1%	3	244	4.6%	14	14.31	1.1	28	297	32	4,230	31	14.24	PA
West Virginia	23	6,013	1.7%	22	93	1.8%	44	10.79	0.8	14	398	19	4,794	7	12.05	WV
Southeastern competitors																
Alabama	6	12,993	3.7%	15	120	2.3%	26	12.31	0.9	13	400	18	4,997	12	12.49	AL
Georgia	10	10,663	3.0%	12	133	2.5%	30	12.10	0.9	34	280	37	4,004	33	14.30	GA
North Carolina	11	10,157	2.9%	14	122	2.3%	31	11.91	0.9	38	256	42	3,790	36	14.80	NC
South Carolina	15	8,220	2.3%	28	69	1.3%	19	12.76	1.0	19	333	23	4,553	26	13.67	SC
Tennessee	22	6,169	1.8%	20	97	1.8%	48	10.33	0.8	21	329	24	4,452	25	13.53	TN

Note: All state ranks are from High (1) to Low (51)

Source: U.S. Energy Information Agency, retrieved December 29, 2015, various tables.

1 **Q. Can economic development discounts and incentives provide benefits to all**
2 **ratepayers?**
3 A. If structured properly, yes. Economic development incentives can help companies
4 lower production costs, control or provide increased certainty over their operating
5 costs, speed the opening of a plant, and influence the design of plant and equipment.
6 Economic development incentives can be used to bring fallow land into use and they
7 can be used to provide a trained workforce. In other words, a public benefit should be
8 identifiable and the incentive should pass the "but for" test—but for the incentive the
9 operation would not have opened.
10 Incentives may be appropriate for economic development reasons, but the incentives
11 need to be uniformly applied and available to all similarly situated customers. The
12 criteria for qualifying for the incentives and discounts should not be so narrowly
13 tailored that they are discriminatory or only apply to one or a few companies.
14 Economic development incentives also should be restricted to companies that
15 primarily sell goods and services to out-of-state customers or have their goods and
16 services bundled into these exported goods and services. These firms are considered
17 to be part of the economic base of the state.
18 The selection of the recipients of narrowly defined economic development incentives
19 should not be made by a private company that is in a position to provide one of its
20 customers with a competitive advantage over another company in its service territory.
21 This is especially true if there is a *quid-pro-quo* as is the case in the proceeding
22 currently pending before the Commission. Most importantly, the state of Ohio should

1 not be delegating its economic development strategy and authority to a privately
2 owned electric utility.
3 What is presented in the stipulations is not a set of economic development incentives.
4 Instead, the incentives are targeted price reductions and discounts that are being
5 offered by the Companies through the regulatory process to only those customers or
6 groups that have been invited to join the exclusive club formed by the Companies,
7 and the costs of such discounts and incentives are being largely passed on to the
8 broad pool of ratepayers in the Companies' service territories who were not invited to
9 join the club formed by FirstEnergy. Typically, in operating competitive markets, the
10 decision to offer a discount is up to the provider and that provider and its stockholders
11 absorb the discount in expectation of other gains, such as increases sales volumes tied
12 to efficiencies of scale or using slack production capacity, or to prevent the loss of the
13 customer. The cost of these discounts is typically not passed onto other customers
14 unless the provider has some form of market power. In competitive markets cost
15 shifting does not take place to customers in a defined geographic area using the
16 regulatory powers of the state.
17 While incentives may reduce the expenses and provide associated benefits to the
18 Signatory or Non-opposing Parties that are receiving the incentive, such discounting
19 becomes problematic when the cost of the incentive is then passed on to other
20 customers or other classes of customers rather than being financially absorbed by the
21 company.
22 The value of incentives should not be shifted to other customers or established in a
23 manner that is tailored to discriminate among competitors. Economists consider such

1 cost shifting to be a form of cross-subsidization where parties that lack market power
2 are paying for incentives offered to parties that have market power. Such cross-
3 subsidies are inherently market distorting.

4 **Q. Can the Joint Stipulation negatively affect interstate commerce and investment**
5 **in Ohio's electric generating infrastructure?**

6 **A.** The Energy Information Agency's profile of the state of Ohio shows that our state of
7 Ohio is the 9th largest generator of electricity in the nation, accounting for 3.1% of all
8 net electricity generated in 2012.[30] Additionally, other states that are members of PJM
9 or touch Ohio's borders are also major sources of electricity production: Pennsylvania
10 is 4th, Illinois 5th, New York 7th, Michigan 13th, Indiana 14th, New Jersey 19th,
11 Kentucky 20th, and West Virginia is 23rd. Ohio's power plants can disrupt new
12 investment in generating capacity across the grid if there is assurance that they have
13 financial guarantees that will prevent them from exiting the market. Due to the nature
14 of the grid, a PPA in Ohio will affect decisions to investment in generating capacity
15 across PJM's grid.

16 The impact will be greater if there is capacity that cannot clear PJM's auctions, as is
17 currently the case. A likely interstate outcome from the broad adoption of PPAs
18 across Ohio is that other states will adopt them in much the same way that Ohio is
19 following West Virginia's example. Political pressure will build to protect generating
20 assets that cannot clear the PJM market due to the way the PPAs will influence the
21 dynamics of the interstate power market. Ohio's demand will be tied through the
22 PPAs to Ohio's plants, meaning that demand for out-of-state production capacity will

[30] See Appendix Table 2

1 drop. This will result in less efficient Ohio plants staying in the market while
2 unsubsidized, more efficient, out-of-state generating will be forced to exit.
3 The federal interest in this dynamic can grow if the PPAs deter investment in new
4 capacity and the reliability of the entire grid weakens and if the new capacity would
5 result in lowering levels of carbon emissions across the grid. This is when Ohio's
6 political-economic problem in supporting non-competitive generating plants becomes
7 a national problem of pollution nonattainment and a barrier to interstate commerce.
8
9 **Q. Do the benefits proffered in the other areas, a business plan for transmission**
10 **grid modernization, investments to begin modernizing of the distribution system,**
11 **and a mixture of alternative energy and carbon reduction actions offset the**
12 **weaknesses that the affiliate PPA generate?**
13 A. While these offerings are desirable, they add more cost, business risk
14 continues to be shifted from the business to ratepayers and the benefits from
15 competition in the generating market will be lost.

Appendix Table 1

Energy Consumption Estimates by End-Use Sector, Ranked by State Total Consumption, 2013

Rank	Residential Sector		Commercial Sector		Industrial Sector [a]		Transportation Sector		Total Consumption [a]	
	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu
1	Texas	1,685.9	Texas	1,609.9	Texas	6,574.8	Texas	3,073.5	Texas	12,944.1
2	California	1,480.0	California	1,483.8	Louisiana	2,562.0	California	2,907.8	California	7,684.1
3	Florida	1,168.3	New York	1,134.2	California	1,812.4	Florida	1,466.0	Florida	4,077.9
4	New York	1,072.1	Florida	968.2	Indiana	1,325.5	New York	1,042.8	Illinois	4,011.5
5	Illinois	1,011.9	Illinois	804.4	Pennsylvania	1,318.2	Illinois	950.4	Louisiana	3,835.0
6	Pennsylvania	930.0	**Ohio**	**694.9**	Illinois	1,244.7	**Ohio**	**920.3**	Pennsylvania	3,795.0
7	**Ohio**	**914.3**	Pennsylvania	630.8	**Ohio**	**1,216.0**	Pennsylvania	916.0	**Ohio**	**3,745.4**
8	Michigan	773.6	Virginia	612.1	Alabama	846.5	New Jersey	847.1	New York	3,625.3
9	North Carolina	692.1	Michigan	600.7	Georgia	753.3	Georgia	823.2	Indiana	2,900.0
10	Georgia	688.1	New Jersey	600.7	Iowa	747.3	Virginia	733.4	Michigan	2,843.2
11	Virginia	626.6	North Carolina	555.8	Michigan	735.8	Michigan	733.1	Georgia	2,795.4
12	New Jersey	599.4	Georgia	530.8	Kentucky	712.9	North Carolina	720.5	North Carolina	2,524.1
13	Indiana	569.6	Tennessee	428.0	Minnesota	636.3	Louisiana	660.2	Virginia	2,410.7
14	Missouri	538.3	Maryland	424.6	Oklahoma	587.8	Indiana	620.0	New Jersey	2,314.5
15	Tennessee	531.9	Missouri	411.2	Tennessee	579.8	Tennessee	596.2	Tennessee	2,135.9
16	Washington	494.9	Indiana	385.0	Wisconsin	577.6	Washington	593.0	Washington	2,039.3
17	Massachusetts	452.6	Washington	382.8	Washington	568.6	Missouri	542.3	Alabama	1,931.4
18	Wisconsin	445.1	Wisconsin	369.1	North Carolina	555.7	Alabama	469.5	Minnesota	1,859.8
19	Maryland	431.5	Minnesota	358.0	South Carolina	527.4	Arizona	459.8	Missouri	1,857.0
20	Minnesota	417.3	Arizona	346.2	Florida	475.4	Massachusetts	456.2	Kentucky	1,822.7
21	Arizona	398.1	Massachusetts	290.9	Virginia	438.6	Oklahoma	453.9	Wisconsin	1,804.0
22	Kentucky	385.2	Colorado	285.6	Kansas	429.5	South Carolina	452.9	Oklahoma	1,622.8
23	Colorado	367.1	Kentucky	284.4	Colorado	417.0	Minnesota	448.2	South Carolina	1,591.4
24	Alabama	358.5	Louisiana	269.1	Mississippi	402.2	Kentucky	440.2	Iowa	1,516.5
25	South Carolina	351.6	South Carolina	259.5	Arkansas	398.8	Maryland	430.9	Colorado	1,471.8
26	Louisiana	343.6	Oklahoma	258.1	New York	376.3	Wisconsin	412.2	Massachusetts	1,442.6
27	Oklahoma	323.0	Alabama	256.8	Nebraska	372.5	Colorado	402.2	Arizona	1,414.8
28	Oregon	258.1	Iowa	215.7	Missouri	365.2	Mississippi	368.1	Maryland	1,403.8
29	Iowa	253.7	Kansas	210.1	Alaska	324.3	Oregon	301.3	Kansas	1,163.1
30	Connecticut	249.1	Oregon	190.9	Wyoming	309.2	Iowa	299.7	Mississippi	1,141.8
31	Arkansas	241.3	Connecticut	189.2	North Dakota	290.1	Kansas	287.3	Arkansas	1,093.0
32	Kansas	236.1	Arkansas	176.6	West Virginia	281.2	Arkansas	276.3	Oregon	996.7
33	Mississippi	211.2	Utah	163.5	New Jersey	267.3	Utah	250.0	Nebraska	871.8
34	Utah	175.3	Mississippi	160.3	Oregon	246.4	Connecticut	228.0	Utah	830.6
35	West Virginia	174.1	Nebraska	140.4	Massachusetts	242.8	Nevada	207.6	Connecticut	748.1
36	Nebraska	163.8	New Mexico	125.8	Utah	241.8	New Mexico	201.5	West Virginia	737.8
37	Nevada	162.1	Nevada	121.3	New Mexico	237.4	Nebraska	195.1	New Mexico	688.5
38	Idaho	127.3	West Virginia	112.3	Arizona	210.7	Alaska	172.8	Nevada	657.1
39	New Mexico	123.9	DC	111.3	Idaho	179.6	West Virginia	170.2	Alaska	609.0
40	New Hampshire	92.8	Idaho	88.1	Nevada	166.1	Hawaii	141.2	North Dakota	588.6
41	Maine	85.6	North Dakota	85.4	South Dakota	156.3	North Dakota	139.6	Wyoming	535.5
42	Montana	85.2	Montana	76.9	Maine	134.6	Idaho	134.6	Idaho	529.5
43	South Dakota	73.5	New Hampshire	70.4	Montana	121.0	Maine	128.0	Maine	407.1
44	North Dakota	73.4	South Dakota	65.2	Maryland	116.8	Montana	118.1	Montana	401.2
45	Rhode Island	66.2	Wyoming	63.1	Delaware	90.5	Wyoming	114.0	South Dakota	390.4
46	Delaware	65.4	Alaska	63.0	Connecticut	81.9	New Hampshire	99.4	New Hampshire	302.8
47	Wyoming	49.2	Maine	58.9	Hawaii	61.2	South Dakota	95.4	Hawaii	277.1
48	Alaska	48.9	Delaware	56.6	New Hampshire	40.1	Delaware	62.0	Delaware	274.5
49	Vermont	42.7	Rhode Island	49.0	Rhode Island	20.0	Rhode Island	58.3	Rhode Island	193.6
50	DC	37.0	Hawaii	39.0	Vermont	15.8	Vermont	49.2	DC	170.9
51	Hawaii	35.7	Vermont	26.0	DC	2.9	DC	19.8	Vermont	133.6
	United States	21,182.0	United States	17,894.3	United States	31,378.9	United States	26,689.4	United States	97,144.7

[a] Estimates for the United States include -17.4 trillion Btu of net imports of coal coke that is not allocated to the states.

Source: U.S. Energy Information Administration - EIA - Independent Statistics and Analysis

Table C10. Energy Consumption Estimates by End-Use Sector, Ranked by State, 2013

Retrieved from: https://www.eia.gov/state/seds/data.cfm?incfile=/state/seds/sep_sum/html/rank_use.html&sid=US

Retrieved on December 29, 2015

Appendix Table 2

Electricity and Energy Data by State

	Net Electricity Generation Sept.2015			Total Carbon Dioxide Emissions 2013			Average Retail Price Residential Electricity Sept. 2015			Total Energy Consumed per Capita, 2013		Total Energy Expenditures per Capita, 2013		Per Capita Energy Expenditure per Million Btu, 2013		
State	Rank	thousand MWh	Percent of U.S.	Rank	million metric tons	Percent of U.S.	Rank	cents/kWh	State:US Average	Rank	million Btu	Rank	Dollars	Rank	Ratio Dollars: million Btu	State
AK	49	450	0.1%	39	36	0.7%	3	20.61	1.6	3	826	2	9,596	5	11.62	AK
AL	6	12,993	3.7%	15	120	2.3%	26	12.31	0.9	13	400	18	4,997	12	12.49	AL
AR	27	4,822	1.4%	29	68	1.3%	46	10.52	0.8	17	369	20	4,732	14	12.82	AR
AZ	8	11,269	3.2%	21	94	1.8%	20	12.74	1.0	44	213	48	3,434	39	16.12	AZ
CA	3	19,164	5.5%	2	353	6.7%	7	18.38	1.4	48	200	47	3,563	43	17.82	CA
CO	30	4,445	1.3%	23	91	1.7%	24	12.43	1.0	35	279	44	3,737	24	13.39	CO
CT	36	3,160	0.9%	41	34	0.6%	4	19.23	1.5	46	208	31	4,260	49	20.48	CT
DC	51	0	0.0%	51	3	0.1%	22	12.65	1.0	36	263	49	3,378	15	12.84	DC
DE	47	785	0.2%	48	13	0.2%	16	13.65	1.0	28	297	33	4,165	30	14.02	DE
FL	2	21,039	6.0%	6	218	4.1%	33	11.81	0.9	46	208	50	3,375	40	16.23	FL
GA	10	10,663	3.0%	12	133	2.5%	30	12.1	0.9	34	280	37	4,004	33	14.30	GA
HI	46	879	0.3%	43	18	0.3%	1	28.52	2.2	49	197	11	5,350	51	27.16	HI
IA	29	4,657	1.3%	25	80	1.5%	28	12.26	0.9	5	490	7	5,583	3	11.39	IA
ID	43	1,182	0.3%	44	17	0.3%	49	10.08	0.8	22	328	29	4,317	19	13.16	ID
IL	5	15,882	4.5%	4	230	4.4%	21	12.68	1.0	25	311	39	3,824	10	12.30	IL
IN	14	8,384	2.4%	7	200	3.8%	40	11.4	0.9	9	441	16	5,079	4	11.52	IN
KS	31	4,202	1.2%	26	73	1.4%	28	12.26	0.9	12	402	13	5,267	18	13.10	KS
KY	20	6,724	1.9%	11	137	2.6%	47	10.36	0.8	11	414	15	5,097	11	12.31	KY
LA	12	9,440	2.7%	8	195	3.7%	50	9.61	0.7	2	828	4	8,545	2	10.32	LA
MA	37	2,998	0.9%	32	65	1.2%	5	18.83	1.4	43	215	34	4,149	46	19.30	MA
MD	39	2,946	0.8%	34	58	1.1%	15	14.1	1.1	40	236	38	3,868	41	16.39	MD
ME	45	893	0.3%	45	16	0.3%	11	15.6	1.2	27	306	6	5,606	45	18.32	ME
MI	13	9,044	2.6%	9	160	3.0%	13	14.56	1.1	32	287	36	4,107	34	14.31	MI
MN	26	4,849	1.4%	24	89	1.7%	17	12.86	1.0	18	343	22	4,554	21	13.28	MN
MO	18	7,154	2.0%	13	131	2.5%	37	11.46	0.9	26	307	25	4,421	35	14.40	MO
MS	25	5,228	1.5%	33	60	1.1%	42	11.07	0.8	16	382	12	5,268	28	13.79	MS
MT	41	2,301	0.7%	42	32	0.6%	38	11.43	0.9	15	395	10	5,452	29	13.80	MT
NC	11	10,157	2.9%	14	122	2.3%	31	11.91	0.9	38	256	42	3,790	36	14.80	NC
ND	38	2,957	0.8%	35	57	1.1%	41	11.11	0.9	4	813	1	####	16	12.96	ND
NE	35	3,416	1.0%	37	53	1.0%	27	12.29	0.9	7	466	9	5,508	6	11.82	NE
NH	42	1,628	0.5%	47	14	0.3%	9	17.25	1.3	42	229	21	4,600	47	20.09	NH
NJ	19	7,008	2.0%	16	105	2.0%	10	15.99	1.2	37	260	26	4,404	42	16.94	NJ
NM	40	2,683	0.8%	36	54	1.0%	18	12.78	1.0	20	330	27	4,387	22	13.29	NM
NV	34	3,610	1.0%	39	36	0.7%	25	12.39	0.9	41	235	46	3,646	38	15.51	NV
NY	7	12,005	3.4%	9	160	3.0%	6	18.44	1.4	50	184	51	3,350	44	18.21	NY
OH	**9**	**11,033**	**3.1%**	**5**	**229**	**4.3%**	**23**	**12.55**	**1.0**	**23**	**324**	**28**	**4,334**	**23**	**13.38**	**OH**
OK	21	6,274	1.8%	17	103	2.0%	45	10.57	0.8	10	421	17	5,073	8	12.05	OK
OR	28	4,739	1.4%	38	38	0.7%	43	10.88	0.8	39	254	43	3,788	37	14.91	OR
PA	4	18,054	5.1%	3	244	4.6%	14	14.31	1.1	28	297	32	4,230	31	14.24	PA
RI	48	495	0.1%	49	10	0.2%	2	21.61	1.7	50	184	45	3,715	48	20.19	RI
SC	15	8,220	2.3%	28	69	1.3%	19	12.76	1.0	19	333	23	4,553	26	13.67	SC
SD	44	920	0.3%	46	15	0.3%	34	11.8	0.9	8	462	8	5,569	9	12.05	SD
TN	22	6,169	1.8%	20	97	1.8%	48	10.33	0.8	21	329	24	4,452	25	13.53	TN
TX	1	41,300	11.8%	1	641	12.1%	35	11.65	0.9	6	488	5	6,114	13	12.53	TX
UT	33	3,685	1.0%	31	66	1.3%	39	11.42	0.9	33	286	41	3,791	20	13.26	UT
VA	17	7,361	2.1%	17	103	2.0%	32	11.85	0.9	31	291	35	4,145	32	14.24	VA
VT	50	125	0.0%	50	6	0.1%	8	17.27	1.3	44	213	14	5,196	50	24.39	VT
WA	16	7,966	2.3%	26	73	1.4%	51	9.36	0.7	30	292	40	3,801	17	13.02	WA
WI	24	5,772	1.6%	19	100	1.9%	12	14.82	1.1	24	314	30	4,304	27	13.71	WI
WV	23	6,013	1.7%	22	93	1.8%	44	10.79	0.8	14	398	19	4,794	7	12.05	WV
WY	32	3,835	1.1%	29	68	1.3%	36	11.49	0.9	1	918	3	9,358	1	10.19	WY
US		350,978	100.0%		5,280	100.0%		13.06	1.0							

1 **Q. Do the provisions of the Stipulated ESP IV resulting from the Third Supp.**
2 **Stipulation improve the competitive standing of the state of Ohio in terms of private**
3 **sector operating costs and economic development as stated in the Stipulated ESP IV**
4 **and supporting testimony?**[31]
5 **A.** No. Despite the benefits derived in the marketplace from decreases in real electricity
6 rates to commercial and industrial customers, Ohio's rates remain above those available
7 in competitor states. Table 2 below provides data from the U.S. Energy Information
8 Agency on the competitive position of Ohio in the aggregate compared to states in the
9 upper Midwest that we compete with—Illinois, Indiana, Kentucky, Michigan, New York,
10 Pennsylvania, and West Virginia, and in the Southeast and Middle South—Alabama,
11 Georgia, North Carolina, South Carolina, and Tennessee.
12
13 Table 2 includes data on the average retail price of electricity in these selected states as of
14 2013. Ohio is ranked 23rd in the nation with an average price of $0.125 cents per KWH,
15 which corresponds with the data in Table 1. Kentucky, Indiana, and West Virginia all
16 have lower rates. Many of the Southeastern industrial states that Ohio competes with
17 regularly also have lower rates—Alabama, Georgia, North Carolina, and Tennessee. I am
18 using retail rates as a proxy for commercial and industrial rates, assuming that they are
19 highly correlated. If so, this is no time to be raising rates and discouraging new
20 investment through regulatory fiat.
21 Ohio is the 9th largest electricity generating state in the nation while we are the 7th largest
22 in terms of the amount of total energy used by our industrial sector, the 6th largest user of

[31] Mikkelsen Fifth Supplemental Testimony at 9-10; Third Supp. Stipulation at 3, 6.

1 energy in the commercial sector, and 7th largest in terms of total energy use in the

2 residential sector. Ohio is not a state that can be autarkic in terms of energy.[32] We are a

3 huge producer of energy, but we import energy as well. Increasing self-reliance in energy

4 requires a commitment on the part of the private sector to develop the natural gas

5 resources of the Appalachian Basin. This will require encouraging investment by new

6 entrants in gas fired power plants, which the Stipulated ESP IV does not.

7

[32]See Table 2 and Appendix Table 1 (attached hereto as Attachment EWH-1).

Table 2
Electricity Data for Ohio and Its Competitor States

	Net Electricity Generation Sept.2015			Total Carbon Dioxide Emissions 2013			Average Retail Price Residential Electricity Sept. 2015			Total Energy Consumed per Capita, 2013		Total Energy Expenditures per Capita, 2013		Per Capita Energy Expenditure per Million Btu, 2013		
State	National Rank	thousand MWh	Percent of U.S.	National Rank	million metric tons	Percent of U.S.	National Rank	cents/kWh	State:US Average	National Rank	million Btu	National Rank	Dollars	National Rank	Ratio Dollars: million Btu	State
Ohio	**9**	**11,033**	**3.1%**	**5**	**229**	**4.3%**	**23**	**12.55**	**1.0**	**23**	**324**	**28**	**4,334**	**23**	**13.38**	**OH**
Regional competitors																
Illinois	5	15,882	4.5%	4	230	4.4%	21	12.68	1.0	25	311	39	3,824	10	12.30	IL
Indiana	14	8,384	2.4%	7	200	3.8%	40	11.40	0.9	9	441	16	5,079	4	11.52	IN
Kentucky	20	6,724	1.9%	11	137	2.6%	47	10.36	0.8	11	414	15	5,097	11	12.31	KY
Michigan	13	9,044	2.6%	9	160	3.0%	13	14.56	1.1	32	287	36	4,107	34	14.31	MI
New York	7	12,005	3.4%	9	160	3.0%	6	18.44	1.4	50	184	51	3,350	44	18.21	NY
Pennsylvania	4	18,054	5.1%	3	244	4.6%	14	14.31	1.1	28	297	32	4,230	31	14.24	PA
West Virginia	23	6,013	1.7%	22	93	1.8%	44	10.79	0.8	14	398	19	4,794	7	12.05	WV
Southeastern competitors																
Alabama	6	12,993	3.7%	15	120	2.3%	26	12.31	0.9	13	400	18	4,997	12	12.49	AL
Georgia	10	10,663	3.0%	12	133	2.5%	30	12.10	0.9	34	280	37	4,004	33	14.30	GA
North Carolina	11	10,157	2.9%	14	122	2.3%	31	11.91	0.9	38	256	42	3,790	36	14.80	NC
South Carolina	15	8,220	2.3%	28	69	1.3%	19	12.76	1.0	19	333	23	4,553	26	13.67	SC
Tennessee	22	6,169	1.8%	20	97	1.8%	48	10.33	0.8	21	329	24	4,452	25	13.53	TN

Note: All state ranks are from High (1) to Low (51)

Source: U.S. Energy Information Agency, retrieved December 29, 2015, various tables.

1 **Q. Can economic development discounts and incentives provide benefits to all**
2 **ratepayers?**
3 A. If structured properly, yes. As I have explained previously, economic development
4 incentives can help companies lower production costs, control or provide increased
5 certainty over their operating costs, speed the opening of a plant, and influence the
6 design of plant and equipment[33]. Economic development incentives can be used to
7 bring fallow land into use and they can be used to provide a trained workforce. In
8 other words, a public benefit should be identifiable and the incentive should pass the
9 "but for" test—but for the incentive the operation would not have opened.
10 Incentives may be appropriate for economic development reasons, but the incentives
11 need to be uniformly applied and available to all similarly situated customers. The
12 criteria for qualifying for the incentives and discounts should not be so narrowly
13 tailored that they are discriminatory or only apply to one or a few companies.
14 Economic development incentives also should be restricted to companies that
15 primarily sell goods and services to out-of-state customers or have their goods and
16 services bundled into these exported goods and services. These firms are considered
17 to be part of the economic base of the state.
18 The selection of the recipients of narrowly defined economic development incentives
19 should not be made by a private company (e.g., the Companies) that is in a position to
20 provide one of its customers with a competitive advantage over another company in
21 its service territory. This is especially true if there is a *quid-pro-quo* as is the case in
22 the proceeding currently pending before the Commission. Most importantly, the state

[33] See OMAEG Ex. 19 at 10-11.

1 of Ohio should not be delegating its economic development strategy and authority to
2 a privately owned electric utility.
3 What is presented in the Stipulated ESP IV is not a set of economic development
4 incentives. Instead, the incentives are targeted price reductions and discounts that are
5 being offered by the Companies through the regulatory process to only those
6 customers or groups that have been invited to join the exclusive club formed by the
7 Companies, and the costs of such discounts and incentives are being largely passed on
8 to the broad pool of ratepayers in the Companies' service territories who were not
9 invited to join the club formed by the Companies. While incentives may reduce the
10 expenses and provide associated benefits to the Signatory Parties that are receiving
11 the incentive, such discounting becomes problematic when the cost of the incentive is
12 then passed on to other customers or other classes of customers rather than being
13 financially absorbed by the company.

14 **Q. Can the Stipulated ESP IV negatively affect interstate commerce and investment**
15 **in Ohio's electric generating infrastructure?**

16 **A.** The Energy Information Agency's profile of the state of Ohio shows that our state of
17 Ohio is the 9th largest generator of electricity in the nation, accounting for 3.1% of all
18 net electricity generated in 2012.[34] Additionally, other states that are members of PJM
19 or touch Ohio's borders are also major sources of electricity production:
20 Pennsylvania is 4th, Illinois 5th, New York 7th, Michigan 13th, Indiana 14th, New
21 Jersey 19th, Kentucky 20th, and West Virginia is 23rd. Ohio's power plants can disrupt
22 new investment in generating capacity across the grid if there is assurance that they

[34] See Appendix Table 2 (attached hereto as Attachment EWH-2).

1 have financial guarantees that will prevent them from exiting the market. Due to the
2 nature of the grid, a PPA in Ohio will affect decisions to investment in generating
3 capacity across PJM's grid.
4 The impact will be greater if there is capacity that cannot clear PJM's auctions, as is
5 currently the case. A likely interstate outcome from the broad adoption of PPAs
6 across Ohio is that other states will adopt them in much the same way that Ohio is
7 following West Virginia's example. Political pressure will build to protect generating
8 assets that cannot clear the PJM market due to the way the PPAs will influence the
9 dynamics of the interstate power market. Ohio's demand will be tied through the
10 PPAs to Ohio's plants, meaning that demand for out-of-state production capacity will
11 drop. This will result in less efficient Ohio plants staying in the market while
12 unsubsidized, more efficient, out-of-state generating will be forced to exit.
13 The federal interest in this dynamic can grow if the PPAs deter investment in new
14 capacity and the reliability of the entire grid weakens and if the new capacity would
15 result in lowering levels of carbon emissions across the grid. This is when Ohio's
16 political-economic problem in supporting non-competitive generating plants becomes
17 a national problem of pollution nonattainment and a barrier to interstate commerce.

18 **Q. Do the benefits proffered in the other areas, a business plan for transmission**
19 **grid modernization, investments to begin modernizing of the distribution system,**
20 **and a mixture of alternative energy and carbon reduction actions offset the**
21 **weaknesses that the affiliate PPA generate?**

1 A. While some of these offerings may be desirable, they add more cost, risk continues
2 to be shifted from the Companies to ratepayers and the benefits from competition in
3 the generating market will be lost.

4 **Q. Does this conclude your testimony?**

5 A. Yes.

6

7

CERTIFICATE OF SERVICE

I hereby certify that a true and accurate copy of the foregoing was served upon the following parties via electronic mail on December 30, 2015.

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AppendixTable 1
Energy Consumption By End Use Sector Ranked by State Total Consumption: 2013

	Residential Sector		Commercial Sector		Industrial Sector *		Transportation Sector		Total Consumption *	
Rank	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu
1	Texas	1,685.9	Texas	1,609.9	Texas	6,574.8	Texas	3,073.5	Texas	12,944.1
2	California	1,480.0	California	1,483.8	Louisiana	2,562.0	California	2,907.8	California	7,684.1
3	Florida	1,168.3	New York	1,134.2	California	1,812.4	Florida	1,466.0	Florida	4,077.9
4	New York	1,072.1	Florida	968.2	Indiana	1,325.5	New York	1,042.8	Illinois	4,011.5
5	Illinois	1,011.9	Illinois	804.4	Pennsylvania	1,318.2	Illinois	950.4	Louisiana	3,835.0
6	Pennsylvania	930.0	Ohio	694.9	Illinois	1,244.7	Ohio	920.3	Pennsylvania	3,795.0
7	Ohio	914.3	Pennsylvania	630.8	Ohio	1,216.0	Pennsylvania	916.0	Ohio	3,745.4
8	Michigan	773.6	Virginia	612.1	Alabama	846.5	New Jersey	847.1	New York	3,625.3
9	North Carolina	692.1	Michigan	600.7	Georgia	753.3	Georgia	823.2	Indiana	2,900.0
10	Georgia	688.1	New Jersey	600.7	Iowa	747.3	Virginia	733.4	Michigan	2,843.2
11	Virginia	626.6	North Carolina	555.8	Michigan	735.8	Michigan	733.1	Georgia	2,795.4
12	New Jersey	599.4	Georgia	530.8	Kentucky	712.9	North Carolina	720.5	North Carolina	2,524.1
13	Indiana	569.6	Tennessee	428.0	Minnesota	636.3	Louisiana	660.2	Virginia	2,410.7
14	Missouri	538.3	Maryland	424.6	Oklahoma	587.8	Indiana	620.0	New Jersey	2,314.5
15	Tennessee	531.9	Missouri	411.2	Tennessee	579.8	Tennessee	596.2	Tennessee	2,135.9
16	Washington	494.9	Indiana	385.0	Wisconsin	577.6	Washington	593.0	Washington	2,039.3
17	Massachusetts	452.6	Washington	382.8	Washington	568.6	Missouri	542.3	Alabama	1,931.4
18	Wisconsin	445.1	Wisconsin	369.1	North Carolina	555.7	Alabama	469.5	Minnesota	1,859.8
19	Maryland	431.5	Minnesota	358.0	South Carolina	527.4	Arizona	459.8	Missouri	1,857.0
20	Minnesota	417.3	Arizona	346.2	Florida	475.4	Massachusetts	456.2	Kentucky	1,822.7
21	Arizona	398.1	Massachusetts	290.9	Virginia	438.6	Oklahoma	453.9	Wisconsin	1,804.0
22	Kentucky	385.2	Colorado	285.6	Kansas	429.5	South Carolina	452.9	Oklahoma	1,622.8
23	Colorado	367.1	Kentucky	284.4	Colorado	417.0	Minnesota	448.2	South Carolina	1,591.4
24	Alabama	358.5	Louisiana	269.1	Mississippi	402.2	Kentucky	440.2	Iowa	1,516.5
25	South Carolina	351.6	South Carolina	259.5	Arkansas	398.8	Maryland	430.9	Colorado	1,471.8
26	Louisiana	343.6	Oklahoma	258.1	New York	376.3	Wisconsin	412.2	Massachusetts	1,442.6
27	Oklahoma	323.0	Alabama	256.8	Nebraska	372.5	Colorado	402.2	Arizona	1,414.8
28	Oregon	258.1	Iowa	215.7	Missouri	365.2	Mississippi	368.1	Maryland	1,403.8
29	Iowa	253.7	Kansas	210.1	Alaska	324.3	Oregon	301.3	Kansas	1,163.1
30	Connecticut	249.1	Oregon	190.9	Wyoming	309.2	Iowa	299.7	Mississippi	1,141.8
31	Arkansas	241.3	Connecticut	189.2	North Dakota	290.1	Kansas	287.3	Arkansas	1,093.0
32	Kansas	236.1	Arkansas	176.6	West Virginia	281.2	Arkansas	276.3	Oregon	996.7
33	Mississippi	211.2	Utah	163.5	New Jersey	267.3	Utah	250.0	Nebraska	871.8
34	Utah	175.3	Mississippi	160.3	Oregon	246.4	Connecticut	228.0	Utah	830.6
35	West Virginia	174.1	Nebraska	140.4	Massachusetts	242.8	Nevada	207.6	Connecticut	748.1
36	Nebraska	163.8	New Mexico	125.8	Utah	241.8	New Mexico	201.5	West Virginia	737.8
37	Nevada	162.1	Nevada	121.3	New Mexico	237.4	Nebraska	195.1	New Mexico	688.5
38	Idaho	127.3	West Virginia	112.3	Arizona	210.7	Alaska	172.8	Nevada	657.1
39	New Mexico	123.9	DC	111.3	Idaho	179.6	West Virginia	170.2	Alaska	609.0
40	New Hampshire	92.8	Idaho	88.1	Nevada	166.1	Hawaii	141.2	North Dakota	588.6
41	Maine	85.6	North Dakota	85.4	South Dakota	156.3	North Dakota	139.6	Wyoming	535.5
42	Montana	85.2	Montana	76.9	Maine	134.6	Idaho	134.6	Idaho	529.5
43	South Dakota	73.5	New Hampshire	70.4	Montana	121.0	Maine	128.0	Maine	407.1
44	North Dakota	73.4	South Dakota	65.2	Maryland	116.8	Montana	118.1	Montana	401.2
45	Rhode Island	66.2	Wyoming	63.1	Delaware	90.5	Wyoming	114.0	South Dakota	390.4
46	Delaware	65.4	Alaska	63.0	Connecticut	81.9	New Hampshire	99.4	New Hampshire	302.8
47	Wyoming	49.2	Maine	58.9	Hawaii	61.2	South Dakota	95.4	Hawaii	277.1
48	Alaska	48.9	Delaware	56.6	New Hampshire	40.1	Delaware	62.0	Delaware	274.5
49	Vermont	42.7	Rhode Island	49.0	Rhode Island	20.0	Rhode Island	58.3	Rhode Island	193.6
50	DC	37.0	Hawaii	39.0	Vermont	15.8	Vermont	49.2	DC	170.9
51	Hawaii	35.7	Vermont	26.0	DC	2.9	DC	19.8	Vermont	133.6
	United States	21,182.0	United States	17,894.3	United States	31,378.9	United States	26,689.4	United States	97,144.7

* Estimates for the United States include -17.4 trillion Btu of net imports of coal coke that is not allocated to the states.

Source: U.S. Energy Information Administration - EIA - Independent Statistics and Analysis

Table C10. Energy Consumption Estimates by End-Use Sector, Ranked by State, 2013

Retrieved from: https://www.eia.gov/state/seds/data.cfm?incfile=/state/seds/sep_sum/html/rank_use.html&sid=US

Retrieved on December 29, 2015

Appendix Table 2
Electricity and Energy Data by State

	Net Electricity Generation Sept.2015			Total Carbon Dioxide Emissions 2013			Average Retail Price Residential Electricity Sept. 2015			Total Energy Consumed per Capita, 2013		Total Energy Expenditures per Capita, 2013		Per Capita Energy Expenditure per Million Btu, 2013		
State	Rank	thousand MWh	Percent of U.S.	Rank	million metric tons	Percent of U.S.	Rank	cents/kWh	State:US Average	Rank	million Btu	Rank	Dollars	Rank	Ratio Dollars: million Btu	State
AK	49	450	0.1%	39	36	0.7%	3	20.61	1.6	3	826	2	9,596	5	11.62	AK
AL	6	12,993	3.7%	15	120	2.3%	26	12.31	0.9	13	400	18	4,997	12	12.49	AL
AR	27	4,822	1.4%	29	68	1.3%	46	10.52	0.8	17	369	20	4,732	14	12.82	AR
AZ	8	11,269	3.2%	21	94	1.8%	20	12.74	1.0	44	213	48	3,434	39	16.12	AZ
CA	3	19,164	5.5%	2	353	6.7%	7	18.38	1.4	48	200	47	3,563	43	17.82	CA
CO	30	4,445	1.3%	23	91	1.7%	24	12.43	1.0	35	279	44	3,737	24	13.39	CO
CT	36	3,160	0.9%	41	34	0.6%	4	19.23	1.5	46	208	31	4,260	49	20.48	CT
DC	51	0	0.0%	51	3	0.1%	22	12.65	1.0	36	263	49	3,378	15	12.84	DC
DE	47	785	0.2%	48	13	0.2%	16	13.65	1.0	28	297	33	4,165	30	14.02	DE
FL	2	21,039	6.0%	6	218	4.1%	33	11.81	0.9	46	208	50	3,375	40	16.23	FL
GA	10	10,663	3.0%	12	133	2.5%	30	12.1	0.9	34	280	37	4,004	33	14.30	GA
HI	46	879	0.3%	43	18	0.3%	1	28.52	2.2	49	197	11	5,350	51	27.16	HI
IA	29	4,657	1.3%	25	80	1.5%	28	12.26	0.9	5	490	7	5,583	3	11.39	IA
ID	43	1,182	0.3%	44	17	0.3%	49	10.08	0.8	22	328	29	4,317	19	13.16	ID
IL	5	15,882	4.5%	4	230	4.4%	21	12.68	1.0	25	311	39	3,824	10	12.30	IL
IN	14	8,384	2.4%	7	200	3.8%	40	11.4	0.9	9	441	16	5,079	4	11.52	IN
KS	31	4,202	1.2%	26	73	1.4%	28	12.26	0.9	12	402	13	5,267	18	13.10	KS
KY	20	6,724	1.9%	11	137	2.6%	47	10.36	0.8	11	414	15	5,097	11	12.31	KY
LA	12	9,440	2.7%	8	195	3.7%	50	9.61	0.7	2	828	4	8,545	2	10.32	LA
MA	37	2,998	0.9%	32	65	1.2%	5	18.83	1.4	43	215	34	4,149	46	19.30	MA
MD	39	2,946	0.8%	34	58	1.1%	15	14.1	1.1	40	236	38	3,868	41	16.39	MD
ME	45	893	0.3%	45	16	0.3%	11	15.6	1.2	27	306	6	5,606	45	18.32	ME
MI	13	9,044	2.6%	9	160	3.0%	13	14.56	1.1	32	287	36	4,107	34	14.31	MI
MN	26	4,849	1.4%	24	89	1.7%	17	12.86	1.0	18	343	22	4,554	21	13.28	MN
MO	18	7,154	2.0%	13	131	2.5%	37	11.46	0.9	26	307	25	4,421	35	14.40	MO
MS	25	5,228	1.5%	33	60	1.1%	42	11.07	0.8	16	382	12	5,268	28	13.79	MS
MT	41	2,301	0.7%	42	32	0.6%	38	11.43	0.9	15	395	10	5,452	29	13.80	MT
NC	11	10,157	2.9%	14	122	2.3%	31	11.91	0.9	38	256	42	3,790	36	14.80	NC
ND	38	2,957	0.8%	35	57	1.1%	41	11.11	0.9	4	813	1	####	16	12.96	ND
NE	35	3,416	1.0%	37	53	1.0%	27	12.29	0.9	7	466	9	5,508	6	11.82	NE
NH	42	1,628	0.5%	47	14	0.3%	9	17.25	1.3	42	229	21	4,600	47	20.09	NH
NJ	19	7,008	2.0%	16	105	2.0%	10	15.99	1.2	37	260	26	4,404	42	16.94	NJ
NM	40	2,683	0.8%	36	54	1.0%	18	12.78	1.0	20	330	27	4,387	22	13.29	NM
NV	34	3,610	1.0%	39	36	0.7%	25	12.39	0.9	41	235	46	3,646	38	15.51	NV
NY	7	12,005	3.4%	9	160	3.0%	6	18.44	1.4	50	184	51	3,350	44	18.21	NY
OH	9	11,033	3.1%	5	229	4.3%	23	12.55	1.0	23	324	28	4,334	23	13.38	OH
OK	21	6,274	1.8%	17	103	2.0%	45	10.57	0.8	10	421	17	5,073	8	12.05	OK
OR	28	4,739	1.4%	38	38	0.7%	43	10.88	0.8	39	254	43	3,788	37	14.91	OR
PA	4	18,054	5.1%	3	244	4.6%	14	14.31	1.1	28	297	32	4,230	31	14.24	PA
RI	48	495	0.1%	49	10	0.2%	2	21.61	1.7	50	184	45	3,715	48	20.19	RI
SC	15	8,220	2.3%	28	69	1.3%	19	12.76	1.0	19	333	23	4,553	26	13.67	SC
SD	44	920	0.3%	46	15	0.3%	34	11.8	0.9	8	462	8	5,569	9	12.05	SD
TN	22	6,169	1.8%	20	97	1.8%	48	10.33	0.8	21	329	24	4,452	25	13.53	TN
TX	1	41,300	11.8%	1	641	12.1%	35	11.65	0.9	6	488	5	6,114	13	12.53	TX
UT	33	3,685	1.0%	31	66	1.3%	39	11.42	0.9	33	286	41	3,791	20	13.26	UT
VA	17	7,361	2.1%	17	103	2.0%	32	11.85	0.9	31	291	35	4,145	32	14.24	VA
VT	50	125	0.0%	50	6	0.1%	8	17.27	1.3	44	213	14	5,196	50	24.39	VT
WA	16	7,966	2.3%	26	73	1.4%	51	9.36	0.7	30	292	40	3,801	17	13.02	WA
WI	24	5,772	1.6%	19	100	1.9%	12	14.82	1.1	24	314	30	4,304	27	13.71	WI
WV	23	6,013	1.7%	22	93	1.8%	44	10.79	0.8	14	398	19	4,794	7	12.05	WV
WY	32	3,835	1.1%	29	68	1.3%	36	11.49	0.9	1	918	3	9,358	1	10.19	WY
US		350,978	100.0%		5,280	100.0%		13.06	1.0							

Source: https://www.eia.gov/state/rankings/#/series/51

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Summary: Temporary Authority Third Supplemental Testimony Of Edward W. Hill On Behalf Of The Ohio Manufacturers' Association Energy Group electronically filed by Mrs. Kimberly W. Bojko on behalf of OMA Energy Group